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TWENTY-FIFTH ANNUAL REPORT

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COMMISSIONER OF LABOR

1910

INDUSTRIAL EDUCATION

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LETTERS OF TRANSMITTAL.

DEPARTMENT OF COMMERCE AND LABOR,
OFFICE OF THE SECRETARY,
Washington, September 14, 1911.

I have the honor to transmit herewith the Twenty-fifth Annual Report of the Commissioner of Labor, entitled "Industrial Education in the United States."

Respectfully,

BENJ. S. CABLE,
Acting Secretary.

The SENATE AND HOUSE OF REPRESENTATIVES.

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF LABOR,
Washington, September 14, 1911.

SIR: I have the honor to transmit herewith the Twenty-fifth Annual Report of the Commissioner of Labor, entitled "Industrial Education in the United States."

The Eighth Annual Report, issued in 1892, and the Seventeenth Annual Report, issued in 1902, both dealt with this subject, but during the last few years there has been such a marked growth of interest in industrial education and such a call for information as to the present status of this branch of education in the United States that the Bureau undertook this present study in response to an insistent demand.

The purpose of the study, the results of which are embodied in this report, was not to go into any theoretical discussion of the subject of industrial education, but rather to bring together the comprehensive data respecting the various systems of industrial education in this country and to analyze and present the information in such way as to be of the most use to those interested in furthering the development of this important branch of education.

The work has been carried on and the report prepared under the supervision of Mr. Charles H. Winslow and Mr. Jesse C. Bowen of the Bureau of Labor.

I am, very respectfully,

CHAS. P. NEILL,
Commissioner.

To Hon. CHARLES NAGEL,
Secretary of Commerce and Labor.

CHAPTER I.

INTRODUCTION.

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INTRODUCTION.

INTRODUCTORY.

In 1892 and again in 1902 the Bureau of Labor published the results of investigations into manual, industrial, and technical education in the United States and abroad. In the eight years since the second of these reports was issued, public interest in the subject of industrial education has so increased that an investigation into its present status seemed desirable.

This increased interest has manifested itself in the widespread and growing demand that the schools shall be more closely related to the future work of the children. Manual training, which was the first departure from exclusively academic studies, has not lost favor, but there is an increasing sentiment that along with the cultural studies of the public schools should go training preparatory to the work the pupils are going to do after they graduate or leave, and that in addition there should be opportunities for trade instruction for those who, on account of age, previous acquirements, lack of time, or other causes, can not take or do not desire general studies. Public high schools, business schools, colleges, and universities offer numerous opportunities through which those who desire to fit themselves for business or professional life may secure a complete and well-rounded training, but for those who wish to take up a trade or a handicraft, opportunities for an equivalent training are much harder to find. The old apprenticeship system has practically died out and the present system of subdivision and specialization in industry confines the beginner to one machine or one operation and gives him no chance to learn the trade as a whole. Consequently the ranks of unskilled and low-grade labor are overcrowded, industry suffers for want of skilled workmen, and the individual worker finds his life narrow and monotonous, his work a mere round of drudgery instead of a means of self-expression. Out of this situation has grown the demand for a system of education which shall meet the needs of workers of the industrial classes at least as thoroughly as the established system meets those of the professional and commercial classes.

The wide extent and the rapid growth of this interest in industrial education are indicated by the fact that since the second of the reports above referred to was published in 1902, in seven States, Connecticut,

Maine, Maryland, Massachusetts, Michigan, New Jersey, and Wisconsin, special commissions have been appointed for the study of industrial education with a view to its introduction either wholly or partly at public expense. The National Association of Manufacturers and the American Federation of Labor have made investigations and issued public reports upon the subject. Two national associations for the promotion of industrial education have been formed. Eight States have made special legislative provision for the maintenance of public industrial training, and in many places where no such provision has been made some training of the kind has been established as part of the public-school system. More significant still, vocational guidance is being introduced widely as a means of turning the attention of both parents and children to the need of preparation for the child's future work, and thus increasing the number who seek industrial training.

In view of this general interest in the subject, it was decided to confine the present investigation strictly to industrial education, using the term as meaning training for the mechanical trades and other manual occupations. Industrial education, thus defined, differs from manual training in that the latter is designed primarily for cultural purposes, while the main purpose of the former is to give the student a thorough, practical knowledge of some trade or handicraft. Technical education differs from both in that it is designed to fit students for supervisory, professional, or semiprofessional vocations.

The data for this report were gathered mainly by special agents of the Bureau of Labor on a schedule of inquiries. The information was collected during the latter half of the year 1910 and relates to conditions at that time. The work was considerably handicapped, owing to the fact that much of the field work had to be done during the summer vacation period while the schools were not in session, thus preventing the agents of the bureau from seeing the schools in actual operation and from interviewing many of the teachers. The data, however, were, except in a few instances, secured by personal interviews of the agents with the school authorities. A very few schedules were secured by correspondence.

DEFINITIONS OF TYPES OF INDUSTRIAL SCHOOLS.

The schools offering industrial training are of several different types, so that a few definitions seem essential before entering upon a discussion of their work. There has been much variation and no little confusion in the use of terms, but the following definitions are now rather generally agreed upon:

Vocational schools in one sense include commercial, technical, agricultural, and professional, as well as industrial schools. In the use of the term as applied to a phase of industrial education, however, a

vocational school is one which (*a*) prepares for a manual occupation which is not classed as a trade, or (*b*) gives training in some line of manual work for the purpose of directing the pupil toward a trade or other manual occupation rather than as a part of direct and intensive preparation for immediate entry into such trade or occupation.

Industrial schools are schools giving training for the mechanical trades or other manual occupations. According to whether they prepare pupils for entrance into practical work either as learners, apprentices, or journeymen, or give supplemental trade instruction to those already in a manual occupation, such schools may be described as follows:

Trade preparatory schools are schools that teach the elements of trades (including practice and some theory) and prepare a pupil to enter a trade school or an apprenticeship, or to become a learner in a trade.

Trade schools are schools that teach trades as nearly as possible in their entirety, i. e., the processes and practices as well as the scientific and mathematical principles upon which these processes are based, the course being designed to take the place of an apprenticeship.

Continuation schools are schools conducted to give instruction (mostly in the evening) in trades or vocations to those already employed in such trades or vocations. The instruction consists of either supplemental practice in the trades, related subjects of study, or both.

Apprenticeship schools are schools conducted by employing establishments for the instruction of their apprentices in the processes and practices and related theory of their respective trades.

Cooperative schools are schools operated for the instruction of apprentices and other employees under a cooperative agreement between the school and employing establishments, the establishments permitting or requiring the employees to attend.

Manual training, now very generally adopted in cities and large towns, in its inception laid the foundation for a broader curriculum in the secondary school; but it did not aim to be, and its founders did not claim that it should be, vocational, i. e., it did not purport to equip the pupil for any particular manual occupation as a means of livelihood. However, in the very recent past serious efforts have been made in a few instances to change the purpose of these schools in the later years of their courses, giving them during this period a definite industrial rather than a cultural or scientific bent. In these attempts to articulate industrial education with manual training in manual training schools the uncertainty as to the aim or purpose of these undertakings has often been reflected in the administration of the schools in question. It is therefore difficult to classify these schools, as the organization of their trade instruction has not been standardized.

SCHOOLS AND INSTITUTIONS INCLUDED IN REPORT.

In carrying out the investigation, some difficulty was experienced in deciding what schools to admit and what to exclude. As yet the lines of demarcation between manual, industrial, and technical training are by no means sharply drawn. Each has its own field, but each shades into the other two. The intention was to include only institutions which aim to give such training as is specifically applicable to manual vocations. In carrying out this purpose it was found necessary to include some so-called manual training and technical schools, because in certain cases their work, in whole or in part, consists of training for manual occupations. In such cases only the department, division, or classes giving industrial training have been discussed, the other work of the institution having been disregarded.

No attempt has been made to take a complete census of the trade, vocational, and apprenticeship schools of the country. Nearly all such schools, however, have been canvassed and it is believed that full information is here presented concerning representative institutions of each class, showing how they have been established and giving their courses and their methods of instruction.

The investigation does not cover commercial schools, manual training schools, technical schools, or agricultural schools. The name of the school, however, does not always indicate the character of its work. Several so-called manual training and technical schools appear in this report because their work or a part of their work consists of training for manual occupations.

A great number of schools throughout the country are doing industrial education work to a limited extent only. Many evening drawing schools, for instance, are to a minor degree teaching what may be construed as theory of trades, that is, drawing, and some of the classes in these evening drawing schools may include journeymen, apprentices, and helpers of different trades and also persons who have not yet chosen an occupation. All the various manual training activities of schools likewise constitute a minor factor in industrial education. Some colleges, too, in their general cultural courses require a certain amount of industrial training; so also do the agricultural schools and colleges of the country, in most if not all of which there is at least some mechanical training required in connection with an agricultural course. Arts and crafts schools may likewise be considered as giving some industrial training. It was regarded as impracticable to attempt a study of all such schools.

The report does not include the schools throughout the country giving or purporting to give trade training, which are primarily commercial enterprises, organized and maintained for the profit of the proprietors. The chief fields for these schools have been horology,

jewelry, watchmaking, engraving and repairing, electricians, operating electricians, steam and gas engineering, engineering, millinery, dressmaking, barbering, hair dressing and manicuring, linotype work, mechanical trades, photography and photo-engraving. These schools usually have day sessions and provide actual trade work for their pupils. No time is given to purely cultural work, and intensive methods are used. In most cases there is no prescribed length of course; it varies with the skill, ability, and previous preparation of the pupil.

CLASSIFICATION OF SCHOOLS INCLUDED IN REPORT.

The classification for presentation in this report of the schools studied involves certain difficulties. Naturally schools maintained especially for the benefit of certain classes would be grouped together and so would those possessing such common peculiarities of support or purpose as would strongly affect their attitude or methods. Thus, industrial schools for girls, simply because they are for girls, have to face certain difficulties and meet certain demands which influence their work so largely that they may properly be classed together, regardless of time of session or method of support. Evening schools, because of the time of holding their sessions and of certain points of general similarity in purpose and method; Negro schools, because of the special needs of the race they serve; and correspondence schools, because of their method of instruction, show certain strongly marked characteristics which of themselves point out their classification. When all the schools dealing with special classes or having distinctive peculiarities of method or management are separated out, the remaining schools of wider scope and more general purpose are so much affected by the source from which their support is derived that they naturally fall into two groups, philanthropic industrial schools and public industrial schools, the latter again being subdivided according as they form part of the local public school system or a State system.

Theoretically such a classification is simple enough, but it is rendered difficult by the fact that a given school may possess two or even more strongly influential characteristics—as, for example, in the case of an industrial school for Negro girls there might be question whether the race or the sex of the special class concerned is more effective in determining the methods and general attitude of the school. Subdivisions under each class might have been adopted, girls' schools, for instance, being divided into schools for whites, for Negroes, for Indians, etc., but this would have involved either much repetition or the dispersal of material which should go together. In such cases the school has been grouped according to what seemed its dominant characteristic and appears with the group whose general

activities it best illustrates. For instance, the Armstrong Manual Training School of Washington, D. C., although restricted to Negroes, is included with schools supported by public funds, because while it is both a public and a Negro school, it is a better illustration of the specialized work of the public school system than of the work of schools devoted to a special race. Such cases are not numerous, but wherever they occur the effort has been made to class the school with the group of which its work is most typical.

Since the philanthropic and public industrial schools are more numerous, more widely distributed, and more illustrative of the general principles of industrial education than are the more specialized schools, institutions of these two general classes are first presented in the following report. Schools designed for some special class or marked by some characteristic feature of method, purpose, or source of support are then considered, followed by chapters devoted to such general aspects of the movement for industrial education as the creation and work of State commissions, the attitude of public bodies, legislation upon the subject, etc.

PHILANTHROPIC INDUSTRIAL SCHOOLS.

These schools, as the name indicates, have been founded by private benevolence. They differ widely in methods and management, but generally agree in trying to give a chance in life to those who, without some help, would be obliged to become or to remain unskilled workers. Naturally they are apt to be located in or near industrial centers, where the demand for skilled workers and the potential supply are alike large. Being independent units, philanthropic schools can adopt or alter courses of study more easily than can the public schools, and hence they have shown a quicker response to the growing demand for trade training. Some schools have been founded expressly to meet this demand, while others which had been established to give technical and scientific education added trade courses or departments for industrial training. In general these schools aim to give trade instruction in a practical way without demanding much study of other subjects, but some of them include also purely cultural studies in their industrial courses.

PUBLIC INDUSTRIAL SCHOOLS.

The public schools lagged behind philanthropic and private institutions in adding industrial training to their courses, but recently there has been a marked increase of activity in this direction. Ordinarily the beginnings have been made in the evening schools, then classes have been established in day schools or industrial courses added in manual training schools, and finally separate industrial schools

provided. Within the last few years the growing sentiment in favor of trade and vocational training has cut short this process, and in 1909–10 a considerable number of public industrial schools were established. Many of these are as yet in the experimental stage.

In general, systems of public industrial education aim to give systematic and thorough training in which a proper groundwork of acquaintance with the theory and underlying principles of a trade shall be correlated with practice work under conditions as nearly resembling those of the shop as possible. To furnish this, they provide schools ranging in type from the elementary school, designed not so much to fit a pupil to enter a given trade as to enable him to judge whether he likes it and is suited to it, up to the secondary school, giving specific and thorough trade instruction.

Broadly speaking, there are two classes of public industrial schools, those maintained as a part of the regular public school system of a given city, and those organized under a special State law, subject wholly or in part to State control. Four States have the latter system. Of these Connecticut maintains two schools wholly at the cost and under the control of the State; Massachusetts pays half the cost of maintaining any public industrial school established with the approval of the State commission on industrial education; New Jersey contributes half the annual cost of any such school between the limits of $3,000 and $7,000; while New York contributes annually certain sums based on the length of the school session and the number of teachers employed. Elsewhere such schools are maintained by local taxation.

In the two Connecticut industrial schools under State control which have been established by the State board of education, at Bridgeport and at New Britain, free instruction in trade work is offered to persons above 14 years of age.

In Massachusetts there are 20 "independent" industrial schools in existence at the present time in various localities. Some are day schools, offering courses for beginners in trade work, while others are open only in the evening and are intended primarily to assist day workers to a more thorough understanding of their vocations. In each case before State aid is obtained the location, course of study, and method of instruction must be approved by the State board of education. Three independent incorporated textile schools have also been established.

In New Jersey three institutions receive State support under the act passed in 1881 for the encouragement of industrial education, but only one of them falls within the scope of this investigation. These schools are governed by boards of trustees appointed by the governor of the State, and their courses of study are supervised by the State board of education.

Under the New York system three kinds of schools have been established. Two of these classes, i. e., the general industrial schools and the trade schools, are strictly industrial schools. The third class are schools for agriculture, mechanic arts, and home making with the mechanic arts as incidental to agriculture and home making. General supervision over all these schools is exercised by the division of trade schools of the State department of education. An enrollment of at least 25 pupils is necessary in order to obtain State aid. So far 11 schools have been established.

Public industrial schools are found most numerously in the north and east—that is, in the older manufacturing sections, where the worker's chance of getting ahead without definite training and preparation is smallest and where the need of skilled workmen is most felt. They are by no means confined to this section, however. The trades taught and the methods used naturally vary according to the dominant industries of each locality.

APPRENTICESHIP SCHOOLS.

These schools are a decidedly recent development, for although one or two, notably that conducted by R. Hoe & Co., were established a generation ago, very few go further back than the beginning of the present century, and the majority have come into existence since 1905. They are an attempt on the part of manufacturers to provide a substitute for the old-time apprenticeship, which has been practically driven out by the modern emphasis on specialization and subdivision of work. Under modern conditions few or no shops offered the beginner a chance to learn more than one small part of a trade, and in consequence within the last decade manufacturers quite generally have found their operations hampered by a lack of all-round skilled workmen able to do high-grade work and to take positions as foremen, etc. A certain proportion of highly skilled and intelligent employees, it is now recognized, is absolutely essential to the successful operation of a modern manufacturing plant, with its expensive equipment of highly specialized machinery and its intricate processes. Hence, as a matter of necessity employers are seeking means of giving the all-round training the apprenticeship system used to afford.

Since each of these schools is a private enterprise maintained by an employer for the sake of providing himself with skilled workers, they are naturally found only in connection with large firms and corporations. Since 1905 the leading railroad systems of the country have rather generally established them. Other corporations, especially large manufacturing concerns, have started a number since 1900.

In general the plan of these schools is to train a boy in the actual work of the shop and at the same time to instruct him in the subjects, such as mathematics, mechanical drawing, and the like, essential for

the practice of the trade. The school work is distinctly practical and applies directly to the shopwork. As a rule, a boy is indentured for four years, though sometimes the term is reduced to two, and is required to attend the school, which is usually situated in the works, a certain number of hours per week. He is paid for his time, his wages being increased at stated periods, usually every six months, if he makes satisfactory progress. The results of this combination of shop and school work in turning out competent workmen well fitted for the needs of the particular concern which maintains the school are reported to be entirely satisfactory.

COOPERATIVE INDUSTRIAL SCHOOLS.

The cooperative industrial school affords, through a combination, what the apprenticeship school furnishes by the employers' single efforts. It is founded on a cooperative agreement between an employer or group of employers and a school in accordance with which apprentices or other young employees are excused from work a part of the time to attend the school, which on its side undertakes to give them instruction wholly or to a considerable extent related to their shop work. By this plan boys who can not afford to remain in school have a chance to secure a good trade education while earning wages sufficient for at least partial self-support, while the employer who can not maintain an apprenticeship school on his own account is enabled to develop within his establishment a class of well-trained mechanics.

These schools are independent units and being very closely adjusted to the needs of their particular localities naturally show much variety of arrangement. Some operate under the half-time plan, by which pupils alternate their work in the school and in the shop, generally week by week. Others provide short periods of instruction each week or at some special time during the year.

In the beginning some foremen objected to the plan because releasing the boys for a part of the time necessitated a readjustment of the shop schedule, which they considered an unnecessary bother. As the schools prove their worth most of this objection is being withdrawn and the superintendents and foremen are now becoming advocates of the cooperative plan. From the outside objection is still made to the plan on the ground that it may in some instances place the school too much under the domination of the employer and, further, that the system depends on the continued cooperation of the employer, which may be withdrawn at any time, thus closing the school. In theory both these objections seem valid, but in practice no trouble has yet been experienced along either line.

This system is not feasible in the elementary schools because of the youth of the pupils.

Cooperative schools have been established in few places as yet, and except where they have been tried they seem to be regarded with indifference. Wherever tried, however, they seem to have been successful and to have won general favor.

EVENING INDUSTRIAL SCHOOLS.

The evening schools were the first in this country to furnish industrial training, and they still do an important work in this field. They vary widely in the kind of work done. Some are really vocational schools, offering courses which enable a pupil to test his fitness for a given trade, others provide trade instruction for those desirous of entering specific industries, while others give continuation work for those already engaged in their chosen trades. Sometimes one school combines all these features.

The evening schools labor under an obvious disadvantage in that their sessions are necessarily short and the student in general already tired by a day's work before beginning his studies. On the other hand, those attending these schools have generally come with a definite purpose, so that they apply themselves earnestly and make more rapid progress than could be expected in such short sessions. Also such schools are often able to secure the services of thoroughly competent instructors in both trade theory and trade practice, since many skilled mechanics and technical experts, employed through the day, can be secured as evening teachers.

The evening schools are very widely distributed, being found wherever any attempt is made to give trade education, and in connection with every variety of industrial school, public or private. In spite of their evident disadvantages, it is apparent that they will for a long time to come play an important part in the provision of industrial education in this country. Except that a given amount of training must be extended through a longer period than in a day school, and that the general tendency is to make courses as practical and concise as possible, their work presents no distinctive characteristics.

YOUNG MEN'S CHRISTIAN ASSOCIATION SCHOOLS.

The Young Men's Christian Association schools are the most widely distributed class of philanthropic agencies for industrial training, there being about 180 associations scattered through the country which give industrial, scientific, technical, and trade instruction to a greater or less extent. The cost of these schools is met to a considerable degree by the tuition and membership fees of students, but they are not run as commercial or money-making enterprises.

Except in a few special local fields, these schools give no strictly trade or vocational instruction, but they present many courses of

study of direct benefit to workers engaged in trades and to persons seeking to enter trades. Many of the subjects taught may be termed properly theory of a trade, and to quite an extent the educational work of the association may be classed as continuation school work. Classes are generally held in the evening. In a few cases the association cooperates with employers and furnishes instruction to certain groups of employees. This work ranges from directing the instruction to merely carrying out a course determined by the employer.

TEXTILE SCHOOLS.

These are specialized schools confining their work strictly to subjects related to the textile industries. At present there are two main types of these schools—those which aim primarily to train for supervisory positions and for such highly skilled occupations that they may be considered semiprofessional, and those in which the main purpose is to train workers for the manual textile occupations. Schools of the first class have in some cases added departments in which training for these manual occupations is given. Except in these instances they are not regarded as falling within the scope of this investigation.

Textile schools of the second class are a recent development, very few having been established before the beginning of the present century. They are found only where textile industries form an important part of a community's activities, and are therefore more numerous in New England than elsewhere. They are generally maintained by public funds, but instances of both apprenticeship and proprietary institutions are found.

The subjects taught vary according to the dominant textile industries of each locality. Usually two kinds of courses are given—short courses giving only the theory and practice of a single occupation, and longer courses embracing academic as well as trade instruction and usually covering a group of related occupations.

Textile schools have been founded only where the need for such work was apparent and pressing, and in general have been very successful. Their graduates are in demand and their classes usually well filled.

GIRLS' INDUSTRIAL SCHOOLS.

Trade schools for girls are rare, and even schools offering them industrial courses as a part of their work are not common. This has resulted directly from the public attitude toward women in industry. For a long time the feeling prevailed that the industrial world was not the place for women, and that a training which fitted them for anything but home life would be highly undesirable. When it became evident that woman's presence in industry must be accepted

it was felt that, since the great majority of wage-earning women marry and withdraw to their own homes before they are 25, it was not worth while to provide specific trade training for so brief a period. This feeling is still widely prevalent, but in the great industrial centers where women workers are most abundant the evil results of permitting annually thousands of girls 14 to 16 years old to enter the industrial world without skill or training, there to shift for themselves as best they may, have become so apparent that a sentiment in favor of trade training for girls is rapidly growing.

As yet the schools giving such training are almost exclusively located in the northeastern manufacturing States. Of 18 considered in this report, 14 are in Pennsylvania, New York, and Massachusetts. Their courses are usually limited to the various forms of dressmaking, garment making, and millinery. In the trade schools proper it is usually considered necessary to make the courses as short as is consistent with thorough training, since these schools are primarily designed for those who are forced to become wage earners as early as possible. In schools which give industrial training as only part of their work courses are often longer, including general academic studies and related subjects.

A large number of the public evening schools open to girls give courses which might be used as preparation for a trade, but which are usually taken with a view to their utility in the girl's present or future home, and hence do not fall within the scope of the present investigation. Courses in millinery, dressmaking, and cooking, for instance, when taken for home use, are excluded, although the training in any of these subjects might be utilized by those intending to follow them as trades.

The strictly trade schools for girls are a recent development, and are still looked upon as somewhat experimental. Their work is reported as successful, however, and their graduates are in demand.

NEGRO INDUSTRIAL SCHOOLS.

Opportunities for securing some degree of industrial education are provided for Negroes in some of the public schools. Also in practically all the Negro agricultural schools throughout the South a certain amount of such training is included, that the student may be prepared to attend to the repairs and the building, blacksmithing, etc., incident to the successful management of a farm. In both cases the kind and the extent of the industrial training is conditioned by the general character of the institution.

In addition to these there are a few schools in the North and a number in the South in which industrial training is either the sole purpose or constitutes a very important part of the work. The aim of these schools varies widely, according to their location, even

though they may teach the same subjects. In the North their purpose is to fit the Negro for city life, and in the South to lead him back to the land. Consequently in the South it is unusual to find such a school which does not have agricultural courses around which the other work centers, while such courses are nonexistent in the northern schools.

Industrial schools for Negroes are almost invariably philanthropic enterprises, and their work is usually hampered by insufficient funds. They have also had to face special difficulties owing to the fact that apprenticeships are practically never open to colored workers and hence their students must receive all their preliminary training before leaving school. The difficulty Negroes find in entering a skilled trade, unless it is one in which they can work independently or as separate groups, limits the scope of their work, and owing to the deficient education of a portion of their students much of their instruction must be elementary. As a further difficulty they have had to counteract the prejudices of their own race who have been inclined to look upon clerical, commercial, and professional callings as the only ones which could be considered by the ambitious.

In spite of all these difficulties the Negro schools have done good work. Several have won for themselves a national reputation, and all are playing an important part in the adjustment of the race to the new conditions in which emancipation has placed them.

INDIAN INDUSTRIAL SCHOOLS.

There are few Indian schools exclusively for industrial training, but there are a number which offer industrial courses in connection with other work. These are mostly scattered through the West, where they are most accessible to Indian pupils. The kind and extent of industrial training offered depends upon the needs of the locality in which a given school is situated. In general the trades taught are those needed in the country or in a small community. Sometimes, especially in the reservation schools, only the fundamentals of trades are given. The few well-known Indian schools, or schools admitting Indian pupils, located in the East teach a greater variety of trades and give a very thorough training.

CORRESPONDENCE SCHOOLS.

Correspondence schools are designed to meet the needs of persons without local opportunity for instruction. Naturally the limitations involved in their methods prevent them from teaching trades, but they give instruction in related subjects, including many which can be applied directly in trade practice. They include among their pupils those already in trades and those preparing to enter them.

The work of the correspondence schools has increased rapidly of late years, and they now teach a wide range of subjects. They have the advantage of adapting their work closely to the needs of the individual student, who advances as rapidly as his own abilities permit, and the very serious disadvantage that the student must work alone, losing altogether the inspiration of personal contact, and obliged to resort for explanation of his difficulties to the slow process of correspondence. Very recently an attempt has been made to overcome this difficulty by the introduction of the "correspondence instructor," whose function is to supplement correspondence work by personal direction. When the number of pupils in a given locality warrants it, they are organized into classes and are met at regular intervals by instructors who explain the perplexities encountered in their work. This method overcomes the greatest discouragement in correspondence study—the necessity of writing for explanations of difficult points—but it is not applicable to isolated students.

TEACHERS.

Each class of schools has its own peculiar problems, which will be discussed in connection with the several groups, but there are certain difficulties encountered by all which may well be considered together. The most serious of these is the matter of securing instructors really qualified to teach trades or vocations.

A good trade teacher needs at least a fair general education, with specialized knowledge of such arts or sciences as may be related to the trade he is to teach, a practical knowledge of the trades such as usually is gained only by working at them under ordinary shop conditions, and in addition an understanding of the general principles of pedagogy, that he may be able to impart what he knows. The combination is not a common one. To be a skilled trade worker presupposes years of training and experience in the shop, and men possessing this have usually begun work by 16, with only a grammar-school education at most. Even if they have added to this by night study, they have had no experience in teaching, and find much difficulty in imparting their own knowledge to learners. The trained teachers, on the other hand, while thoroughly familiar with the theory and underlying principles of the trades, usually lack concrete and practical experience with industrial conditions. As a general rule, therefore, the school has to choose between the skilled worker, not trained as a teacher, and the professionally trained teacher, who knows by theory of the trades, but has had little, if any, practical experience.

Some schools try to meet this difficulty by appointing their teachers, especially the teachers of practice work, experimentally, thus giving the skilled mechanics whom they secure a chance to demonstrate

their ability as instructors. If they prove satisfactory, they are advised and even expected to take work in pedagogy either outside of school hours or during their vacations. This plan is not generally feasible, as in many instances schools can not pay as much as such men can earn at their trades, so that they are unable to secure or to hold such men.

Many manufacturers and some educators think that normal industrial schools; that is, schools for training normal teachers, are necessary to provide the combination of trade, general, and pedagogical education which is required. Others feel that such schools would be apt to lay too much stress on the theoretic and too little on the practical side of the work, and that therefore they are undesirable. Such objectors, however, suggest no alternative to the present unsatisfactory situation, beyond urging a closer watch for intelligent and ambitious young skilled workers who, by the offer of sufficiently tempting salaries, may be persuaded to add pedagogical and general training to their present equipment and thus fit themselves for teachers' positions.

In the apprenticeship schools less difficulty is experienced in this matter than elsewhere, since the teachers are supplied from employees of the company itself, such teachers being selected from men who have been with the company long enough to understand its methods and standards, and who have shown not alone a high degree of skill, but also a degree of intelligence and of capacity for leadership that can be depended upon to command respect and interest. Evening schools also have less trouble in securing teachers than day schools, since properly qualified mechanics who could not afford to give up their work for a teacher's salary, are often ready to teach in the evening for the sake of increasing their income. In general, however, the problem of securing properly equipped teachers is felt to be an acute one.

TEXTBOOKS.

The schools very generally report that few suitable textbooks on trade and vocational subjects are on the market.

The ordinary academic textbooks on subjects taken in a course in trade and vocational instruction are not considered sufficiently direct and practical, and many of the industrial textbooks available are considered as being too highly technical and presupposing a considerable academic education.

Some of the schools use such textbooks as are obtainable, but in many of the schools, especially the apprenticeship schools, pamphlets or lesson sheets are prepared by the directors or instructors and placed in the hands of pupils. These loose-leaf sheets are of advantage in that they present but a limited amount of study at a time and the

pupil is not discouraged by looking ahead through a textbook at the large amount of work before him.

Many of the public and philanthropic schools use no textbooks or printed lesson sheets, trade theory and related subjects being taught orally. Some schools were found to be using textbooks and lesson sheets published by correspondence schools.

VOCATIONAL GUIDANCE.

Vocational guidance is the newest development in connection with industrial education, the term being practically unknown and the thing practically nonexistent five years ago. As connected with industrial education it is based on the fact that the great majority of children at the time when they leave school and go to work have really made no choice of a pursuit at all, but take the first position they can get, regardless of its fitness to them or theirs to it. Often the children have not and can not attain the information which would enable them to make a choice. The aim of vocational guidance is to change this situation by rousing the interest of pupils, while still attending school, in their future work, informing them of the demands and possible rewards of the occupations open to them, and by helping them to judge of their own capabilities and to make an intelligent choice of a pursuit. Vocational guidance is developing along many lines, but all are based on the fundamental idea of preventing waste of time and life by helping workers to choose the right occupation, and then to fit themselves thoroughly for it. The idea is gaining rapidly in favor, and the movement is becoming widespread.

POSSIBILITY OF TEACHING TRADES.

Even among the authorities of trade schools themselves opinions were found to differ as to whether or not trades can be successfully taught in schools. It was pretty generally agreed that in the ideal trade school trades could be taught in full, but only a few claimed for schools, as they are at present managed, the ability to give all of the necessary training. On this question there was found to be a difference of opinion between the officials of philanthropic and of public industrial schools, the former taking the more optimistic view. The majority of the public schools visited were not attempting to teach trades in their entirety, their efforts being mostly confined either to laying the foundation of trades, or to giving supplemental training to workers.

In general it may be said that graduates of industrial schools, even if they lack a practical familiarity with their trades on leaving school, possess a comprehension of the underlying principles and a knowledge of the related subjects which soon enables them to surpass

their fellow employees in general efficiency and earning power. The trade training received in a school may, it is asserted, take the place of one, two, or three years apprenticeship, according to the equipment of the school, while the general training received helps to fit the student for higher positions.

DEMAND FOR GRADUATES.

The demand for graduates on the part of employers may be looked upon as a test of the ability of the schools to turn out well-trained workmen. Public industrial schools are so new that it is not yet possible to determine the extent and permanence of the demand by employers for their graduates. In localities where such schools have been in operation long enough to produce graduates, employers have usually shown a willingness to "try them out" by giving them employment. In the case of the Negro public schools, graduates are usually given the preference over untrained workers within the limited field in which Negroes can find employment.

Of the philanthropic schools reporting on the matter, about 80 per cent show a demand for their pupils by employers. In some cases this so-called demand represents merely the ability of the school to find positions for graduates. Often, however, it means more, as shown by the applications from employers for graduates. In 1910 one school received 160 requests for its 51 graduates.

DISPOSITION OF PRODUCT OF INDUSTRIAL SCHOOLS.

A very troublesome question arises over the disposition of the product of industrial schools. If they are teaching any trade in its entirety so as to turn out journeymen, they must necessarily make a product which will have a commercial value; if it has not, the work has not been carried on as it would be in real shops, and the training is imperfect. But if this product is put upon the market in any way, there is likely to be much opposition both from manufacturers or contractors and organized labor, since it will inevitably come into competition with the product of regular establishments. It has been pointed out that if the students were regular apprentices in industrial establishments they would be working as much in competition with apprentices and journeymen in other establishments as if they were doing the same kind of work and producing the same kind of articles in the schools. This meets the objection only partially from the standpoint of labor, and not at all from that of the employer. In both cases the objection is to what may be called subsidized competition, competition which is not hampered by the necessity of making its product pay for its own cost of production. The difficulty does not, of course, arise in apprenticeship schools, in which a manufacturer

trains his own employees, but in philanthropic and public industrial schools it presents a serious problem for which as yet no satisfactory solution has been found.

An agreement between school authorities and contractors who are erecting public buildings whereby pupils of schools giving instruction in the building trades shall be permitted during a part of the time to make practical application of their training on buildings in course of erection, the pupils to receive credit for such work as a part of their course, has been suggested as a feasible and unobjectionable plan. Similarly, the work under the various city departments has been suggested to provide practice for pupils in many other trades.

A minor difficulty in connection with a product having commercial value is the temptation to increase output by keeping a student longer at one machine or operation than he needs for his own training—in other words, there may be a tendency, for the sake of revenue, to follow the example of the shop and specialize instead of giving a well-rounded training. This, however, is a matter of school administration and can easily be guarded against.

ATTITUDE OF EMPLOYERS AND OF EMPLOYEES.

Another matter of great importance to the future of industrial schools is the attitude toward them of both employers and organized labor. This attitude differs somewhat according to the type of school considered.

At present the general sentiment among employers and employees, both in and out of organizations, seems to be in favor of the public schools which give any kind of bona fide industrial or trade training. Concerning the philanthropic industrial schools there is some difference of attitude. Generally speaking, employers, whether as individuals or as organized bodies, are warmly in favor of them, often giving material aid in the way of contributions, equipment, or scholarships, and when in need of additional workers frequently drawing upon these schools for employees. The labor unions, on the other hand, are not inclined to commit themselves until these schools shall have settled upon a definite policy in regard to supplying help to employers during strikes or lockouts. The unions state, however, that they are in favor of any form of industrial education which will give thorough training, if its graduates compete on a "fair" basis with other workingmen.

In general, the evening industrial schools, both public and philanthropic, are indorsed by both employers and employees. The elementary trade schools are commended, since their training enables a pupil to choose a trade intelligently and to gain information which can be obtained in the shop only by long effort, if at all, while the

more advanced schools provide for ambitious and energetic workers a training which the commercial shop has not the time to supply, and which fits them for higher positions and more skilled work. Employees, whether organized or not, look upon evening schools with special favor because they make no effort to put men into the trades. As the initiative in establishing evening textile schools came from the textile employees, these schools naturally have the unqualified support of the workers.

Apprenticeship schools are favored by individual employers, the attitude naturally depending on conditions in the employer's own trade or establishment. In most cases, labor unions are favorably inclined toward them because they do not attempt to shorten the period of apprenticeship, and because they counteract, to some extent, the tendency toward machine specialization.

Employers are in general warmly in favor of cooperative schools, seeing in them the opportunity to train boys from the beginning of their trade career according to the methods and standards of their own shops, and at the same time to give them the supplemental education necessary to the all-round competent workman. Members of labor unions are noncommittal in their attitude toward these schools; they appear to be withholding judgment until the schools shall have been in operation long enough to determine fully their measure of success and their effect on organized labor.

STATE COMMISSIONS ON INDUSTRIAL EDUCATION.

During the last decade seven States, Connecticut, Maine, Maryland, Massachusetts, Michigan, New Jersey, and Wisconsin, have appointed special commissions for the study of industrial education. The duties of these commissions have usually been to investigate the needs for education of persons employed or aiming at employment in the different grades of skill and responsibility in the industries and to report to what extent such needs are met by existing institutions and what additional measures are needed to secure the desired results. In some instances, important reforms in education have resulted from the labors of the commissions. In Massachusetts a system of public-trade instruction under State supervision has been worked out. In other States, the commission reports have had a marked effect in shaping popular sentiment in favor of the provision of trade instruction under State auspices.

LEGISLATION RELATING TO INDUSTRIAL EDUCATION.

The legislation enacted by various States indicates the trend of public opinion for industrial education at public expense. While New Jersey can claim credit for the first enactment, probably the

most advanced legislation has been passed by Massachusetts, Connecticut, New York, and Wisconsin. The laws of the several States appear in Chapter XVII.

Under the Massachusetts law, in order to secure the subsidy offered by the State, industrial schools must be established as "independent" schools; that is, independent of the common-school system. The State subsidy is one-half the cost of maintenance. The State board of education has general supervision of these schools. It may assist in their establishment and maintenance in cooperation with the municipalities concerned and any money contributed by the State and municipality jointly shall be expended under its direction. The law provides that cities and towns may establish (1) industrial schools and schools for instruction in agriculture and the domestic and mechanic arts; (2) part time classes in such schools, and (3) evening courses in such schools for persons already employed in trades. The law of Massachusetts also provides for the establishment and subsidy of incorporated textile schools in which the State has representation on the board of trustees. The subsidy for these schools is one-half the maintenance costs.

The schools provided for under the act in Wisconsin are to be strictly trade schools intended to produce skilled workmen rather than to give any additional or extended industrial courses along with academic work. The act provides also for levying a tax not exceeding one-half of one mill, to be used in establishing and maintaining such schools. A check on the establishment of trade schools against the wishes of the community is provided by a requirement that the question must be submitted to a vote of the electors of the municipality upon a petition of 20 per cent of the voters, at a stated election.

The act of the State of New York provides for the establishment and maintenance of three classes of schools, as follows: (1) General industrial schools open to pupils who are 14 years of age or who have completed the elementary school course; (2) trade schools for pupils 16 years of age or over who have completed the general industrial school course or who have met the requirements of the local school board; (3) schools of agriculture, mechanic arts, and home making for pupils who are 14 years of age or who have completed the elementary school course or met such other requirements as the local school authorities may have prescribed.

By the terms of the Connecticut act the State board of education was authorized and directed to establish two public day and evening schools "for instruction in the arts and practices of trades." The location of these schools was left to the discretion of the board. The act provides that regulations governing the admission of pupils may be prescribed by the board, but it is stipulated that no person

under 14 years of age shall be admitted except during public-school vacations. Authority is given the board to expend the funds provided for the support of the trade schools, to appoint and remove their teachers, and to make rules for their management. In addition, the board may construct buildings or hire temporary quarters for the schools, and may enter into arrangements with manufacturing and mechanical establishments for the provision of half-time practice for pupils. For the purpose of erecting buildings and maintaining the schools, the board is authorized to expend $50,000 annually. It is provided that the town in which a trade school is established under the terms of the act may contribute any sum properly voted therefor for the enlargement of the school or the improvement of its efficiency.

ARRANGEMENT OF THE REPORT.

In the succeeding chapters the various classes of schools which have been briefly described in the foregoing pages are considered and a description is given of a sufficient number of individual schools investigated to illustrate the different kinds and types. Other topics of importance to industrial education are also discussed in separate chapters.

In addition, in Chapter XVIII, five general tables are presented, showing the most important items of information obtained relating to the schools investigated, many schools being included in the general tables in addition to the typical ones described individually in the text. In these tables the schools are grouped in three general classes, philanthropic, public, and apprenticeship, and the special type of school, if it belongs to one of the specialized types, is indicated in the table in connection with the title of the individual school. Correspondence schools and the Young Men's Christian Association schools are not included in the tables. The titles of the general tables are as follows:

TABLE I.—Trades and subjects taught and time devoted to schoolroom work and to practice.

TABLE II.—Qualifications of teachers of practice.

TABLE III.—Year established, persons accepted as pupils, fees, acceptance of school work on apprenticeship, terminal dates, school days and hours, etc.

TABLE IV.—Governing and advisory boards, source of materials used in practice work, and product.

TABLE V.—Shop equipment and shop practice.

CHAPTER II.

PHILANTHROPIC INDUSTRIAL SCHOOLS.

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PHILANTHROPIC INDUSTRIAL SCHOOLS.

INTRODUCTION.

Except in the one particular that they were all founded for benevolent purposes, schools of this class bear no necessary resemblance to one another. Some were established for general training and have added departments for industrial education, others were founded as trade schools. Some are maintained entirely on the original foundation, others receive aid from State, city, or individuals. Some are free, some make a nominal charge for tuition, while others receive as tuition fees sums nearly sufficient to support the institution. Some are preparatory trade schools, some continuation schools, some give training which takes the place of one, two, or three years of apprenticeship, while others aim to teach trades in their entirety and to turn out pupils ready to begin work as journeymen. In fact, nearly every variety of industrial training, for both sexes and for different races, is provided by schools of this class.

The trades taught are apt to be those most numerously followed in the community in which the school is situated. An exception to this is found in the case of institutions which provide a home as well as trade instruction. In these it is supposed that the pupils will go back to their own homes to work after their graduation, so they lay special weight on the building and machinists' trades which are common to all localities. The schools for Negroes, which are very largely philanthropic, in the South almost invariably emphasize agricultural training and often teach the trades merely as accessory to the proper conduct of a farm. Schools for girls, or which admit girls, usually confine their trade instruction to dressmaking, millinery, and needlework in general. They very often give courses in cooking, laundry work, etc., but these are more apt to be planned as a preparation for future home making than for wage-earning careers.

The philanthropic schools offer two general kinds of industrial training: Short, intensely practical courses, rigidly confined to the theory and rudimentary practices of given trades, and full-time courses aiming to give the student a good general training and turn him out either ready to enter his trade as a journeyman, or with but a brief period of apprenticeship yet to serve.

The agencies offering this long and thorough training are, of course, less numerous than those giving the short-time courses. They are apt to be large and well-endowed institutions, very often giving trade training as one part of an extensive curriculum. As a class they are

older than those giving the short-time training. Because of this fact, and because owing to their wider curriculum and consequently greater number of graduates, they are more generally known than the smaller and more widely distributed agencies for short-time training, and are apt to figure in the public mind as the type of industrial training.

The short-time courses fall into three general groups. First, there are the day courses, intended for children who for the sake of this training will remain in school three months, six months, or a year longer than they would otherwise have done, but who can not stay long enough for the full trade training. Then there are short-time evening courses intended either for children of the same class who have been obliged to go to work, but who wish to fit themselves for something better than the unskilled occupations they have entered, or as continuation courses for those already in the trades. As a third group there are special schools for immigrants or their children, often limited to one particular race.

The first two classes spring directly from the need of special industrial training among the children of the less well-to-do. It is matter of common knowledge that great numbers of children leave the public schools and begin work at an early age. Investigation has shown that while few of these could afford the time for a complete trade training, in many cases their parents would keep them in school longer if they could see any practical result from so doing. To meet this situation short-time philanthropic schools have been opened for the industrial training of such children, in which they are taught the theory and rudimentary practices of the trades in courses requiring approximately five or six months in the day schools and from one to three years in the evening schools.

Some unfavorable criticism of these schools has been made on the ground that they claim to teach trades thoroughly in periods of a few months or a year. Such a claim, if made at all, is certainly not common. In general, they base their claim to usefulness on the fact that they reach those who otherwise would have no opportunity to secure trade training of any kind, and their courses, though short, have some very apparent beneficial results. For instance, they afford the pupils an opportunity to test their fitness for the trades, they divert numbers of boys and girls from the unskilled occupations into which they might otherwise be forced or drift, and they enable those who finish the courses to go into an employer's shop ready to begin work then and there without any preliminary waste of time in getting interested in the work or adjusted to the shop requirements.

Much of the short-time evening work, especially of the elementary training, is done in connection with settlements, through which the needs of a given neighborhood have become known.

The third group includes schools in which trade instruction is offered to immigrants or their children with the purpose of affording

them definite means of a livelihood other than the poorly paid occupations in sweatshops or mercantile establishments which are usually the only avenues of employment open to them. Since such pupils often come to the school with little or no education, and are usually ignorant alike of the language and of industrial work of every kind, only those occupations in which the operations are simple and easily mastered can be taught. Some of these schools, especially those for Hebrews, were founded by persons who wished to help others of their own race. In other instances, philanthropists who have studied the congested city tenement districts have founded therein schools for short-time trade instruction intended primarily to draw the young people away from the underpaid, unskilled occupations which abound in such sections. The majority of these schools for special races have in them a strong element of social betterment; they promote many interests beyond trade instruction, and indirectly aim to raise the standard of living both of the pupil and of his family.

The schools of philanthropic foundation investigated will be found listed in the general tables, Chapter XVIII. They are of various types, and several of them are discussed in other chapters of the report dealing with certain special classes of schools. In addition a number of schools not discussed elsewhere are described in the following pages as illustrating the different purposes of philanthropic schools, their courses, and their methods of instruction.

The Williamson Free School of Mechanical Trades (p. 41) is a representative philanthropic school that provides free support and instruction to its pupils. It is also a representative trade school that approaches very closely to the shop apprenticeship in the practical instruction and practice work afforded. The sole purpose of this school is trade teaching.

Girard College (p. 45) is a school that entirely supports its pupils, but in this school trade instruction is elective.

Four schools are described, which in whole or in part are trade schools, but which, unlike the Williamson School, charge tuition and do not support their pupils, namely, Carnegie Technical Schools (p. 50), Pratt Institute (p. 57), David Rankin, Jr., School of Mechanical Trades (p. 61), National Trade Schools, Indianapolis, Ind. (p. 64), Mechanics' Institute of Rochester (p. 69).

Other schools giving trade instruction, but which do not charge a tuition fee, are Wilmerding School of Industrial Arts (p. 74), California School of Mechanical Arts (p. 72), Manual Training and Industrial School, New London, Conn. (p. 76), Hebrew Technical Institute (p. 77). The last named was established especially for trade instruction of Hebrew children.

Among the short-time trade schools are the New York Trade School (p. 81), the Baron de Hirsch Trade School (p. 84), and the Hebrew

Education Society school (p. 86), the last two named being schools established for the Hebrew race.

The Illinois Manual Training Farm school at Glenwood, Ill. (p. 89), is a type of many similar institutions which receive and care for orphans and other dependent children who are public charges.

The philanthropic schools described in other chapters of this report are as follows:

Cooperative industrial schools (Chapter V):
- Lewis Institute, Chicago, Ill., page 194.
- David Rankin, Jr., School of Mechanical Trades, St. Louis, Mo., page 205.

Evening industrial schools (Chapter VI):
- Ohio Mechanics' Institute, Cincinnati, Ohio, page 216.
- Franklin Union, Boston, Mass., page 219.
- Virginia Mechanics' Institute, Richmond, Va., page 221.
- North Bennet Street Industrial School, Boston, Mass., page 222.
- Italian Evening Trade School, New York, N. Y., page 225.
- Preparatory Trade School, New York, N. Y., page 227.

Girls' industrial schools (Chapter VIII):
- Clara de Hirsch Trade School, New York, N. Y., page 283.
- Pascal Institute, New York, N. Y., page 286.
- Chicago Girls' Trade School, Chicago, Ill., page 288.
- Jewish Kitchen Garden Association and Trade School for Girls, Cincinnati, Ohio, page 289.
- Hebrew Technical Institute for Girls, New York, N. Y., page 290.
- Pratt Institute: School of Household Science and Arts, Brooklyn, N. Y., page 293.

Negro industrial schools (Chapter IX):
- Hampton Normal and Agricultural Institute, Hampton, Va., page 314.
- Tuskegee Normal and Industrial Institute, Tuskegee, Ala., page 323.
- Snow Hill Normal and Industrial Institute, Snow Hill, Ala., page 327.
- Berean Manual Training and Industrial School, Philadelphia, Pa., page 329.
- Watchman Industrial School, Providence, R. I., page 330.
- High Point Normal and Industrial School, High Point, N. C., page 333.
- Mayesville Industrial and Educational Institute, Mayesville, S. C., page 334.
- Claflin University, Orangeburg, S. C., page 334.
- Voorhees Industrial School, Denmark, S. C., page 335.
- St. Paul Normal and Industrial School, Lawrenceville, Va., page 335.

WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES, WILLIAMSON SCHOOL, PA.

The Williamson Free School of Mechanical Trades, in Delaware County, Pa., an independent day trade school, founded and endowed in December, 1888, was opened in 1891. Its purpose as stated by the founder is to afford an opportunity for poor and deserving boys to receive the rudiments of a good English education, a training in habits of industry and economy, and instruction in mechanical trades or handicrafts, so that they may be able to support themselves by the labor of their own hands and become useful and respectable members of society. He also stated that the general abandonment or disuse of the system of apprenticeship made necessary the establishment of such an institution to afford an opportunity for industrial education which the public schools or other institutions failed to provide. He further stated that in place of a respect for the dignity of labor there had grown up a false belief to the effect that manual labor is not respectable, which belief had sent young men into already crowded professional pursuits in which they had but slight chance of success, and in which failure resulted in idleness, beggary, and crime.

By the terms of the foundation deed the benefits of the school are entirely free. These include boarding, instruction, clothing, etc., during the entire course.

Thoroughness is the keynote of the work of the school. In the foundation deed a list of trades was enumerated, but the choice of trades to be taught was left to the discretion of the trustees.

Many of the pupils come from other parts of the State and when graduated seek employment in the neighborhood of their homes. The trades taught are those found in practically all localities where building operations and mechanical construction are carried on.

The school is governed by a board of trustees, a self-perpetuating body of seven members. Trustees must be males, at least 25 years of age, and residents of Philadelphia, Bucks, Montgomery, or Delaware Counties, Pa. The school is under the direct charge of a president.

The curriculum of the school is planned to teach thoroughly the five trades listed below and to equip graduates, in so far as a school may, as journeymen mechanics. In its shop practice the school covers all the work of the usual apprenticeship.

The trades taught and the pupils enrolled in each for 1909–10 are as follows: Bricklaying, 55; carpentry, 54; stationary engineers, 27; machinist, 54; pattern making, 42.

These pupils have been assigned to the various trades by the trustees, who are enjoined to consider the taste and adaptability of each candidate. A candidate is given an opportunity to name from the trades taught the trade which he desires to learn, and if there is a substantial reason for the choice and it is possible to grant it, he is

assigned to that trade. If it is not possible to consider the choice, another trade is offered. If this is declined, the name of the candidate is removed from the list.

The selection of candidates is governed by the three following factors: (1) Financial conditions, (2) place of birth, (3) ability to pass the entrance examinations. Preference is given to indigent boys. In the matter of place of birth preference is given in the following order: (1) Philadelphia, (2) Bucks County, Pa., (3) Montgomery or Delaware County, Pa., (4) elsewhere in Pennsylvania, (5) New Jersey, (6) elsewhere in the United States. Candidates must be able-bodied, healthy males, 16 and under 18 years of age.

Applications from boys of at least 15 years of age are received and recorded for action later. Applications must be signed by the parents or guardians. A certificate of the date and place of birth of the candidate is required.

Candidates are required to pass an academic and a physical examination. One important requisite of admission is a statement to the effect that the candidate expects to follow the trade learned in the school.

Admissions are made in April, and pupils are placed on probation for four months, at the conclusion of which, if satisfactory, they are indentured to the trustees for three years. This indenture may be canceled for good and sufficient reasons. In exceptional cases boys may be admitted to fill vacancies which occur in the first month, but otherwise no pupils are admitted after April 1.

In addition to the regular trade pupils there is a class of "reserve boys" who, while desirable in every other way, have failed to pass the academic entrance examination. About 20 such boys are given an opportunity to receive nine hours per week of academic instruction in order to make up the deficiencies of their education. They are supported by the school and in return are required to assist in the care of the shops and of the household. If, at the end of the year, they successfully pass the examination and have proved satisfactory in conduct and work, they are admitted as regular trade pupils.

The course for each trade covers three years. During the first 2 years 20 hours per week are given to school and 20 to shopwork; for the first 4 months of the third year there are 20 hours of school work and 23 hours of shopwork; during the remainder of the third year there are 43 hours per week of shop practice, with a limited amount of academic work in addition in evening classes.

The periods for the regular academic work are in the day classes 60 minutes in length; in the evening classes for seniors the periods are 90 minutes each. In subjects in which there is laboratory work and in mechanical drawing several periods may be consecutive. The subjects for all pupils except stationary engineers are as follows:

First year.—Grammar, geography, physiology and hygiene, literature, history, music (vocal), arithmetic, mechanical drawing.

Second year.—Grammar, literature, music (vocal), arithmetic (mensuration), algebra, chemistry, physics, mechanical drawing.

Third year.—First four months, algebra, geometry, trigonometry, chemistry, physics' commercial forms, strength of materials, mechanical drawing; and for the remainder of year in evening classes, trigonometry, strength of materials; and for machinists and pattern making the theory of the steam engine in addition.

Stationary engineers in the first year take practically the same course as the other pupils except that one hour given to the subject of the steam engine leaves one period less in mechanical drawing. In the second year they take grammar, literature, music (vocal), arithmetic (mensuration), algebra, chemistry, physics, steam, steam boiler, steam engine, steam heating, ventilating, and mechanical drawing.

In the third year during the first four months the subjects are algebra, geometry, trigonometry, physics, alternating current, direct current, refrigeration, steam, gas and gas engine, mechanical drawing, chemistry, and commercial forms. During the remainder of the year the subjects are trigonometry and strength of materials, taken in evening classes.

The shops are completely equipped with tools and machines. (See Table V.) The effort is made to give as many practical problems as possible.

The school and shop classes are in session from 8 a. m. to 12 m. and from 1 to 5 p. m. from Monday to Friday, inclusive. The third-year pupils have shop practice also on Saturday from 8 to 11 a. m. and during the last 7 months have 1½ hours of academic work, two or three evenings per week. The term opens in September and closes on July 31, the school year consisting of 46 weeks. Pupils are graduated in March in order to be prepared to accept or to seek employment at the opening of the season in the building trades. There is a 10 days' recess at Christmas.

A diploma is given on the completion of the course, which states that the pupil has completed his apprenticeship in his trade, including a course of practical and theoretical instruction therein, in trade drawing, and also in the usual branches of a good common-school English education. No certificate or statement is given for a partial course. About 80 per cent of the pupils receive a diploma. Pupils who withdraw before the completion of the course are usually those who fail to show sufficient application to their work.

No textbooks are used for the theory of the trades. A series of shop talks are prepared for each trade. The classes meet in a room adjoining the shop for this instruction, which precedes each exercise or set of exercises in practical work. A reference library and trade magazines

are at the disposal of the students for supplementary information regarding their work.

There are seven instructors, one of whom teaches mechanical drawing and the remainder the practical work of their respective trades. The director of the shopwork holds a degree in mechanical engineering, five are graduates of the Williamson school, and all but one have had practical shop experience. The positions are considered desirable, and there is a waiting list of applicants. The director of the school has prepared a series of shop talks, or outlines for each trade. None of the others has done any original work in the preparation of textbooks.

The property of the Williamson school consists of 24 buildings, located on 230 acres of ground. The eight buildings used for trade purposes are valued at $115,000 and the industrial equipment at $51,000. No outside financial assistance is received by the school, the sole support of which is the income from the endowment fund of $1,575,812. All school books and apparatus are furnished free of charge. In 1909–10, $5,800 was expended on materials for shop practice.

The product of the school is not sold; it is up to the commercial standard and is used in so far as it is available to repair, improve, and extend the buildings and equipment. Some of the buildings have been erected by the students. Throughout all practical exercises the pupils are continually impressed with the fact that no interference with the outlined course will be permitted in order either to expedite or facilitate work, or to make undue use of any ability or skill of individual pupils. The school constantly emphasizes the fact that a commercial object in its work would result in keeping pupils on such processes as they could best execute, and, consequently, would either retard or arrest their development, which can be reached only by thorough knowledge and skill in all the phases of their trade.

In the foundation deed the following is stated in reference to the status of the pupils of the Williamson school: "All scholars admitted to the school shall be bound as indentured apprentices to the trustees."

The school considers its course as covering all of the usual shop apprenticeship and graduates its pupils as journeymen mechanics. Graduates experience no difficulty in finding employment, as the demand for them is greater than the number available. In March, 1910, there were 160 requests for the 51 graduates. The demand for these graduates is about equally divided among the trades, though some particular industrial condition at the time of graduation may call for journeymen of one trade rather than of another.

No graduates are expected immediately to assume such positions of responsibility as foremen, but are considered so well equipped in the fundamentals of their trade and their practical application that

after a short time in the shop they are ready to advance to executive positions. This has been the experience of graduates and is so stated by their employers.

These employers were emphatic in their commendation of the school. Some declared themselves anxious to secure as many graduates in their line of work as the school could turn out. Some of these employers do not rate the graduates as full-fledged journeymen when they first apply for work, but state that in a comparatively short time they acquire sufficient shop experience to place them on an equality with the shop journeymen.

The employers' associations as a class approve both the purpose and methods of the school. The school authorities stated that in former years there existed a very decided antagonism against the school on the part of some employers and shop superintendents, but that this is now exceptional.

A representative of a building-trades union objected to the claim being made that graduates of the school were competent journeymen. He admitted the graduates were admirably equipped theoretically and were given a good start in the practice of their trades, but lacked the experience that could be acquired only on regular jobs to obtain the proficiency required for admission into the union ranks.

Other representatives of organized labor coincided with these views. They will receive graduates into their organizations as soon as they are vouched for by some member as competent.

The total number of graduates by trades from 1905 to 1909, inclusive, was bricklaying, 62; carpentry, 59; engineering (stationary engines), 31; machinist, 62; pattern making, 54; total, 268.

On November 1, 1909, two of the above were reported as deceased and the remainder engaged as follows:

At mechanical trades as journeymen, foremen, superintendents, and contractors, 244, or 91.72 per cent; at college, 5, or 1.88 per cent; at commercial pursuits, 15, or 5.64 per cent; no information, 2, or 0.76 per cent.

Four of those at college worked at their trades for a considerable time after graduation, and the two who died did the same.

It is claimed by the school that 95 per cent of the graduates enter at once on trade work at wages from 60 to 100 per cent of full journeymen's pay, nearly all receiving the latter in less than 12 months.

GIRARD COLLEGE, PHILADELPHIA, PA.

The aim of the trade department of Girard College is to give thorough trade instruction. This school differs from other institutions described in the report, not alone in the scope of the instruction, but also in the fact that the taking up of a trade is elective and is possible only after several years' preparation in manual training.

Girard College is an independent endowed institution, which provides for the support and education of white males orphaned of the father. Boys to be admitted must be at least 6 but under 10 years of age. This institution, opened in 1848, occupies a tract of land covering about 45 acres. On the grounds are 15 buildings, 3 of which are devoted exclusively to educational purposes. One of the latest that has been erected is the mechanical school, built in 1884, in which manual training and the trades are taught. Manual training was added to the curriculum in 1882. Trade instruction was introduced in Girard College in 1900.

The administration of the institution is vested in the board of directors of city trusts, of Philadelphia. This board is composed of 12 members appointed for life or during good behavior by the judges of the court of common pleas in the county of Philadelphia. The mayor, the president of the select council, and the president of the common council are ex officio members of the board.

The several grades of the academic work of the institution are divided into four groups designated as "schools." Pupils are indentured to the institution until 18 years of age. This indenture may be canceled because of incorrigibility, of failure to reach the third school at the age of 15, or of the desire and ability of a family to resume support of a child. For these reasons many boys leave the college between the ages of 15 and 17 years. The majority of this class go to work, while a few enter other schools. Admissions to the college, while semiannual, are to a considerable extent dependent upon the withdrawal of pupils from the upper classes.

Elementary work in manual training begins in the first or lowest school. This is followed in the second school by a two-years' course in sloyd. In the third school the pupils begin a regular course in manual training, which they carry through to graduation unless they elect a trade for the last two years. Trade boys spend four hours a day in shopwork. In academic work their course is practically the same as for other pupils, with the exception of a few changes in certain subjects in order to more closely correlate school and shop work.

The trades taught are those considered most desirable from an economic point of view in the industrial field generally and not in reference merely to opportunities offered by local industries.

The selection of the trades taught is based on the action of the committee on instruction of the board of directors of city trusts, who receive recommendations from the president of the college. The latter may recommend subjects on his own initiative or may present those suggested to him as valuable in the opinion of the superintendent of the mechanical department.

For the year 1909–10 the number of boys in each trade was as follows: Machinist, 23; carpentry and pattern making, 25; electrical

work, 27; molding and core-making, 15; plumbing, steam, and gas fitting, 14; blacksmithing, 4; and printing, 3.

As instruction in manual training has preceded the trade work, pupils have such practical knowledge of tools as makes it possible to cover the course in two years.

Entrance to the trade classes follows the general promotions and occurs semiannually. Boys may enter the trade classes from 14 to 17 years of age. The average age at which they enter is 15 years, one year younger than the apprentice without previous training usually enters a shop. The course outlined is designed to cover part of the period of apprenticeship in the shop. In general it is accepted as the equivalent of two years; that is, one-half of a four-years' apprenticeship. A few employers have accepted it for three-fourths.

The academic work is taken in the forenoon from Monday to Friday, when the sessions are from 8 to 12. This time includes a daily recess of 15 minutes. The shopwork is taken in the afternoon, Monday to Friday from 1 to 5 and on Saturday morning from 8 to 10, except on two afternoons per week, when one hour is deducted from shopwork for military drill.

The trade courses cover two years of two terms each. The program of studies is as follows:

First year.—First term: English history; English, including grammar, literature, and composition; Spanish; algebra; geometry; bookkeeping; and drawing. Second term: French history; English; geometry; bookkeeping; stenography and typewriting; and drawing.

Second year.—First term: General history, embracing Greek, Roman, and mediæval; physics; trigonometry; bookkeeping; drawing; stenography and typewriting; and theory of military science. Second term: Physics; drawing; stenography and typewriting; physiology; and vocal expression.

Throughout their trade course the pupils spend on an average two hours per week in drawing. The actual time required depends upon the character of the object to be constructed, since the usual method in this school is to complete a working drawing of the object before any shopwork is undertaken.

Military training is required of all boys in the institution physically qualified to take it. Drills are held twice each week from 4.30 to 5.30 p. m., and, in case of the trade boys, the drill takes two hours from their shop practice.

The academic work covers 20¾ hours per week, except in the first half of the second year, when it is 21¾ hours; while the time spent in the shops is 20 hours, except in the first half of the second year, when it is 19 hours.

The school year covers a period of 42 weeks. The fall term begins in September, the winter term in February. During July and August all school and shop work is suspended.

The trade classes are well equipped with textbooks for individual use in connection with shopwork. In addition, pupils have access to a library of 400 volumes on technical subjects and 20 trade magazines.

Graduates of the institution receive a diploma for their completed course in both academic and shop work. A separate certificate is given for the whole or part of the work in the trade and manual-training courses. This certificate states the trade elected, length of instruction, grade attained, and conduct. About 98 per cent of the trade pupils receive a certificate for completed work. The superintendent stated that, in general, a superior class of boys elected trades.

The mechanical department is under the charge of a superintendent and nine assistant instructors. These instructors teach both the manual-training and trade classes. They have been selected for their practical knowledge and their ability to impart it. Only four have taught in the school less than 10 years, while the remainder have held their positions from 10 to 20 years. One instructor teaches drawing and eight teach the practical work of the shop. The instructor of drawing is a mechanical engineer with the degree of bachelor of science from the University of Pennsylvania. None of the others hold college degrees. The drawing instructor was previously employed as a draftsman in several large plants in Pennsylvania. He has taught for 18 years in Girard College and for 17 years in the evening classes of the Spring Garden Institute of Philadelphia.

The instructors of shop practice are men of common-school education, except the superintendent (who teaches printing) and three others, who reported having received instruction in special schools. The instructor in electrical mechanics received special instruction for about two years in higher mathematics and in physics, and also took a commercial course; the instructor in plumbing took a four years' course with a correspondence school in plumbing, heating, and ventilation; the instructor in blacksmithing attended night school for three years. Six reported teaching experience besides that gained in Girard College, and two of these six had had charge of apprentices in commercial shops. Three had been foremen, and one other, the instructor in plumbing, had carried on a business for himself. The superintendent has had shop experience as a machinist.

The trade classes are held in two buildings, the combined value of which is estimated at $50,000. The equipment of the mechanical school, which provides for both manual training and trade classes, is valued at about $50,000. The maintenance of the institution as a whole is derived from the income from the endowment fund, which is estimated at $24,000,000.

The completed work of the trade classes has a marketable value, but none of it is sold. Some is used in the school and the remainder

becomes the property of the pupils making it. Among the products turned out are the following: Woodwork, such as chairs, closets, cabinets, desks, benches; ornamental ironwork; tools; installation of electric wires; models and patterns for the different shops; repairs in the household, school, and shop departments. All shopwork must be up to grade and finished in a specified time.

The superintendent made the following statement in reference to the graduates of the trade classes: "We do not claim to turn out journeymen mechanics, but we aim to instruct our students thoroughly, in as short a time as possible, in all the fundamental principles and practices of the trade in question so that they may, upon graduation, possess ability and confidence, and be of immediate practical value to their employer and receive a fair remuneration at once. Speed and efficiency as a journeyman should follow very soon."

The superintendent stated that the manufacturers of the locality were favorably impressed with the work of the school and desirous of having its graduates in their shops. There is usually a position waiting for each graduate who has demonstrated his ability.

Some adverse criticism has been made concerning this school, questioning the possibility of teaching a trade outside of the shop.

In connection with a charge frequently made that students drift away from their trades the superintendent said that at times trade boys who seek employment in shops accept temporary positions in the office of the company with the promise of the first vacancy in the shop. This results, usually, in the abandonment of their trade. The fact that all students of the institution are required to take some commercial studies prepares them for office work and makes them acceptable in such positions. Moreover, these positions appeal to the graduates because of the cleanly conditions, congenial associations, and comparatively good pay at the start. In the annual report for 1909 the superintendent of admissions and indentures gave the total number of graduates of the trade classes from 1904 to 1909 as 62. These graduates were divided among the trades as follows: Carpentry and pattern making, 14; electrical work, 19; foundry work, 4; metal working (forge), 18; plumbing, 7.

In 1909 a report of these graduates showed that 25 were employed in manual occupations while 36 were in commercial and professional positions. One was reported as a student in another institution. The occupations of the 25 engaged in manual trades were as follows: Car shops, 2; chauffeur, 1; draftsman, 1; electricians, 5; foundry, 1; machine operator, 1; machinists, 6; pattern makers, 6; plumber, 1; round house, 1.

In reference to this report the superintendent of admissions and indentures stated: "The disposition of some who have started to

learn a trade to exchange a mechanical pursuit for one of a clerical nature may be explained at times, not so much, perhaps because of aversion to manual labor as such, but rather on account of the unsteadiness of employment in the former lines of industry or the lack of physical strength to perform the duties thereto."

CARNEGIE TECHNICAL SCHOOLS: SCHOOL OF APPLIED INDUSTRIES, PITTSBURG, PA.[1]

This school is a part of the Carnegie Technical Schools. A tender of the money with which to establish technical schools for both sexes was made to the city of Pittsburg in 1900, on condition that the city provide a site of ample size for future extension. In compliance with this stipulation, a tract of 32 acres of land adjoining Schenley Park, near the Carnegie Library and Institute building, was purchased by the city in 1903 as a location for the schools. The first group of buildings was completed and opened to pupils in October, 1905, additional departments being organized as new buildings were made ready for occupancy. Funds for buildings and equipment have been supplied by the founder as needed from time to time, in addition to which he has increased his original gift of $1,000,000 to a present endowment of $7,000,000.

In the School of Applied Industries young men who desire to enter industrial work are assisted to select a congenial trade and are given practical instruction not only in that trade but in the closely allied subjects, thereby preparing them to start in as competent workmen who are soon able to obtain recognition as journeymen. Older men who are already engaged in a chosen trade may obtain in the school such additional information relating to their work as will increase their efficiency and consequent earning power. Special emphasis is placed on the fact that, besides the possession of mere skill, it is essential for a man to concern himself with right living and good citizenship in order to be permanently successful.

The school is open to both day and evening pupils. The day courses are offered primarily to meet the existing demand for proficient men in the machinery and building trades, where a reasonable amount of technical information and trained intelligence is essential. Two courses are given in the day school—a regular industrial course extending over two or three years according to the ability and progress of the pupil, and a short course which may be finished in one school year. The regular course is intended for young men who present evidence of good scholarship, but who lack practical experience and whose age warrants the expenditure of time to lay a broad foundation for trade work. It deals with the sciences fundamental to all trades and includes practice in the various shops. Its aim is

[1] Formerly School for Apprentices and Journeymen.

to carry a young man through the fundamentals of a selected trade and at the same time to give him practical instruction in subjects which are closely related to the trade. The short course is for men of maturer age who possess considerable experience in a trade and who desire to confine their efforts to improving themselves in that trade only, with a minimum amount of attention to related subjects. It is particularly advantageous to young men approaching their majority who have served the larger part of their apprenticeship and who wish to enter the field of skilled labor with more training than the shop generally gives to an apprentice. A course for teachers, designed to meet the growing demand for men to take charge of departments in manual-training and trade schools, is also offered.

The opportunities for employment in the vast iron and steel industries of Pittsburg and vicinity determine to a large extent the nature of the school. The subjects taught have been selected by the faculty after a careful consideration of what is needed to satisfy the demand for skilled workers in the local field, where a phenomenal development of the manufacturing and building industries has occurred in recent years. On October 28, 1909, the enrollment by trades in the regular day course was as follows: Bricklaying, 10; electric wiring, 44; forging, 3; foundry work, 8; machinists, 36; pattern making, 14; plumbing, 14; stationary engineers, 18. In addition, 82 boys were receiving instruction in mechanical drawing only, much of which was closely correlated with trade work. On the same date there were 7 advanced pupils who were taking the full machinist's course in one year, and 3 advanced pupils who were taking the full plumbing course in one year, with 6 pupils in the short drawing course.

All applicants for admission to the school are subjected to a personal interview in order to discover their adaptability to the course selected. Applicants are either approved or disapproved as a result of this interview, but an applicant who is not approved may be admitted on probation for one term, after which he is dropped unless a creditable standing in his studies has been made. Candidates for admission are also required to submit letters from teachers in high or manual-training schools which they may have attended, or letters from previous employers, giving evidence of experience in shop or trade work. There is no fixed age limit on school entrance. It is recognized that some vocations demand more maturity than others. Two factors govern in determining the age at which an individual pupil may be admitted; first, the amount of preparation that the applicant has acquired in other schools and, second, the character of the environment he must face on leaving the school. Sixteen years is regarded as the earliest age at which a pupil can fully appreciate the responsibility and the intensity of his work, and this is usually

accepted as the minimum for school entrance. No maximum age limit has been fixed. In the short course, except in rare cases, applicants must be at least 20 years of age. Pupils are received at any time during the school year, but are encouraged to enter at the beginning of the term. As a rule no work for wages outside the school is done by day pupils during the school year. During vacation periods, however, pupils are encouraged to seek employment in lines of work similar to the courses pursued in the school. A bureau organized especially for that purpose assists pupils and graduates to obtain congenial employment.

The theoretical subjects for study in the regular day courses are chemistry of materials, drawing, English, mathematics (including arithmetic, algebra, plane and solid geometry, and plane trigonometry), principles of mechanism, and estimates and cost. In addition, pupils devote about one hour per week during a part of the school course to a study of the laws of hygiene. Pupils taking the short course have instruction in mechanical drawing and mathematics. In the regular courses the time given to theory and to practice work varies greatly among the different trade subjects and the different stages of each course. For stationary engineers the preponderance of time is given to theory throughout the entire course, while in other trades, as bricklaying and plumbing, practice work receives the greater attention after the first term. For machinists, pattern making, forging, and foundry work the aggregate time devoted to shopwork during the course only slightly exceeds that given to theory. In the two short courses taken by pupils in 1909–10, viz, machinist and plumbing, 8 hours were devoted to theory and 22 hours to practice during each week.

The practice work and instruction in the practice shops in the different trades is as follows:

Bricklaying.—The use and care of tools; proper handling of mortar; striking of different kinds of joints; building straight walls of different thicknesses; angles, piers, arches, fireplaces; setting of different walls, frames, and caps; building of scaffolding for inside and outside work; the application of fireproofing upon steel structural shapes; brick and terra cotta, floor arches, etc.; ornamental cornices; the use of concrete in building; pressed-brick work; placing drain pipes, etc.

Electric wiring.—Instruction in the use and care of tools and the correct posture of the workman; trade names and other usual designations of fittings, apparatus, and materials in common use, such as wires, cables, insulators, switches, cut-outs, etc.; operation, care, and adjustment of machines and apparatus; making joints and splices, running wires on insulators, in moldings, etc.; electric light and power wiring; exposed porcelain knob work; cleat work; concealed knob and tube work; iron conduits; fixture wiring; panels and switchboards; electric bell and annunciator wiring; bells in multiple and in series; return calls; house and hotel annunciators, burglar alarms, watchmen's clock systems; telephone wiring; interior telephones, switchboard and intercommunicating systems; the telephone and its parts; laboratory work.

Forging.—Practice in building and care of fires; use of fans and forges; names and use of tools; economical use of material; square, hexagon, octagon, and round steel pointing; eye bending; forging staples, gate hooks, crane hooks, S hooks, square, octagon, and hexagon shapes; angle bending; forging shaft keys; wrenches of different shapes and devices; brackets; bending rings on edge and flat; pointing iron upsetting; scarf, butt, V, and lock V methods of welding iron and steel; bolt heading; chain making and light ornamental work; tools of high-carbon and high-speed steel, such as chipping chisels, lathe, milling, shaper, planer, and boring mill tools; repairing shop tools generally.

Foundry work.—Practice in tempering sand and in molding with dry loam and green sand; use and care of tools and flasks for bench and floor work; making sheaves, rollers, brackets, test bars, pulleys, faceplates, etc.; molding sprocket wheels in green and dry sand; molding cylinders, sweeps, templates, cylinder heads, pistons, drums, tees, ells, etc.; making, drying, venting, handling, and setting cores; green and dry sand facings; preparation and management of cupola lining; drying and care of ladles; mixtures of iron for cylinders, pulleys, beds, and other shapes.

Machinist.—Chipping and filing, involving a study of the tools used, with reference to their shape, size, and cutting angles; chipping chamfers, flat, concave, and convex surfaces, keyways, and "chipping to shoulder"; names and classification of files; methods of holding and "laying out" the work; exercises in cross filing, draw filing, freehand filing, etc.; mechanism of machine tools; centering, squaring, straight and taper turning, and fitting; outside and inside screw cutting; chucking, reaming, finishing, and polishing; drilling, tapping, mandrel making, grinding, lapping, boring, brass turning, and finishing; the use of milling machines; gear cutting; tool making; designing and making jigs.

Pattern making.—The sharpening, adjustment, care, and use of bench and machine tools; the selection of materials; exercises in sawing, planing, chiseling, wood turning, and measuring; practice in reading of drawings; general exercises in making, marking, and storing patterns.

Plumbing.—Exercises in lead and solder working; calking and installing cast-iron pipe; installing and bending brass pipe; installing the Durham system of drainage; making traps and miscellaneous work; advanced work, such as setting up sinks, closets, and other fixtures; fitting up bathrooms, etc.

Stationary engineer.—The actual operation of steam and gas power plants and electrical machinery is required of all pupils who have not had practical experience in such work. This includes the discovery and correction of engine troubles, emergency repairs for engines, etc. Employment for at least five months in a power house is required as a part of the course.

In addition to the foregoing trade courses, which included all pupils enrolled in 1909–10, the day school also provides courses in heating and ventilating and in sheet metal and cornice work. The shop-work and instruction provided for in these two courses is as follows:

Heating and ventilating.—The use of tools; boiler and furnace setting; running of mains and risers; placing radiators and registers; making and installing various kinds of coils, such as wall coils, miter coils, corner coils, and manifolds; the use and proper placing of various types of valves, drips, traps, seals, etc., in one and two pipe systems of steam gravity and vacuum systems; the placing and care of machinery used in connection with heating and ventilating apparatus, such as blowers, fans, electric motors, gas and gasoline engines.

Sheet metal and cornice work.—The shop work is largely individual, so that the pupil can start according to his ability and past experience. The apprentice with little or no experience is started at cutting along straight and curved lines, preparing the

soldering tools, forming and assembling work, wiring and seaming different shaped articles. After becoming proficient in these lines he is given a number of carefully graded problems to develop, cut, form, and assemble. In the journeymen's class, the pupil is drilled on work in which he has not had much experience, after which he is taught pattern drafting.

In the day school the regular hours of instruction are from 9 a. m. to 5 p. m., with one hour for luncheon, from Monday to Friday, inclusive, but individual pupils are not required to remain during the entire time the school is in session. No pupils have less than 30 hours per week, while some have as much as 34 hours, depending on the course taken. The school year was originally divided into two terms of 15 weeks each, from the 1st of October to the middle of May, approximately. In 1909–10 the school was in session 32 weeks and in the future the school year will embrace 34 weeks. No summer term is provided. Two weeks of vacation are given pupils at Christmas and the usual legal holidays are observed.

Graduates from the regular course, either day or evening, receive a certificate of graduation from the school. Pupils who complete any portion or all of the work of the short course are given a letter by the dean of the school, setting forth the work done and the proficiency attained. About 35 or 40 per cent of pupils are reported as leaving school before the completion of their courses, the greater number of whom drop out during or soon after the first year. Most of the withdrawals are occasioned by the obtainment of employment by pupils.

During the year 1909–10 there were 21 teachers who gave trade instruction in the day course. Of these all but 1 taught the theory of a trade, while 12 of the number were instructors in shopwork. In addition there were 2 teachers of English, 1 of whom taught specifications and contracts. Of 20 teachers of trade subjects, 17 had attended other than common schools, 16 had practical experience in the trade taught, and 18 had previous experience in teaching the trade. Five teachers reported experience in supervisory school work.

In common with the other units of the Carnegie Technical Schools system, the School of Applied Industries is under the board of trustees of Carnegie Institute. A committee from the board has general supervision over all matters pertaining to the school's management and control. The officers of administration of the four Carnegie technical schools are the director, secretary, registrar, the dean of each school, the bursar, the supervisor of equipment, and others. The practical administration of the affairs of the four schools is in the hands of this body.

The School of Applied Industries is housed in a commodious building, having a floor area of 120,000 square feet. The style of architecture adopted is simple, dignified, and essentially serviceable, while the construction throughout is absolutely fireproof and in accordance

with the most modern practice. On the grounds are machinery hall, equipped with laboratories and heavy machinery, and a large power plant which insures efficient heating, lighting, and ventilation for all the buildings. The equipment for trade instruction represents an expenditure of approximately $400,000.

The income of the school, both day and evening sessions, from all sources in 1909–10 was about $75,000, the major portion coming from the general endowment fund provided by the founder. In the day school the tuition fee to residents of Pittsburg is $20 per annum and to others, $30. In addition, a general fee of $10 is collected to defray partly the cost of instructional material, the depreciation of laboratory and shop apparatus, and incidental supplies. A breakage deposit of $3 is required of each pupil, the unused portion of which, less 50 cents for locker rental, is returned at the end of the year. Pupils are required to furnish their own schoolbooks, but are permitted to take out without charge for home use circulating volumes from the Carnegie Library, which is located but a short distance from the school.

Approximately $13,000 were expended for materials used in trade instruction in the day and night schools during the year 1909–10. Nothing that is produced in the schools, however, is offered for sale, the articles manufactured, such as hand tools, patterns, castings, cabinetwork, etc., being either applied to school use or reduced to stock. A number of power machines built by pupils are in everyday use in the school shops.

The regular day course has been arranged primarily to meet the needs of young men who desire a broad industrial education in order to equip themselves for positions as foremen, inspectors, assistant master mechanics, assistant superintendents, etc., in the manufacturing and building trade industries. At the same time the executive side of the instruction is not stressed, the aim being to direct pupils into the skilled manual vocations, where in course of time they may rise to higher positions, rather than to prepare them for such positions immediately. The short day course and the evening courses are primarily for improvement in the trade selected or followed by the pupil. Graduates from these courses are soon able to do the work of journeymen. No difficulty in obtaining positions is experienced.

EVENING SCHOOL.

The evening courses are intended primarily for those who are working at a trade. In the formation of classes preference is given to men already at work, as it is recognized that they are in a position to make the best use of the instruction given. The usual time required to complete a course is four years, but advanced pupils finish a four

years' course in two years. Stationary engineers have three years of instruction and painters have two years.

The regular evening courses were opened January 7, 1906. The enrollment by trades on November 7, 1909, was as follows: Bricklaying, 21; electric wiring, 55; forging, 19; foundry work, 19; heating and ventilating, 9; house painting and graining, 8; machinists, 67; pattern making, 28; plumbing, 74; sheet-metal and cornice working, 25; sign painting, 24; stationary engineers, 23. In addition 80 pupils were studying mechanical drawing only.

On the same date, in addition, there were two advanced pupils who were taking the full machinists' course in two years; two who were taking the full forging course in two years; and one who was taking the full pattern-making course, one the full foundry-work course, and one the full sheet-metal and cornice workers' course in two years. Four advanced pupils were enrolled in the course in mechanical drawing.

The curriculum of theoretical studies pursued by evening pupils varies somewhat among the different trade courses, a greater number of subjects being included in some courses than in others. In the machinery and building trades the subjects taught are chemistry, drawing, English, mathematics, and physics. Lectures and shop talks form a part of the instruction in some of the courses.

In house painting and graining, chemistry was the only subject required in 1909–10, while in sign painting pupils had chemistry and free-hand drawing, a preponderance of time being given to the latter subject.

In every course attendance is required on three evenings of each week in the session. As the school hours are from 7.30 to 9.30 o'clock, each pupil has a maximum of six hours per week. In general, pupils in the regular four-year courses devote more time to practical work during the first two years and more time to theory thereafter. For stationary engineers and heating and ventilating, the work is all theoretical in character, while in the two years' course in house painting and graining almost the whole of the pupil's time is devoted to practice work.

The curriculum of shop practice followed in the evening school is identical with that of the day session, as far as the limited time will permit. At the same time, in the arrangement of evening courses a considerable amount of practice work by the pupil in his daily vocation is presupposed. In house painting and graining and in sign painting, which are taught only in the evening school, the shopwork and instruction is arranged as follows:

House painting and graining.—The care and uses of brushes and tools; mixing and applying of paints; cutting and setting of glass; puttying, sandpapering, and all the steps of proper development of work. In hardwood finishings the processes include staining, filling, shellacking, varnishing, rubbing, polishing, refinishing, and graining.

Sign painting.—Handling and care of tools; mixing and blending colors, preparation of various surfaces for sign purposes; coating wood, metal, brick, etc.; use of driers; gilding on wood and glass; the use of the "lettering pencil;" the use of "fitches;" practice in lettering.

The school is in session five evenings each week, from Monday to Friday, inclusive. The school year, containing 26 weeks, usually begins on the second Monday in October and ends on the last Friday in April. Thirty-one teachers were employed in 1909–10. Of these, 28 were teachers of trade subjects, either theory or practice, or both. A majority of these teachers also gave instruction in the day school.

The tuition fees in the evening courses are $5 per annum for residents of Pittsburg and $7 for all others. A general fee of $5 is collected from each pupil, as is also a breakage deposit and locker rental of $3. Of the latter amount, all but 50 cents locker rental is returned to the pupil if no breakage has been charged against him.

Workers in mills and factories and other persons from the middle walks of life, who have profited by the instruction offered at nominal cost, have expressed great appreciation of the school There is said to be some opposition on the part of colleges and college graduates, but this hostility is believed to be disappearing. Employers and employees, individually and as associations, are friendly toward the school. The plumbers', founders', and machinists' unions have committees to cooperate with the school committee in arranging the courses of instruction. The faculty, through the committee on student discipline, promulgates such rules for the government of pupils as are needed, and these rules are enforced through the cooperation of the various class organizations. Heads of trade departments are made advisors for pupils in their respective divisions.

PRATT INSTITUTE, BROOKLYN, N. Y.

Pratt Institute, in Brooklyn, N. Y., an independent endowed institution, was founded in May, 1887, by a philanthropic manufacturer. Classes were opened in October, 1887. The founder realized the lack of opportunity for practical education which he had experienced, and to supply such opportunity his school was planned to afford adequate training for young men and women who are to earn their living in the trades or professions. He particularly aimed to help the practical workers in the world, for whom the average school fails to make provision. The institute has five separate schools—a school for fine and applied arts, a normal school, a domestic-science school, a technical school, and a trade school. Only the day and evening sessions of the trade school for men and boys are here considered; the industrial school for girls and women is described separately, page 293.

In the selection of the trades to be taught the general demand of manufacturers for workmen was considered, as well as the lack of training schools offering industrial education.

The decision as to what trades shall be taught is with the trustees, who consider recommendations made by the director of the school.

The board of trustees is composed of six members of the Pratt family, assisted by an associate council of eight members.

The purpose of the trade school is to train skilled mechanics by teaching those who have had some experience in the trades.

The trades taught and the number of pupils in each are as follows: Carpentry and building, 39; machine-shop practice and toolmaking, 42. For admission to the school applicants must be at least 17 years of age and be fitted by nature and experience to succeed in the trade selected. No entrance examination is required, but the director personally interviews applicants in order that he may determine their ability to take up the work. For machine-shop practice and toolmaking pupils must have had a two years' apprenticeship or its equivalent. Unless some special reason warrants the setting aside of the rule, entrance to any class must be made at the beginning of the school year.

School is in session from Monday to Friday, inclusive. The school year of 36 weeks is divided into three terms, beginning with September, January, and April, respectively. The hours are from 9 to 5, with a midday recess of 50 minutes. All legal holidays and a 10 days' vacation at Christmas are observed. Between the terms regular sessions are discontinued for a few days. No summer classes are held.

The length of each course is one year. In carpentry and building $11\frac{2}{3}$ hours per week are devoted to theory and $24\frac{1}{6}$ hours to practice. The program for theory is as follows: Practical mathematics, three periods; elementary mechanics, three periods; estimating from plans, two periods; mechanical drawing, six periods. A period is 50 minutes. In the second and third terms architectural drawing replaces mechanical drawing. The shop practice for the first term includes bench work and wood turning; for the second term, mill work and roof framing; and for the third term, stair building.

In machine-shop practice and toolmaking 10 hours per week are given to theory and $24\frac{5}{6}$ to shop practice. The program for theory throughout the three terms is as follows: Practical mathematics, three periods; mechanics, three periods; and mechanical drawing, six periods. The shop practice includes machine construction and toolmaking throughout the year, and for one term each foundry work, patternmaking, and forging.

No textbooks are used, but syllabuses prepared by the school are sold to the pupils. Pupils have access to the general library of the school for reference books on technical subjects.

A satisfactory completion of the year's work entitles the pupil to a certificate. Such certificate admits to higher courses in the technical and art classes. About 50 per cent receive certificates, while 30 per cent remain until the end of the course, but fail to reach the standard required for the certificate. The remaining 20 per cent leave for financial or other reasons before the course is completed. These figures apply to both trades.

Two teachers are engaged for the instruction in theory, while four teach shop practice. The institute requires its teachers to be well qualified for their work. The teachers of shop practice had had considerable shop experience before going to the school.

The trade school uses the rooms and equipment of the department of science and technology, which occupies two separate buildings, as well as parts of two other buildings.

The institute is maintained mainly by the interest of the endowment and by gifts from the trustees.

Tuition for each course is $20 for a term of three months or $60 for the year. All tuition is paid by the term in advance. There are no free pupils. In addition to the tuition a $3 breakage fee must be paid. Formerly a fee of $2 for gymnasium privileges was required from every pupil, but this was discontinued at the close of the school year of 1909–10.

The product of the trade school consists of tools, machines, apparatus, benches, tables, and other furniture. A small part of this is sold. When practicable the product is used by the school.

To some extent the school work is accepted as an equivalent of part of the usual term of apprenticeship, but no specific arrangement exists between the school and employers by which apprenticeship is shortened because of school work. It has been stated that about one-half of the period of apprenticeship can be covered by the school, but this depends to a considerable degree upon both the ability and the previous experience of the pupils. The school work enables them to round out their shopwork and to acquire an intelligent grasp of the principles which underlie the work they are called upon to execute in the shop now and in the future.

There is a demand for the pupils of the school. The value of much of the training received is recognized not alone in their success on leaving the school, but when the subsequent history of graduates shows them as occupying executive positions as foremen or superintendents. The institute does not directly train for these higher positions, but expects many graduates to rise to them without much

delay; that is, as soon as they have had sufficient opportunity to acquire speed and skill in the shop.

The school has found its strongest appreciation in two classes: (1) The pupils whom it has educated, and (2) the employers to whom it has furnished competent workmen. No class has shown opposition to its work. Associations of employers as well as individual employers have been interested and cordial in their attitude. It was stated that the representatives of the employees' associations had no personal knowledge through its graduates of the work of the trade school. They would not, however, allow any deduction from the regular term of apprenticeship because of attendance at the school.

The evening trade school is intended primarily for boys and men who, because they are forced to work during the day, are unable to attend the day trade school. The course in each trade is planned to give practical instruction as well as whatever theory incidental to the work at hand may be required. There is an elementary course in carpentry for pupils who have had no previous experience, but, with this exception, the work is planned to supplement the daily work of the shop and not alone to increase present proficiency, but to prepare apprentices and journeymen for steady advancement.

Pupils in the evening school use the equipment of the department of science and technology.

No entrance examinations are required. A personal interview with the director must be held to determine the eligibility of applicants. All such applicants must be at least 16 years of age; the school prefers that they should be 17. Instruction in most cases is individual and planned to meet the immediate needs of the pupils.

The trades taught and the number of pupils enrolled in each are as follows: Machinist and toolmaking, 112; carpentry and pattern-making, 53; plumbing, 59; sheet-metal working, 16; steam engineering, 36; sign and fresco painting, 32.

For each course the tuition is $15 per season of six months. No refund is made for an unfinished course.

Classes meet on Monday, Wednesday, and Friday evenings from 7.30 to 9.30 p. m. from the latter part of September to the end of March. The same holidays are observed as in the day classes. The course for each trade except machinists and toolmaking, sheet-metal working and steam engineering covers two years. Machinists and toolmaking requires three years; sheet-metal working and steam engineering one year each. At the conclusion of the course a certificate is given for satisfactory work. It is stated that from 20 to 25 per cent leave before the completion of the course.

Theory of the trade such as shop mathematics or mechanical drawing is not given, but instruction in these topics, as well as lectures, is given as occasion demands in the explanation or development of shop practice.

The course for steam engineers is theoretical and is intended primarily for men who wish to become stationary engineers or who are preparing for examinations for an engineer's license. All applicants must be at least 17 years of age and must pass an entrance examination in arithmetic unless they have satisfactorily completed the course in practical mathematics.

The work is conducted by means of laboratory experiments in the properties of steam, the study of the steam engine, calculations in reference to horsepower, gas-engine tests, etc.

DAVID RANKEN, JR., SCHOOL OF MECHANICAL TRADES, ST. LOUIS, MO.

This institution was endowed and established in 1907 and opened in 1909. It was founded on the assumption that the public schools and other educational institutions not only had failed to provide training in mechanical trades, but had tended to draw boys away from the consideration of them by the creation of a prejudice against manual labor. Boys who could have succeeded as mechanics were in consequence caused to engage in pursuits either already overcrowded or for which they had no aptitude. The founder believed that there was a need of an institution to provide education in the ordinary mechanical trades and to inculcate an appreciation of the dignity of labor. He stipulated that the trades taught should be those in which there is a demand for practical workmen in the community and in the State.

The institution has three separate schools—a day school, an evening school, and a day cooperative school. The institution aims to give the boy without experience training similar to that received by the apprentice, to give the apprentice such instruction as will round out his shopwork, and to give the journeyman information concerning his trade that is not given in his shop. It also aims to secure the cooperation of manufacturers who acknowledge the limitations of shop instruction and who will send their apprentices to the school to study the theory of their trade.

For admission to the day or evening school candidates must be white males, 15 years of age or over, who have completed the sixth grade of the public schools or its equivalent. An exception is made in the day school for the admission of boys 14 years of age who have completed the work of the sixth grade of the public school, or its equivalent, and who are physically qualified for the work and show particular aptitude for trade instruction. All applicants must be in good physical condition and furnish a certificate of good moral

character. Any applicant who has had trade experience but who lacks the educational qualifications may make up the latter in special classes formed by the schools for preparatory instruction.

In the day school the trades taught and the number enrolled in each in January, 1910, were as follows: Carpentry, 15; bricklaying, 7; plumbing, 19; painting, 6; stationary engineers, 6. Pattern making is included in the list of trades offered, but as yet no pupils have elected it.

In the evening school the enrollment was as follows: Plumbing, 40; carpentry, 9; bricklaying, 10; painting, 10.

In the cooperative school 30 machinists' apprentices studied mathematics and drafting. This school is described in the chapter on cooperative schools, page 205.

The full courses for the day and evening schools have not yet been formulated. Some changes are in progress by which the theoretical work which covers drafting and mathematics will include elementary science and building theory. Day-school courses cover two years, but are to be extended to three years. The evening-school courses are indefinite.

Drafting and mathematics require seven hours each per week in the day school. These subjects are required of all day pupils, but are elective by the evening pupils. If elected, two evenings of two and one-half hours each are devoted to them. Pupils may elect shop practice for two or four evenings, may take two evenings for practice and two for theory, or may elect theory alone for two evenings.

The shops are well equipped with tools and materials for the various trades. For shop practice and equipment, see Table V.

The school year for day pupils covers a period of 46 weeks, extending from September to August. The year is divided into three terms, beginning in September, January, and April, respectively. The evening-school year covers two terms of 12 weeks each, beginning in October and in January.

Day-school sessions are held from 8.20 a. m. to 12 m. and from 1 to 4.40 p. m. from Monday to Friday, inclusive. On Saturdays the sessions are from 8.20 a. m. to 12 m. Evening classes are held from 7.30 to 10 p. m. from Mondays to Thursdays, inclusive.

As the trade instruction is almost entirely individual, pupils, except those who are taking the stationary engineer's course, may enter at any time. Practically all of the pupils in the evening school are actively engaged in the trade the theory or practice of which they study in the school.

Nominal tuition is charged, so that pupils will appreciate the opportunity offered and because of some sacrifice to pay for it will take it seriously. The charge for tuition eliminates to a considerable

extent an undesirable element that otherwise drifts in and out of schools without a definite purpose of completing any course. The charge for tuition is $30 per year, or $10 per term, for the day-school courses. For the evening-school courses $5 per term for two evenings per week, or $10 per term for four evenings is charged. Pupils are required to provide their own drawing instruments, paper, and other small incidentals. Tools and supplies in the shops are furnished by the school.

No textbooks are used as yet. A reference library in process of formation contains a few books on technical subjects and some trade magazines. The pupils use drawings and blue prints in connection with their work in the shop.

For a completed course a diploma is given. Upon request a statement of work done and the instructor's estimate of the pupil's proficiency will be given for any partial course.

The decision as to the election of trades rests largely with the superintendent, whose suggestions are subject to approval by the board of trustees.

The board of trustees is a self-perpetuating body of eight members, whose four officers are elected annually. This board annually elects an advisory committee of not more than 15 members. The governor, the attorney general of the State, and the mayor of St. Louis are members ex officio of this committee.

The grounds cover about 3 acres, on which a 3-story brick building, the first of a group, has been erected. This building contains six shops, a drafting room, science room, library, classroom, and offices.

The institution has an endowment fund of $3,000,000. The building cost $170,000 and its equipment $9,000. The expenditures for shop materials for both day and evening classes in 1909–10 amounted to $5,500, and for janitor service, heat, light, and power to $3,000. No outside financial assistance is received.

There are seven instructors, all of whom teach in the three schools. Two are college graduates in engineering, one having had five and one six years' shop experience. One of these teaches drafting and mathematics, the other drafting and practical steam engineering. Five instructors, with from 8 to 37 years' experience in their trades as journeymen, foremen, or as men in business for themselves, teach shop practice. The instructor of carpentry, who has worked at his trade 12 years, is a graduate of the Williamson Free School of Mechanical Trades.

It is believed by the superintendent that with adequate equipment trades can be thoroughly taught in this school. Later experience in the shop will be necessary for the development of the thoroughly competent workman. Promotions to positions of responsibility are

apt to follow where the actual shop practice has been supplemented by instruction in drafting, mathematics, and science, presupposing, of course, that the pupil has the requisite executive ability.

The appreciation of the value of theoretical training in addition to shopwork resulted in the establishment of the cooperative classes. (See p. 205.)

Considerable appreciation of the school has been shown by workmen, by contractors, and by associations of manufacturers, as well as by men and boys employed during the day who attend the evening classes. The attitude of the public in general is favorable to the school, but this attitude so far is merely an expression of good will, since there have been no means as yet of determining its value as a trade institution through the work of any graduate. The employers whose apprentices are in the cooperative classes have expressed themselves as pleased with the results, but as yet this arrangement is in its experimental stage.

NATIONAL TRADE SCHOOLS, INDIANAPOLIS, IND.

(Formerly the Winona Technical Institute.)

Agitation for the establishment of a trade school at Indianapolis was begun in 1903, and in March, 1904, the grounds of the United States arsenal were purchased with funds raised by popular subscription among citizens of Indianapolis and the friends of the Winona movement. In April, 1904, the Winona Technical Institute was incorporated and in September of the same year it was opened with departments of pharmacy, chemistry, electrical wiring, and a little later lithography and house and sign painting were added. Other departments have been added from time to time.

The school has for its purpose the teaching of the trades. On the assumption that no trade can be taught thoroughly without the actual shop conditions of commercial work, opportunity is given for shop practice on commercial work. This work is secured through the interest of manufacturers who are willing to intrust parts of their own contracts to the school. While the school plans to give the pupils as much of this commercial work as possible, no work may be undertaken at the expense of the regular course of instruction.

The school has been national in character and in reaching decisions as to what subjects should be taught the authorities of the school have conferred with the advisory boards of the various national employers' associations and with any other bodies directly interested. An arrangement with several machine manufacturers gave the boys an opportunity to put in a part of their time working in commercial shops.

In 1909 the school became so involved financially that it went into the hands of a receiver, who, at the time the school was visited, was

engaged in reorganizing the school and reconstructing its policy. It is expected to pass under the direction of the public-school authorities of Indianapolis, in which case it is proposed to levy a tax on the city of 3 cents on the $100, yielding an income of approximately $60,000 annually.

Under the reorganization an extensive cooperative scheme is to be introduced, whereby pupils will have an opportunity to earn a part of their maintenance while in school, as well as to get commercial shop practice.

Any boy 16 years of age or over, who desires to learn one of the trades taught is accepted as a pupil. The school prefers, however, to take no boy under 18 years of age, on the ground that younger boys are too immature to grasp the work. It is preferred that the pupils enter at the beginning of a term, but they are received at any time during the year, provided there is a vacancy and that their entrance does not interfere with class work of other pupils.

The trades taught are lithographing, printing, molding, machinist, bricklaying, tile and mantel setting, carpentry, painting and paper hanging, and pattern making. Courses in pharmacy and chemistry are also provided.

The year 1909-10 was hardly a normal year in point of attendance, since, because of financial uncertainty, some of the courses were not given. The attendance in each course was as follows: Lithographing, 44; printing, 93; molding, 29; bricklaying, 11; machinist, 25; tile and mantel setting, 13; carpentry, 1; and painting and paper hanging, 2. The number taking pattern making was not reported.

The years in the courses vary. Printing, lithographing, molding, machinist, pattern making and carpentry have in the past offered a two years' course; painting and paper hanging a one year's course; bricklaying three-fourths year's course; and tile and mantel setting one-half year's course. Under the plan of reorganization the program in some departments will be materially changed.

The amount of time devoted to the theoretical side of the trade differs widely in the different trades. Painting, bricklaying, carpentry, and pattern making offer no strictly theoretical work, the other trades offer theoretical courses varying from 2 to 15½ hours per week. For hours of theory and practice, see Table I.

In the lithographing course pupils in the first year devote 9 hours to theory and in the second year 15½ hours to theory and get practical work in every branch of the trade, beginning with the rudiments of drawing on paper and stone, preparations of stones and plates, lettering and engraving, transferring, proving, and printing, and then moving through the various stages to the final production of the work on flat-bed and rotary lithographic presses.

The department of lithography does all of the lithographic work for the school and in addition does as much commercial work as can be handled. Many of the machines have been donated by manufacturers of lithographic machinery.

The course in printing covers a preparatory course for pupils who have had no experience in printing, in which the rudiments are taught and attention is given to the simpler forms of composing and press-room work, and a junior course for pupils who have had one or two years' experience in printing, and covers ordinary display hand composition and presswork up to the more advanced composition, imposition, and presswork; and a senior course for pupils in the branch of printing for which they are best fitted. There is also a linotype course of eight weeks; pupils who have had no previous training in hand composition are required to take a short preparatory course in the composing room before entering the linotype course. Three hours per week are devoted to the theoretical side, history of printing, typography, and shop talks. In addition to the regular machine-operator instruction pupils receive sufficient training to be able to take care of and repair the linotype machine. The school is equipped with power presses, linotype machines, and type for hand composition.

The school of tile and mantel setting occupies a two-story building. The space is cut up into booths where each pupil has practice in tile laying and mantel setting. All of the tile work about the institution in lavatories, halls, etc., is done by the pupils. Actual working conditions are reproduced as nearly as possible, and practice is given in every branch of the trade. One hour per week is given to history of the manufacture and use of tiles and one hour to shop talks.

In the course in bricklaying, indoor practice is given in the various branches of the trade; pupils frequently have an opportunity to go outside of the school to work on buildings for pay. No time is given to theoretical work, except as it is incidental to practice. Fifty-two hours per week are given to shop practice.

The National Association of Brick Manufacturers has supplied several carloads of brick for use in the school.

In the machinist's course the pupils in the first year devote 7 hours per week to the theoretical side, covering applied mathematics, mechanical drawing, and shop talks; in the second year 8 hours are given to machine design. Thirty-seven hours per week during the first year and 36 per week during the second year are devoted to practice.

Machinery manufacturers have donated toward the equipment of the shop; they also aid the machinery department by allowing the department to finish parts of their machines.

In the foundry, which prepares for the molding trade, 12 hours per week are given to theory covering chemistry, mechanical drawing

(first year only), and shop talks, and 40 hours per week are given to shopwork.

Pupils in painting and paper hanging give all of the time, 48 hours per week, to practice. They get considerable practice by doing the work of the institution, and, through the cooperation of the master painters of Indianapolis, they get some commercial work.

The carpentry course combines the theory with the practice work, which covers 52 hours per week. The shop is well equipped with tools and the work in the shop is to teach the fundamentals of the trade and to give the pupil a chance to learn the various uses of commercial machines used in the trade and the methods of "getting out" various parts of material in house construction.

Later in the course the pupil is taught how to lay out and construct centers and window frames; make, case, and hang doors; lap beams and set bridging in them; erect stud partitions and lay flooring. In addition, house construction is taught. The course is aimed to give each member of the class a varied amount of shop and construction work. In connection with this department a course in joinery and a course in practical pattern making are given. Patterns are made for the foundry department.

In addition to the above courses there is a school of pharmacy, where a course in pharmaceutical chemistry fits boys for work in industrial chemistry and in manufacturing chemists' establishments.

The tuition fees vary in the different departments according to length of term and the instruction given. (See Table III.)

Pupils in the molding, printing, lithographing, machinist, and carpentry trades are required to deposit $5 for tools which amount is restored to them if they return all tools in good order. Each pupil in the tile and mantel setting, painting and paper hanging, and bricklaying trades must purchase a set of tools.

In each department there are a number of scholarships provided by manufacturers' associations for pupils who are unable to meet the tuition. The scholarship amounts to a loan, which is to be repaid by the pupil within five years after graduation.

School is in session throughout the year. The majority of the several departments are in session from 8 a. m. to 5 p. m., with an hour at noon, Monday to Friday, and on Saturday, 8 a. m. till noon.

Comparatively few textbooks are used, the most of the work being practical shopwork. For reference books the various trade journals furnish the chief supply. In addition, there is a reference library at the disposal of the pupils.

A diploma stating course taken and kind and grade of work done is given for completed courses. Certificates stating merely the amount of work done are given for fractional courses. It is estimated that at least 40 per cent of the pupils leave before the completion of a course.

In some cases they have completed some specific branch of it; in others they have merely gained information enough to enable them to get a job.

During 1909–10 fourteen trade teachers were employed. Practically all of them were men from the trades and were in general nominated by the National Manufacturers' Association. Most of the teachers had had little or no teaching experience prior to that at Winona, but had had from 5 to 30 years' experience as mechanics. There has been little trouble in retaining teachers.

Labor unions in the past have been hostile to the institution, but under the new management there probably will be some cooperation of the trade unions with the authorities of the school.

Under the régime of the Winona assembly there was a board of 50 directors; seven were ministers, two were attorneys; the rest represented various manufacturing interests throughout the country; each department had an advisory committee from the employers' organization of the trade it teaches. The reorganized board is planned to have nine members, two of whom are to be appointed by the governor of the State; two, one of whom must be a labor man, by the mayor of Indianapolis; one by the Commercial Club of the city; one by the board of trade; one by the Merchants' Association, and two by the school board.

The grounds and buildings purchased from the Government were valued at $29,990.34. Since that time the foundry building, costing $10,090.55, has been added. The present working outfit of all departments is valued at $135,000, of which an equipment valued at $85,000 was furnished by the institute, and an equipment valued at $50,000 was furnished by various manufacturers' organizations.

During the past year employers' associations have given $11,623 toward the support of the school; and $5,857 more was given by local employers and by other people interested, while additional funds were made up by tuition fees, etc.

The machine shop, foundry, printing, lithographing, and pattern-making departments make a marketable product. For the past year receipts from the output were approximately as follows: Foundry, $18,000; printing, $6,000; lithographing, $3,000; machine shop, $7,200; pattern making, $5,000.

This work is almost entirely order work. No work is done for the open market, but is made up as ordered.

Pupils engaged in commercial work are paid for their time. In the foundry department boys are paid 8 cents per hour from the start, advancing 1 cent per hour each quarter until the course is completed. They earn from $4.20 to $12 per week. In the machine-shop department they work piece rate and earn from $3 to $10 per week. In the printing and lithography departments earnings are very irregular.

In the past the manufacturers have recognized the work of the school as equivalent to an entire apprenticeship. The trade unions, on the other hand, refused to recognize the school or to give any credit on union apprenticeship to pupils of the school. Under the new board it is expected that the union will give credit on the apprenticeship for the time put in at school. When pupils leave the school and join the union they are to be known as advanced apprentices until they become qualified as mechanics.

In the past there has been a considerable demand for graduates of Winona Technical Institute in open and nonunion shops. Testimonials of employers indicate that the students are efficient and are desirable workmen.

It is stated by the school that it can effectively teach trades, and turn out men who can hold their own in any shop, and commercial shop experience of from six months to a year gives them added speed and adaptation to shop conditions. Neither the unions nor all employers subscribe to this; they claim that while the training is undoubtedly valuable it can not take the place of so large a portion of the apprenticeship.

The greatest appreciation of the school has come from the various national associations of employers. It is natural that it should be so since the school has always derived its greatest support from these associations.

The unions have agreed to support the reorganized National Trade School on condition that neither employers nor workmen will in any way involve the school in disputes between capital and labor, that the employers will not use the school as a strike-breaking institution, that the school will not allow its pupils to go to any place where a strike is under way for the purpose of breaking the strike, and that if any pupil shall do so he will be debarred from ever returning to the institution.

MECHANICS' INSTITUTE OF ROCHESTER, ROCHESTER, N. Y.

The Mechanics' Institute of Rochester was established in 1885 as an evening school for mechanics or others employed during the day. The success of the evening classes led to the establishment of day classes in 1886. The object of the institute is twofold: To afford opportunity for persons of both sexes to take up at least the beginning of a trade or vocation, or to assist persons already in trades by such added instruction along both theoretical and practical lines as would not be offered them in their regular shopwork.

The curriculum of the school has been based on the need for skilled workmen in the various local manufacturing establishments, and for women in the dressmaking and millinery trades. The board of directors decides which trades shall be taught. This board is composed

of 33 members, who are elected in groups of 7 by the subscribers to current expenses. An executive committee of 14 members is appointed by this board from its own membership.

The following statement shows the trades taught and the pupils enrolled in each for the day and evening schools:

Day school.—Machinist, 40; woodworking, 30; electrical work, 28; dressmaking, 40; millinery, 16.

Evening school.—Machinist, 198; toolmaking, 30; pattern making, 8; joinery and cabinetmaking, 12; chauffeurs, 100; carpentry, 40; masonry, 41; sign painting, 11; steam engineering, 20; gas engineers, 89; electrical work, 66; sewing, 25; dressmaking, 40; millinery, 30; buttonhole making, 4.

Applicants for admission to the day classes must be at least 16 years of age, and to the evening classes 14 years. To enter the day classes men and boys must have had a grammar-school education or its equivalent. Females who wish to enter the dressmaking classes must pass an entrance examination in sewing, including machine work. Entrance to the day classes except for special reasons must be made at the beginning of the term. In the evening classes the entrance of pupils in the sewing, millinery, and dressmaking classes must also be at the beginning of the term, but other pupils may enter at any time, although the school authorities prefer that they follow the rule for the day classes. The majority of the evening pupils are employed during the day at the trades in which they are registered.

The time required for each trade varies from six months to four years. (See Table I.)

The academic subjects in the day courses for machinists and woodworkers are as follows:

First year.—Algebra, physics, English, and mechanical drawing.

Second year.—Plane geometry, chemistry, English, German, mechanical drawing.

Third year.—Solid geometry, English, mechanics, German, algebra, plane trigonometry, surveying, and mechanical drawing.

The academic subjects for the course in electricity are the same for the first year as in the other two trades just cited, but in the second year are as follows:

Plane geometry, chemistry, English, electricity, and mechanical drawing. In the third year the course includes solid geometry, chemistry, English, electricity, mechanics, plane trigonometry, and a review of algebra. Some theoretical instruction is given in millinery and dressmaking.

In the evening classes the time is divided between theory and practice. For the hours devoted to schoolroom work and shop practice see Table I.

The day school is in session from September to June, the school year consisting of 36 weeks. Classes are held from Monday to Saturday, inclusive, from 8.50 a. m. to 12 m., and from 1 to 4.15 p. m., for males; and from 9 a. m. to 12 m., and 1 to 4 p. m., for females.

The evening school is in session from September to March. The school is in session from 7.30 to 9.30 p. m. Mondays to Fridays, inclusive. For the hours per week for the separate trades see Table I. All sessions in both schools are suspended on legal holidays, for two weeks at Christmas, and for one week at Easter.

A diploma is given for the completion of a course, a certificate for the completion of a year's work in the day school, while in the evening school a letter based on the records of the pupil and stating the time spent and the work done is given on request for any part of a course. It is estimated that in the day school about 50 per cent receive diplomas; in the evening school about 95 per cent of the males and about 75 per cent of the females receive diplomas. In the trades for females pupils frequently come for merely certain parts of their trade and do not consider a full course necessary to secure them satisfactory employment.

Fourteen teachers are employed, 13 of whom teach both day and evening classes, and 11 of whom teach both theory and practice of their respective trades. Of the number who reported, one is a college graduate, an electrical engineer, while, with the exception of two, all have had practical shop experience. The school experiences some difficulty in retaining competent teachers because the increasing number of trade and technical schools has created a demand for them.

The value of the two buildings in which trade instruction is given is placed at about $195,000 and their equipment at about $35,000. The support of the institute is derived from interest on the endowment, from private gifts, from State appropriations, and from tuition fees. The expenses of the pupil include tuition fees, textbooks, drawing materials, and certain amounts paid for lockers and for breakage. Tuition fees, in both day and evening school, vary according to trade taught. The pupils in domestic arts provide their own materials. For materials provided in 1909–10 by the institute for both the day and the evening school, $2,920 was expended. To a considerable extent the completed product of the institute is marketable and is sold. From some sales the institute retains one-half the proceeds, while from others the pupil receives the entire amount.

There is no claim made by the school to teach a trade as thoroughly as a shop may teach trades. If a pupil plans to enter a trade his instruction will be along fundamental lines with practical exercises in order to prepare him to take up his work in an intelligent manner; if he is already engaged in a trade his course in the school is intended to supplement and round out his work. Except in the trades for women the institute does not consider that the courses outlined do more than give either the fundamentals or such theory and practice as are not available in the shop. The evening school is practically a continuation school. As a continuation school it has the approval of the

labor organizations, who consider its work of value to the apprentice or journeyman. On the other hand these organizations are opposed to the work in elementary trade instruction. The industrial classes generally, the graduates and former pupils of the school, and their parents show the greatest appreciation of the work of the institute. There are continual requests from employers for graduates.

CALIFORNIA SCHOOL OF MECHANICAL ARTS, AND THE WILMERDING SCHOOL OF INDUSTRIAL ARTS, SAN FRANCISCO, CAL.

The Wilmerding School of Industrial Arts and the California School of Mechanical Arts are two entirely separate schools and are maintained by separate endowments, but cooperate so closely that they should be considered together. Both are under the same director and all duplication of work is eliminated. The California School of Mechanical Arts offered a strong course in the machinery trades, so when the Wilmerding school was established, the latter offered courses in the building trades. Such woodworking instruction as had been given at the older school was transferred to Wilmerding. Students registered at the California school are given full credit for work done at Wilmerding and vice versa.

THE CALIFORNIA SCHOOL OF MECHANICAL ARTS.

This is the older of the two schools. It was established January 3, 1895, in pursuance of the will of a citizen of California. By the terms of the will $540,000 were left in trust "to found and endow an institution to be called the 'California School of Mechanical Arts,' the object and purpose of which shall be to educate males and females in the practical arts of life * * *; such institution to be open to all youths born in California."

The will provided for a board of six directors who were "to acquire the site thereof, and to form a corporation, the only corporators being themselves, to own, control, and manage the said institution, the members of said corporation never to exceed seven, and vacancies in the membership to be filled from time to time by the survivors."

The will provides that instruction shall be given in "working in wood, iron, and stone, or any of the metals, and in whatever intelligent mechanical skill now is or hereafter can be applied." So far the school is devoted to pattern making, forging, and machine-shop work, with correlated work in mechanical drawing and industrial chemistry. Sewing, dressmaking, and millinery courses taken by girls are intended for home use only. In addition to these courses the school offers a technical college preparatory course.

The only limit on attendance provided for by the will is that the pupil shall have been born in California. The school adds the further requirement that the pupil shall have had a grammar-grade

education. The capacity of the school is limited, so the admissions are allotted to the various counties of California according to the population of those counties. If there are more candidates from any county than the quota allows, admission is determined by competitive examination.

The trade department of the school provides for a four years' course, including a two years' preliminary course and two years of specialization. During the two preliminary years instruction is given in English, mathematics (algebra and geometry), general science, chemistry, free-hand and mechanical drawing. During the first of these two years 15 hours per week are given to academic work and $11\frac{1}{4}$ hours to shopwork. In the second year $16\frac{7}{8}$ hours are given to academic and $9\frac{3}{8}$ hours to shopwork. For boys this shopwork consists of elementary work in molding and pattern making in the first year, and forge work and molding in the second year.

At the beginning of the third year specialization begins. In the third year $22\frac{1}{2}$ hours are given to shop practice and $7\frac{1}{2}$ to academic work, and in the fourth year $26\frac{1}{4}$ hours to shop practice and $3\frac{3}{4}$ to academic work.

The academic time in the third year is devoted to American history and government, mathematics, and mechanics. In the fourth year the entire time allotted to academic work is devoted to heat calculations, boiler and engine tests, and electrical calculations.

The first two years of shopwork consist of a graded course, and include instruction in sharpening saws and edge tools, elementary joinery, lathe work, etc., and making drawings of all work performed.

At the beginning of the third year the pupil selects a trade and confines his shopwork to such subjects as are necessary to a thorough knowledge of the trade. Following are the courses in the various trades:

Pattern making.—Continuous practice upon patterns for actual use in the foundry, including gears, steam pumps, engines, hoists, propeller blades, dynamo frames, etc., core work, and sweep work. Supplemental instruction is given in methods of manufacturing, preserving, and seasoning lumber, shop arrangement and management, woodworking machinery and mill methods, methods of storing and checking patterns.

Forging.—Practice in forging difficult machine parts, such as engine shafts, connecting rods and other parts, accessories for hoists, cranes, forge and lathe tools, carriage and wagon parts, etc.; also structural and ornamental ironwork and sundry selected jobs covering the entire field of forging. Supplemental instruction is given in estimates, contracts, and specifications; metallurgy, production of steel, manufacture of rolled steel shapes, and their use.

Machinist.—Machine-shop practice in all its details, including work at the vise, use of lathe, planer, shaper, milling machine, drill press, etc.; construction of engines, hoists, lathes, pumps, etc.; electrical construction, dynamos, motors, hoists, heating and lighting appliances, etc., and care of a power plant. The supplemental instruction given is the same as that given in forge work.

The school opens the first week in August, and, with the exception of two weeks at Christmas and two at Easter, is in continuous operation until early in June, covering 40 weeks. School is in session from 9 a. m. to 4 p. m., with 45 minutes' recess at noon, from Monday to Friday, except on Wednesday, when the afternoon session closes at 2.15.

A trade-school diploma is given for satisfactory completion of the work in any trade.

About 20 per cent of the pupils enrolled leave before completing the course.

There is no fee charged for tuition, but pupils in trade courses are charged $12 per year for materials used. The school does not make a practice of furnishing free schoolbooks, but a limited number of books are kept on hand which are loaned to pupils upon request of parents.

The equipment of the school is valued at $30,000.

The school makes a limited product in each department, such as hoist engines, turbines, motors, patterns, castings, and forgings, which are sold, the profits accruing to the school. The pupils earn nothing from the sale of finished product.

There has been no standardization of the credit allowed graduates of this school upon their apprenticeship. Most employers allow some time, the amount varying from two to four years.

The teacher in forge work has had 8 years' trade experience and 28 years' teaching experience, the machinist teacher has had 30 years' trade experience and 2 years' teaching experience, and the teacher in pattern making has had 6½ years' trade experience and 8 years' teaching experience. An effort is made to secure for all boys in the trade courses some actual experience in commercial shops before graduation.

THE WILMERDING SCHOOL OF INDUSTRIAL ARTS.

This school was founded in 1894 by the will of a San Francisco merchant. Under the will $400,000 was bequeathed to the regents of the University of California "to establish and maintain a school, to be called the 'Wilmerding School of Industrial Arts,' to teach boys trades, fitting them to make a living with their hands, with little study and plenty of work."

After mature deliberation the regents resolved to cooperate with the California School of Mechanical Arts, to avoid duplication of work in the two schools. They acquired lands and erected buildings near by. An advisory board consisting of four members is chosen by the regents of the University of California. The first class was admitted January 8, 1900, and subsequent classes have been organized at intervals of six months (July and January) of each year.

The school is open to "any earnest, industrious boy who wants to learn one of the building trades as an integral part of his education and preparation for life." It aims, however, to give something more than the mere equivalent of a workshop apprenticeship. Its graduates must have a fair command of the English language; they must know enough of mathematics, drawing, and science to insure intelligent and progressive workmanship.

Any boy who has completed the grammar grade is eligible for admission. Boys who have finished only the seventh grade will be admitted provided they are 16 years of age or over; the maximum age of admission is 21 years.

The enrollment for the various courses is as follows: Carpentry, 15; bricklaying, 8; plumbing and tinning, 24; electrical work, 60; cabinet making, 16; trade not yet determined, 60.

The school also has a class in architectural drawing. The length of the school year is 40 weeks. The hours of attendance are from 9 a. m. to 12 m. and from 12.45 to 4 p. m. Monday to Friday, except on Wednesday, when the afternoon session closes at 2.15. The daily program includes eight periods of 45 minutes each. During the first two years four periods per day are spent in the shops and four periods are devoted to academic instruction. During the last two years the academic instruction is gradually discontinued.

The academic subjects consist of English, mathematics, science, drawing, and history.

A student may select his trade immediately upon entering school, or he may defer selection for a period not exceeding two years. Whenever he begins his trade course he devotes all of his shop time to his chosen trade.

If he chooses to defer selection of a trade, his preliminary course must include the regular academic subjects and must not include more than two lines of shop work at one time. He may change from one industrial department to another or he may begin a regular trade course, at the beginning of a new term (July or January). Boys are encouraged to take some preliminary work in order to determine for what trade they have the greatest adaptability.

The trade practice teachers are men of experience both in the commercial practice of their trade and in teaching.

The school furnishes all materials, and all products are the property of the school. The pupils may buy articles they have made, at the cost of the materials.

A certificate showing work done is given pupils who have completed at least two years' work, and a diploma is given upon completion of four years' work. About 20 per cent of pupils finish the four-year course.

MANUAL TRAINING AND INDUSTRIAL SCHOOL, NEW LONDON, CONN.

This school, established in 1903 and opened in 1906, owes its foundation to a banker, who was interested in industrial education. For some years the superintendent of schools of New London had urged the introduction of industrial education in the public schools. In 1903 an offer was made to donate $100,000 for the purpose of adding such a department to the public-school system, but after some deliberation the founder decided to establish an independent trade school. A self-perpetuating board of trustees, consisting of 11 members, 1 of whom was the superintendent of public schools, was appointed to administer its affairs. After the necessary expenditures had been made for the land, building, and equipment of the school the remaining funds were inadequate to provide for its maintenance. The public-school authorities then offered to provide teachers of the academic and theoretical subjects on condition that the children of the public schools might receive free tuition in manual training and trade instruction. This arrangement was accepted by the trustees. The local opportunities for employment in the machinist trade and in dressmaking and millinery have been the basis for the selection of the trades taught. The selection of any trade rests with the board of trustees.

The trades taught and the number enrolled in each during 1909–10 were as follows: Machinist, 16; dressmaking and millinery, 66. All applicants must be grammar-school graduates at least 14 years of age. Entrance to the school may be made at any time of the year.

The course for each trade covers 4 years. Fifteen hours per week are given to cultural and theoretical subjects and 7½ to shop practice for the first three years, while 7½ hours are given to theoretical and cultural subjects and 15 hours to practice during the fourth year. The subjects in the machinist trade are mathematics, English, scientific subjects, and mechanical drawing. In the last term of the fourth year mechanical drawing is discontinued, and less time is given to scientific subjects and mathematics.

In dressmaking and millinery the academic studies are mathematics and English, to each of which are given 3¾ hours per week. In addition, 7½ hours per week during the first three years are given to lectures and general instruction in trade theory. In the fourth year the subject of mathematics is dropped and 2¼ hours per week are given to English and 5¼ hours to lectures on trade theory.

Sessions are held from Monday to Friday, inclusive, from 8.45 a. m. to 3.30 p. m., with a forenoon recess of 15 minutes and a recess of 2 hours at noon. The school year, covering 38 weeks, opens in September and closes in June. Classes are suspended for four days at Thanksgiving, one week at Christmas, and for a spring vacation in April of 11 days.

A diploma is awarded for a completed course in either trade. No certificate is given for a partial course. It is stated that about 85 per cent of the pupils in each trade receive diplomas.

Three teachers are employed for the trades. All teach theory and practice. One of the two instructors of the machinist's trade reported special preparation in the Massachusetts School of Technology. One had had one year's experience as a teacher, the other 21 years' experience as a teacher. The teacher of dressmaking and millinery worked at the trade of dressmaking for five years and has had six years of teaching experience. So far the school has experienced no difficulty in retaining its teachers.

The founder of the school gave $100,000 for its establishment. Of this amount $60,000 were spent for the building and grounds and $28,025 on the furnishing and equipment. The present available endowment amounts to $11,975. The city donated in 1909–10 a sum of $3,500, while the founder gave the same amount, and has assured the school of this amount annually. Tuition is free for residents of New London, but nonresidents are required to pay $20 per year in advance. All pupils furnish their own books, while girls who take dressmaking and millinery supply the materials for all articles except the practice models. None of the school product is sold, but becomes the property of the school, or, in dressmaking and millinery, of those pupils who provide their own materials.

It is stated by the school that the completed work of the machinist's trade has been accepted as the equivalent of three years in the usual four years' shop apprenticeship. As the school is new, its status in this respect can scarcely as yet be defined. Both employers and employees show interest in it and speak well of its work. The fact that the graduates have all secured employment has indicated a demand in the vicinity for well-trained workers—a demand which the school expects to experience each year. No claim is made by the school that it can place its graduates in the shop equally qualified with those workmen who have had all their training in the shop; it is stated that to accomplish this result one year in actual trade practice is required.

No opposition has been shown to the school or its purpose, but on the other hand decided appreciation has been expressed by parents, pupils, school officials, and manufacturers.

HEBREW TECHNICAL INSTITUTE, NEW YORK, N. Y.

The Hebrew Technical Institute, of New York City, was established in 1883 by a society organized to promote industrial pursuits among Hebrews. The society was incorporated in January, 1884, when the first classes offering instruction in drawing, English, and mathematics were opened. Woodworking was introduced in March of the

same year. The school at first experienced some difficulty in securing pupils because Jewish parents, many of whom were immigrants, had brought with them from Russia a prejudice against manual labor and objected to having their sons trained as mechanics. A house-to-house canvass was made to induce such parents to send their boys to the school. In a short time the interest taken in the work by the pupils removed the prejudice against it, and its popularity was assured.

The institute is endowed. The sources of endowment are numerous, including many private bequests. The curriculum is determined by the local demand for workmen in the building trades and in the metal and woodworking industries.

The institute is independent and has no affiliation with any other school, except that it receives boys trained in elementary woodworking from two Hebrew charitable institutions. The affairs are administered by a board of directors composed of 21 members.

The course covers three years. The first and second years are devoted to general instruction covering all the trades taught; in the third year a special trade is elected. The number of pupils in each trade (third year) during 1909–10 was as follows: Woodworking and pattern making, 14; wood carving, 1; metal working (machinists, etc.), 13; instrument making (electrical and scientific), 12; electrical work and electrical construction, 25.

There were in addition 111 pupils in the first-year class and 87 in the second.

Boys not less than 13 or more than 17 years of age, living within convenient reach of New York City, who pass a satisfactory examination in arithmetic, English, geography, and United States history, and who upon physical examination are found to be in good health, are eligible for admission to the institute. General admission to the institute is made in September and February, but for special reason pupils may be admitted at any time during the school year, in which case they are given individual instruction for a time until they make up any work already covered by the class.

For the first two years the academic work includes English, history, and civics, geography (first year only), mathematics, physics, mechanics, electricity, shop lectures, free-hand and mechanical drawing, and shop-inspection trips. During the third year the same subjects except geography are studied, except that free-hand drawing is taken only by the class in wood carving. A feature of this school is the regular system of observation of work in industrial plants, to which the pupils are conducted by a teacher regularly engaged for these inspection trips.

During the first year of the course 21 hours a week are devoted to theoretical and academic instruction and 8 hours to shopwork practice. During the second year 21 hours per week are devoted to

theory and 11 hours to shop practice. During the third year of the course, in electrical work (and electrical construction), metal working (machinists, etc.), and woodworking and pattern making the hours devoted to theory are 17 and to shop practice 14 per week; in instrument making pupils devote 16 hours each to shop and school, and in wood carving 19 hours per week are devoted to theory and 12 hours to shop practice. The daily session of the institute begins at 9 a. m. and closes at 5 p. m. from Monday to Thursday, inclusive; Friday the session closes at 4 p. m. The first-year class, however, is always dismissed at 4 p. m. There is a recess of one hour at noon.

The school year covers 42 weeks, beginning early in September and ending in June. In addition, there is a summer term of 4 weeks, divided into two sections of 2 weeks each, one the latter part of July and the other through part of August and September. The regulations governing the summer term are the same as for the general term, except that during the summer term the daily session of the school is from 9 a. m. to 12 m. The same pupils attend as in the regular term. The vacational periods of the school year conform to the legal and the Hebrew holidays.

The institute has a library of upward of 4,000 volumes, consisting chiefly of books of reference on mechanical and scientific subjects. Upon satisfactory completion of the full course of three years the institution confers a diploma upon the graduate and may give special recommendations as an aid to securing employment. It is stated that in the trade about 20 per cent of the pupils of the institute leave before the completion of the course. Practically no pupils leave from the third year.

The institute employs 15 teachers, as follows: Four who teach theory of the trade, six who teach shop practice, and four who teach general subjects. The institute formerly experienced difficulty in retaining qualified trade teachers; now, however, in order to hold competent occupational teachers, salaries have been advanced so as to about equal earnings in outside professional pursuits. The teachers are immediately responsible to the board of directors of the institute.

The estimated cost of the buildings occupied by the institute is $100,000 and the estimated cost of the equipment for trade instruction is $43,000. Through the contribution of members of the society and from independent sources the institute received financial assistance during the year 1909 to the amount of $42,806.

No tuition fee is charged by the institute and the books used by the pupils are furnished free of charge. The cost of materials used for trade instruction during the calendar year 1909 was $2,866. The pupils make a marketable product, such as electrical appliances, machines, etc., but these are used for shop equipment or display.

While the institute aims to prepare its pupils to assume places in the shops of their respective trades, it has no specific arrangement with employers by which the usual apprenticeship is abridged. Graduates who enter shops must show by their ability the stage of the apprenticeship they are able to assume, and by their progress the value of their training in fundamental principles. It is stated by the institute that its graduates are able to immediately enter upon their respective trades and hold their own as general shop workmen, but the scope of instruction does not include the idea of equipping pupils for positions of foremen or other executive positions. It is said, however, that about 10 per cent of the graduates of the institute employed in technical branches rise to the position of foreman or superintendent, while others again become independent manufacturers, builders, etc. The employers who in their shops have found the work of the graduate satisfactory have shown the greatest appreciation of the school. The attitude of associations toward the institute is said to be favorable. While there has been no expression of opinion from organizations of employees, as individuals they indorse the school.

The evening school was established in 1903. The instruction of the institute in the evening school is limited to those persons already engaged in a trade. The trades taught and the number of pupils enrolled during 1909–10 are as follows: Toolmaking, 23; instrument making (electrical and scientific), 25; pattern making, 10.

No one under 19 years of age is admitted to the evening school. The course for each of the occupations taught requires two years. The school year covers 35 weeks, from early September to the middle of May. Classes are held three evenings of each week—Monday, Tuesday, and Thursday—from 7.30 to 9.30 p. m. The subjects taught are drawing and mathematics, the latter, however, being optional with the pupil. Instrument makers (electrical and scientific) and toolmakers devote 2 hours to drawing and 1 hour to mathematics if mathematics be taken, and 3 hours to shop practice, per week. If mathematics is not taken the time is given to shop practice. Pattern makers do not take drawing, but may devote 1 hour to mathematics and 5 hours to shop practice; if mathematics is not taken the 6 hours per week is given to shop practice. Pupils furnish their own hand tools and drawing materials. No fee for tuition is charged, but a charge of $1 per month is made to cover the cost of supplies. The classes use the building and equipment of the day classes.

There are three teachers of practice in the evening school, all of whom teach in the day school also.

The pupils make a marketable product, such as tools, which are used in the school.

NEW YORK TRADE SCHOOL, NEW YORK, N. Y.

The New York Trade School is an independent endowed institution which provides day and evening trade instruction to beginners and to men already at work in the various trades. The school was founded in 1881 by an architect who realized in his own experience the lack of competent workmen in the building trades and the failure of any prevailing system of apprenticeship to change conditions. He desired to offer a means of livelihood to young men who have an aptitude for mechanics. He knew that the opportunity to learn thoroughly a trade in the shop was rare, and that the training necessary to develop the highly skilled mechanic needed systematic instruction for which the employer seldom has either the time or the ability.

The demand in New York for skilled workmen, particularly for those in the building trades, has been the basis of the selection of trades taught in the school. A secondary influence is the recognition of the absence of adequate training in trades in which there is no definite system of apprenticeship, and the consequent need for trade schools to supply this training.

The school regards itself as a pioneer in trade-school instruction in the United States. The system instituted by the founder combines both theoretical and practical work and aims to send forth the pupil equipped with a knowledge of the theory of his trade and of the use of tools combined with sufficient manual dexterity to execute his work. The subsequent practice in the shop will supply skill and speed.

The school was incorporated in 1892 and is under the administration of a board of trustees consisting of 7 members who are men prominent in professional and financial circles. In addition there are four trade school committees, of at least 5 members each, composed of master mechanics in the trades taught in the school, as well as a committee from the General Society of Mechanics and Tradesmen of New York. These committees visit the school, keep in touch with the work, and where some change may prove beneficial, make suggestions as to different methods of operation.

The work of the trade courses is not considered as a part of an apprenticeship, but in shops where no regular apprenticeship obtains the graduate is regarded as a handy man who is in position to learn his trade well. Where there is a definite term of apprenticeship he may shorten his time because of his ability, but no agreement exists between the school and any employers.

The trades taught and the pupils in each in the day school are as follows: Plumbing, 84; electrical work, 33; painting and decorating, 4; sign painting, 5; cornice and skylight work, 7; bricklaying, 14; carpentry, 11; steam and hot water fitting, 14.

In the evening classes the enrollment is as follows: Bricklaying, 25; plastering, 13; plumbing, 199; electrical work, 106; pattern making, 10; painting and decorating, 20; blacksmithing, 9; printing, 28; sign painting, 21; cornice and skylight work, 61; steam and hot water fitting, 24. Young men who can read and write and who are at least 17 years of age may enter the day or evening school. The maximum age at entrance varies from 22 to 25 years according to the trade. In only one course, cornice and skylight work, is previous trade experience an entrance requirement.

All pupils must register for a full term. Except for excellent reasons entrance must be made when the classes are formed. Practically all of the pupils in the evening school are employed during the day in the trades which they are taking.

The length of the day course for each trade is 16 weeks, except for steam and hot water fitting, which covers 12 weeks. Classes meet every day from Monday to Saturday, inclusive, from 8.30 a. m. to 4 p. m., with one hour's recess at noon. Classes on Saturday close at noon. The school year opens in December and closes in March.

The evening school year extends over a period of 26 weeks from September to March. The course for steam and hot water fitting covers two years; for other trades three years are required. Sessions are held Mondays, Wednesdays, and Fridays from 7 to 9.30 p. m. In the plumbing and cornice and skylight-work courses the large classes necessitate extra sessions on Tuesdays, Thursdays, and Saturdays for first-term pupils. Legal holidays are observed as well as a recess of 3 days at Christmas.

In the day classes the periods per week for theory and for shop-work are divided as follows: Electrical work, 3 hours theory, 33 shop practice; painting and decorating, bricklaying, cornice and skylight work, carpentry, $1\frac{1}{2}$ hours theory, $34\frac{1}{2}$ hours shop practice; steam and hot water fitting, sign painting, and plumbing, $3\frac{3}{4}$ hours theory, $32\frac{1}{4}$ hours shop practice.

In the evening school, theory and shop practice are divided as follows: Electrical work, 1 hour theory, $6\frac{1}{2}$ hours shop practice; in sign painting, steam and hot water fitting and plumbing, $\frac{3}{4}$ hour theory, $6\frac{3}{4}$ hours shop practice; for the 7 remaining trades, $\frac{1}{2}$ hour theory, 7 hours shop practice.

Theory in both schools includes drawing, either free hand or plan, lectures, and examinations.

Pamphlet textbooks and typewritten sheets are furnished without charge to the pupils. No other textbooks are used. There is a reference library connected with the school for the pupils.

For the completion of each term's work an "award of merit" is given to undergraduates. A certificate, in which is stated the successful completion of any course and a satisfactory examination in

both the theory and practice of the trade studied, is awarded each graduate. In the day classes it is stated that between 97 and 99 per cent receive certificates. In the evening school 80 to 85 per cent receive certificates.

Twenty-seven teachers are employed. All teach both the theory and practice of their trades. Two reported education in technical schools; four reported secondary education in high schools. All had practical shop experience in their trades. The teachers are selected because of their reputation as all-round competent workmen who have the ability to teach. The educational qualifications are not considered unless the shop ability of the teacher has been accepted as satisfactory.

The school building is valued at $300,000. The equipment valued at $50,000 was provided in part ($40,000) by the founder and in part ($10,000) by the funds of the school. In 1892 the school received an endowment of $500,000 from a philanthropist. The interest on this endowment and the tuition fees support the institution. In the day school tuition for sign painting is $25 per term, for plumbing $45, and for all other trades $40. In the evening school tuition is as follows: Cornice and skylight work, including sheet-metal drafting, $15 per term; for bricklaying, plumbing, plastering, electrical work, $16; steam and hot water fitting, and printing, $14; painting and plain decorating, sign painting, blacksmithing, pattern making, $12. In all evening classes an award of merit for the first term secures tuition at half price for the second and third terms. All books and materials are furnished free. The cost of materials in 1909–10 was $3,837, while the expenses incurred for janitor service, heat, light, etc., during the same period, were $2,674. The school uses any available finished product for exhibition purposes. Nothing is sold, the policy of the school being against any attempt to utilize the product of students for pecuniary return.

There is no claim made by the school that its work covers the shop apprenticeship where a definite apprenticeship exists. It does aim to fit the pupils to take up shopwork immediately without the waste of time usual to the boy who learns his trade in the shop. It assists apprentices who attend the evening school to shorten their period of training. There is no demand for pupils. This is due in part to the fact that the majority of the day pupils come from places outside of New York and do not remain in the city after completion of their work in the school. The pupils of the evening school are for the greater part already employed, and regard their course in the school merely as a part of their work. No part of the plan of the school considers the training of pupils for executive positions such as foremen. It is expected that the development of the theoretical instruction will cause men to rise quickly to higher positions.

The pupils and their parents have shown the greatest appreciation of the work of the New York Trade School. Employers both as individuals and as members of organizations have been interested and in general favorable in their attitude to the school. They stated that the graduates were good, handy men in the shops, and had learned more in the school than they could have learned in double the amount of time in the shop. The labor organizations have been opposed to the school in so far as its day classes are concerned, since they state that the time is too brief for the acquisition of any trade. They approve the evening school, as they recognize the need for theoretical instruction, which is available in very few shops. As an adjunct to the shop these organizations indorse such schools.

BARON DE HIRSCH TRADE SCHOOL, NEW YORK, N. Y.

The Baron de Hirsch School, an elementary trade school, was established in 1891 through the agency of the Baron de Hirsch fund. The object of the school is to fit boys in as short a time as possible for employment as helpers in the mechanical and building trades. The school affairs are administered by the trustees, a self-perpetuating body consisting of 13 members. There is also an "advisory committee" of 4 members chosen by the board of trustees.

Two classes are admitted to the school each year. The trades taught and attendance during the second half of the year 1909–10 was: Machinist, 27; plumbing, 38; electrical work, 50; carpentry, 9; house, fresco, and sign painting, 7.

Candidates for admission must be Jews, able-bodied, and able to speak, read, and write English, and must be at least 16 years of age; those over 20 years of age are rarely accepted. Entrance to the classes must be made at the beginning of the terms, viz, in February and August, except in special cases, when admissions may be made as late as three weeks after the formation of the classes. All pupils are taken on trial for a period of 14 working days, after which the superintendent has authority to reject any boy who, in his judgment, is unfit for a trade career. None of the pupils give any part of their time to work for wages outside the school.

The school is in operation 46 weeks in the year. There are two terms, each covering 23 weeks, the first beginning in the middle of August and the other in February. All Jewish and the usual legal holidays are observed. The courses of instruction cover but one-half of the school year, thus two classes pass through the school each year.

The subjects taught, exclusive of shopwork, are mechanical drawing and shop arithmetic. The total number of hours per week devoted to theory are 5, while 34 hours are devoted to shop prac-

tice. The school is in session from Monday to Friday, inclusive, from 8 a. m. to 4.30 p. m., except on Friday, when it closes at 3.30 p. m., with 30 minutes each day for luncheon. During the first two weeks of each term, however, the school holds sessions for only six hours a day.

No textbooks are used by the school, but printed shop notes prepared by the school are used instead for purposes of instruction. Various building trades' handbooks and the publications of a correspondence school are used as books of reference. At the termination of the course a final examination is held, and each pupil who satisfactorily completes the course is given a certificate and a kit of tools. When able the graduate is expected to repay the cost of the tools. It is estimated that 15 per cent of the pupils leave the school before the completion of the course.

Nine teachers are employed by the school, seven for the teaching of practice and two for theory. Graduates of technical colleges are the source from which the school obtains its teachers of theory, and foremen of industrial establishments are selected as the instructors in practice work. The school has experienced no difficulty in retaining teachers duly qualified to teach trade work.

The cost of the building occupied by the school, including the site, was $150,000. The cost of the school equipment is estimated at $15,000. The school charges no fee for tuition and the pupil is subject to no charge or expense in connection with his school attendance. The cost of materials used by the school during the year 1910 is estimated at $8,448. The school makes no marketable product.

The scheme of the school does not comprehend the abridgement of the term of shop apprenticeship, but it claims that the training the pupils receive is a help toward getting employment. The school reports that there is a special demand in the trades for the services of its pupils. The greatest appreciation of the advantages afforded is manifested by the pupils themselves, who realize the difference between the amount of their earnings in skilled trades and the amount earned in the unskilled labor in which they were formerly engaged. The school reports that there has been no opposition to the school, a fact due in part to its policy not to incur the antagonism of any class of workers.

Among the labor organizations there are favorable and unfavorable opinions held of the school. In one trade there was decided feeling against it because the graduates were reported as having been employed as strike-breakers. In general, however, labor organizations know little of the employment of the graduates because the latter do not seek membership in their ranks.

HEBREW EDUCATION SOCIETY, PHILADELPHIA, PA.

The Hebrew Education Society, of Philadelphia, conducts a free school for the purpose of affording religious, academic, and industrial training to newly arrived immigrants. The society was organized in 1848 through the efforts of a Jewish rabbi. Evening industrial instruction was introduced in the school in 1890. The evening industrial school which was established in 1890 is the result of constantly increasing desire on the part of the children of immigrants for opportunities to acquire sufficient training to secure employment. It appeals to those who come to this country wholly ignorant of any occupation or trade that will bring in a livelihood and who are further handicapped by an ignorance of the language. The school does not aim to teach thoroughly any trade except sheet-metal working. Many pupils are under the immediate necessity of providing a livelihood either for themselves or for their families, and can not afford the time required for a long course of study. The majority have in view some definite employment which instruction in this school will enable them to secure. Others, who have taken the first available form of employment, see in the school an opportunity to better their condition through a course in one of the trades.

The character of the work into which many of the pupils go does not call for a high grade of labor. For this reason the instruction received serves merely as a means of entrance to the shop or factory by giving the rudiments of the trade; that is, a general knowledge of tools and materials. With a short period of instruction and practice in the school, employment may be secured in small dressmaking and tailoring shops, in factories using power sewing machines, in cigar factories, and in shops. Some pupils go into business on a small scale for themselves. All trades taught have been introduced either in response to a demand for workers or because of a promise of employment to pupils qualified to assume it.

The school is governed by a board of officers, consisting of 4 executive officers elected annually and 15 other officers elected in groups of 5 to serve three years. An advisory committee for each department of the school is appointed by the president to serve one year.

Any person 14 years or over may enter the school. No distinctions are made as to race or creed. As instruction is largely individual, entrance to the school may be made at any time of the year. Some pupils in the sheet-metal workers' class and all pupils in the plumbing class are employed during the day in the trades they are studying at night. The pupils in plumbing are usually apprentices in their fourth year who are preparing for the examination for a master plumber's license. The majority of the sheet-metal workers' pupils are also apprentices. In the other classes pupils are at work,

but, with few exceptions, they are employed in other lines than the trades they are taking.

The trades taught and the number of pupils in each for 1909–10 were as follows: Dressmaking, 26; millinery, 28; garment cutting, 8; power sewing-machine operating, 5; cigar making, 15; plumbing, 5; sheet-metal working, 18.

In the sheet-metal working course the theory of the trade consists of mechanical drawing and the making of blue prints in preparation for shop practice. All practical work must be preceded by plans made by the pupils. The amount of time spent in drawing is two evenings of two hours each per week.

In the dressmaking course pupils are required to draft a few of their patterns; no definite statement as to the time required for this work was available, since it is largely a matter of individual ability. With the exception of these two trades the pupils devote all of their time to shop practice. No fees are charged for tuition. The length of the course for each trade is as follows: Sheet-metal working, three years; dressmaking, millinery, plumbing, each one year; cigar making, one-half year; garment cutting, one-fourth year; power sewing-machine operating, two to three weeks.

The school is open the entire year from Monday to Thursday, inclusive, from 7 to 9 p. m., except Hebrew and legal holidays. The sheet-metal workers' class meets for two hours on Sunday morning to make blue prints. The day is an enforced holiday for the pupils who keep the Jewish Sabbath, and moreover it gives the opportunity to get the sunlight necessary to make the prints. In the sheet-metal workers' class a vacation of two weeks in July or August is given, about one-third of the class going off at a time. This is an individual arrangement of the instructor. Other classes have no vacation. No textbooks are used. The nature of the greater part of the work does not call for textbooks, and the class of foreigners attending the school would make such books of no value unless written in a language familiar to the pupils.

About 80 per cent of the pupils in each trade complete the course elected. The inclination to withdraw before the completion of a course is checked by reason of the fact that an occupation or trade has been selected with a definite promise of employment as soon as there is sufficient skill attained to do the work required. In cigar making it was reported by the school that males attend the class throughout the year, but that females come in greater numbers and with more regularity in winter than in summer. In the other classes the season of the year does not affect the attendance.

There are seven instructors, all of whom teach practice. The selection of these intructors has been based on both their teachings and practical experience. The instructor of the sheet-metal workers

also teaches mechanical drawing and the developing of blue prints. He had a three years' course in a correspondence school in sheet-metal pattern drafting, and worked at his trade for eight years, and had previous experience in teaching. The teacher of millinery and the instructor in cigar making learned their trades in this school. The instructor in plumbing taught in an apprentice school. All the instructors except the teacher of dressmaking are actively engaged in their trades; two are foremen. The teacher of dressmaking has had the experience of supervising the work of other teachers in another school.

The value of the equipment for the trade classes is estimated at $950, and is adequate for all classes except the sheet-metal working class, where there is a lack of necessary hand tools and machines, and in the plumbing class, in which the equipment is so meager that only a limited number of processes can be taught.

The materials for the first lessons in practice work in the dressmaking course are supplied by the school; the pupils must provide other materials. With the exception of this class, all materials are supplied free of charge. Donations of materials for the class in millinery are provided by persons interested in Hebrew charities. The cost of materials provided by the school in 1909–10 amounted to $635.

The product made is marketable, and is sold in the open market, donated to charitable institutions, or used by the school. Dresses made from material furnished by the pupils belong to them.

The product of the sheet-metal workers' class is used by the school for models or for practical purposes. This class made the furnaces for the plumbing class, and the umbrella stands and the water coolers used in the school. The society has a license to make and sell cigars.

There is a demand for the pupils in the shops and factories where cheap immigrant labor, particularly of the Hebrew class, is employed. Instructors are engaged in the trades they teach and are usually able to assist the pupils to get employment. In some instances promise of employment hinges on attendance for a time at the school. In general, the demand for semiskilled labor makes it comparatively easy for the pupils to go without delay from the school to the factory.

The Hebrews of the immigrant class have shown their appreciation of the school by availing themselves of its opportunities to learn a trade or occupation. They have shown their earnestness by regular attendance and by perseverance, despite conditions of poverty or of extremes of weather, although some have not shown this appreciation later by a just acknowledgment of the benefits the school has provided. Such persons have either looked down upon it as a charitable institution or else refused to admit that they learned their trade or

occupation in it, on the ground that this would be injurious to them in their relationship with other workmen.

In the employees' associations criticisms of the school were both favorable and unfavorable. The business agent of the garment cutters' union stated that his organization was friendly in its attitude to the school and assisted men who came into the trade after having covered the limited course the school offers. It had been found necessary to help such workers when they first came into the shops because of their limited training, but in a short time they were able to do satisfactory work and compete successfully with other workmen.

Some adverse criticism was made to the effect that the school injured certain trades by sending out an inferior class of workers who underbid others in wages, but this was denied by others, who considered the pupils sent out as too insignificant in number to make any appreciable effect and too unskilled to be of value until the shop had taken them in hand and trained them in its methods.

The representative of the cigar makers' union said that this union objected to the work of the classes in cigar making in the school for the following reasons:

Those who attended were largely foreigners unable to speak English, ignorant of conditions in this country, unaware of the existence of employees' organizations, and willing to work for any wage available. These foreigners did not learn the trade thoroughly, spending only six months where two or three years are necessary; they acquired a superficial knowledge and could not become skilled workmen; they could produce merely an inferior class of work and in consequence were offered low wages. The instruction omitted many necessary phases of the trade. These incompetent cigar makers drift out of the trade after failure to make a satisfactory living in it. They are looked upon as a disturbing element by skilled workers who want steady employment at the normal wages of the trade.

ILLINOIS MANUAL TRAINING FARM, GLENWOOD, ILL.

This is an institution in which homeless or neglected boys are placed by order of court. Its establishment in 1887 was due to the efforts of a farmer much interested in dependent boys, who gave his farm of 300 acres as the beginning for the institution. At various times philanthropists have contributed to the support of the institution while an irregular income is received through the amounts charged parents or paid by the counties for board and tuition for the children committed. About $6,000 is available annually from the income from endowments.

When boys are first received at the institution they are given certain forms of domestic, office, or farm work to do while the superintendent studies them. Their final assignment depends largely upon

where they are needed. If a boy shows any special adaptability or desire for a particular kind of work an effort is made to give him that kind. The boy's choice is made a reward of merit, so that if he does well where he is first placed he may eventually get into the shop or be given other work he desires. All boys must in turn serve in the office, in domestic service, in the laundry, and in the shoe shop. The term of such service depends partly upon the boy and partly upon vacancies in the other departments.

Trade instruction is given, but owing to the fact that the boys remain on an average of only one and one-half years in the institution no trade can be taught thoroughly. The minimum age for admission to the trade classes is 12 years and the maximum age is 16. The trades and the enrollment for 1909–10 were as follows: Printing, 10; carpentry, 10; cabinetmaking, 15; blacksmithing, 20; machinist, 20; laundering, 40; cobbling, 15; stationary engineers, 8; baking, 10. Pupils alternate in school and shop, spending 3 hours per day 5 days per week in school, and 3 hours per day 6 days per week in the shop. The academic subjects taught are regular grammar-grade work. The school year covers 52 weeks. The sessions of the classes are from 9 a. m. to 12 m. and 1.30 to 4.30 p. m. Monday to Friday, Saturday 9 a. m. to 12 m. Legal holidays are observed as well as extra holidays decided upon by the superintendent. All books are furnished free.

Board and tuition is $15 per month if paid by parents or guardians, or $10 if paid by counties. All the teachers of practice are persons of experience in the trades they are teaching.

Practically all pupils leave before the completion of a full course in the trades. This is due to the fact that the institution is a temporary shelter and pupils leave as soon as permanent homes are found for them or their former home conditions are adjusted.

Subsequent reports of the pupils have shown some to be at work in the trades taken in the school. A manager of a printing shop stated that the rudiments of printing were well taught in the school and that it was to be regretted that the boys could not be kept for a complete course. The present foreman of this shop was at one time a member of the school.

The school-shop products, which consist of wood and metal work, are mostly used by the school, though some are sold.

The governing board of the school is composed of six members, who are chosen by the members of the school corporation. There is also an auxiliary board consisting of four ladies who are responsible for providing clothing and caring for the beds.

CHAPTER III.

PUBLIC INDUSTRIAL SCHOOLS.

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INTRODUCTION.

Industrial training in the public schools is a comparatively recent development. It was practically unknown prior to 1875 and only within the last decade has it become at all general. The earliest public industrial schools were, with a few exceptions, institutions for dependent children and for children of the Indian and Negro races. Naturally, these reached but few. Some public evening continuation classes for apprentices and journeymen were established at an early date, but classes in the day schools for pupils who might wish to enter trades grew very slowly in favor. There was a general feeling that trade training was the affair of employers, not of the general public, and combining with this feeling to prevent the introduction of such training was a very strong sentiment against the use of the public schools for other than cultural purposes.

This opposition has given way rapidly as the public has begun to appreciate what numbers of children leave school between 14 and 16 with no training which makes them desirable employees, and with the chances all in favor of their entering some dead-end or no-thoroughfare occupation, there to waste their time for two, three, or four years until they find themselves too old to be satisfied with a boy's wages, and no better equipped for an industrial life than when they left school. The results of investigations into what untrained children actually did on leaving school, their chances of advancement, and the effect on their future of the occupations into which they drifted showed very plainly that the industrial education of the young could not safely be left to private effort, and that the prevailing system was harmful alike to the individual and the community. As a consequence, the former opposition is rapidly disappearing and industrial day schools steadily increasing in number.

The opposition to such schools has not wholly disappeared, however, and there are still many, both among educators and skilled trade workers, who feel that the school's function does not include industrial education. To some extent this sentiment has prevented pupils from electing trade instruction. On the other hand, the success of many pupils and the opportunity to remain longer at school, while at the same time preparing for a future occupation, have influenced both parents and children to consider the trade courses favorably.

Broadly speaking, there are in addition to institutional schools two classes of public industrial schools—those established by local

authorities as a part of the regular public-school system of cities and those organized under a special State law and subject wholly or in part to State control. In schools of the latter class the instruction is in some cases correlated with that of the city public-school system, while in other places it is entirely independent.

In the following pages a description is given of the State systems of Massachusetts, New York, Connecticut, and New Jersey, and of the schools operating thereunder, and in addition a description of certain representative public schools in other States, namely: The Philadelphia Trades School, Philadelphia, Pa.; the Altoona High School (industrial course), Altoona, Pa.; the Columbus Trades School, Columbus, Ohio; the Armstrong Manual Training School, Washington, D. C.; the Milwaukee School of Trades for Boys, Milwaukee, Wis.; the Wisconsin State Mining Trade School, Platteville, Wis.; and the Soldiers' Orphans' Industrial School, Scotland, Pa. The Vocational School for Boys of New York City, a public institution maintained entirely by the municipality, is also briefly described.

A number of other public industrial schools are described in other chapters of the report, as follows:

Cooperative industrial schools (Chapter V):

Fitchburg High School (cooperative course), Fitchburg, Mass. (p. 187).
Beverly Independent Industrial School, Beverly, Mass. (p. 190).
Technical High School (cooperative course), Providence, R. I. (p. 193).
Cincinnati High School (cooperative course), Cincinnati, Ohio (p. 198).

Evening industrial schools (Chapter VI):

Stuyvesant Evening Trade School, New York, N. Y. (p. 230).
Brooklyn Evening Technical and Trade School, Brooklyn, N. Y. (p. 231).
Long Island City Evening High and Trade School, Long Island City, N. Y. (p. 231).
Industrial Evening School, New York, N. Y. (p. 232).
Evening Trades Schools, Nos. 1 and 2, Philadelphia, Pa. (p. 233).
Evening Technical School, Providence, R. I. (p. 235).
High Industrial School, Dayton, Ohio (p. 236).
Columbus Trades School, Columbus, Ohio (p. 237).
Technical High School, Cleveland, Ohio (p. 237).
McKinley Manual Training School (evening courses), Washington, D. C. (p. 238).
South Manchester Evening School, South Manchester, Conn. (p. 240).
Armstrong Manual Training School (evening courses), Washington, D. C. (p. 240).

Textile schools (Chapter VII):
- Lowell Textile School (evening classes), Lowell, Mass. (p. 251).
- Lawrence Industrial School (textile department), Lawrence, Mass. (p. 254).
- Secondary Industrial School (textile department), Columbus, Ga. (p. 257).

Girls' industrial schools (Chapter VIII):
- Manhattan Trade School for Girls, New York, N. Y. (p. 267).
- Girls' Trade School, Boston, Mass. (p. 278).
- Milwaukee School of Trades for Girls, Milwaukee, Wis. (p. 282).
- High School of Practical Arts, Boston, Mass. (p. 299).
- New York Evening High School for Women, New York, N. Y. (p. 303).
- Cincinnati Evening School, Cincinnati, Ohio (p. 304).
- Evening High School for Women, Philadelphia, Pa. (p. 305).
- School of Domestic Science and Domestic Art, Rochester, N. Y. (p. 307).

Negro industrial schools (Chapter IX):
- Alcorn Agricultural and Mechanical College, Alcorn, Miss. (p. 331).
- State Agricultural and Mechanical College, Normal, Ala. (p. 332).

Indian industrial schools (Chapter X):
- United States Indian School, Carlisle, Pa. (p. 339).
- Thomas Indian School, Iroquois, N. Y. (p. 347).

STATE SYSTEMS.

In four States systems of industrial education apart from the regular public-school systems of cities have been established as a part of the public instruction provided by the State. Massachusetts has, in addition to subsidizing textile schools at Fall River, Lowell, and New Bedford, adopted a scheme of independent industrial schools in various localities where there is a demand for such training. One-half of the maintenance cost of these schools is borne by the State. In New York a system of vocational or "factory" schools has been established for the purpose of preparing young persons for industrial pursuits. These schools are supported in part by State subsidies. Other instances of State supervision over the industrial education of its citizens are furnished by the State trade schools of Connecticut, offering instruction in the theory and practice of trades and supported entirely by State funds, and the schools for industrial education of New Jersey, which are liberally aided by the State. In all cases the grant of State aid has been conditioned on the approval by the State educational authorities of the courses of study offered in the schools. In New Jersey the schools are entirely under the direction of local boards appointed by the governor of the State, while in Connecticut

complete control is exercised by the State board of education. The schools in Massachusetts and New York are controlled jointly by the State and the locality, advisory committees composed of men from the industries represented in the school work being chosen to confer with the local school authorities. No administrative connection with the regular public schools of the cities in which they are located is borne by the industrial schools of Massachusetts, Connecticut, and New Jersey. The New York schools, on the contrary, are integral parts of the regular public-school system of the various cities and their work articulates with its other parts. A description of the industrial school system in operation in each of these four States follows.

MASSACHUSETTS.

In the recent national awakening to the importance of industrial education, other States have been influenced to a considerable extent by the example of Massachusetts in instituting inquiries as to the need for public industrial training and the most effective methods of supplying such need. While much that has thus far been accomplished in this direction is regarded as experimental, certain well-defined theories and principles have been evolved which are likely to have an important bearing on future attempts at providing trade instruction under State control.

Schools offering evening instruction to workers employed during the day in the textile industries of the State were among the earliest forms of industrial training provided. Such schools, supported partly by annual grants by the State and the city and partly by tuition fees from pupils, were opened at Lowell in 1897, at New Bedford in 1899, and at Fall River in 1904. The experience of these institutions paved the way for the introduction of a more general system of trade instruction throughout the State.

The movement for industrial education in Massachusetts led to the appointment by the governor, on June 7, 1905, of a commission on industrial and technical education. In its report issued in April, 1906, terminating its labors, this commission submitted for the consideration of the legislature the draft of a bill which embodied many of its recommendations relating to the promotion of industrial training in the Commonwealth. This bill, with some modifications, became chapter 505 of the acts of 1906, which, with subsequent amendments by succeeding legislatures, constitutes the present law on independent industrial schools. (See p. 504.) The act provided State aid for the encouragement of industrial schools and created a central authority, to be known as the commission on industrial education, charged with the duty of organizing and supervising them. The schools established under this act, while entirely supported by public funds, are

quite separate and distinct from the public-school system. There is no correlation between the regular public-school course and that of the industrial schools. For each of these schools the municipality supporting it receives a refund from the State of one-half the total cost of maintenance.

During the legislative session of 1909 a new State board of education was created, into which the powers and duties of the former State board of education and of the commission on industrial education were merged. This new board of education became the central authority of the Commonwealth for the administration of State-aided industrial education as provided for in the statutes. (See p. 505.)

The present law relating to independent industrial schools may be summarized as follows:

1. The city or town must establish, equip, and maintain the school. The State annually reimburses the community for one-half the money expended for the school's maintenance.
2. The local board of trustees is charged with the actual direction of the school.
3. The State board of education is to supervise and approve the school as to location, course of study, qualifications of teachers, methods of instruction, admission of pupils, and expenditures of money.
4. The schools are open to children not less than 14 years of age who are capable of receiving the instruction offered. The attendance of those under 14 upon such schools is forbidden.
5. Tuition is free to all residents of the Commonwealth. The claim for tuition of pupils not residing in the community supporting the school must be paid in full by the community in which the pupil resides. The State reimburses such community to the extent of one-half the tuition claim.

In a report on the independent industrial schools submitted to the legislature January 1, 1911, the board of education approved of the location, course of study, and methods of instruction in 20 schools maintained by 16 cities and towns. Ten of these are evening schools, 8 are day schools, and 2 are both day and evening schools. Of the 10 schools offering day instruction exclusively, or both day and evening instruction, 8 fit for the trades, crafts and manufacturing pursuits and 2 for agriculture and the mechanic arts. Four of the 8 exclusive day schools are for boys, 1 is for girls, and 3 are coeducational in character. One of the day schools for boys, that at Beverly, is operated on a part-time plan, the pupil spending alternately one week in the shop and the next in the school, the same trade instructors teaching them practice and theory during the full round of the two weeks. Another, the Worcester Trade School, has recently introduced part-time instruction at the school for one-half day per week to pupils employed in the industries.

Owing to the considerable differences that exist among the institutions belonging at the present time to the State system of independent industrial schools, both with respect to their general purposes and the details of their actual management, it is deemed advisable to present herewith a condensed description of each. It should be stated, however, that a number of the schools included in the following list have not been made the subject of investigation in connection with the present report, since their work appears to be of a character not contemplated by the inquiry. In some schools of this class the training appears to be designed chiefly for home use or for use on the farm, while in others it is seemingly too general in character to be regarded as trade instruction. The schools not included in the investigation are the Brockton Industrial School (evening), the Hyde Park Evening Industrial School, the Montague Industrial School, the Natick Industrial School (evening), the Newton Evening Industrial School, Smith's Agricultural School and Northampton School of Industries, the Somerville Industrial School, the Taunton Industrial School (evening), the Walpole Industrial School (evening), and the Worcester Industrial School (evening).

DAY INDEPENDENT INDUSTRIAL SCHOOLS.

Beverly Industrial School.—The day department was established June 26, 1909. As conducted in 1909–10, the course consisted of 50 alternate weeks of instruction in the school and in the plant of the United Shoe Machinery Co. The schoolroom instruction comprised mechanical drawing and sketching, shop mathematics, explanations and records of shopwork, machinists' literature, and shop talks, science, arithmetic and business practices, and civic duties. The time given to this work was $7\frac{3}{4}$ hours per day from Monday to Friday, inclusive, or a total of $38\frac{3}{4}$ hours per week. The shop work occupied 9 hours each day for 5 days and 5 hours on Saturday, making a total of 50 hours per week. This consisted of machine-shop practice, including the operation of various machine tools and later specializing on tools according to ability. In addition, freehand sketches and written descriptions of manufactured articles were required. The length of the course has not been definitely determined, and at the time the school was visited the work had not been planned beyond the first year. It is expected, however, that the course will cover two or three years. On July 15, 1910, there were 50 boys in attendance. The intention is to increase the number of admissions to the school as additional facilities for shop practice become available. A further description of this school will be found in the chapter on cooperative schools, page 190.

Boston School of Printing and Bookbinding.—This school was established February 7, 1910, as the "Pre-Apprentice School

for Printing and Bookbinding," with two-year courses provided in each of these two trades. At the time it was visited no work beyond that of the first year had been formulated. The subjects of study included arithmetic, English, industrial history, current events, spelling, and drawing—all pupils pursuing the same general course in these branches. A total of 20 hours per week was devoted to this work by each pupil. In printing, pupils received 3 hours of shop practice per day, or 15 hours per week, making a total of 35 hours per week spent in the school. Pupils taking the bookbinding course had 1 hour of shop practice each day, or 5 hours each week. In their case the total number of hours required per week was 25. The length of the school year was fixed at 40 weeks. The number of pupils enrolled between February 7 and June 21, 1910, was 92, of whom 26 were printers and 66 were bookbinders. Of the latter, 9 were females.

The school was reorganized as an independent industrial school in September, 1910, and was approved by the State board of education on December 9, following. According to a recent report of that board four-year courses of study are now offered. The instruction covers shop practice in printing or bookbinding as a handicraft, together with drawing, English, trade mathematics, industrial history, spelling, current events, and civics. The teachers of printing and bookbinding are practical workmen, thoroughly versed in their trade. An advisory committee of employing or journeyman printers and bookbinders has been active in counseling with the officers and teachers of the school. The enrollment in 1910–11 was 38, the capacity of the school being limited to 40 pupils.

Girls' Trade School of Boston.—Started as a philanthropic institution in July, 1904, this school was reestablished by the Massachusetts Board of Education as an independent industrial school on September 15, 1909. Courses one year in length are given in dressmaking, millinery, and machine operating, including cloth sewing and straw sewing. The school is in session 7½ hours each day from Monday to Friday, inclusive. Pupils devote 28½ hours to shop work and 9 hours to supplementary academic work and other exercises during each week of the course. The academic subjects consist of business English, spelling, arithmetic, and drawing. A moderate amount of domestic science is taught each girl, and some attention is also given to physical training and the laws of hygiene. In 1909–10 the school term began on September 15 and ended on June 22. A summer term extending from July 5 to the last Friday in August is provided by the rules of the school committee. The number of girls in attendance on May 20, 1910, was 159, of whom 110 were studying dressmaking, 23 millinery, and 26 machine operating. The total registration during 1909–10 was 347. This school is more fully described, page 278 of the present report.

LAWRENCE INDUSTRIAL SCHOOL.—The day department of this school was established February 23, 1909, and was opened in the following September. During 1909–10 three general courses of study in textile arts, mechanic arts, and domestic arts were provided. Each of these courses was planned to cover three years and to embrace a number of shorter specific courses. For a description of the work done in the textile-arts course the reader is referred to the chapter on textile schools (p. 254) of the present report. In the mechanic-arts course instruction is common to all trades during the first year, after which pupils specialize in one. The trades taught in 1909–10 were pattern making and molding, electricians, and machine-shop work. The academic subjects taught in those trades were English, civics, industrial history, mathematics, electricity, drafting, and mechanics. At the time the school was visited the course for the third year had not been determined. First-year pupils were required to spend an aggregate of $23\frac{5}{6}$ hours each week in the school, and second-year pupils an aggregate of 23 hours. This time was almost equally divided between theory and practice work.

In the domestic-arts course instruction was given in dressmaking and millinery during 1909–10. The subjects taught included English, civics, industrial history, dressmaking design, applied drawing, theory of hat construction, applied arithmetic, and chemistry of cooking. All pupils in this course pursue the same studies during the first year, after which they specialize in either dressmaking or millinery. In 1909–10 the time required of pupils each week was as follows: First year—academic subjects, $13\frac{5}{12}$ hours practice, $7\frac{5}{12}$ hours; total, $20\frac{5}{6}$ hours. Second year—academic subjects, $12\frac{1}{2}$ hours; practice, $10\frac{1}{2}$ hours; total, 23 hours. Third year—academic subjects, $12\frac{1}{2}$ hours; practice, $10\frac{1}{2}$ hours; total, 23 hours.

Practical instruction is given in the school shops, which are well equipped with machines and appliances. Part-time instruction is also offered to shop workers. The length of the school year is fixed at 40 weeks. On June 29, 1910, the enrollment of regular pupils in the day courses was as follows: Textile arts, 24 (all males); mechanic arts, 81 (all males); domestic arts, 38 (all females). In addition, there were 45 pupils attending the school on alternate half days or alternate weeks, divided as follows: Textile arts, 9 males; mechanic arts, 30 males; domestic arts, 6 females.

MONTAGUE INDUSTRIAL SCHOOL.—This school was established June 30, 1908. A course of five years, preparing boys and girls for life's work in a rural community, is offered. The instruction includes agriculture, carpentry, and mechanical work for boys and domestic science and domestic arts for girls. The course is said to be still in the formative stage. The school day is from 8.45 a. m. to 2.55 p. m.

After school hours work is done in agriculture and carpentry. In 1909–10, 36 pupils were registered.

NEW BEDFORD INDUSTRIAL SCHOOL.—The day school was opened September 8, 1909, a course of four years designed to prepare for the mechanical industries being offered. The instruction is planned to be common to all trades during the first and second years, and to be specialized in the third and fourth years. In 1909–10 the subjects taught were drawing, theory of wood shopwork, theory of metal shopwork, mathematics, English, and physical science. The course beyond the first year had not been formulated at the time this school was visited. Pupils during 1909–10 devoted 16.2 hours to theoretical instruction and 19.8 hours to practice work each week. The school is in session from 8.30 a. m. to 12 m. and from 1.15 to 4.15 p. m. on five days of the week. On Saturday the session ends at noon. The school year embraces 40 weeks. The enrollment on June 1, 1910, was 75.

NEWTON INDUSTRIAL SCHOOL.—Day classes in the Newton school were organized February 1, 1909. A three-years' course, embracing the rudiments of machine-shop practice, woodworking, pattern making, electricity, and printing, is offered. This arrangement contemplates two years of general preparation and a third year of specialization in a particular trade. The subjects taught in 1909–10, which included only those of the first year, were drawing, industrial geography, arithmetic, elementary science, and English. The school is in session five days each week, from Monday to Friday, inclusive, the daily sessions lasting from 8.30 a. m. to 4 p. m., with one hour noon recess. During each year of the course the time of pupils is about equally divided between schoolroom and shop-practice work. The school year covers 44 weeks. On July 1, 1910, there were 45 boys in attendance. The school is maintained under city auspices, but the expense of maintenance is largely met by private donations. Hereafter State assistance is to be given.

SMITH'S AGRICULTURAL SCHOOL AND NORTHAMPTON SCHOOL OF INDUSTRIES.—Established March 15, 1907. Courses of four years, offering preparation in agriculture, mechanic arts, and household economy, are maintained. In the first and second years the general subjects are the same for all pupils, but in each department there is a specialization in its work. The school has buildings worth probably more than $90,000. It was established upon a fund that has been accumulating for many years, but substantial support from the taxpayers of Northampton has been given. The registration for 1909–10 was 107, of whom 80 were boys and 27 girls.

SOMERVILLE INDUSTRIAL SCHOOL.—Established September 1, 1910; approved December 9, 1910. This school thus far offers instruction

in woodworking and metal working for boys. The addition of other courses is planned. The courses of study include shop practice in wood and metal working; shop drawing, based on shop problems; mechanical instruction and shop science, comprising the study of the construction, operations, and functions of the various parts of the complete machine; the elementary principles of physics and chemistry; industrial history; and civics. The school is in session five days per week. The daily session occupies 6½ hours, equal time being given to shopwork and to related or cultural study. An advisory committee, composed of men representing both industries taught, has been appointed. According to the latest available information 44 pupils have been enrolled in the school, which has a total capacity at the present time of 60.

WORCESTER TRADE SCHOOL.—School work began February 9, 1910. Four-year courses in woodworking (pattern making and cabinetwork) and metal working (machine-shop practice) are provided. The associated subjects, arranged by years, are as follows:

First year.—Shop computations, shop formulas, geometry, natural science, English, history of commerce and invention, drawing, and shop instruction.

Second year.—Shop computations, geometry, study of triangles, commercial arithmetic, cost accounts, natural science, commercial geography, English, good citizenship, drawing, and shop instruction.

Third year.—Cost accounts, natural science, bookkeeping, commercial law, English, good citizenship, drawing, and shop instruction.

Fourth year.—Commercial law, English, good citizenship, strength of materials, jig and fixture design, and shop instruction.

Shopwork occupies one-half of the whole school time during each year of the course, the curriculum being so arranged that pupils have alternate weeks of theoretical instruction and shop practice. The hours of instruction are from 8 a. m. to 12 m. and from 1 to 5 p. m., Monday to Friday, inclusive. On Saturday the session ends at 12 o'clock. The school is open all the year except four weeks in August. The registration on May 1, 1910, was 79, of whom 41 were doing woodwork and 38 metal work. A system of part-time instruction for one-half day per week to pupils employed in the industries has recently been introduced into the school.

EVENING INDEPENDENT INDUSTRIAL SCHOOLS.

The purpose underlying the establishment of evening independent industrial schools in Massachusetts has been to provide for workers employed by day in the industries of the State adequate instruction in all matters conducive to an intelligent and properly directed exercise of their daily vocations. In many instances these schools have superseded evening schools of an inferior and inadequate type. The older schools were not primarily industrial schools and in so far as

industrial courses were given, they were but tentative and experimental. With the advent of the independent schools, controlled and supported in part by the State, industrial education for day workers was placed upon what is believed to be a sound and effective basis. In the following paragraphs an outline of the work of each of the 12 evening schools at present belonging to the State system is given. It should be stated, however, that, in the case of several schools named in the following list, only such of their features as fall within the scope of the present investigation have been included in the presentation. For this reason the facts reported for these schools can not be regarded as constituting a complete exhibit of their work. In instances where schools, in their entirety, are outside the investigation, the description has been taken from a recent report of the Massachusetts Board of Education.

Brockton Industrial School.—Established October 6, 1909. Courses in plain sewing, dressmaking, millinery, mechanical drawing and engineering are provided. In 1909–10 there were enrolled 560 pupils.

Cambridge Evening Industrial School.—Date of original establishment, October 10, 1906; established as an independent industrial school October 14, 1907. Three-year courses are offered. The enrollment in the courses on March 23, 1910, was: Machine-shop practice, 59; woodworking and pattern making, 32; forging and foundry work, 20. Pupils in machine-shop practice have two hours of shop mathematics and four hours of practice work each week. In the other courses the whole time of pupils is given to shop practice. The school sessions are held from 7.30 to 9.30 p. m., on Monday, Wednesday, and Friday of each week. The length of the school year is 22 weeks.

Central Evening Industrial School of Boston.—This school was established September 24, 1908, by a reorganization of the Free Evening Industrial Drawing School, organized in 1870. Courses three years in length are provided. The total enrollment in these several courses between October 4, 1909, and March 18, 1910, was 167, divided as follows: Machine-shop practice, 54; interior decorating, 73; steam engineers, 40. In addition to these, there were courses in architectural and mechanical drawing and building estimating, in which large numbers of pupils were enrolled. The school is in session on Monday, Wednesday, and Friday of each week from 7.30 to 9.30 p. m. The entire time of pupils is given to practice work. In 1909–10 the school year embraced 22 weeks.

Chicopee Evening Industrial School.—The date of establishment of this school is reported as November 20, 1908. Courses covering four years are offered in the woodworking (carpentry, pattern making, and wood turning) and in machine-shop practice. The

number of pupils enrolled in these courses on April 1, 1910, was 100. Pupils taking both shopwork and drawing have four evenings each week in school while those taking only shop work have but two evenings. School instruction is given on five evenings of each week, from 7 to 9 o'clock. The school year comprehends 24 weeks, from the 1st of October to the 1st of April.

Hyde Park Evening Industrial School.—Established October 7, 1910; approved November 11, 1910. The course of study covers shop drawing, shop science, and shop mathematics (including mensuration), strength of materials, and simple formulas used in problems dealing with horsepower, transmission of power, and elementary calculations. The plan is to maintain the school for a session of 25 weeks each year, giving an aggregate of 100 hours of instruction in each course. An advisory committee has been appointed, which consists of citizens of the town who have had experience in the metal-working trades, either as workmen or directors of workmen. The classes are practically confined to boys and men already engaged in the industries.

Lawrence Industrial School.—The evening department of this school was established January 20, 1908, and opened March 16, following. Courses in textile arts, mechanic arts, and domestic arts are provided. The textile arts course is described on page 254 of the present volume. The course in mechanic arts is planned to cover one year, and includes instruction of a theoretical character for the benefit of electricians, firemen, steam engineers, carpenters, and masons. During 1909–10 firemen and engineers had four hours per week in the school, while electricians, carpenters and masons had but two hours. The domestic arts course in 1909–10 included only dressmaking, in which pupils had two hours of instruction each week, most of which was practice work. The sessions of the school are held on five evenings of each week, from 7.15 to 9.15 o'clock. Twenty weeks make up the school year. The enrollment on March 1, 1910, was as follows: Textile arts, 313 males; mechanic arts, including 44 pupils in drafting, 374 males; domestic arts, 433 females.

Natick Industrial School.—The school at Natick was established September 28, 1909. In 1909–10 a course in cooking was offered, the enrollment in which was 92. The addition of work in sewing and dressmaking is planned.

New Bedford Industrial School.—In this school the evening courses for men were opened January 1, 1910. A course in millinery was opened on March 23 and one in dressmaking on April 23 of the same year. These courses are each three years in length. The work for men in 1909–10 consisted of carpentry, machine-shop practice, and the study of steam and gasoline engines. In all trades taught pupils had two hours of theoretical instruction and 2 hours of shop practice

per week. The school was in session four nights a week, Monday to Thursday, inclusive, from 7.30 to 9.30 o'clock. The school registration for 1910 was as follows: Carpenters, 57; machinists, 35; steam and gasoline engineers, 100; dressmakers, 95; milliners, 95.

NEWTON EVENING INDEPENDENT INDUSTRIAL SCHOOL.—Established in October, 1910; approved November 11, 1910. Courses are offered in mechanical drawing, machine design, shop mathematics, and blue-print reading, industrial drawing, cooking and housekeeping, and sewing and dressmaking. The school is open three nights in the week, for two hours each. It is claimed that the bulk of the membership in each of the domestic-art classes consists of those who are engaged during the day in occupations for which the evening instruction gives preparation, either directly or indirectly. The registration at the time of the latest information was 194, of whom 117 were men and 77 were women.

TAUNTON INDUSTRIAL SCHOOL.—This school was established December 23, 1907. Formerly courses in modeling, sewing, and dressmaking were given. In the fall of 1910 courses in industrial drawing and design were organized and the sewing and dressmaking work was discontinued. In 1909–10, 120 pupils were enrolled.

WALPOLE INDUSTRIAL SCHOOL.—Established December 11, 1908; this school offers courses in mechanical drawing, architectural drawing, and cooking. During 1909–10 the attendance averaged about 14 pupils.

WORCESTER INDUSTRIAL SCHOOL.—The Worcester school was established and approved by the State board of education in September, 1910. It was inaugurated by the board of trustees of the Worcester School of Trades, of which it is an extension. The courses thus far offered include lathe work, milling and gear cutting, planer and shaper work, grinder work, pattern making, house framing and estimating, gasoline-engine practice, mechanical drawing, blue-print reading, and shop mathematics. Classes meet on two evenings of one week and three of the next. The school term covers 27 weeks. According to recent information the enrollment is 215.

Since September 1, 1910, six schools have been tentatively approved by the board of education as independent industrial schools. These are the Boston School of Printing and Bookbinding (day), the Hyde Park Evening Industrial School, the Newton Evening Industrial School, the North Attleborough Evening Industrial School, the Somerville Industrial School (day), and the Worcester Evening Industrial School.

The following schools are at the present time in process of organization: The Boston Industrial School for Boys (day), the Cambridge Trade School for Boys (day), the Cambridge Trade School for Girls (day), the Holyoke Industrial School (day and evening), the Norwood

Industrial School (part time), the Pittsfield Trade School for Girls (day), the Somerville Industrial School (evening), and the Somerville Trade School for Girls (day).

The total cost of maintaining the independent industrial schools for the period from July 1, 1909, to November 30, 1910, inclusive, was $129,229.56. This sum does not include expenditures for construction and equipment. Of this amount, $8,407.88 was paid by towns and cities for the tuition of residents attending school in other localities, the State in turn reimbursing such towns and cities for one-half these tuition claims, or $4,203.94. The State also paid $60,410.84 to communities maintaining schools, making the total amount paid by the Commonwealth to aid the independent industrial schools for the period, $64,614.78. The rate of tuition charged by the schools for nonresident pupils, which is determined by the board of education, varies greatly in both day and evening class instruction. The prevailing rate for the evening classes is $25 and for day classes $100 per year.

These schools are looked upon as being in a sense experiment stations where, in addition to the valuable training given to the pupils, standards in industrial and agricultural education are being evolved. Guided largely by the experience of the existing schools, certain theories and principles have been established, which, it is believed, will have an important bearing on the future development of industrial education.

NEW YORK.

The industrial and trade school act of New York, passed in 1908, permits local school authorities to establish two kinds of schools for industrial training:

1. General industrial schools, open to pupils who have completed the elementary public-school course or who have attained the age of 14 years.

2. Trade schools, open to pupils who have attained the age of 16 years and who have met such requirements as the school authorities may have prescribed.

The first of these two classes of schools has a twofold purpose: (1) To keep pupils in school after the compulsory school age is passed, and (2) to make better provisions for the vocational needs of those likely to enter industrial pursuits. In them pupils are given an opportunity to learn something of the different vocations and are better prepared to select a trade with some knowledge of their fitness for it.

The schools of the second class supplement those of the first. The pupils in the lower schools, having been given a chance to discover their bent, are, in the higher schools, provided special practice in a

chosen trade. Both classes of schools are intended to be educative of the mind as well as of the hand.

In addition to these a third class of schools having for their purpose the training of young persons in agriculture, mechanic arts, and home making, are provided for by article 22, chapter 16, Consolidated Laws of 1910. Schools of this type do not fall within the scope of the present report.

The division of trades schools of the State educational department has supervision of the organization and management of these schools, including the licensing of teachers, who must prove not only their teaching ability but also their knowledge of the trades taught. The schools being a part of the public-school system, are under the immediate control of the local boards of education, who are required by the law to appoint advisory boards of five members representing the trades or industries predominating in each locality. These boards, while having no administrative power, are expected to exercise a supervisory interest and to be consulted in matters pertaining to trade training.

The schools in question are not special schools in any sense other than that they have an especially definite purpose and a course of study fitting in with the purpose. They belong to the general school system and articulate with its other parts, but their work is not to be confused with the work of other departments, though including much in common with them. They may properly be called either "schools," "departments," or "courses," it being borne in mind that the word "course," as here used, does not refer to merely a single line of study, but to a group of related studies forming in itself a scheme of education having a distinct vocational purpose.

In order to obtain an allotment of State funds under the law, these schools must be independently organized and must have an enrollment of at least 25 pupils. This does not necessarily require a building separate from others used for general school purposes.

It is held by the State education department that the independent organization of such schools or departments should include the following features:

1. A course of study approved by the department. This course includes academic studies as well as work of an industrial nature. The law does not definitely specify the amount of industrial work which a pupil must do in his weekly program, but it is evident that more time should be required than is the case in elective manual-training courses.

2. A special yearly report to the department. The requirement of this special report is to make it clear that the vocational training is not obscured by other educational work and so made an unrelated and minor subject.

3. One or more teachers holding special trades school certificates and devoting their entire time to the teaching of industrial subjects. If the school program is so arranged that these teachers have any spare time they may devote such extra time to teaching the beforementioned subjects to pupils other than those enrolled in the special industrial courses, but they are not to teach other subjects if a special State allotment of money is to be granted.

In subjects other than those which are vocational in character, the pupils in these special departments recite in classes with other members of the public school unless there is some practical advantage or teaching economy in a different arrangement. Under no conditions is there any demarcation between pupils preparing for industrial pursuits and those preparing for college entrance. Neither line of study is to be regarded as more or less important than others pursued in the schools.

No teacher is licensed to give instruction in these industrial courses or departments who is not specially prepared for such work. The applicant for the certificate to teach must furnish (1) evidence of satisfactory general education and (2) evidence of graduation from an approved institution wherein he has completed a course of study in the special subject, or evidence of an intimate knowledge of the subject which he is to teach, gained through actual experience. In addition he must establish to the satisfaction of the commissioner of education that he is qualified to teach such special subject.

Emphasis is placed on the fact that the boys and girls who take the vocational courses, including English, history, science, and mathematics, may get a high-school diploma; that vocational subjects count toward such a diploma, and that boys who are in the elementary school can get into the high school even if they take vocational work in the seventh and eighth grades. There is no intention to shut out any such pupil from entrance to the high school.

The education department has decided to issue a "junior trades school certificate," this certificate to be granted upon the successful completion of six years of elementary school training plus two years of intermediate industrial school training, in which at least five-twelfths of the school program has been given over to industrial subjects. The remaining seven-twelfths of the school program may be devoted to English, history, industrial and commercial geography, and industrial arithmetic. This certificate will be signed by officials of the State education department, as well as by local school officials.

Provision is being made for advanced industrial training in localities where these intermediate industrial schools are established, either through the organization of separate trades schools or through technical school departments in existing high schools. One of the purposes of the intermediate industrial work is to provide such studies

as will point out to the child the particular line of vocational activity which he is likely to pursue to his advantage. Care is being exercised that industrial education shall have a distinct field of its own.

The purpose of these vocational schools is to educate young men and women for practical service. It is expected that this type of education will eventually be open to pupils who can not attend school every day, or for the full school term, and will confer its aid upon adults as well as younger persons. The advisory boards may be of great service in fitting the general course of study to the special requirements of their own communities.

When all of the requirements of the State education department are complied with, the State makes an allowance of $500 to a school for the first industrial teacher and $200 for each additional teacher. All other expenses are provided for through the local school funds. So far schools have been established in Albany, Buffalo, Gloversville, Hudson, Lancaster, Rochester, Schenectady, and Yonkers.

ROCHESTER.

Rochester was the first city to avail itself of the provisions of the State industrial and trade school law. It now has three schools which have been approved by the State education department. The first of these, opened on December 1, 1908, has for its aim the training of boys along general industrial lines and in the fundamentals of certain trades. It does not aim to teach a trade, but to develop efficiency and rapidity in execution, so that graduates will be better fitted to enter their chosen trades than they would be under other conditions.

The school opened with cabinetmaking as the only course. The 40 boys who entered were taught by two teachers, one instructing in common-school grade work and drawing and the other in shopwork. The following February a course in electricity was offered and two more teachers employed, one to give shop instruction in electrical work and the other to take charge of the grade work. Mechanical drawing from this time on was taught by a separate teacher. In February, 1910, courses were added in carpentry and plumbing, and a principal and three new teachers were employed. In September, 1910, courses in architectural drawing and machine design were added. The shop instructors have classes of from 13 to 15 pupils and the grade and drawing instructors have from 25 to 30.

The school is under the immediate supervision of the board of education, and is free to any boy in the city between 14 and 18 years of age who has completed the sixth grade in the common school. The length of each course is two years of 40 weeks each. Thirty hours make up the school week. It is the aim to place the boys in con-

ditions as nearly like those to be found in actual practice as is possible, and for this reason the school has more the air of a shop than of a school. School sessions are from 8.30 to 11.30 a. m., and from 12 m. to 3 p. m., Monday to Friday, inclusive. The early closing in the afternoon allows many boys to do outside work and thus continue in school a longer period.

The number of hours per week devoted to each subject is as follows: Shopwork, 15; shop mathematics, 4⅙; drawing, 5; English, 3⅓; industrial history and civics, 1¼; spelling, 1¼. Five hours of home work in spelling and shop mathematics are required of all pupils each week.

It is not the intention to have any fixed time of graduation. A boy may enter school at any time during the year and will be graduated as soon as he completes the prescribed course.

Where graduates have entered the classified trades, shop foremen and managers have expressed much appreciation of the instruction given in the school.

The advanced boys are given one afternoon a month to visit factories and get first-hand knowledge of working conditions.

A second school was established in Rochester in March, 1909. The school is in a way a preparatory school to the one established in 1908. Woodworking and cabinetmaking are taught. The younger and less promising boys are started here, but a boy who evinces great interest and aptitude is at the earliest opportunity transferred to the older school and placed in the department for which he seems the best fitted or which he prefers. One teacher is employed for practice work and one for academic instruction. The daily sessions are 5½ hours in length, and the school is conducted upon practically the same plan as the one just described.

The School of Domestic Science and Domestic Art of Rochester was opened in September, 1909, as a home-making school, with one teacher who gave instruction in cooking, sewing, and general care of the home and another teacher for academic instruction. In February, 1910, millinery and sewing were added, and in September, 1910, the school was entirely reorganized. Home making was made secondary to the work of preparing girls to enter the trades of millinery and dressmaking. All girls are now required to take instruction in cooking, but not with the idea of making it a gainful occupation. A description of this school will be found in the chapter on "Girls' schools," page 307 of this report.

ALBANY.

A vocational school was established in Albany in April, 1909. Any pupil who has completed the sixth grade of the public school may be admitted. Girls devote one-half of the daily session of six

hours to academic studies and one-half to vocational work and drawing. Boys have 20 hours of academic work and 10 hours of shop practice per week. The schoolroom instruction does not differ materially from that described for the Rochester school. The boys have instruction in cabinetmaking, the girls in sewing and cooking.

In the cabinetmaking shop industrial conditions are reproduced as nearly as possible. Pupils have charge of the tool room and stock room and in some cases act as foremen, with duties as clearly defined as those of any shop foremen. Pupil workers ring in and out on a time-record clock as in a regular producing shop. The "shop" timekeeper each week issues a "pay slip" to the pupil at the rate of 4 cents per hour. This becomes a weekly statement of the number of hours for which he receives credit. Sometimes he is docked an hour for tardiness, closing up work too early, or listlessness in his work. At the end of the year the hours of shopwork as well as the boys' standing are considered in making out the grade card. So thoroughly is the shop idea carried out that the entire school attendance is kept on a time-keeping basis by pupil timekeepers. Pupils share in all the running of the school shop—a fact that eliminates what is usually known as discipline in schools and puts in its place a sense of responsibility which helps to make character.

Business skill as well as manual skill is developed. As soon as a boy is sufficiently skilled he takes orders for products made in the shop. The boy then becomes the "contractor." He draws up the plans and specifications, estimates the amount of material to be used, and puts in his order to the stockroom clerk. Having taken the order, he, and not the teacher, is responsible for its satisfactory completion.

The general scheme is the same for the girls. In the cooking school girls, in relays of 25, have charge of the kitchen and serve noon luncheons to the teachers and pupils (75 or more persons) daily. The pupils do the planning of the bill of fare, also the marketing and buying. A cashier and an assistant cashier, both pupils, keep the accounts and do the banking. The lunches are sold at 2 cents per item, the average lunch check amounting to 6 cents. Each relay of girls serves two weeks. In addition to the lunches the girls take orders for bread, cake, pastry, etc.

The sewing room is equipped with 25 sewing tables and 5 sewing machines, and has its girl forewoman. The work begins with hemming. The pupils have hemmed all of the table linen used by the school and also have made curtains for the household department. The girls take orders for window curtains with stenciled borders, for aprons, children's clothes, shirt waists, etc. Many of the children bring the sewing for their homes and do it in the school shop.

The academic work is very closely correlated with the practice work. In the drafting room the boys draw designs for furniture and machinery. The girls draft patterns for garments and lay the scientific foundations for the tailoring and dressmaking trades.

The arithmetic classes work out the problems that arise in the shops. The compositions in the English classes are upon subjects relevant to the shopwork. History is studied in the English class in its relation to character making and civics in its relation to local affairs.

A second vocational center has recently been opened at school No. 6 in Albany, which is to be conducted upon practically the same lines as the one described. The principal maintains what may be termed a vocational bureau, where an attempt is being made to bring about a system of intelligent vocational direction for the pupils of the school.

GLOVERSVILLE.

The school at Gloversville, established in November, 1909, is unique among vocational schools in that it is the only institution in the United States known to be teaching the glove-making trade. Gloversville, with its immediate vicinity, is noted as a glove-making center. It is estimated that two-thirds of the school children who go from the public schools of this city into gainful occupations enter some branch of the leather or glove industry, and it is the purpose of this school to develop in them the ability and skill which will enable them successfully to meet these conditions.

The school program is so arranged that pupils who have completed the sixth grade may devote one or more 45-minute periods per day to vocational work. Usually pupils of the seventh grade devote one period, those of the eighth grade two periods, and high-school pupils three periods to glove making each day. There is no attempt at correlation of school and shop work. The only connection lies in the fact that the pupils are allowed the time from the regular school work to attend the factory training classes.

The gloves are cut out at the factory and sent to the school, where the pupils make them under the direction of a woman teacher who has had 23 years' experience in a glove factory. The least experienced begin on sewing mittens, and learn the trade step by step until they can put in the thumb, which is considered the most difficult operation. When the gloves are completed they are returned to the factory whence they came. Neither the school nor the pupil gets pay for the work. The number of pupils enrolled in the glove-making class in June, 1910, was 60.

In addition to the day-school work a night training school for glove makers, with about 30 pupils enrolled, is open for 50 nights (5 nights

per week, 2 hours per night) during the year. This school is attended by persons employed during the day, mostly in clerical positions, but the majority of those who have finished the school course have secured work at the trade.

YONKERS.

The Yonkers school is similar to that at Rochester. Both a trade and a vocational department were opened January 1, 1910. The vocational work may be commenced upon the completion of the sixth grade. This covers two years and is intended to give the pupils an opportunity to discover their aptitudes. The last two years, spent in the trade department, are intended to develop the aptitudes of pupils along definite trade lines.

In the vocational department girls are taught cooking and sewing. At the time this school was visited carpentry was the only subject taught to males, but it is the plan to offer instruction in any trade for which there may be a demand. The academic work is that of the regular seventh and eighth grades.

The trade department has no provision for girls at present. The boys are instructed in pattern making and machine-shop work and forging, the work being so planned as to take the boy where the vocational department leaves him and give him two years of trade training which will fit him to go at once into a gainful occupation.

The teachers here are practical tradesmen, but are required to take a normal course under the direction of the principal of the training school for teachers.

While theoretically the trade department is open to boys 14 years of age, in practice no boys under 16 are enrolled. The academic work corresponds to that of the first two years of the high school.

In addition to the day schools night continuation classes are held two nights per week for 60 nights. Courses are given for machinists, blacksmiths, patternmakers, carpenters, cabinetmakers, and plumbers. No academic instruction is given in the evening school, but pupils who desire it may attend the regular evening high school on alternate nights.

HUDSON.

The Hudson Industrial School, opened September 7, 1909, is similar to the Albany school, but the work is more limited. Woodworking, including practical training in the use of tools and furniture making, is the only subject taught to the boys. A course in domestic science is provided for the girls. In this school pupils who have completed the sixth grade and who are at least 14 years of age are given their choice of entering the regular seventh grade classes or taking the vocational work. The schoolroom instruction in the vocational course is

equivalent to that of the regular course and is credited for high-school entrance, but it is somewhat different in character in order to give the theoretical training which underlies the trade.

Approximately one-half of the day is given to instruction in English, spelling, mathematics with reference to shop requirements, geography, and history and civics, with special emphasis upon social and industrial development. In the shop, during the remaining half day, the boys are engaged at making furniture for use in the schools, and are also allowed to make articles for their own use, in which case they pay for the materials used. They also take orders for furniture to be sold. When the product is to be sold pupils are paid 3 cents per hour for their work. There is said to be a steady sale for bread, cakes, and cookies made by the cooking class. During 1909–10 about $125 was obtained from the sale of furniture and $50 from baked goods. The cost of materials for the year was $250.

LANCASTER.

At Lancaster the industrial department was opened in 1909. Classes are open to all who have completed the sixth grade of the public school. A two years' course in woodworking only is offered.

SCHENECTADY.

The first industrial school at Schenectady was established in September, 1909, the second in September, 1910. There is one teacher of vocational work in each school. Woodworking and cabinet-making is the only course so far offered.

BUFFALO.

The Seneca Vocational School was established in September, 1909. The purpose of the school is to teach the beginning of trades so that graduates may shorten the period of apprenticeship. A secondary motive is the retention of the boy in school for two additional years after the completion of the period of compulsory school attendance.

The course of study includes academic subjects and the theory of the trades, as well as actual shop practice.

Applicants for instruction must be public-school pupils at least 13 years of age, unless they have completed the sixth grade, in which case they may be admitted at 12 years. A total of 50 pupils was enrolled in the first class. These were distributed as follows: Cabinet-work, 17; carpentry, 17; printing, 10; electrical work (wiring for light and telephones), 6.

The course of instruction covers two years. The academic subjects taught are arithmetic, spelling, English, bookkeeping, electricity, and lectures on industrial economics. During the week 14¼ hours are

devoted to the schoolroom and 13¼ hours to the shop. Classes are held Monday to Friday, inclusive, from 8 a. m. to 2 p. m., with a half hour for lunch. The school year covers 40 weeks, beginning with the first Monday in September and closing about June 25. There is also a summer term of 4 weeks during which industrial work only is taught.

At the completion of a course a diploma will be awarded. Three teachers are at present employed—one for teaching theory and two for instruction in shop practice.

The equipment is valued at $1,700. During 1909–10 the school received from the State $900 as its share of the appropriation for vocational work. The cost of materials for the year amounted to $800. No marketable product is made by the pupils.

CONNECTICUT.

In addition to the public industrial schools maintained in several localities, which are supported in part by State funds, Connecticut has recently inaugurated a scheme of trade instruction wholly at the expense of the State. The history of industrial education under State control in Connecticut may be said to date from the creation of a commission by the general assembly in 1903, charged with the duty of investigating the subject of trade schools with a view to their adoption as a part of the State school system. This commission, after a careful study of the question, submitted a final report in 1907 recommending the passage of a bill granting to any trade school, under certain conditions, an appropriation equal in amount to that contributed by the town in which the school is located. It was further recommended that all details in the management of such schools be controlled by the local school boards, subject to the general authority and supervision of the State board of education.

In 1909 a special education commission presented a report to the general assembly, in which it was stated that "it is the duty of the State to provide to a considerable extent industrial education, including training in at least the elements of agriculture."

As a result of the recommendations of these commissions, and in view of popular demand, a law providing for the creation of two schools for free public instruction "in the arts and practices of trades" was enacted. This measure, the text of which is reproduced on page 501 of the present report, was approved June 23, 1909, and became operative immediately. An annual appropriation of $50,000 was provided to carry out the provisions of the law.

The two State trade schools created by this law are placed under the control of the State board of education, and that body is authorized and empowered by the law to make regulations governing the admission of pupils, the appointment and removal of teachers, and the

expenditure of the fund provided for the erection of buildings and the maintenance of the schools.

Pursuant to the authority contained in the act, the State board of education located one of the schools at Bridgeport and the other at New Britain. The subjects for instruction are selected by the principals of the schools, but prior to their adoption they must be submitted to the State board of education for approval. The schools are in continuous session every week day of the year, except legal holidays, and pupils may be admitted at any time. Any resident of the State who is 14 years of age or older may attend them. In addition, the law under which these schools were established permits the admission of children under 14 years of age during public-school vacations. Instruction is free to all residents of the State. Nonresidents may be required to pay for instruction, the rates for which have not yet been formulated.

STATE TRADE SCHOOL, BRIDGEPORT.

The establishment of this school was decided upon by the State board of education on September 15, 1909. Both day and evening instruction, also cooperative industrial day classes, are provided.

Day school.—The specific purpose of the day school is to provide instruction in the technical and practical knowledge of a trade. The pupils do not work at gainful occupations outside of school hours, as do the pupils in the cooperative classes. The school was opened for instruction on August 15, 1910. The number of pupils enrolled on August 30, 1910, was as follows: Machinists, 13; carpenters, 10; dressmakers, 15. The industrial training in the day trade school is considered equal to a full period of apprenticeship in each of the trades taught.

The time devoted to theoretical training for the trades of machinist and carpenter is 12½ hours per week for each year of the course. The subjects taught in each year are making and reading drawings, trade mathematics, spelling, industrial history, lectures, and general instruction. Pupils preparing themselves for the machinist trade have mechanical drawing, while those learning carpentry have architectural drawing. Both classes of pupils receive, incidentally, some instruction in free-hand drawing.

In dressmaking the time devoted to theoretical training is 10 hours per week for each year of the course, and the subjects taught are designing patterns, English, arithmetic, lectures and general instruction, free-hand drawing (incidentally), and industrial history.

The full course of training for the machinist and the carpenter trades is two and one-half years in length. For dressmaking the full course is two years.

Practice work in the machinist and the carpenter trades occupies 36½ hours per week during each year of the course, while the time devoted to practice work in dressmaking is 39 hours per week.

The total number of hours per week devoted to theoretical training and practice work is 49 for all pupils. The foregoing program of practice work is not considered permanently fixed; some changes may be made to meet future contingencies.

The hours of instruction are from 8 a. m. to 12 m. and from 1 p. m. to 6 p. m., Monday to Friday, inclusive; on Saturday the hours are from 8 a. m. to 12. The school is in session the entire year, no provision being made for summer sessions or vacation periods. The usual legal holidays are observed. As in other units of the State trade-school system, lesson sheets prepared especially for the use of the school are used instead of textbooks.

A diploma or certificate of efficiency will be presented to pupils who complete the full course of training.

Four teachers were employed in the day school in 1910. These were selected from scientific schools and from the trades. All four gave instruction in theoretical subjects, and three of them instruction in practice work also. All have had actual shop experience in the trade taught, while two have had previous experience in teaching the trade. One teacher has had experience in supervising the work of teachers.

The school occupies two floors in a leased building formerly used for manufacturing purposes. The mechanical equipment, which was supplied by local manufacturers of the city, includes all the latest and most approved types of tools and machinery. Materials used in practice work are furnished by the school.

The school receives an annual appropriation of $25,000 from the State, a part of this amount going to the support of the evening school and the cooperative classes. Additional financial assistance, amounting to $15,000, was received from the local manufacturers to provide equipment for the school. No fees are charged for instruction. Up to the present time no productive work has been attempted.

Evening school.—This school was established and opened on the same dates as the day trade school, and the general management, rules, and conditions are similar. The purpose of the night school is to furnish free industrial instruction to persons working during the day who may desire to increase their knowledge and efficiency in their vocation. On August 30, 1910, the number of pupils by trades were machinists 40, carpenters 40, and dressmakers 24.

The evening school has fixed no limit to the length of the course, the purpose being to continue the training of pupils until they arrive at a stage of efficiency that may be satisfactory to the teacher and the pupils. The theoretical subjects selected for study during the

first year of the courses for machinists and carpenters are making and reading drawings, trade mathematics, spelling, and industrial history. In dressmaking the theoretical subjects for study in the first year are lectures and general instruction, free-hand drawing, designing patterns, English, arithmetic, spelling, and industrial history.

The time devoted to schoolroom studies is two hours per week and that given to practice work four hours, making a total of six hours devoted to schoolroom studies and shop practice each week during the first year. The program of practice work has not been definitely fixed for the night school, but that used in the day school is followed as closely as possible. The hours of instruction are from 7:30 to 9.30 p. m. on Monday to Friday of each week.

The teachers employed in the evening school are those employed in the day trade school, with an additional teacher for practice work in the machinist trade. This teacher was selected because of practical experience at the trade. The sessions of the evening school are held in the building occupied by the day school, and the same equipment is used by both.

Cooperative classes.—Following an agreement made by the State board of education with the manufacturers' association of Bridgeport, the cooperative classes were organized on October 3, 1910.

These are located in the same building and are under the same general management, rules, and conditions as the day trade school.

The purpose is to cooperate with employers by furnishing technical instruction to their apprentices. Pupils are admitted to the classes at any time during the school year. Apprentices serving a regular period of apprenticeship in the machinist or tool-making trades in any establishment are received as pupils. The lowest age limit for admission is 16; there is no maximum age limitation.

On October 8, 1910, there were 35 pupils who were receiving technical instruction in the machinist's trade and 25 who were studying tool making. The subjects studied were mechanical drawing, free-hand drawing, trade mathematics, spelling, industrial history, and lectures and general instruction.

The length of the course is fixed at two years, but the period may be extended to meet future contingencies.

Two hours per day during two days of each week are devoted to theoretical instruction by each pupil. The practical training is obtained in the establishment where the apprentices are employed. The hours on which school instruction is given are from 8 a. m. to 12 m. School sessions are held every week day for 35 weeks during each year of the course, beginning on September 1 and ending on May 1. Lesson sheets instead of textbooks are used, and reference

books provided for the day trade school are also available for the use of the apprentices and the teacher.

There was only one teacher employed for the instruction of the cooperative classes in 1910. This teacher is a university graduate in mechanical engineering and had had two and one-half years' practical experience in the machinist trade, as well as two years' experience as a teacher of theoretical subjects relating to that trade.

STATE TRADE SCHOOL, NEW BRITAIN.

The State Trade School at New Britain is under the same administrative control and is governed by the same general rules and conditions as the State Trade School at Bridgeport. School work began on June 20, 1910. On August 15, following, there were 11 pupils in machine-shop work, 5 in tool making, 3 in die making, 2 in carpentry, and 2 in pattern making.

To be accepted as a pupil in this school the applicant must have a fundamental knowledge of arithmetic and be able to read, write, and speak the English language. The full course of instruction for all trades is fixed at two years, and the program for theoretical training is as follows:

Machine-shop work.—Making and reading working drawings, trade mathematics, diemaking and toolmaking, and theory of the trade, including strength of materials, use and care of tools, use of micrometer, threads, and gears.

Carpentry.—Making and reading working drawings, trade mathematics, and the theory of the trade, including care and use of tools, classification of lumber, use of steel square in framing, value of nails and screws and their uses.

Pattern making.—Making and reading working drawings, trade mathematics and the theory of the trade, including rules of shrinkage, prints, cores, tail prints, green sand, dry sand, and loam.

The school is in session from Monday to Friday of each week, from 8 a. m. to 6. p. m., with one hour recess at noon. On Saturday the hours are from 8 a. m. to 12 m. School work continues during the entire year. First-year pupils have 15 hours of schoolroom work and 34 hours of shop practice per week. At the time the school was visited the course for the second year had not been formulated.

Lesson sheets prepared especially for the school are used instead of textbooks. Periodical trade publications are used for reference by pupils and teachers.

The school employed three teachers in 1910. All three teachers gave instruction in theoretical subjects, and two of them also gave instruction in practice work. One of the teachers of theoretical subjects is a college graduate, one is a high-school graduate, and one is a practical workman selected from the trades. One teacher had had four years' experience, and two had had no previous experience in teaching trades.

The school is located in a building that was recently erected for an up-to-date manufacturing plant. Entirely new and modern machinery of the most approved type was provided by the local manufacturers of the city for the use of the school. The State of Connecticut makes an annual appropriation of $25,000 for the support of the school; the local manufacturers have contributed $10,000 for the shop equipment.

The materials used in practice work are furnished by the school.

Owing to the recent establishment of the school pupils have not been sufficiently advanced to turn out a marketable product. It is the purpose of the school officials to arrange with local manufacturers to send unfinished parts of machinery to the school so that in the future the pupils may do productive work.

NEW JERSEY.

The New Jersey law granting State aid to schools for industrial education was enacted in 1881. This law, which has several times been amended, provides for an annual contribution by the State of an amount equal to that expended by a locality for the support of an industrial school, but subject to the conditions that the local expenditure be not less than $3,000 and the contribution of the State not more than $7,000. In cases where $100,000 or more is raised by the locality for the purchase of land, buildings, and equipment, in addition to $3,000 or more for maintenance, the State may duplicate the local expenditure to an amount not exceeding $10,000 per annum. The text of this law will be found on pages 507 and 508 of the present report.

An amendment to the law, approved March 22, 1895, provides for a board of trustees for each school so established, the board to consist of the governor of the State and the mayor of the city as ex-officio members and eight active members appointed by the governor for a term of four years. This board has full authority in all administrative matters of the school. In order to obtain aid from the State the courses of study adopted in the school must be approved by the State board of education.

By an act of the legislature, approved October 19, 1903, the Manual Training and Industrial School for Colored Youth, located at Bordentown, was placed under the control of the State board of education and the sum of $5,000 per annum was appropriated for its support. Succeeding legislatures increased the appropriation for the school's maintenance in addition to providing special funds for buildings and equipment. In 1910 the amount of State aid was fixed at $18,000.

The laws of New Jersey (sec. 205, Ch. I, Acts of Second Special Session of Legislature, 1903) authorize the duplication from the

State treasury of amounts expended for industrial education or manual training by any school district up to the sum of $5,000, provided at least $250 is raised by the district. The course of study must, in every case, be approved by the State board of education before State assistance is given. Up to the present time more than 50 school districts have availed themselves of the provisions of this law, the instruction given being manual training rather than industrial education.

Three schools have been established under the industrial-education act of 1881. These are the Newark Technical School (1885), the Hoboken Industrial School (1888), and the Trenton School of Industrial Arts (1898). The work of the Trenton and Hoboken schools, it is believed, does not fall within the scope of the present report. In the Newark Technical School, the sessions of which are held only in the evening, courses in electric wiring, electroplating, and plumbing form a part of the instruction offered. These are essentially trade courses. For this reason a brief account of the institution is given herewith.

NEWARK TECHNICAL SCHOOL.

The school was opened to pupils on February 9, 1885, as a result of the activities of the Newark Board of Trade, the members of which felt the need of supplying industrial education for those already employed at trades. Its object is "the advancement of the manufacturing interests of the city and State in the line of technical and industrial education." Its affairs are administered by a board of trustees of eight members appointed by the governor of the State in conformity with the terms of the law providing schools for industrial education.

On October 4, 1909, the total enrollment of the school was 365. Of these, however, only 46 pupils were in courses falling within the scope of this investigation. These were: Electric wiring, 19; electroplating, 17; and plumbing, 10. The remaining pupils were pursuing courses largely technical in character.

In general, males of 16 years or older, of good moral character, are received as pupils. In the electric-wiring course applicants must pass an examination in arithmetic. Before admission to the plumbing class can be had candidates must pass an examination in arithmetic and also must show that they have worked at the plumber's trade for at least one year. No entrance examination is required in the course for electroplaters. In all three courses pupils may enter at any time of the school year provided they do not retard the work of the class.

The length of the course in each of the three trades mentioned is two years. In electric wiring pupils have two hours of lectures on

electricity and two hours of practice work during each week of the first year, and two hours of practice work alone in each week of the second year. In electroplating the course is so arranged that pupils get two hours of chemistry (lectures) and four hours of practice per week in the first year, and five hours of chemistry (lectures and laboratory work) with two hours of practice per week in the second year.

The plumbing work is arranged as follows: First year, two hours of lectures on chemistry, two hours of mechanical drawing, and four hours of shop practice per week; second year, two hours of mechanical drawing, four hours of chemical laboratory work, and two hours of shop practice per week. In this course the drawing consists of the arrangement of the house trap, fresh-air inlets, all the connections of the horizontal and vertical runs of drain, waste, and vent piping, as well as the elevations of all plumbing fixtures with the required drain, vent, and supply pipes and connections. On the completion of the details the pupil is taught how to draw the diagrams of plumbing and piping for the plan and elevation of all classes of buildings, from small dwellings to large office buildings, apartment houses, or public buildings. The purpose of the instruction is not "to make plumbers of the students following the course" but "to educate plumbers."

The school is in session five nights a week, Monday to Friday, inclusive, from 6.30 to 9.30 o'clock. Individual pupils are required to attend from one to five evenings per week, depending on the course taken and the stage of advancement attained therein. The school year embraces 30 weeks, from the first Monday in October to the second Friday in May, with 10 days of vacation at Christmas. Pupils completing the full two-year course are awarded a certificate showing the work accomplished.

In 1909–10 four teachers were employed in giving instruction in the three trades mentioned. Of these, all four had attended technical or scientific schools for periods ranging from two to five years and three had had actual shop experience in the trade taught. A teacher of mechanical drawing in the plumbing course had worked five years as a practical draftsman. The three teachers of practice work reported previous experience in teaching the trade.

The equipment for trade instruction in the three branches named above represents an expenditure of approximately $3,000, the apparatus used in the electroplating course requiring the greatest outlay. The materials used in 1909–10 cost about $175. In the electric wiring and plumbing courses the tuition fee is $5 per term (half year). In electroplating, pupils pay $7.50 per term in the first year and $5 per term in the second year. A deposit of $5 for tools is required in the plumbing and electric wiring courses, this money being refunded

on the return of the tools in good condition. No other fees or charges are made.

The Newark Technical School receives an annual appropriation of $7,000 from the State and $10,000 from the city. The tuition fees for the year 1909–10 amounted to $1,382, of which about $500 was paid by pupils in the electric wiring, electroplating, and plumbing classes.

The school does not make a marketable product. The work of the pupils is either dismantled and the material used again, or retained for purpose of exhibition. There is said to be considerable demand for pupils of the school among manufacturers and builders of the city, who find that the school training produces a superior class of skilled workmen. No attempt is made directly to qualify boys for foremen or other executive positions.

Mechanics and manufacturers have expressed much appreciation of the school's work. The attitude of organized labor is said to be neutral, no credit being allowed apprentices for time spent in the school. At the same time it is stated that young men who have received instruction in the school advance much more rapidly in their trades than do their fellow workers who have not had the benefit of the school's training.

PHILADELPHIA TRADES SCHOOL, PHILADELPHIA, PA.

The Philadelphia Trades School is a public day school established by the board of public education, October, 1906, solely for the purpose of giving trade instruction. The many and varied industrial interests of Philadelphia and vicinity, as seen in the large construction plants, including locomotive, shipbuilding, and boiler works, electrical supplies and installation concerns, and the great amount of building both for public and private purposes, demand a large supply of skilled workmen. A committee appointed by the board of public education to investigate the needs of the community for industrial education decided upon the trade courses to be offered in the school. As a part of the public school system of the first school district of Pennsylvania, comprising the city of Philadelphia, the school is supported entirely by public funds. Pupils enter by promotion from the eighth grade, and occasionally from the seventh grade of the public schools.

The members of the board of public education have supervision over the school. It is under the direction of a principal, to whom all the instructors are responsible.

The number of pupils enrolled in the several trade courses in 1909–10 are as follows: Electrical construction, 107; carpentry, 11; pattern making, 11; printing, 13. Plumbing has been placed on the list of trades in which instruction is to be given, but so far there has not been a sufficient demand to warrant its introduction. The course in

each trade is open to pupils who are residents of Philadelphia and who have completed the eighth grade or its equivalent. Candidates must be at least 15 years of age. Boys at least 15 who are in the seventh grade or who have not completed the eighth, and who show sufficient ability and determination to carry on the work, are permitted to enter the school as subfreshmen. In the classroom they cover the work of the eighth grade, particular attention being paid to mathematics. In the shop they begin with sloyd and take a general course in manual training. In a term (five months) or in a year they are ready for the regular work of the school.

Pupils may enter at any time of the year on condition that they make up any work already completed by the class entered. They elect their trade and must devote six hours per day to their combined shop and school work.

The course of study for each trade covers three years. This includes academic subjects selected as being closely related to the trade and also as being important in the comprehension of its underlying principles. In electrical construction the subjects are as follows:

First year.—Grammar, industrial history, American literature, mensuration and algebra, physics, electricity, and mechanical drawing.

Second year.—Grammar, physics, economics, English literature, algebra, electricity and magnetism, rhetoric, plane geometry, chemistry, architectural and free hand drawing.

Third year.—Rhetoric, commercial law, literature, plane and solid geometry, electricity and magnetism, chemistry, civics, trigonometry, bookkeeping, and mechanical drawing.

In carpentry, pattern making, and printing the academic work includes the following:

First year.—Grammar, industrial history, American literature, mensuration, algebra, physics, drawing.

Second year.—Grammar, rhetoric, economics, English literature, algebra, plane geometry, physics, electricity, chemistry, and drawing.

Third year.—Rhetoric, commercial law, literature, plane and solid geometry, strength of materials, chemistry, economics, civics, trigonometry, bookkeeping, and drawing.

The course of study for pupils who plan to take up carpentry or pattern making is the same both in school and in shop for the first year. In the second year the particular kind of woodwork is elected and continued until graduation. Throughout the second and third years the academic work, except drawing, is the same for both trades. In drawing those who are to be carpenters take up architectural drawing in so far as it relates to the subjects upon which they are at work, such as houses or parts of houses, furniture, etc., while the pattern makers take mechanical drawing in order to make the working drawings of the models which are to be developed in the shop.

The printers follow the same academic course of study as the carpenters and pattern makers during the three years, except that in

the last year they take no drawing, but devote the four hours given to it by the other two classes to extra shopwork.

Pupils receive 30 hours' instruction per week. During the first year for all trades 20 hours per week are devoted to school and 10 hours to shop. In the second year the same division of hours is maintained except in electrical construction, where 21 hours are given to the schoolroom work and 9 hours to the shop practice. In the third year shop hours are increased in all trades, so that the pupils in electrical construction spend 11 hours in the shop, those in carpentry and pattern making 12, and those in printing 16.

The shops are well equipped with hand tools and machines. For the kind and extent of shop practice and for the shop equipment, see Table V.

The school is in session from 9 a. m. to 3.30 p. m., from Monday to Friday, inclusive. The school year, covering 42 weeks, is divided into two terms which open in September and February, respectively. All national and school holidays, as well as a 10 days' recess at Christmas, are observed.

Textbooks on the following subjects are furnished free to the pupils: Elements of physics, elementary chemistry, strength of materials, elementary electricity, and magnetism. There is also a well-selected reference library on technical subjects at the disposal of the pupils.

A diploma is given for the completed course. No certificate is given for any partial course.

The faculty of the Philadelphia Trades School includes the principal and 11 assistants. The five teachers of academic subjects, one of whom also teaches shop practice in electrical construction, have all had training in secondary schools and colleges. Four of the five instructors of shop practice have attended secondary schools or special classes. All have had shop experience varying from 10 to 22 years, as well as previous teaching experience. The teacher of carpentry was an instructor for 15 years in the Williamson Free School of Mechanical Trades.

Only men who have had practical experience are wanted for trade teaching. The principal is a mechanical engineer who for a time was actively engaged at his trade and later took a course in pedagogy in order to qualify himself as a teacher. The rule has lately been made that all teachers of theory must hold a degree from a college or other school of good standing in order to be eligible candidates for the competitive examination through which such teachers are secured. The teachers of shop practice have been secured from shops or other industrial establishments in which they have given evidence of a thorough and practical knowledge of their trade.

The school occupies a buildihg formerly used by a grade school, which was remodeled to accommodate the trade pupils. This build-

ing is not entirely satisfactory, as the classes are hampered by lack of room. The equipment is valued at $10,000. The appropriation received in 1909–10 from the board of public education for all expenses was $16,205. During the same period, of this sum, $1,473 was expended on materials for trade instruction.

Pupils are under no expense except for drawing materials. The classes make a marketable product such as benches, platforms, or other equipment for schoolrooms; printed matter for schools, announcements, catalogues, etc., electrical appliances, and patterns. None of this is sold, however, but is used in the building or in other schools. The pupils receive no financial return from the work done by them.

The principal believes that the fundamental principles of a trade can be taught in this school, but that subsequent experience in the shop is necessary to make a finished workman. The school work is not accepted by employers as the equivalent of any part of the usual term of apprenticeship, but the preparation of the school enables the boy to advance more rapidly after he has entered his chosen trade. The graduate is rated by the school as an advanced apprentice and in most shops shortly obtains that grade.

In the catalogue the aim of the day school is thus stated: "The aim of the school is the education of artisans rather than the mere teaching of trades. It is not expected that a graduate of a trades school at the age of 18 will be a finished tradesman, but experience has proven that the training received in a good trades school forms a foundation upon which can be built a growing knowledge which has no limit. The trades school does not attempt to develop skilled mechanics, but offers instruction planned to strengthen the reasoning faculties, to teach both theory and practice, and to prepare its students for more advanced positions in their chosen lines. Nothing that is produced in the shops will be offered for sale."

Various representatives of employers' associations stated that there is a decided need for trades schools, and that they take an active interest in the work of the three public trades schools of Philadelphia. One reported that the graduates of the day classes in electrical construction have proved satisfactory workmen and that he would be willing to place others in employment in order to give them an opportunity to prove their ability. Committees from the plumbers', pipe fitters', sheet metal workers', bricklayers', and electricians' associations of employers visit the schools and report upon the work. Some of these associations offer prizes for successful work by the pupils. Individual employers, in some instances, also visit the schools and from the evening classes employ men on recommendation of their teachers.

On the other hand, the attitude of employees' associations is said to be, in general, unfavorable to the trades schools. This attitude

may be to some extent the result of misapprehension of the claims made by these schools, which are still too young to demonstrate what they may be able to accomplish. However, the movement to teach trades outside the shop is regarded by many labor men as antagonistic to the best interests of the skilled workmen in the trades. The course in printing has met with serious opposition, it is said. Some employers assert that the organized printers have quietly discouraged boys from taking up the course. No boy has been graduated from the printing classes, although a number have started the course.

The Philadelphia Trades School has been regarded as offering an opportunity for the higher education of boys equal to that provided by the high or manual training schools, which give boys no direct preparation for their future work. This school not only gives them instruction in a trade as a means of livelihood, but also some related cultural work as well, which the apprentice in the trade can only obtain by attending an evening school. The parents of such boys are willing to permit them to remain longer in school on the assumption that their time will be well spent. This, it is held, would not be the case in schools offering preparation for business or professional careers, neither of which appeals to most parents in the industrial world as practicable in the consideration of the education of their children. The Philadelphia Evening Trades Schools, Nos. 1 and 2, are described on pages 233 to 235.

ALTOONA, PA., HIGH SCHOOL (INDUSTRIAL COURSE).

In the Altoona (Pa.) High School an industrial course was opened in September, 1905, which aims primarily to prepare boys for entrance into the local mechanical industries, particularly the shops of the Pennsylvania Railroad Co. The high school in which this course has been organized is an integral part of the public-school system of Altoona, and its affairs are directed by the board of education of six members elected by popular vote of citizens of the school district. The director of industrial training for the district has general supervision over the work of the industrial course in the high school.

The plan of instruction contemplates four years of training for boys in the fundamentals of certain trades, all pupils being required to pursue the same general course. During the first year pupils have cabinetmaking and machine-shop practice, equal time being given to each. In the second year pattern making and foundry practice are studied in the same manner, while third year boys have only blacksmithing. Pupils in the fourth year receive instruction in advanced machine-shop practice, particularly in tool making. The average attendance in 1909–10 was as follows: First year pupils, 23; second year, 12; third year, 10; fourth year, 6; total, 51.

The high school accepts as pupils those who have completed the eighth-grade work of the public school, or its equivalent. There is no age limit on school entrance. Persons other than graduates of grammar schools of the city are admitted at any time during the school year on furnishing proper credentials. Pupils from the city schools may enter only at the beginning of the year. Any boy in the high school is at liberty to enroll in the industrial course.

There is no direct correlation between the academic and the industrial work of the school. The academic subjects which pupils pursuing the industrial course in 1909–10 were required to take are as follows:

First year.—English, algebra, German (or ancient history), and mechanical drawing.

Second year.—English, algebra, physical geography, and botany, German (or medieval history), and mechanical drawing.

Third year.—English, plane geometry (or English history), chemistry, German (optional), and mechanical drawing.

Fourth year.—English, physics, solid geometry and trigonometry (or U. S. history), and mechanical drawing.

During 1909–10 pupils in the first and fourth years of the course had 14¼ hours of academic instruction and 4½ hours of shop practice each week. The remainder of the time, amounting to 3¾ hours per week, was devoted to study. Second and third year pupils during the same time had 18 hours of academic work and 4½ hours of shop work per week. The school is in session 5 days a week from 9 a. m. to 12 m. and from 12.30 to 2 p. m. Pupils may remain after school hours for practice in the shops. The school year embraces 36 weeks, from the 1st of September to the 1st of June. One week of vacation is given at Christmas and another at Easter. A diploma is awarded pupils who complete the industrial course, while those who are unable to take the full course are given a certificate by the school principal, showing the amount of work done. About 50 per cent of the pupils are reported as leaving school before the completion of the four-year course. The withdrawals are said to be caused mainly by the desire of the boys to obtain remunerative employment outside the school, the opportunities for which are exceptionally good at Altoona.

Four instructors were employed in the industrial course in 1909–10. Of these, three taught practice work in the shops, as well as the theory of certain trades. One teacher taught only mechanical drawing. Two teachers had attended other than common schools and three had had actual experience in the trade taught.

The school shops are located in the basement of the high-school building and are exceptionally commodious and well arranged. The equipment for trade instruction, valued at $25,000, was presented to the school by the Pennsylvania Railroad Co. It was installed under the direction of a master mechanic of the railroad, and it is modern

and up to date in every respect. There is no belting or overhead shafting in any of the shops, every machine being driven by its own motor. In most cases these motors are directly connected or built as a part of the machine itself. There are in all 39 motors ranging from ¾ to 15 horsepower. The motive power is received from the school's own generating plant. A more detailed statement of the school's equipment will be found in Table V.

Tuition is free to residents of the Altoona school district who are of school age. Nonresidents and persons over 21 years of age are charged a fee of $5.50 per month. The cost of shop materials used in 1909–10 was $410, a small part of which amount was expended for lumber used in the seventh and eighth grades of the city schools. No product is marketed by the school. Pupils are allowed to purchase raw materials and take home the finished product, such as articles of furniture, forge work, and hand tools. The sale of such articles by pupils is not encouraged.

It is said that employers generally give preference to pupils of the school in taking on new workmen. This is particularly true of the Pennsylvania Railroad Co., in whose local shops large numbers of the graduates find employment. While they are not credited with any part of the required four-year apprenticeship term, boys who have completed the industrial course are usually placed by the company in its higher class of apprentices and are often given work of special importance. Few graduates, it is said, remain long as journeymen after finishing the period of apprenticeship, but soon advance to higher positions requiring special ability.

COLUMBUS TRADES SCHOOL, COLUMBUS, OHIO.

This institution is a public trades school, which has both day and evening classes. Only the day school is here described. It was established November 1, 1909, by the city board of education. The chief purpose of the school is to place within reach of boys practical trade instruction in which both hand and mind may be trained, thus leading them into the way of earning a livelihood. The director of the school decides what subjects shall be taught. In this he is guided by local demands of the trades that open up the best field for the employment of the pupils. The city has large printing establishments and many woodworking factories, which industries to a considerable extent determined the nature of the school. As an integral part of the regular public school system it is under the supervision of the superintendent of the public schools of the city. The affairs of the school are administered by a board of directors of 15 members, who are elected by the people. On account of its recent establishment, no definite statement can be made as yet as to what relation the school

bears to trade apprenticeship, but it is stated that it is the aim of the school to take the place of the apprenticeship in all the trades in which instruction is given. The trade courses offered are printing and woodworking, the latter embracing wood turning, pattern making, joinery, carpentry, cabinetmaking, and millwork. The number of pupils in the printing class on November 1, 1909, was 15; in woodworking there were 60 pupils.

Boys 14 years of age or over who have finished the sixth grade of the city schools and whose deportment record is good may be admitted to the school, preference being given to boys older than 14 years and to those who need to learn a trade as soon as possible as a means of livelihood. Pupils may enter at any time during the school year.

The full course for each trade is two years. All pupils take the following academic subjects: Language, spelling, history, reading, civil government, mathematics, and mechanical drawing. For the pupils in printing the course in language, which includes composition, is intended to aid in detecting and correcting bad copy; reading includes the different kinds of copy, headings, and difficult spacing, as well as purely cultural reading; history includes the history of printing. The pupils in woodworking study the history of the woodworking trades, of architecture, etc. In general, in the history class, stress is laid on a study of industrial conditions, with their causes and development.

The total number of hours per week devoted to instruction in the trades, including theory and practice work, is 25. Pupils in the printing course have 13 hours of cultural work and 12 of shop practice, while woodworkers have 9½ hours of cultural work and 15½ of shop practice. The daily hours, from Monday to Friday, inclusive, are from 8.15 to 11.30 a. m. and from 1 to 3.30 p. m. The school is open 40 weeks during the year. The usual legal holidays are observed. The school grants a certificate for the fractional part of a course, and it is the purpose to confer diplomas on the completion of the full course.

Five teachers were employed in 1909–10, three of whom taught the theory as well as the practice of the trade. The teachers of theory were secured from technical schools, while those who taught only practice included men from technical schools who had had practical experience, as well as men directly from the trades.

The school is located in a building formerly occupied by one of the grade schools. The trade equipment cost $30,000. There remains on hand a sum amounting to $1,200 yet to be spent for further equipment. The cost of equipment is defrayed by the board of education, out of the general school funds. Tuition is free and the pupils are at no expense whatever in connection with their school attendance.

The materials used in the school since its establishment to June, 1910, cost $2,000.

The Columbus Trades School has been in existence too short a time to have established any definite status with respect to the trades in its curriculum. It is the plan of the school, however, to so equip its pupils that they may enter upon their trades immediately on the completion of their course, without further trade apprenticeship. The executive ability of the pupils, as well as their mechanical ability, is borne in mind with the idea that some graduates after a short period in the shop will gradually prove themselves capable of assuming responsibility for the successful completion of work and for the direction of other workmen who are engaged upon it.

The evening classes of this school are described briefly on page 237.

ARMSTRONG MANUAL TRAINING SCHOOL, WASHINGTON, D. C.

The Armstrong Manual Training School of Washington, D. C., is an institution for colored pupils. While it is one of the high schools established for the purpose of providing manual training in the city public-school system, the work is more intensive and more nearly approaches real trade training than does that of the usual school of this type. It is said that graduates from the trade courses of this school are able to hold their own in their respective trades as finished workmen.

The school is under the direction of the Board of Education of the District of Columbia. This board is made up of nine persons, three of whom are women, representing the professional and commercial interests of Washington, and is appointed by the Supreme Court of the District for a term of three years.

In determining in what trades instruction shall be given in the school due regard has been had for the local opportunities that exist for the employment of colored persons in the District.

The school is open to two classes of pupils: First, those who have finished the eighth grade in the grammar school or its equivalent; second, any colored persons 16 years of age or over who desire special trade instruction.

The trade subjects taught are joinery and cabinetmaking, pattern making and wood turning, forging, machine-shop work, steam engineering, electrical work, automobile mechanicians' work, sewing, dressmaking, millinery work, and laundry work.

Cooking is taken by many girls in addition to their other trade work. On account of the fact that many pupils were pursuing concurrent courses in several trades on the date this school was visited, the enrollment by trades is not given. The total school enrollment on February 1, 1910, was 634.

The pupils in the regular courses are required to enter at the beginning of the school half year. Those designated as "special trade pupils" may enter at any time.

Four groups of pupils are found in the school:

1. Those pursuing the "general scientific course" of four years, during the last two of which at least 60 per cent, according to the principal, select a specific trade and devote the most of their time thereto.

2. Pupils in the four-year "technical preparatory course" in which about 60 per cent of the pupils give the most of their time to a selected trade during the third and fourth years.

3. Those taking the "special technical course" covering two years, in which practically all of the pupils' time, except six hours per week in English and drawing, is given to trade work.

4. Special trade pupils who do only shop work, receiving a certain amount of theoretical instruction from trade teachers along with shop practice.

In the first and second years of the "general scientific course" all pupils have practically the same instruction, the boys uniformly doing woodwork (joinery, wood turning, and pattern making) in the first year and forging in the second year. The girls do plain sewing and dressmaking in the first year and dressmaking only in the second year. This work is elementary in character.

The foregoing statement concerning the work of the first and second years of the "general scientific course" applies equally to the corresponding years of the "technical preparatory course," but in the third year pupils may elect a trade and pursue that to the exclusion of all other subjects except English and drawing in the general scientific course, and English, chemistry, and drawing in the "technical preparatory course," to each of which subjects three hours per week are given. In the fourth year of each course, pupils may give practically all of their time to a selected trade, except three hours per week to English and an equal time to drawing.

In the two-year "special technical course" pupils may select a trade and devote all of their time to it, except three hours per week required for English and three hours for drawing.

The number of years that a pupil may devote to a specific trade depends upon the course followed in the school. For special trade pupils the course in any trade is indeterminate and certificates may be had at any time on pupils showing themselves fully able to do the required work. In the "special technical course" of two years, the pupils may have one or two years of trade training, as they desire. In the four-year courses, owing to the wide range of electives, the time in a trade varies. In some trades a pupil has from one to four years, depending largely on the pupil's election in the matter. Some trades,

as machine-shop work and electrical work, are limited to two years. In all occupations taught to girls the time is limited to two years.

In the electrical course the purpose is to give the pupils a knowledge of the problems that occur in the various lines of practical electrical work. To this end the practice work is made to conform as closely as possible to actual trade conditions. Special attention is given to the operation and care of electrical plants and the wiring regulations of the District of Columbia.

A course in machine-shop practice is provided for young men who are chauffeurs and who want to learn how to make minor repairs to their machines, and also for young men who are desirous of becoming chauffeurs. In this course, before a certificate is given, the pupils must have a chauffeur's license from the District government.

In steam engineering pupils have practice in the actual operation and care of the steam engines and machinery with which the school is equipped. Graduates from this course are said to be fully prepared to earn a living as practical steam engineers, and before a certificate is issued they must pass the license examination before the District board. For an account of the practice work performed by pupils in these and other courses offered by the school the reader is referred to page 240 of this report.

In plain sewing and dressmaking the girls do a good deal of actual work, furnishing the materials themselves and keeping the product, or disposing of it as they desire. Also, they may do their home laundry work at school. Frequently the school gets requests from families for girls to go into their homes and sew, either as seamstresses to do plain sewing—making childrens' wear, etc.—or to do dressmaking. In response to these requests girls sometimes spend several weeks at a time away from school, sewing in private families. For such time they are credited on their school year and are considered technically "present" in school. The millinery course aims to fit girls for positions as helpers and preparers in millinery shops. They do all the work of making, trimming, and renovating hats.

The laundry department prepares the girls to do scientific laundry work, while the course in domestic science fits them for domestic service as well as for home duties. It is said that a number of the girls go into domestic service upon graduation. They have instruction in all phases of cooking, from preparing the simplest dishes to planning and serving a full course dinner. They serve noon lunches daily to teachers and pupils of the school. Several times a year a "company dinner" is served. The girls do not only the preparing of these meals but also the planning and marketing for them. They also receive instruction in all details of caring for a kitchen.

Upon completion of the four years' course pupils are given a high-school diploma. A certificate is awarded on completion of the two

years' course. The special trade pupils are given, at whatever time they leave school, a certificate stating the work done.

There were eight teachers of practice work in trades falling within the scope of this report in the school in 1909–10. Of these all taught trade theory in connection with the practice work. Two others taught trade theory exclusively. In addition to these there were two teachers of domestic science. The majority of these trade teachers were college graduates. All who were teaching trade practice had had experience in trade work.

The school has experienced no difficulty in retaining teachers after they have been obtained. It has been very difficult, however, to secure teachers possessing the proper trade qualifications. The prescribed teachers' examination in the District is very exacting with regard to academic subjects, and it is said that insufficient credit is allowed for actual trade experience, which makes it difficult to get efficient teachers.

All financial support for the Armstrong school is from Congressional appropriation. The original appropriation of $50,000 for building site, plans, etc., was made in 1899. In 1900 an additional $100,000 was appropriated to complete the work begun, and school was opened in the present building in 1902. In 1908 an additional amount of $4,000 was appropriated to purchase an adjoining lot, followed in 1910 by $65,000 with which to construct an addition to the building. Work on the addition has not yet begun. The equipment for trade instruction is valued at approximately $50,000.

For residents (colored) of the District of Columbia all instruction is free. Nonresident pupils pay a tuition fee based on the per capita cost of instruction.

No textbooks on purely industrial subjects are used in the trade courses, but reference books are available from the school library. Pupils are required to pay for all breakage of laboratory apparatus, tools, etc.

The value of materials used for trade instruction during 1909–10 is estimated at $2,000, which sum was paid from the Congressional appropriation for manual training.

The Armstrong Manual Training Evening School is described on page 240.

MILWAUKEE SCHOOL OF TRADES (DAY CLASSES FOR BOYS), MILWAUKEE, WIS.

The Milwaukee School of Trades was established as a private school in 1906 through the activity of interested members of the Merchants and Manufacturers' Association of the city. On July 1, 1907, through authorization of the State legislature, it was taken into

the public school system of Milwaukee. Its purpose is to instruct young men in the fundamental principles of the machinery and building trades, in which there is great need for skilled workers.

The school is a part of and articulates with the regular public school system. It is under the control of the board of school directors, consisting of 15 members, who are elected by the voters at the city election. There is also an advisory committee, consisting of 5 members, appointed by the president of the board of school directors, with the approval of a majority of the board, which has immediate supervision over the school. This advisory committee has authority, subject to the approval of the board of school directors, to prepare courses of study, employ or dismiss instructors, purchase machinery, tools, and supplies, and purchase or rent suitable grounds or buildings for the use of the school.

Ability to read and write English and to do simple problems in arithmetic constitute the entrance requirement. Graduates of the Milwaukee grammar school are admitted without examination. Applicants must be at least 16 years of age. They may enter at any time during the school year.

Following is the enrollment by trades on March 31, 1910: Pattern-making, 26; machinist and tool making, 24; carpentry and wood-working, 12; plumbing and gas fitting, 14.

The school offers two years' instruction in all trades except plumbing and gas fitting, which is a one-year course.

An average of 8 hours per week is devoted to theoretical instruction and 36 hours to actual practice work by all pupils.

The theoretical instruction covers shop mathematics mechanical drawing simple mechanics and trips through commercial shops.

After these trips the boys are required to "write up" the trip and to make sketches.

For shop equipment and shop practice see Table V of this report.

A thorough course in mechanical drawing based on the special needs of each trade is given to each pupil. The school furnishes each pupil with a drawing board and a T square. Pupils must supply their drawing instruments.

Instruction is given by lectures by means of specification sheets prepared in blue-print form and by notes prepared by the drawing instructors and printed by neostyle. Most of the instruction is individual. Pupils are urged to do as much home work as possible, such as making tracings and inking in their drawings which have passed inspection.

The course in each trade leads up to practical problems in original designs peculiar to that trade.

As the value of a pattern maker to his employer depends largely on his ability to interpret correctly blue prints and working drawings the pupils in this trade are given special practice in that line.

School is in session from 8 a. m. to 12 m. and from 1 to 5 p. m., Monday to Friday, and 8 a. m. to 12 m., on Saturday, for 50 weeks of the year. There is no school from July 15 to August 1.

No printed textbooks are used. The shop mathematics, notes on mechanical drawing, and notes on special subjects are written by the instructors and are designed especially to satisfy the wants and requirements of the shop workman. All the theory presented is directly tested by practical application and examples. The subject matter is presented to the pupil in the form of loose printed sheets and blue prints, which are laced in a loose-leaf-cover book.

About 80 per cent of the pupils are not graduated. Of this number approximately 50 per cent remain for one-half of the course. The number of pupils who remain until the completion of their courses is said to be increasing.

The school employs three teachers for theory and five teachers for practice work. The teachers of theory were secured from technical and engineering colleges and those for practice work from among foremen of manufacturing plants who are capable of imparting their knowledge to others. Teachers of theory do not give instruction in the trades.

At present rented buildings are used by the school and shops. Approximately $45,000 has been spent for equipment for trade instruction. Seven thousand five hundred dollars of this amount came mostly from private subscriptions of manufacturers, the balance being furnished by the city of Milwaukee.

Tuition is free to pupils residing in Milwaukee who are between the ages of 16 and 20 years. Resident pupils over 20 years of age are charged $5 per month tuition fee, while nonresidents must pay a tuition fee of $15 a month. There is no charge for materials used by pupils paying tuition fees, but those having free tuition are charged $1 per month for materials used. No other fees are charged. School books are furnished without charge.

The cost of materials used during the school year 1909–10 was approximately $3,400. Materials are purchased in the open market and paid for from the trade-school fund.

To date the school has not made products for sale, but expects to do so hereafter. On November 2, 1909, the board of school directors passed the following resolution:

Resolved, That in accordance with chapter 122, section 026–027, Laws of 1907, State of Wisconsin, the product of the Milwaukee School of Trades may be sold in open market at prevailing market prices.

Tools, parts of machinery, tables, and cabinet work are made, all of which are at present used by the school. During the year the building containing the machine shops and the woodworking shops was destroyed by fire. The carpenter work necessary in fitting up a newly rented building was done by the pupils, and several machines were rebuilt by them from the remnants of those destroyed.

In addition to the school described, there is a trades school for girls (see p. 282) and an evening school. The evening school is described on page 242.

WISCONSIN STATE MINING TRADE SCHOOL, PLATTEVILLE, WIS.

The specific purpose of the Wisconsin State Mining Trade School is "to meet the need for well-trained, practical men to operate the mines of the State successfully and economically." The initial steps for establishing this school were taken by the mining men of the Wisconsin lead and zinc district, under authority of an act of the State legislature passed in 1907. Actual work began January 27, 1908. The school receives its support from funds appropriated by the State legislature and from fees paid by nonresident students. The subjects to be taught are regulated by the act establishing the school, of which the following is a part:

SECTION 392q. The course of instruction shall be two years in length and shall embrace geology, mineralogy, chemistry, assaying, mining and mining surveying, and such other branches of practical and theoretical knowledge as will, in the opinion of the school board, conduce to the end of enabling such students of said school to obtain a knowledge of the science, art, and practice of mining and the application of machinery thereto. The dean of the college of engineering of the University of Wisconsin shall be consulted concerning the course of study, and the same and all modifications thereof shall be approved by him.

This school bears no relation to any other school. It is under the control and management of a board of three members, one of whom is the State superintendent of education and the remaining two are residents of the Wisconsin lead district, appointed by the governor of the State. In June, 1910, there were 23 students enrolled in the mining classes. Graduates from the eighth grade of a city school or pupils who have a diploma from a country school are admitted without examination. Other candidates for entrance must pass an examination in arithmetic and English. There is no regulation as to age limit, and pupils may enter the school at any time during the school year. There is no arrangement with the local mining companies for giving employment to the pupils while attending school, but students frequently work Saturdays and Sundays in the lead and zinc mines.

The subjects taught during the two years' course are: Physics, advanced arithmetic, plane geometry, solid geometry, algebra, plane trigonometry, chemistry, mining machinery, mining methods,

mining economics, elementary mechanics, surveying, mechanics of materials, metallurgy, general geology, mining geology, hygiene, and first aid.

The school year is divided into two terms of about 18 weeks each. In the first year of the course a total of 24 hours per week on an average is devoted to theory, including time spent in study in school, and 16 hours per week to practice work. In the second year 23 hours per week are devoted to schoolroom work and 17 hours per week to practice work. During each winter a course of evening lectures covering 20 hours is given on mining metallurgy and allied subjects. All students are required to attend these lectures and take notes.

Instruction is given from 8 a. m. to 12 m. and 1 to 5 p. m. daily, from Monday to Friday, inclusive. The length of the school year is 38 weeks, the school opening Septemper 7 and closing June 10. There is no summer term, but the pupils are expected to spend the summer vacation between the first and second school year working in some branch of the mining industry.

The practice work is of a practical nature and is carried on in the basement of the school building, which is fitted up as a miniature mine, having all the machines, tools, and appurtenances of a mine in operation. For shop equipment and practice work see Table V.

The school has a mineralogical museum, which is primarily a working collection of all the common varieties of minerals and rocks for student use. In addition, many fine exhibition specimens have been secured and special attention will be devoted to making a collection of the various crystals found in southwestern Wisconsin. The collection of lead and zinc ores from Wisconsin, Iowa, and Illinois, belonging to the Tri-State Mining Association, has recently been secured for the use of the school.

Graduates are given a diploma which certifies that the student "has satisfactorily completed the two years' course of study."

Approximately 50 per cent of the students are reported as leaving the school at the end of the first year. As a rule this is owing to a lack of funds. Some return later and finish the course.

The school has seven teachers, secured either from scientific schools or from the mining industry. These teachers are responsible to the Wisconsin Mining Trade School board. There has been no difficulty in retaining teachers qualified to teach mining.

No tuition fee is charged to residents of the State of Wisconsin. Nonresidents must pay $50 per year tuition fees. All students are required to pay $20 per year for materials and also to deposit $5 on entrance to cover cost of breakage or damage to apparatus. The students are required to furnish their own text and note books,

drafting instruments, etc., and a charge of $2 for a diploma is made on graduation. The cost of materials used in shop practice during 1909–10 was approximately $500. No marketable product is made by the school.

There is said to be a demand for pupils from this school. Graduates have no difficulty in obtaining immediate employment in the mines. Great appreciation of the school has been shown by mine owners and by general managers of mines.

SOLDIERS' ORPHANS' INDUSTRIAL SCHOOL, SCOTLAND, PA.

This is one of the two State schools of Pennsylvania which provide for the support and education of orphans of soldiers, sailors, or marines and the children of honorably disabled soldiers, sailors, or marines who had served in Pennsylvania regiments during the Civil War or who had resided in the State for five years. These children are indentured to the institution until the age of 18, but they may be withdrawn at the age of 16 if the family need their financial assistance.

Through an act of the State legislature the school was opened in 1895. It is governed by a board of commissioners consisting of 11 members. These members are the governor of the State, two State senators, three members of the legislature, and five members of the Grand Army of the Republic. The administration of the school is under the direct charge of a superintendent.

As a part of the soldiers' orphans' system of schools it receives the more advanced pupils who are transferred from the primary grades of the other school, in which the industrial training is limited to a few elementary forms of work. The industrial training given in the school is planned to furnish a means of livelihood for the pupils. This training enables them in some instances to shorten the period of shop apprenticeship after entering a trade.

Such trades as are usually found in every community have been placed in the curriculum of the school. These trades and the pupils enrolled in them for 1909–10 are as follows: Woodworking, 48; machinist, 54; printing, 33; tailoring, 92; baking, 23; engineering (stationary engines), 11; cobbling, 7; sewing and dressmaking, 75. In addition there are other pupils who take no industrial training.

The length of a course in trade instruction varies according to the time of entrance and the length of stay in the institution. Some pupils begin their trade instruction earlier than others. The minimum age for admission to the trade classes is 12 years and the maximum 14. The majority of pupils remain until 18 years of age. On leaving they are given a diploma on which is stated the trade studied and the grades attained in both academic and industrial work.

Instruction is divided between the classroom and shop, giving 15 hours per week to each. One week the pupils spend from 8.30 to

11.30 a. m. in the classroom and from 1.30 to 4.30 p. m. in the shop. The next week the order is reversed. Sessions are held from Monday to Friday, inclusive, during 43 weeks of the year, extending from September to June. Academic subjects are taken by pupils from the second to the eighth grades and include the following: Spelling, reading, language, arithmetic, geography, physiology, United States history, civil government, physics, rhetoric, algebra, and geometry. School and shop work are independent of each other and there is no correlation between the two. No theory of the trades is taught except as it is incidental to the shop practice.

Eleven teachers give instruction in the trades. All of these teachers reported shop experience varying from 4 to 18 years before going to the school.

The institution property is valued at $42,000 and the shop equipment at $17,700. The product of the trade classes is used by the institution. This product includes clothing, uniforms, repair of clothes and shoes, furniture, equipment for the shops, and bread, cake, pastry, and other supplies from the bakery. The pupils are not paid for their labor, but are expected to execute whatever work is needed in their respective trades.

VOCATIONAL SCHOOL FOR BOYS, NEW YORK, N. Y.

This institution is a day school established in 1909 by the department of education of the city of New York. Its purpose is to prepare boys to enter the trades as apprentices, and in some cases to become advanced apprentices. Combined with the industrial training, general education is provided along lines best suited to the needs of the individual pupil. The need for such a school was felt, not through local industrial conditions, but through the failure of the present schools to prepare boys for other than the already overcrowded positions for unskilled labor in shops or offices. As a part of the city public school system, the vocational school receives boys who are graduates of elementary schools or those who have not graduated but are at least 14 years of age. Admission depends on the approval of the principal.

The school, which is housed in a new building, is under the charge of a special committee on vocational schools and industrial education, composed of three members. A principal directs the industrial and academic work.

The following trades and the boys enrolled in each were reported for 1909–10: Composition and press work, 34; carpentry, 37; plumbing, 15; electrical wiring, 117; forging and machine-shop practice, 66; pattern making, 15; bookbinding, 18. Boys who select a trade begin work on it when they enter school, while those who have made no decision take a general course until a selection is made with

the aid of their instructors. Instruction is for the most part individual, so that pupils may enter at any time of the year. Boys work in groups, but there are no regular classes. As stated in the school announcement, "Each boy is a unit and progresses as rapidly as his ability will permit."

The present course covers two years, but provision for a longer course is made for boys who wish to take more training, and the matter of prolonging the regular course to three or even four years is under consideration. The school is in regular session daily from Monday to Friday, inclusive, for 46 weeks, beginning in September and closing at the end of July. Sessions are held from 9 a. m. to 5 p. m., with a lunch period from 12 to 1. The regular school holidays are observed.

Academic work is individual and is outlined by the principal. The subjects taken include trade mathematics, English, industrial history and civics, geography (industrial and commercial), science, including physics and chemistry, bookkeeping, and commercial law. In general, the pupils spend an average of 15 hours in the schoolroom and 20 hours in the shop per week. No textbooks on industrial subjects are used. The textbooks on academic subjects are furnished free of charge.

For a satisfactory completion of the course a diploma will be awarded. This will state the trade studied and the length of time spent in the school.

There are 15 teachers employed, all of whom teach the practice of their trades and some of whom teach the theory also. The requirement for such teachers includes a record of at least 5 years' experience as a journeyman. The present force, however, has had from 12 to 20 years' experience. All trade teachers must first be employed as substitute teachers until they have demonstrated their ability to successfully teach their respective trades. It is hoped through this method to save the time of both the school and of the pupils by making possible the prompt dismissal of incompetent teachers.

The pupils make a marketable product, particularly in the printing, cabinetmaking, and bookbinding courses. The board of education disposes of these products and credits the school with their value less the cost of supplies which the department furnishes.

No attempt will be made to cover the whole period of the shop apprenticeship. The statement is made by the school that "graduates will need experience, practice, and maturity before they can claim to be journeymen." It is believed that with the training received boys will advance steadily and be able to assume positions of responsibility.

CHAPTER IV.

APPRENTICESHIP SCHOOLS.

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APPRENTICESHIP SCHOOLS.

INTRODUCTION.

These are for the most part schools maintained by large corporations to give the academic training needed by the apprentices who are receiving their trade training in the employer's works. They form part of a movement to restore the apprenticeship system to its old status, with such modifications as modern conditions make necessary.

The old-time apprenticeship system was never formally given up, but as a matter of fact it almost disappeared during the latter part of the last century. In many cases apprentices were not taken, and even where the name was still used there was a strong tendency in the interest of a large output to keep the so-called apprentice at one operation or on one machine long after he was thoroughly familiar with it and should have been advanced to something else. Consequently when he had finished his term he might know one or two parts of his trade thoroughly, but he was but little better qualified as an all-round skilled worker than when he began.

As a result of this condition employers have found themselves confronted with such a scarcity of well-trained skilled workers as to seriously hamper their industrial enterprises. Within the last decade they have begun to realize that the situation is grave, that they can secure a sufficiency neither of foremen to supervise nor of skilled workmen to execute, and that they must modify the policy of extreme specialization or give up their industrial supremacy.

A number of employers have sought to remedy this situation by so remodeling their apprenticeship systems that the boy indentured to them should receive a complete trade training and also the instruction in mathematics, mechanical drawing, and elementary physics necessary for his advance in his trade. For older men this latter training may well be obtained in evening continuation classes, but boys still in their teens who have put in 8 or 10 hours of manual work through the day sometimes will not and sometimes can not undertake school work at night. Hence the apprenticeship school.

In many cases the term of indenture is four years, and boys are required to attend school for a few hours per week throughout the period of indenture. A few require school attendance during the first two years only. At the satisfactory completion of the apprenticeship

the boys are in most cases given their tools and a bonus varying from $50 to $150. The rate of pay is standardized in each shop, according to the trade, and increased frequently enough (in most cases every six months) to make the boy feel that he is getting ahead.

In the greater number of instances school is in session five or six days of the week, but each boy attends two days only. This arrangement prevents the serious interference with shop organization resulting from the taking of a large number of boys from any one department at the same time. Instruction is given mainly from lesson sheets prepared by the instructor and correlating with the work in the shops. All the apprentices in the same shop generally follow the same general course of instruction irrespective of trades. Instruction usually is individual, and the needs of each individual apprentice are noted, and the teaching he receives is made to conform as nearly as possible to the requirement of his case. In the drawing classes the aim is to develop ability to use drawings rather than to train draftsmen.

In addition to the school instructor some firms, especially railroads, employ one or more shop instructors, who give their entire time to instructing the boys in the performance of the operations in the shop or supervising their rotation at various machines, etc. School and shop instructors are expected to encourage clean personal habits, inculcate right ideals of work, and in general exert a wholesome influence over the boys.

Ordinarily these schools are situated in the employer's works. Attendance is obligatory, and the time spent in school is paid for at the same rate as the other working hours. The school work bears closely upon what the pupil is doing in the workrooms, every subject being taught in its relation to the trades. The instructor is usually taken from the working force, men being selected who are not only thoroughly familiar with the company's methods and processes, but who are good leaders, able to inspire as well as to teach. Since nothing is taught which does not bear upon the trade, and since the school work is as much required as the shop work, the pupils are apt to take it earnestly and make good progress.

The discussion in the present chapter is confined to schools maintained by two classes of employers: (1) Those maintained by the motive power departments of railway systems, and (2) those maintained by manufacturing corporations. No attempt has been made to describe all such schools, but it is believed that illustrations of all the different types of railway and corporation apprentice schools have been given.

The railroad and manufacturing concerns are not the only agencies furnishing apprentice education. In some localities there is cooperation with the public schools, whereby the public school furnishes the schoolroom instruction and the manufacturer furnishes the shop

instruction. Such schools are discussed under the head of Cooperative Industrial Schools, Chapter V.

Some labor organizations, such as the carpenters in Chicago, require apprentices in their trade to attend school during certain months of the year and have a special arrangement with the public schools for that purpose. (See p. 206.)

RAILWAY APPRENTICESHIP SCHOOL SYSTEMS.

A decrease in the efficiency of the shop workmen and a general dearth of skilled labor in the motive-power shops was for some years a cause of considerable worry on the part of the officials of many of the railway systems of this country. A school was established by the Grand Trunk at Battle Creek, Mich., in 1902. Very little serious thought, however, was given to the solution of the problem by any other roads until 1905 when, in a paper before the Railway Mechanics' Association, a note of warning was sounded and a plan outlined for apprentice instruction to meet the needs of the case. As soon as possible after this the New York Central lines put into operation a system of instruction based upon the plan outlined. The Santa Fe; Delaware & Hudson; Delaware, Lackawanna & Western; Erie; and others followed with systems more or less modified to fit the needs of their particular roads.

Though the methods followed are different in details, the purposes of these schools are essentially the same—"to produce many well-trained and educated workmen, some foremen, and a few superintendents." In every case the school work is under the direct supervision of the motive-power department, and usually the superintendent of motive power has final decision in all matters pertaining to the school.

In all these schools the emphasis is placed on mechanical drawing and shop mathematics. Some teachers give instruction in additional subjects, such as spelling, writing, physics, or civics; other teachers hold that they are called upon only to develop good machinists and that their responsibility need not go beyond that point.

The instructors in both shop and school are men of practical experience who are able to demonstrate any problem that will arise. Usually they are men who can win the confidence of the boys, and whose influence is beneficial. The whole work of the apprentice school is calculated to raise the moral character as well as the standard of efficiency of the boys; how much is accomplished in this way depends largely upon the personality of the instructors. In any case, however, it makes the boys think, which is considered the first step in the right direction.

In the time spent in the schoolroom, varying from one to five hours per week, the boy is taught the "language of the trade." Here there is no attempt to teach the trade or to make a product. In the shop, in most cases under the direction of a shop instructor, he learns the trade itself as he works on the regular shop product. No practice work is given in the school and there is no "construction for instruction" in the railway shop; it is all instruction for construction, commercial work from the start. Shop discipline is maintained throughout. Any infraction is reported to a shop official, usually the master mechanic, and the case is dealt with in the same manner as though the infraction had occurred in the shop.

On all of the lines it is intended that the apprentice school shall train men competent to fill the positions of bosses, foremen, inspectors, instructors, and master mechanics as vacancies occur. Not many, however, advance to these positions because of their limited number; the majority remain in the shops as skilled workmen.

By the various systems of apprentice instruction the railroads have disproved the theory that the American boy will not go into the trades, and have proved conclusively that if the trade be made attractive the American boy will go into it. Where formerly it was difficult to keep a full quota of apprentices at most shops, there is now a waiting list in several trades. With this increasing disposition on the part of boys to enter apprenticeships there has been a tendency on some roads to increase the ratio of the number of apprentices to the number of journeymen employed. In some shops the apprentices outnumber the journeymen. In many instances high school boys have enrolled as apprentices. About 90 per cent of the apprentices on the New York Central lines and the Santa Fe system are American born, and a large per cent are of American parentage.

A description is here given of the schools of the following-named railroad systems: New York Central; Santa Fe; Grand Trunk; Erie; Pennsylvania; Union Pacific; Delaware, Lackawanna & Western; Delaware & Hudson; Central Railroad of New Jersey; Chicago Great Western; Pere Marquette; St. Louis & San Francisco; Southern; Cincinnati, Hamilton & Dayton; and Alabama Great Southern.

NEW YORK CENTRAL.

The New York Central system now has schools established in 9 of its 20 motive power shops in the United States and one school in Canada.

For nearly 40 years there has been some form of educational classes in the motive power shops, but it was of a desultory nature. Classes met after shop hours and attendance was not compulsory, the work was unorganized and dependent upon the interest and initiative of of each local master mechanic.

Actuated by the decrease in the efficiency of workmen in the shops and the impossibility of finding men in the shops to put into positions of responsibility, the superintendent of motive power determined to put into operation a system of apprentice education based upon a plan outlined at the 1905 meeting of the Master Mechanics' Association. Headquarters are maintained in New York City where a supervisor of apprentices (a former master mechanic) and his assistant, a technical school graduate with practical experience, determine the educational policy of the school, prepare courses of blue prints for mechanical drawing and lesson sheets for shop arithmetic.

Boys are apprenticed to all trades of the shops, but the trades vary in the local shops according to the work done in them. Apprentices are required to attend school throughout the period of their apprenticeship, which is three or four years. If any time is lost in any year it must be made up before a new year can be entered upon.

Boys between the ages of 17 and 21 only are apprenticed, preference being given to sons of employees. Every boy must pass a physical examination, and while no formal entrance examination is required, he must be able to satisfy the school instructor of his ability to do the school work. No examinations are ever given. The instructors are expected to know just what each boy is capable of, and promotions are made on the basis of work actually done and not upon the result of examinations.

Following is a list of the schools in the system and the number of pupils in each by trades:

NUMBER OF APPRENTICES IN SCHOOLS OF THE NEW YORK CENTRAL LINES, BY TRADES AND BY LOCATION OF SCHOOL.

Location of school.[1]	Number of pupils by trades.									
	Blacksmithing.	Boiler making.	Brass smithing.	Cabinetmaking.	Car building.	Carpentry.	Coppersmithing.	Electrical work.	Machinist.	Mill hands (machine woodworkers.)
Beech Grove, Ind	2	8	.....	.....	.....	.....	1	2	35	.....
Collinwood, Ohio	3	3	.....	.....	10	.....	.....	9	12	.....
Depew, N. Y	8	17	.....	.....	.....	.....	.....	.....	50	.....
East Buffalo, N. Y	1	.....	.....	.....	.....	3	.....	.....	4	2
Elkhart, Ind	1	9	.....	.....	.....	.....	.....	.....	57	.....
Jackson, Mich	1	13	.....	.....	.....	.....	.....	.....	27	.....
McKees Rocks, Pa	.....	3	.....	.....	.....	.....	.....	.....	32	.....
Oswego, N. Y	3	3	.....	.....	3	.....	.....	.....	19	.....
West Albany, N. Y	.....	23	1	9	3	1	.....	4	74	.....
Total	19	79	1	9	16	4	1	15	310	2

[1] One school in Ontario, Canada, has 31 pupils.

NUMBER OF APPRENTICES IN SCHOOLS BY THE NEW YORK CENTRAL LINES, BY TRADES AND BY LOCATION OF SCHOOL—Concluded.

Location of school.[1]	Number of pupils by trades.									
	Molding.	Painting.	Pattern making.	Pipe fitting.	Plating.	Tin and copper smithing.	Tinsmithing.	Upholstering.	Not reported.	Total.
Beech Grove, Ind.	.....	2	3	.....	.....	.....	.....	.....	.....	53
Collinwood, Ohio	3	3	.....	.....	.....	.....	4	.....	78	125
Depew, N. Y.	.....	.....	.....	1	.....	.....	.....	.....	.....	76
East Buffalo, N. Y.	.....	.....	.....	.....	.....	.....	2	.....	.....	12
Elkhart, Ind.	1	.....	5	.....	.....	.....	1	.....	.....	74
Jackson, Mich.	.....	.....	1	.....	.....	.....	5	.....	.....	47
McKees Rocks, Pa.	.....	.....	.....	.....	.....	1	.....	.....	.....	36
Oswego, N. Y.	.....	1	.....	.....	.....	.....	2	.....	.....	31
West Albany, N. Y.	.....	4	1	2	1	.....	1	2	.....	126
Total	4	10	10	3	1	1	15	2	78	580

[1] One school in Ontario, Canada, has 31 pupils.

School is in session 48 weeks per year, and instruction is given Monday to Saturday from 7 to 9 a. m. Each apprentice is required to attend two days per week, and is paid for the time spent in school at the same rate he is paid for his shop work. The remainder of the day he is in the shop at his trade and under the direction of a shop supervisor. Three hours per week are given to mechanical drawing, and one hour to shop arithmetic. Mechanical drawing is done from blue prints and from models. The course in mechanical drawing is not aimed to turn out draftsmen but to equip the boy to read any blue print, to lay out work from blue prints, and to make any ordinary blue print.

The mathematical instruction is very informal. The work in every case is supplemented by models and actual parts of machines. The common practice is reversed, the boy first studies the mechanism itself and later draws its parts and calculates its strength, power, and efficiency. Stress is laid upon the practical and commercial side of the mathematical instruction. Every example is clothed in the language of the shop, illustrated by actual practice in the daily work, and is based upon shop practice and company standards. No matter how simple the problems, they refer to something with which the boy is familiar in connection with his work. For example, the boy learns ratio and proportion by figuring the change gears for cutting different screws in his lathe, and the principles of leverage are demonstrated by the throttle and reverse lever on the locomotive and brake rigging on the car. Arithmetic, algebra, geometry, physics, and practical mechanics are fused so completely that the student knows no study by any name but arithmetic.

After about two years of general study applicable to all apprentices in all trades, each boy specializes in his school work along a course

adapted to his particular trade, and the problems and drawings become more specifically practical. In several shops incidental instruction is given in spelling and in business letter writing; in some shops home study is required. This instruction is made incidental to the other work. In addition to the classroom work, the boys from time to time hear lectures upon shop management, air brakes, chemistry, first aid, etc., delivered by the company's officers. No attempt has been made to grade classes according to the progress made by the pupils except at Oswego. Care is exercised that not so many boys are taken from any department at any one time as to interfere with shop work.

The boys "ring in" at the shops, and proceed directly to the schoolroom. The shop schedules are so arranged that the boys rotate on the machines, thereby the work is hampered very slightly by the boy's absence. In the shop the boys are under the supervision of the shop instructor, who gives the necessary instruction as to the performance of the "job" and directs the rotation of the pupils on the various machines and in the different departments of the shop. It is one of the aims to counteract the tendency to turn out machine specialists, and to turn out all-round machinists.

Shop schedules have been arranged for the different trades which, while followed as closely as possible, are sufficiently flexible to meet the needs of the boys in the various grades and of varying aptitude. Machinist, boiler maker, tin and copper smith, and painter apprentices are assigned to the roundhouse for a short period during their apprenticeship. Those who show special aptitude for drawing are assigned to the drawing room to assist the shop draftsman for periods of from 60 to 90 days. The shop schedule for the principal trades, which is flexible, is as follows:

	Months.
Blacksmithing (4-year course):	
Hammer work and helping	3 to 12
Light fire	12 to 24
General work	12 to 24
Heavy fire	3 to 12
Boiler making (4-year course):	
Heating rivets, etc	3 to 6
Light sheet-iron work	12 to 15
Flue work	3 to 6
Riveting, chipping, calking and staybolt work	12 to 18
Flanging and laying out	1 to 3
General work	6 to 12
Cabinetmaking (4-year course):	
Helping cabinetmakers and jointers	6
Making doors, sash, etc	6
Making partitions, veneer work and car furniture	20 to 24
Setting up interiors of cars	8 to 12
Car building (4-year course):	
Helping machine hands in wood mill	2
Running machines in wood mill	2
Freight repair yard, freight cars (Above includes trucks and new work, if any.)	2
Freight repairs, cabooses	5

	Months.
Car building (4-year course)—Concluded.	
Coach shop (truck and platforms)	6
Coach shop (body work)	13
Cabinet shop (stripping and trimming)	4
Cabinet shop (general cabinetwork)	14
Machinists (4-year course):	
Helping in shop	0 to 3
Bench work	6 to 12
Light-tool work	3 to 6
Heavy-tool work	3 to 12
In air-brake department, tool room, or brass room	3 to 6
Erecting shop	18 to 24
Mill hands (machine woodworkers) (3-year course):	
Helping machine hands	3
Setting up and running simple machines	9 to 12
Tool room (sharpening tools, etc.)	2
Laying out by templates	4
Balance of time setting up and running more complex machines, including cabinet machinery	12 to 15
Molding (4-year course):	
Helping	3 to 6
Core work	6 to 12
Light work	6 to 12
General molding	18 to 24
Dry sand	1 to 12
Painting (4-year course):	
Stock room	6
Truck and platforms	3
Priming, rough stuff, putty, and rubbing	6
Inside finishing	6
Varnish room	3
Cutting in and outside varnishing	12
Striping, lettering, and ornamenting	12
Pattern making (3-year course):	
Helping in pattern shop	0 to 3
Foundry	3 to 6
Machine work	3 to 12
Bench work	24 to 30
Tin and copper smithing (3-year course):	
Helping around shop	0 to 3
Pipe work	6 to 12
Sheet-iron work, including jackets	6 to 12
Tinware	6 to 12
Coppersmithing	6 to 12
Tinsmithing (3-year course):	
Scraping solder, patching, laying out by templates	6
Roofing cars and general tin work	18
First-class work (dining, private cars, etc.)	12
Upholstering (4-year course):	
Stripping, setting in springs, etc	6
Tying springs, stitching, etc	12
General upholstering on plain work	12
Tufting and first-class work	18

The time above the minimum allotted to each division of shop work is divided among the kinds of work on which the apprentice shows the most adaptability.

Upon completing their apprenticeship the boys receive the New York Central lines diploma, which entitles them to preference in employment anywhere on the system.

The boys leave the school only by leaving the shop. The majority of the machinist apprentices remain with the company. It is more difficult to hold the boiler makers and blacksmiths.

There are two teachers at each point, a school instructor, usually the chief draftsman of the shop, who conducts the schoolroom work, and a shop supervisor, a practical shop workman, who devotes his entire time to supervision of the apprentices in the shops. The shop supervisor must also pass upon all applications for apprenticeship, as the official representative of the apprentice department, and make recommendations as to apprentices who are unsatisfactory. In addition to these two, in the larger shops there is a senior apprentice appointed to act as assistant in the school.

Wherever possible the school instructor is a technical graduate; that, however, is not considered so important as the practical experience; the policy is to supply both school and shop instructors from the ranks of graduated apprentices as rapidly as graduates who can qualify are turned out. Much emphasis is placed upon the personal equation of the teachers. They must be men qualified not only to teach the trade, but also men who understand boys and who have the qualifications of leadership. Unfortunately, the salaries paid the instructors frequently are not sufficient to hold men of initiative, and to the best qualified men the instructorship becomes a stepping stone to better positions.

A comprehensive system of reports is made by the school and shop instructors. These reports show, first, the apprentice's ability at the trade; second, the disposition and mental ability of the apprentice; and third, the standing in class work. Instructors are required at all times to know the standing of each apprentice, thus making examinations unnecessary. Special emphasis is placed on the personal touch maintained between the instructor and the apprentice, so as to ascertain the type of work or branch of the service for which each boy is best fitted.

At some shops separate schoolrooms have been built; in others, rooms in shop buildings have been fitted out for instruction purposes. Each school is equipped with leverage models for problems in all classes of levers, gears and lathes for studying the properties of gearing, wheel and axle models, pulley blocks, inclined planes, screw jacks, etc., and a small upright engine for teaching valve setting; models of valve gears and small scale engine wheels and frames are furnished for teaching the boys the practical way of laying out keyways for axles and eccentrics and for setting the shoes and wedges which are used in the main driving-wheel journals of locomotives. A small tension and compression machine is used for instruction in strength of materials.

No textbooks are used in these classes; the lessons, prepared on lesson sheets in the New York office, take up problems bearing on shop work. The lessons must be arranged to meet the conditions found in a railroad shop. The local instructors keep in close touch with the central office and cooperate in getting together material for the draw-

ing and problem courses. In addition to this the school instructor collaborates with the shop instructor and shop foremen and utilizes practical problems of the shop upon which the boys are working. The lessons are arranged in a series, and each boy must complete the series, to do which requires some additional work at home.

While no textbooks are used, each boy is furnished with a copy of a machine-shop arithmetic and a book on link motion for reference purposes. At one or two points a manufacturing company furnishes each boy with a pamphlet known as the "Young Machinist's Practical Guide." At West Albany there is a series of charts furnished by an air-brake company showing the different parts of their apparatus. Catalogues of interest to pupils are kept on file at each point. In several instances publications of special interest are given to each pupil; for example, a publication on the cross-compound locomotive, published by the American Locomotive Co., was given to all apprentices of the Michigan Central, on which road this type of locomotive is used very largely.

The boys must purchase their own drawing sets. The company furnishes these at half price, amounting to about $5.

In the shop the pupils are working on a regular product; in no case do they "make chips for the sake of making chips."

The school system is yet too young for many of the graduates to have risen to executive positions. However, at the 1909 meeting of apprentice instructors there were reported 15 boys who that year had been promoted to positions of responsibility, such as shop instructors, material inspectors, assistant foremen in various departments, and draftsmen. It is the policy of the company to fill vacancies as they occur with graduates of the apprentice school who have demonstrated their efficiency.

The railroad officials, from the gang boss to the superintendent of motive power, are in favor of the system; the workmen in the shops have shown much interest and appreciation; they are glad to have an opening for their sons by which they can be assured of thorough training which will make them first-class mechanics, and which, if properly followed up, may fit them for positions of authority and responsibility.

In addition to the regular apprentice instruction, night classes are conducted for men at several points. These classes are open to all employees. At one shop nearly all of the night-school pupils were apprentices receiving regular instruction in the day school. At points where there is a full quota of apprentices and a waiting list, the boys take places as helpers and enroll in the night school until there is an opening for them. Many boys who have finished their apprenticeship continue their studies in the night class. These night classes give the more ambitious men a chance to become more proficient and to fit them for better positions.

SANTA FE SYSTEM.

The Santa Fe system of apprenticeship schools was established in 1907. Schools are now in operation at 24 localities or shops. Headquarters are maintained at Topeka, Kans., where the largest shops are operated. An ex-master mechanic is supervisor of apprentices, and his assistant was principal of the Topeka High School at the time of his appointment. The courses are planned here, and lesson sheets made up and sent out to the various schools. Monthly reports are sent to headquarters from each school.

Every apprentice in shops where schools are in operation is required to attend school throughout the period of his apprenticeship, which is four years. The Santa Fe has not confined its efforts to the largest shops. Even in small shops where there are but three or four apprentices arrangements are made to give them systematic instruction. In order to be accepted as an apprentice the candidate must be from 16 to 22 years of age, except in California, where the State law makes the minimum age 18. The preference is usually given to the younger boy. He must pass an examination which requires schooling to at least the fifth grade, and must pass a physical examination. The candidate must be approved by both school and shop instructors before he can be employed. The number of apprentices by localities and trades are shown in the following table:

NUMBER OF APPRENTICES IN SCHOOLS OF THE SANTA FE SYSTEM, BY TRADES AND BY LOCATION OF SCHOOLS.

Location of schools.[1]	Number of pupils by trades.										
	Blacksmithing.	Boiler making.	Brass finishing.	Coach carpentry and cabinet making.	Electrical work.	Machinist.	Painting.	Pattern making.	Tinsmithing and pipe fitting.	Upholstery.	Total.
Topeka, Kans.	6	18	6	26	1	121	13	4	8	3	206
Albuquerque, N. Mex.	2	6	.....	2	1	30	1	.....	6	.....	48
Amarillo, Tex., and Wellington, Kans.	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	6
	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	18
Argentine, Kans., and Chanute, Kans.	.....	1	.....	.....	.....	4	.....	.....	.....	.....	5
	.....	2	.....	.....	.....	9	.....	.....	.....	.....	11
Arkansas City, Kans., and Newton, Kans.	.....	.....	.....	.....	.....	7	.....	.....	.....	.....	7
	.....	3	.....	.....	.....	15	.....	.....	1	.....	19
Bakersfield, Cal., Needles, Cal., and Winslow, Ariz.	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	5
	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	4
	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	5
Cleburne, Tex.	6	11	.....	6	.....	40	2	.....	8	.....	73
Clovis, N. Mex., and San Marcial, N. Mex.	.....	.....	.....	.....	.....	9	.....	.....	.....	.....	9
	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	5
Galveston, Tex., Silsbee, Tex., Somerville, Tex., and Temple, Tex.	.....	1	.....	.....	.....	2	.....	.....	.....	.....	3
	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	5
	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1
	.....	1	.....	.....	.....	5	.....	.....	.....	.....	6
La Junta, Colo., Pueblo, Colo., and Raton, N. Mex.	1	.....	.....	.....	.....	24	.....	.....	3	.....	28
	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	2
	.....	1	.....	.....	.....	16	.....	.....	.....	.....	17
Richmond, Cal.	1	7	.....	.....	1	12	.....	.....	3	.....	24
San Bernardino, Cal.	.....	1	.....	3	.....	29	1	.....	4	.....	38
Fort Madison, Iowa.	.....	1	.....	.....	.....	21	.....	.....	.....	.....	22
Total.	16	53	6	37	3	395	17	4	33	3	567

[1] Each group of two or more shops is under one school instructor.

School is in session throughout the year. In schools having resident school instructors whose time is devoted entirely to teaching, instruction is given Monday to Saturday from 7 to 9 a. m., also from 1 to 3 p. m. in schools at the larger shops. In other schools the days and hours of instruction vary. Each boy is required to attend school four hours per week. No home work is required. The supervisor holds that recreation is necessary to the normal boy and that it is unjust to require a boy who has been employed all day to give up his evenings to study, and instructors assign no more work than can be done during the daytime allotted.

In general, the school work follows closely the same plan as the New York Central. Two and two-thirds hours per week are given to mechanical drawing and one and one-third hours to shop arithmetic. Spelling and business letter writing and the elements of mechanics and physics are taught incidentally. Throughout all of the work there is an attempt at the teaching of civics, not under that name, but through personal contact with the instructors who teach those things which make for better and more intelligent citizenship.

The shop practice does not differ materially from that of the New York Central system. In the course of his apprenticeship the boy gets experience in all phases of his trade. At one point an engine was overhauled and repaired (practically rebuilt) entirely with apprentice labor.

In 5 of the schools there are resident school instructors whose time is devoted entirely to teaching. In some places the chief draftsman of the shop is the school instructor. There are 32 instructors in the system. Nine instructors give school instruction only, 18 give shop instruction only, and 5 give both school and shop instruction. These 5 have the close cooperation of foremen. One school instructor has 4 shops under his supervision; 2 school instructors have 3 shops each under their supervision, and 4 have 2 each. In most cases there is a shop instructor at each shop, and where the apprentices are very few in number he may have other duties in the shop. It is the policy of the supervisor to have 1 shop instructor to every 25 boys. In Topeka there are 10 shop instructors and 2 school instructors. Teachers are responsible to the chief local shop official, and they to the supervisor. The supervisor is nominally held accountable to the general superintendent of motive power; practically, however, the action of the supervisor is final on all matters pertaining to apprentices, and the instructors are on equal footing with the shop foreman.

Several of the school instructors are graduates of the apprentice school and have had some higher training. With one exception all of the school instructors have had work at technical schools and some are graduates. The shop instructors are men who have had

experience in the Santa Fe shops. The Santa Fe places emphasis upon the personal equation. All instructors must be efficient men, and the shop instructor must be able to take hold of any machine or work on the floor or bench and to demonstrate to the boy the correct and quickest way of completing the job in hand. But in addition to this the instructor must be an active, boy-loving man, who naturally commands respect and who instinctively draws the boys to him and wins their confidence. He must be able in a measure to "live their lives," enter into their games, and to be a real factor in shaping the life of the apprentice into the most desirable cast.

At a few points the school is housed in a separate building, but at most places the schoolroom is in some regular building, usually the office building. A complete set of models is furnished to every school, also parts of machines, valves, gears, etc. At one point, La Junta, Colo., the high-school manual training department of the public schools is furnished with a set of models, and instruction is given in the school according to Santa Fe methods. In this way the high school will become a feeder to the apprentice school.

The company furnishes each apprentice with lesson sheets and blue prints (which take the place of books), paper for drawings, a drawing board, a T square, and a complete set of drawing instruments. If the boy leaves before the completion of his time, these instruments revert to the company, but if he finishes his time they become his property. These boys are engaged in the shop on productive labor under the direction of a shop instructor. The ratio of apprentices to journeymen is so large that really a very large part of the shop product is the work of these apprentice school pupils.

The school work of apprentices is accepted, hour for hour, on their time. The company wishes to keep all of its graduates in its own employ, but many are attracted by the higher wages offered elsewhere and do not remain. The boys are impressed with the possibilities of promotion, and it is the policy of the company to fill all vacancies, from master mechanics down, from the ranks of those who have been graduated from the apprentice school. The school is still so young that few have as yet risen to positions of responsibility.

There is a bonus system in vogue in the Santa Fe shops; under it a specified time is given to accomplish a certain piece of work, and if the workman or apprentice accomplishes this work within the given period, he is paid an extra amount in addition to his regular wage. It is not uncommon for the bonus to equal or exceed the regular wage of the apprentice.

The apprenticeship training system has met with the approval of the officials throughout the motive power department from the superintendent down. Parents have, in the main, been very favorably disposed toward it. There has been some opposition, not especially to

the school feature, but to the whole system, from the men in the shops, because of the proportion of apprentices to journeymen, and from the apprentices themselves, because they have felt that they were doing regular journeymen's work in their third and fourth years, and were getting paid only apprentice rates for so doing.

Upon completion of the four years' course, graduates receive the Santa Fe diploma, which assures them preference for employment in the Santa Fe shops.

The first six months of the apprenticeship are regarded as a probationary period. If in that time the boy does not show evidences of becoming an efficient workman he is advised to take up some other employment for which he is better adapted. Boys leave the service either voluntarily or because they are advised by the instructor to resign, or they are dismissed. The following statement from the quarterly report of the company June 30, 1910, shows the number leaving before and after graduation:

Number of apprentices Oct. 1, 1907	345
Number employed since Oct. 1, 1907	757
Number of apprentices leaving service before graduation	375
Number graduated since Oct. 1, 1907	168
Number of graduates leaving service immediately upon graduation	17
Number of graduates now in service	109
Total number of apprentices in service June 30, 1910	559

At Topeka, in addition to the regular day school there is an evening school which is in session two evenings each week. Boys who do not keep up their work in the day school either because of lack of previous training or disinclination to work are required to attend this school.

At Topeka, in addition to the night "coaching class" referred to above there is an evening class for men in the shops which meets for two hours once a week. Men pay $1 per month for instruction in this class.

The Santa Fe Employees' Magazine provides one four-year scholarship each year to Armour Institute of Technology in Chicago. The scholarship is awarded in September to the apprentice who has served at least three years of his apprenticeship and who ranks first in an average of school and shop grades, bonus, and efficiency. The scholarship pupil is given employment on the road during the summer months when Armour Institute is closed and is "welcomed back to the service after he has graduated."

GRAND TRUNK.

The Grand Trunk Railway system has an evening apprenticeship school at Battle Creek, Mich., which was established in 1902, and also one at St. Albans, Vt. Schools are also in operation at several localities in Canada.

BATTLE CREEK, MICH., SCHOOL.

Persons 16 to 21 years of age who are able to meet the mental and physical requirements are accepted as apprentices, and are required to attend school throughout their apprenticeship, which is 4 years for boiler makers, electricians, or pattern makers, and 5 years for machinists. The enrollment last year was boiler maker, 1; electricians, 2; machinists, 67; pattern maker, 1. School is in session from October 1 to June 30, and instruction is given in mechanical drawing and shop arithmetic Monday to Thursday from 7 to 9 p. m. Each boy attends school two evenings per week. Apprentices are not paid wages for the time spent in school. Frequent examinations are held, the results thereof being posted so that apprentices may be advised as to their progress, and "thereby be able to brush up the weak spots." Each apprentice is provided, without expense to him, with a copy of Practical Mechanics for Apprentices and Others, and with blue-print drawing for instruction. As an incentive to good work annual competitive examinations are conducted. Prizes are awarded for highest average in classes in each year of apprenticeship. The school is equipped with a complete set of models.

ST. ALBANS, VT., SCHOOL.

Persons accepted as apprentices at the St. Albans shop are required to attend school throughout their apprenticeship. The enrollment in 1909 was 35. School is in session in the evening from the first week in October to the last week in April.

ERIE.

The Erie Railroad system of apprentice schools which is similar in the more important details to the New York Central system, was established in 1908. Schools are in operation in 5 of its 21 shops, and several others are to be started in 1911. The supervisor of apprentices and his assistant outline the courses and prepare the lesson sheets. Persons 16 to 21 years of age who pass the mental and physical examination are accepted as apprentices. Preference is given to sons of employees. Apprentices serve a three months' probationary period before they become regular apprentices. Apprentices in shops where schools are in operation are required to attend school throughout the period of their apprenticeship, which is four years. Apprentices, if able, are permitted to complete the course in three years, and many do so.

The number of apprentices by localities and trades is shown in the following table:

NUMBER OF APPRENTICES IN SCHOOLS OF THE ERIE RAILROAD, BY TRADES AND BY LOCATION OF SCHOOL.

Location of schools.	Number of pupils by trades.										Total.
	Blacksmithing.	Boiler making.	Car building, freight.	Carpentry.	Electrical work.	Machinist.	Molding.	Pattern making.	Pipe fitting.	Tinsmithing.	
Dunmore, Pa	1	5	4	.....	.....	32	7	2	1	1	53
Hornell, N. Y	.....	11	.....	.....	.....	36	.....	.....	3	3	53
Meadville, Pa	1	6	.....	.....	.....	64	.....	7	.....	1	79
Port Jervis, N. Y	1	3	2	1	.....	17	.....	.....	.....	1	25
Susquehanna, Pa	4	12	.....	1	1	32	.....	.....	1	1	52
Total	7	37	6	2	1	181	7	9	5	7	262

School is in session 40 weeks per year. Instruction is given Monday to Friday from 7 to 9 a. m. and from 1 to 3 p. m.; Saturday, 7 to 9 a. m. Each apprentice attends school four hours per week and receives full pay for the time spent in school. This time is given over chiefly to mechanical drawing; at each session, however, a lesson is assigned in shop mathematics. The student is required to prepare the lesson in shop mathematics at home and submit it to the instructor, and such explanations as are necessary are given during the school period. No attempt is made to teach anything beyond mechanical drawing and mathematics.

There is a school instructor and a shop instructor at each shop having 50 or more apprentices, and one instructor who gives both theoretical and practical instruction for shops having less than 50 apprentices. The company endeavors to keep all of its graduates on its own pay rolls.

It is not the policy of the school to turn out draftsmen or foremen, but if a boy shows an unusual aptitude for drawing he is given six months in the drafting room, and when a vacancy occurs he may be promoted to the drafting room.

PENNSYLVANIA.

The Pennsylvania Railroad established an apprentice school at the Altoona, Pa., shops in September, 1910, and requires all apprentices in Altoona to attend school for three years. The trades taught at the present time are blacksmithing, with an enrollment of 3 pupils; boiler making, 6; car building, 7; electrical repairing, 6; machinist, 170; molding, 8; painting, 1; pattern making, 7; pipe fitting, 5; plumbing, 1; and tinsmithing, 4.

School is in session from the first Monday in September to the second Friday in July. Instruction is given five days per week from 10

a. m. to 12 m., 1 to 3 p. m., and 3.30 to 5.30 p. m. Each apprentice attends school four hours per week. All apprentices follow the same general course regardless of their trades.

The course is somewhat more elaborate than that of other railroad schools. Apprentices are divided into two groups. The first group consists of apprentices of lower educational qualifications; the second of those of higher educational qualifications. In addition there is a preparatory class in which apprentices are placed until the instructor is able to ascertain their educational qualifications. If any apprentices are very deficient in education they remain in this class until able to enter the first group.

The first group receives instruction in mechanical drawing, algebra, arithmetic, English, physics, geometry, mechanism, mechanics, chemistry, machine design, steam practice, and strength of materials. The second group receives instruction in mechanical drawing, algebra, geometry, physics, mechanics, mechanism, strength of materials, chemistry, experimental tests, machine design, shop management, and steam practice. The object of the instruction is to make better artisans rather than to develop foremen and superintendents.

The railroad company cooperates with the extension department of the Pennsylvania State College. The State college acts in an advisory capacity and the teachers are State college professors. These men are, however, carried on the company's roll, and the school is entirely independent of the college. Officials of the road state that as soon as the work has passed its experimental stage and the company feels able to do so, all connection with the State college will be severed and the school will be managed independently.

Practical training is obtained by apprentices while engaged on actual productive work in the shops. No shop instructors are employed, but it is the duty of the shop foremen to give such practical instruction as may be needed. The rotation of boys on machines and in the various divisions of the shop is in the hands of the supervisor of apprentices, who is responsible for the thorough training of the apprentices.

UNION PACIFIC.

The Union Pacific has a very extensive educational system which is described under Correspondence Schools on page 357. This system is for all classes of employees and not especially for apprentices. In addition, there is an evening school for apprentices which was established at the Omaha (Nebr.) shops in 1906. Persons 16 years of age and over are accepted as apprentices, and are required to attend school three years. There were 84 pupils in September, 1910. The following trades are taught: Blacksmithing, boiler making, cabinet-

making, carpentry, coach carpentry, electrical work, machinist, painting, pattern making, silver plating, steam fitting, tinsmithing, and upholstering. School is in session 26 weeks per year, and instruction is given Monday, Tuesday, Thursday, and Friday. First-year apprentices take arithmetic from 7.30 to 8.30 p. m. two evenings per week. If they have completed the eighth grade in the public school, they are not required to take arithmetic, but enter the class for second-year apprentices. Second-year apprentices take elementary mechanics from 5.10 to 6.10 p. m. two evenings per week. Third-year apprentices take mechanical drawing from 7.30 to 9.30 p. m. two evenings per week. The chief draftsman is the superintendent and two other draftsmen do some teaching. There is a special shop instructor, whose only other duties are those of general repairman of the shop. The only textbook used is in the arithmetic class; the boy must provide himself with the textbook on arithmetic used by the Omaha public schools, and with a set of drawing instruments. Men from the shops are allowed to attend this school upon payment of 50 cents per month.

In connection with the evening school work a reading room has been established for the apprentices and other shopmen, in which the leading railway magazines are kept for the use of men and boys during the noon hour. A branch of the Omaha Public Library has been established at the shops, in which the best books dealing with the various branches of work in the shop are kept, and the men are allowed to draw these books from the library for their personal use.

In the Cheyenne (Wyo.) shops there is a class in which instruction is confined to one year of mechanical drawing. This class was established in 1907.

DELAWARE, LACKAWANNA & WESTERN.

Since January, 1910, the Delaware, Lackawanna & Western Railroad has cooperated with the Young Men's Christian Association to furnish instruction to its apprentices in the shops at Scranton, Pa., Kingsland, N. J., and East Buffalo, N. Y. Persons 16 to 21 years of age who pass the required mental and physical examination and serve satisfactorily a three months' trial period are accepted as apprentices and are required to attend school four years.

The number of pupils by trades and localities is shown in the following table:

NUMBER OF APPRENTICES RECEIVING INSTRUCTION, BY TRADES AND BY LOCALITY.

Trades.	Locality.			Total.
	East Buffalo, N. Y.	Kingsland, N. J.	Scranton, Pa.	
Blacksmithing	2	.....	6	8
Boiler making	6	16	15	37
Cabinetmaking	.....	2	.....	2
Carpentry	.....	1	.....	1
Machinist	49	65	91	205
Molding	.....	.....	15	15
Painting	3	14	3	20
Pattern making	.....	.....	5	5
Pipefitting	1	.....	.....	1
Tinsmithing	1	2	.....	3
Upholstering	.....	1	.....	1
Total	62	101	135	298

The work is under the direction of a supervisor and one instructor. Both of these men spend Monday, Tuesday, and Wednesday from 9 a. m. to 12 m. and from 1 to 4 p. m. at Scranton, Pa., where the largest shop is located; one man spends Thursday and Friday from 9 a. m. to 12 m. and from 1.30 to 4.30 p. m. at East Buffalo, N. Y.; and one spends Thursday and Friday from 9 a. m. to 12 m. and from 12.25 to 3.25 p. m. at Kingsland, N. J. School is in session 44 weeks per year. Each apprentice devotes two and one-fourth hours per week to mechanical drawing, and three-fourths of an hour to shop mathematics. Spelling, reading, and business letter writing are also taught incidentally. Boys are given articles to be read at home and briefed in writing, which represents three hours per week. Occasionally the usual routine is suspended and the methods used in the old-fashioned spelling school is subsituted. In addition to this talks are given by the supervisor and by outside men. These talks are sometimes on practical shop subjects and sometimes on civic subjects. The supervisor believes that a part of his mission in the school is to turn out men who shall be good citizens, and his work is shaped to that end. Making efficient workmen, he considers one of the necessary steps to making good citizens.

The supervisor makes a personal study of every boy and attempts to discover the work he is best fitted for and to direct him into it. Boys are frequently transferred to some other trade after they have been apprenticed, and if the boy proves unsuited to any work about the shops he is advised as to what vocation seems to offer a better future for him.

The shop practice is that of the ordinary motive-power shops.

DELAWARE & HUDSON.

The Delaware & Hudson maintains apprentice schools at its motive-power shops at Carbondale, Pa., and Green Island and Oneonta, N. Y. These schools were established in 1907. Persons 17 to 21 years of age who pass the mental and physical examination are accepted as apprentices, and are required to attend school throughout their apprenticeship, which is four calendar years.

The number of apprentices by trades and localities is here given:

NUMBER OF APPRENTICES IN SCHOOLS OF THE DELAWARE & HUDSON RAILROAD, BY TRADES AND BY LOCALITY OF SCHOOLS.

Trades.	Locality.			Total.
	Carbondale, Pa.	Green Island, N. Y.	Oneonta, N. Y.	
Blacksmithing	2	1	2	5
Boiler making	4	5	3	12
Car building	1	.....	1	2
Machinist	22	27	25	74
Painting	.....	1	2	3
Tinsmithing	1	1	1	3
Total	30	35	34	99

The superintendent of tests is the supervisor of apprentices, and the lesson sheets and blue prints are made up under his direction. There is but one regular instructor. He is a graduate of one of the New York Central apprentice schools. There is a senior apprentice at each shop who acts as assistant instructor. School is in session 52 weeks per year. Instruction is given Monday and Tuesday from 1 to 6 p. m. at Green Island; Wednesday and Thursday from 7 a. m. to 12 m. and 1 to 6 p. m. at Oneonta; and Friday from 7 a. m. to 12 m. and 1 to 6 p. m. at Carbondale. Each apprentice attends school five hours per week. Instruction is given in mechanical drawing and shop mathematics. In the shops apprentices are under the direction of the shop foremen, and are transferred from one operation to another according to the rules of the Master Mechanics' Association.

CENTRAL RAILROAD OF NEW JERSEY.

The Central Railroad of New Jersey has no general system of apprentice schools, but maintains a school at the Elizabethport (N. J.) shops which were established in 1905. Persons 17 years of age and over who are able to read and write the English language, and pass an examination in arithmetic, embracing all subjects to and including decimals, are accepted as apprentices, and are, after two months' probation, required to attend school four years.

The trades taught during the past year were blacksmithing, with an average enrollment of 2 pupils; boilermaking, 4; carpentry, 4; electrical work, 1; machinist, 47; and patternmaking, 2. School is in session 40 to 42 weeks per year, and instruction is given Monday, Wednesday, and Friday from 2.45 to 4.45 p. m. Each pupil attends one day per week. One and two-thirds hours per week are devoted to mechanical drawing, and one-third to elementary mechanics. The aim is to develop ability to read drawings rather than to train mechanical draftsmen. A draftsman in the company's employ, serves as school instructor, and the various foremen are depended upon to give shop instruction; no books or lesson sheets are used.

CHICAGO GREAT WESTERN.

The Chicago Great Western maintains an apprentice school at Oelwein, Iowa, which was established in 1908.

Persons 16 to 20 years of age who have a common-school education are accepted as apprentices and required to attend school throughout their apprenticeship, which is four years.

There were 88 pupils in school in October, 1910. The following trades are taught: Blacksmithing, boiler making, coach carpentry, electrical work, machinist, painting, pattern making, steam fitting, tinsmithing, woodworking, and upholstering.

School is in session throughout the year, and instruction is given Monday to Saturday from 1 to 2 p. m. Each pupil attends school one day per week and receives instruction in mechanical drawing, or in arithmetic, algebra, and geometry.

One teacher devotes his entire time to the instruction of apprentices and to watching them in their daily work and giving such instruction as is needed. The mechanical engineer assists in getting out practical lessons in mathematics; he also takes special interest in mechanical drawing. A record is kept of the work covered by each apprentice, the progress being carefully noted. Transfers and promotions are made as rapidly as the boy's work warrants.

THE PERE MARQUETTE AND THE ST. LOUIS & SAN FRANCISCO RAILROADS.

These roads have evening classes for apprentices, meeting one or two evenings per week, in which instruction is given in mechanical drawing and shop arithmetic. The object of the courses is to teach apprentices to read drawings and blue prints and to enable them to work intelligently from the blue prints.

The information obtained concerning the schools of these two roads was so limited that they do not appear in the general tables of this report.

THE SOUTHERN AND THE CINCINNATI, HAMILTON & DAYTON RAILWAYS AND THE ALABAMA GREAT SOUTHERN RAILROAD.

The Southern Railway in its shops at Spencer, N. C., Knoxville, Tenn., Birmingham, Ala., and Atlanta, Ga.; the Cincinnati, Hamilton & Dayton in its Cincinnati and Lima (Ohio) shops; and the Alabama Great Southern in its Birmingham (Ala.) shops, have cooperated with the railroad department of the International Correspondence School of Scranton, Pa., to furnish instruction to apprentices.

At each shop there is a room equipped with benches and tables in which the classes meet. The equipment is furnished by the railroads. Apprentices are given three hours per week at full pay to attend school. The railroads have no other expense connected with the school. The International Correspondence School furnishes teachers, lesson sheets, and drawing outfits. The apprentice boy taking the course must bear the expense. He takes a "course" according to the regular method of the correspondence school.[1] The price varies according to the course taken. While most of the boys take the mechanical drawing course, at a cost of $75 (or $78.40 if they also take arithmetic), they are privileged to take any course offered by the correspondence school. The pupil may have five years in which to pay this tuition, making monthly payments, and he is entitled to instruction from the school instructor during that time if he wants it. The average pupil, however, completes the payment in 20 months.

The system of instruction is different from that of other roads. Each apprentice attends school one-half hour of every working day.

The mechanical drawing work is supposed to be done by the pupil at home and brought to the instructor for criticism, the brief period in the schoolroom is devoted chiefly to arithmetic. Further, the boys are supposed to put in at least 12 hours per week at home study, but as there is no method of compulsion, really very few do put in that much, and some give only the one-half hour per day to study.

Theoretically attendance upon these classes is not compulsory. The boy is made to feel, however, that it is to his interest to take up the work, and at one shop (Knoxville) employment is made contingent upon taking the correspondence course. The fact that the instructor's position depends largely upon the number of pupils he enrolls makes him zealous in inducing apprentices to take the course.

The schools for the three systems here described being of such a different character are not included in the general tables.

CORPORATION APPRENTICESHIP SCHOOLS.

The training of apprentices in corporation schools is conducted in three ways. In the greater number it is planned and managed by the company employing the apprentices. Some cooperate with the

[1] For description of this school see p. 352.

public school, whereby the public school furnishes the school equipment and instruction and the corporation furnishes the shop instruction.[1] A few cooperate with the Young Men's Christian Association.

Reports were obtained for 19 establishments, exclusive of those cooperating with the public schools, which are giving apprentice instruction.

The school instruction of boys apprenticed to corporations does not differ materially from that of apprentices in railway motive power shops. The hours of instruction in a majority of the corporation schools for which reports were secured are from two to six per week. School is conducted during working hours and apprentices are paid regular wages for the time spent in school. The principal instruction is in mechanical drawing and in shop mathematics. Some purely cultural work, which is incidental, is given in some of these schools.

In most corporation schools there is no shop instructor, the shop instruction devolving upon the shop foreman under whom apprentices work. In many cases the school instructor has other duties about the shop and does not give his entire time to pupils.

On the succeeding pages a description is given of the following schools:

General Electric Co., West Lynn, Mass.
Western Electric Co., Chicago, Ill.
Westinghouse Electric & Manufacturing Co., East Pittsburg, Pa.
Westinghouse Air Brake Co., Wilmerding, Pa.
Brown & Sharpe, Providence, R. I.
International Harvester Co., Chicago, Ill.
Yale & Towne Manufacturing Co., Stamford, Conn.
R. Hoe & Co., New York, N. Y.
Geo. V. Cresson Co., Philadelphia, Pa.
Fore River Shipbuilding Co., Quincy, Mass.
American Locomotive Co., Dunkirk, N. Y.
Cadillac Motor Car Co., Detroit, Mich.
Lakeside Press, Chicago, Ill.
North End Union, Boston, Mass.
Solvay Process Co., Solvay, N. Y.
Manufacturers Association, Bridgeport, Conn.

There is also included a description of the school attendance required of the apprentices of the Baldwin Locomotive Co.

GENERAL ELECTRIC CO., WEST LYNN, MASS.

The General Electric Co. of West Lynn, Mass., is engaged in the manufacture of electrical supplies, steam turbines, and general electrical machinery. In 1902, impressed by the inadequacy of their

[1] See Cooperative Schools, p. 185.

apprenticeship system, they established the system now in operation, which includes a rather elaborate method of instruction, designed to turn out skilled workmen for the instrument makers', machinists', tool and die makers', molders' (brass, iron, and steel), steam fitters', pattern makers', and testers' trades.

The actual operation of the instruction, both in the shops and in the school, is in charge of a supervisor of apprentices, who is responsible to the company for the satisfactory training of apprentices.

A committee of company officials meets with the pupils and examines each one once or twice a year in order to test his theoretical and applied knowledge. Those who show no capacity for future responsible work are weeded out and courses are modified to suit the needs of industrial pupils.

Boys of at least 15 years of age—16 for molders' and steamfitters' trades—who have had a grammar-school education or its equivalent may be admitted to the regular apprenticeship. Every applicant must serve a two months' trial period before being regularly apprenticed.

The school year is divided into three 14-week terms and the apprentice must enter class at the beginning of the first of these terms after he has been accepted.

Instrument makers, machinists, and tool and die makers serve a four years' apprenticeship and are required to do school work three years; pattern makers and testers serve a three years' apprenticeship and attend school two and two-thirds years. Molders (brass, iron, and steel) and steam-fitters serve a two years' apprenticeship and are required to attend school one and two-thirds years.

Apprentices spend from 3 to 12 hours per week in school, varying in the different trades and in different years. Classes meet during the regular working hours, Monday to Friday, 8.30 a. m. to 12 m. and 1 to 6 p. m. Pupils receive the regular compensation for time spent in school.

The classroom instruction is based on a grammar-school education and includes arithmetic, algebra, geometry, and trigonometry; physics as it concerns simple machines, power transmission, strength of materials, machine design, magnetism and electricity, free-hand and mechanical drawing, jig and fixture design.

The company maintains what is known as a practice shop, where the apprentice does the first part of his shopwork. A regular commercial product, upon which the company makes a profit, is made in this practice shop, but only apprentices work there. The work is selected solely for its instructive character.

Most of the machines in this school shop are of the latest type. Some of the tools are second-hand and a few have been reserved from the scrap heap.

The man in charge of the training room is himself a trained mechanic, who has served an apprenticeship, and was selected for his experience in superintending work and for his ability to instruct beginners. One assistant takes charge of the apprentices in the pattern training room and four assistants look after the machinist training room, and there is an arrangement under which the apprentices themselves at various stages act as instructors to those less advanced.

The pupil, having spent the first part of his apprenticeship in the practice shop, is transferred to the factory proper for the remainder of his apprenticeship. No course has been laid out for the shop-practice work. Each apprentice is advanced as fast as is consistent with his industrial capacity. At times apprentices in all stages of training are loaned to the factory departments for a few days or weeks. On the other hand, some of those who have already progressed into the factory are brought back to the training room if the quantity or quality of their work or their deportment necessitates such measures. If a disagreement arises between the shop foreman and the apprentice, the shop instructor acts as mediator. The school has graduated 112 apprentices. Of these, 63 are still in the employ of the company, 8 are serving as assistant foremen, 5 as inspectors, and 12 as draftsmen. The remainder are employed as journeymen.

At the satisfactory termination of an apprenticeship, including school and shop training, a certificate of apprenticeship and a cash bonus of $100 are given. Graduates are encouraged to remain with the company.

The General Electric Co. also maintains a school operated on similar principles at its plant at Schenectady, N. Y. The course of instruction there is not so elaborate. Every apprentice receives four years of instruction in shop mathematics and mechanical drawing and three shop instructors direct their work in the shop. Each apprentice attends school three 70-minute periods a week. School is in session from 8.15 a. m. to 12.15 p. m., 1.15 p. m. to 5 p. m. every week day but Wednesday and Saturday, when there are only half-day sessions.

WESTERN ELECTRIC CO., CHICAGO, ILL.

At the Western Electric Co.'s plant in Chicago, Ill., school is conducted for apprentices who are learning to be either toolmakers or pattern makers. The school was established in March, 1907, to prepare apprentices to become superior workmen who will have an intelligent understanding of the trade technically as well as practically and from whom it will be possible to select foremen and assistant foremen. There is but one teacher. He is in full charge of the school, but makes reports to the assistant superintendent of the

establishment, and he in turn is responsible to the superintendent. The school work of the apprentices, combined with the work which they do in the shops of the company, constitutes an apprentice course which 25 toolmaking apprentices and 1 pattern-making apprentice are at present taking. To this course boys 16 to 20 years old are admitted who, by their character, reputation, conduct, and attention to work, have commended themselves to the company and have been indentured as apprentices. All applicants must be proficient in elementary arithmetic and must pass an examination in that branch before they are accepted as apprentices. No apprentice is compelled to take the course, but all who have once entered upon it are required to carry it out. Refusal to do so would jeopardize their employment with this company. Those selected may enter on school work at any time of the year.

The term of apprenticeship is four years and the school work covers three years; but if a boy has completed the equivalent of the first year's shopwork or is a graduate of a manual-training school he will be accepted for an apprenticeship of three years and may finish up the school part of the course in two years. The school work is not extensive, being four hours a week in the first and second year of apprenticeship and one hour a week in the third year. The fourth year apprentices have no school work. The same school instruction is provided for both the toolmaking and pattern-making apprentices. In each school week of the first year the school work consists of two periods, each of 60 minutes, on arithmetic, with special reference to its application to problems that arise in the shops, and of two periods, each of 60 minutes, on geometrical drawing. In each school week of the second year they have one 60-minute period on algebra, one 60-minute period on plane geometry, and two 60-minute periods on mechanical drawing. In each school week of the third year they have one 60-minute period on mechanical drawing. At irregular times, in place of classes lectures are given by the heads of departments on the lines of work in which they are particularly interested, the idea of this being not only to instruct the apprentice in the work of other departments than his own, but also to teach him the relation between other departments and the one in which he is employed. Whenever the nature of the subject will permit, these lectures are illustrated by practical demonstrations. For example, the lecture on hardening and annealing is given in the blacksmith shop and the actual processes, so far as possible, are carried on before the class. No text or reference books on industrial subjects are used other than typewritten instructions and shop problems in arithmetic and drawing, which have been prepared by the instructor himself.

The trade practice that the apprentices get consists in their regular daily work in the shops. It is the intention so to regulate the shop instruction that the apprentices will not be kept at any one kind of machine work in excess of a fixed period of time.

Instruction in school is given from 4.15 p. m. until 5.15 p. m., on Monday, Wednesday, Thursday, and Friday for first-year apprentices; on Tuesday, Wednesday, Thursday, and Friday for second-year apprentices; and on Friday for third-year apprentices. The school year is 43 or 44 weeks long, the school being closed in July and August.

In the shops the apprentices are under the supervision of a foreman and his four assistants, all of whom are men qualified by years of actual experience to direct the apprentices' work. The school instructor has had 10 years' experience as a tool and pattern designer, but has had no experience as a practical worker at any trade. His university training has fitted him to teach practical mathematics and mechanical drawing.

The school uses a small room in one of the buildings at the establishment. The school costs the company about $1,000 a year. The apprentice must buy his own set of drawing instruments.

The apprentices are paid for both school and shop time according to a scale of wages fixed by the terms of the apprenticeship agreement. In addition to his wages the company agrees to give each apprentice upon the completion of his full term of service a bonus of $100. As the rate of pay of an apprentice is comparatively small and the cost of tools considerable, the company has found that unless tools are provided many of the boys are handicapped and can not make the progress the company expects and desires. An arrangement has been provided in the contract whereby a boy may get tools at the discretion of the foreman through the company at cost, the cost of the same to be charged against the $100 bonus. It is understood and agreed that these tools will remain the property of the company until the expiration of the boy's term of service, when they will be turned over to the boy as a part of the bonus. The amount of tools furnished in no case exceeds $60 in value.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO., EAST PITTSBURG, PA.

The Westinghouse Electric & Manufacturing Co. requires a four years' apprenticeship in the machinist, pattern-making, armature-winding and electrical-machinists trades. The school was established in 1909 and is open throughout the year. Persons 16 to 21 years of age who have a common-school education are accepted as apprentices. All apprentices are required to attend this school. Instruction is given Monday to Saturday, inclusive, 7 to 9 a. m. Each pupil attends two days per week. During the first two years

of the apprenticeship mechanical drawing and shop arithmetic are taught, each two hours per week. The course for the last two years' apprenticeship has not yet been formulated. The school is under the direction of a committee made up of the company's consulting engineer, assistant superintendent, and the apprentice instructor.

In the shop boys are under the direction of the various shop foremen. In addition to this school there is an evening continuation school for men in the shops.

WESTINGHOUSE AIR BRAKE CO., WILMERDING, PA.

The Westinghouse Air Brake Co. has had a school for its apprentices since 1906. The school is operated for the company by the Young Men's Christian Association. Males 16 years of age and over, physically suited for the machinists' and pattern-making trades, who satisfy the instructor of apprentices as to aptitude, and who pass the required examination, are accepted as apprentices by the establishment, indentured for four years, and required to attend school.

Twenty-five machinists' apprentices and two pattern-making apprentices were in school June, 1910.

The school year is from the middle of September to early in June. Instruction is given Monday to Friday from 7.15 to 10.45 a. m. Each pupil attends one-half of this time. Advanced arithmetic, algebra, business English, mechanical drawing, and shop mathematics are taught during the first year; algebra, business English, mechanical drawing, shop mathematics, and physics during the second year; business English, mechanical drawing, shop mathematics, physics, geometry, trigonometry, and analytical geometry the third year; and shop mathematics, analytical geometry, analytical mechanics, calculus, and electrical engineering during the fourth year.

BROWN & SHARPE, PROVIDENCE, R. I.

Brown & Sharpe Manufacturing Co., manufacturers of machinist tools, have 118 boys apprenticed to the machinists', blacksmithing, and pattern-making trades. A school was established by the company for its apprentices in 1908. It is in session from September to June. White males 16 to 22 years of age who have made suitable progress in their studies, especially arithmetic, are accepted as apprentices. All apprentices are required to attend school. School is in session Monday to Friday from 7 to 9 a. m. and from 1 to 3 p. m., and Saturday 7 to 9 a. m. Pupils taking the blacksmithing trade attend school three years; machinists and pattern-making, four years. During the first two years of the apprenticeship each boy attends one session per week, during the third and fourth years each boy attends two sessions per week. Time spent in the schoolroom is paid for at the same rate as time spent at productive work in the shop.

The boys are instructed in making and reading drawings, algebraic formulas, geometry, trigonometry, physics, and the theory of shop practice.

The first 12 weeks constitute a trial period. If at the end of the 12 weeks the boy is accepted he is required to deposit $50 with the company as a guaranty that he will serve his full term. Upon completion of his apprenticeship, the $50 plus a $100 bonus is returned to him.

A copy of a Handbook for Apprenticed Machinist is given to each boy on entering. This book was written and published by the company. A full set of tools is loaned the boy, which may become his property upon the payment of a nominal sum.

There is but one instructor employed. In addition to giving schoolroom instruction it is his duty to supervise the apprentices both in the shops and on the outside, to see that they have fair treatment in the shop, and that outside of the shop they do not frequent questionable places, associate with improper companions, or smoke cigarettes. If apprentices offend in these matters after having been warned, they may be discharged and the $50 deposited forfeited.

INTERNATIONAL HARVESTER CO., CHICAGO, ILL.

The McCormick works of the International Harvest Co. has a school for machinist apprentices. The school was established in 1906. It is in session throughout the year. Boys 16 years of age and over who have received at least a sixth-grade education are accepted as apprentices. All machinist apprentices are required to attend school. The apprentices are divided into junior and senior grades. Instruction is given Tuesday to Friday, inclusive, from 12.30 to 1.30 p. m. Each pupil attends school two days per week and receives instruction in shop mathematics for four years under the direction of a practical man from the shops.

When the boy is first employed he is started in the storeroom, where he waits on workmen, delivering and caring for such tools as they call for, in order to give him a good practical idea of the names and uses of the tools used in the machine shop. After a few months he is placed in the shop to operate some tool under the direction of the foreman. He is carefully observed, and if he is promising he is regularly indentured to the trade. It was stated that some of the best mechanics in the works are graduates of the apprenticeship school.

The apprenticeship school is also supposed to furnish material to draw on for assistant foremen and foremen in the shop, and during the past few years quite a number have been drawn for such positions. The company estimates six vacancies among the foremen must be filled every year, and to provide for this demand some such system of developing the proper material to recruit from is absolutely necessary.

YALE & TOWNE MANUFACTURING CO., STAMFORD, CONN.

The Yale & Towne Manufacturing Co., manufacturers of locks and iron specialties, established their apprentice school in 1907 with the aim of preparing mechanics for the service of the company. Males 16 years of age who pass a satisfactory examination are accepted as apprentices. Apprentices are required to attend school. The school provides a four-year course for apprentices in chasing, electroplating, die making, pattern making, and tool making. During the last year there was an enrollment of 53 pupils. A three months' trial service is required for admission to apprenticeship. School is in session from September 1 to May 4. Instruction is given Monday, Tuesday, Thursday, and Friday from 9 a. m. to 12 m. and from 1 to 6 p. m. During the first two years of the apprenticeship three hours per week are given to trade mathematics and three hours to lectures and mechanical drawing; during the last two years three hours per week are given to lectures and mechanical drawing and three hours to mechanics and theory of shop practice. There are two shop instructors who supervise the work of the boys in the shop and instruct them. There is a special training room where apprentices spend the first two years of their apprenticeship. In this training room boys make many of the tools used in the establishment, also parts of machinery are sent in from the regular shops to be finished.

R. HOE & CO., NEW YORK, N. Y.

R. Hoe & Co., manufacturers of printing presses and steel products, maintain an evening school which apprentices may attend during three and one-half years of their four years' apprenticeship. It is possible for the unusually bright boy to finish the required work in less than three and one-half years. This school was established in 1872 and is one of the oldest examples of an apprenticeship school now in existence.

Persons 16 to 18 years of age, who have been at school at least four years, are accepted as apprentices. The enrollment in the school last year by trades was as follows: Carpentry and millwrighting, 3; machinists, 214; molding and general foundry work, 5; pattern making, 10; saw making, 4.

School is in session from the first Monday in October to June 1, and instruction is given Monday to Saturday from 5.20 to 6.45 p. m. During the first three years each boy attends three evenings per week and two evenings per week during the last six months. Arithmetic and English are taught during the first year; arithmetic, English, geometry, mechanics, and drawing during the second and third years; and free-hand and mechanical drawing during the last six months of the course.

Attendance at the school is compulsory once the boy has been accepted. A week before the commencement of a new term the head master calls upon the foreman of each boy who has entered the shop since the commencement of the last term. If his report of the boy is favorable the boy is accepted in the school; if not, he must wait until he has earned a favorable report.

Five teachers are employed in the school. One is a graduate of a technical school; all others are graduates of the R. Hoe apprentice school. For practical instruction in the shops, the shop foremen are depended upon.

GEORGE V. CRESSON CO., PHILADELPHIA, PA.

The George V. Cresson Co., manufacturers of hoisting engines cranes, etc., maintains a four years' apprenticeship system. The school was established in 1907. Boys apprenticed to the machinists', molding, millwrighting, and pattern making trades are, during the first two years' apprenticeship, required to attend this school. Thirty-seven pupils are now attending. Males 17 to 19 years of age, educated to the tenth grade and able to pass the required examination, are accepted as apprentices.

School is in session from the 1st of September to the third week in April. Instruction is given Monday, Tuesday, Thursday, and Friday from 4 to 6 p. m. Each pupil attends two days of two hours each and two days of one hour each. Arithmetic is taught two hours per week and mechanical drawing four hours.

The instructors in both school and shop have other duties about the shop, so no man gives his entire time to the instruction of the apprentice.

A $5 deposit is required of each boy at the beginning of his probation period, and an additional $20 when he is accepted as a regular apprentice.

Originally the company maintained a special training room where apprentices were required to spend the first two years of their apprenticeship. The idea now, however, is to get back to the old apprenticeship system as nearly as is compatible with modern shop methods; the boys work in the regular shops from the beginning.

FORE RIVER SHIPBUILDING CO., QUINCY, MASS.

Fore River Shipbuilding Co. indentures its apprentices for four years in each of the following trades: Blacksmithing, coppersmithing, plumbing and steam fitting, electricians, shipwrighting, pattern making, joinery, ship fitters, machinists, and sheet-metal workers, and for two years in the chipping and calking trade. The school for apprentices was established in 1906. There were 153 pupils enrolled during the year reported. Grammar school graduates or persons of higher

education, 16 to 18 years of age and physically sound, are accepted as apprentices The school is in session from October 1 to May 1. Instruction is given Monday to Saturday inclusive from 8 a. m. to 12 m. Apprentices are required to enter the school at the beginning of the school year next following their indenture and to remain in the school during their indenture, but they can not enter school during a school year. During the first year boys attend school four hours per week, and receive instruction in arithmetic, geometry, strength of materials, mechanics, freehand and mechanical drawing, and during the last three years lectures on difficult points arising in shopwork are given one hour per week. Pupils attend school during working hours and are paid at the regular rates for the time spent in school. During the apprenticeship the foreman regularly shifts each boy to different parts of the work to give him the necessary shop training and experience.

AMERICAN LOCOMOTIVE CO., DUNKIRK, N. Y.

The American Locomotive Co. requires a four years' apprenticeship in the following trades: Blacksmithing, boiler making, brass finishing, carpentry, core making, electrical workers, machinists, molding, pattern making, painting, pipe fitting, tank making, tin and copper smithing.

The system found in operation at this plant is in vogue in six other plants of the company. Boys at least 17 years of age, who have not less than an eighth-grade education, or who pass a satisfactory educational test, and are judged physically fit by the supervisor of apprentices are accepted as apprentices. The school for apprentices was established in 1909. One hundred and one pupils are attending school. School is in session from the first week in October to the first week in June. Instruction is given Monday to Wednesday from 7.30 to 9.30 p. m. Each pupil attends school one evening per week. During the one year the school has been in operation instruction was given in shop drawing and shop mathematics. The course of study for the last three years of apprenticeship has not yet been formulated. There are two shop supervisors in each shop, who give their entire time to instructing apprentices in the shops. They so direct the shop practice that apprentices get experience on the various machines, and they otherwise look after the welfare of apprentices. There is also a general supervisor of apprentices who makes his headquarters at the Dunkirk (N. Y.), plant, and from time to time visits other plants. Regular reports are transmitted to him from each plant regarding each apprentice.

Teaching is from text sheets, designated as "Trade problems," which are especially prepared by specialists in the employ of the company. Drawings are selected before class time and are placed,

together with sheet of problems, on a table for the use of apprentices. The apprentices then work the problems in order, studying the drawings in the problems that refer to the blue prints placed before them. They are taught to understand drawings so as to readily and rapidly interpret blue prints, and are allowed to do such rough sketching as may be necessary in connection with their work. They are taught at all times that they are being trained as mechanics capable of turning out the highest skilled work in the least possible time, with the interests of the company paramount to all others, and drawing, drafting, or any other cultural study that does not dovetail into this idea is eliminated.

These problems cover all phases of shop practice and shop economy of both time and material. Frequently apprentices sketch different parts of a locomotive referred to in the problems in order to explain their answers to the problems more clearly, and in this way they become familiar with drawings by actually handling them and working problems based upon them. The aim constantly held in all instructions is to have apprentices understand blue prints rather than to spend time on the mere mechanical work of making drawings.

BALDWIN LOCOMOTIVE CO., PHILADELPHIA, PA.

The Baldwin Locomotive Co. has no school. Since 1901 it has required its apprentices to attend a free school two evenings per week for 24 weeks per year. Boys 17 to 18 years of age who have a common-school education are indentured for four years, and required to attend school during the last three years' apprenticeship; those who have an advanced grammar school or high school education are indentured for three years, and are required to attend school during the last two years. During the past year 265 boys apprenticed to the following trades attended school: Blacksmithing, boiler making, brass finishing, machinists, molding, pattern making, and sheet-metal workers. During the first year in school two hours per week are devoted to elementary algebra, and two to elementary geometry; during the last two years four hours per week are devoted to mechanical drawing. There is no system of reports from teachers and no method of enforcing regular attendance, the boy's written statement, made weekly, that he has attended school for two evenings during the past week is accepted by the superintendent. The day upon which the boy attends evening school he is excused from the shop, with full pay, one to two hours early in order to enable him to go home for supper and to prepare for school.

There is no regular shop instructor, the boys are dependent upon the shop foremen and workmen for instruction in their trade.

CADILLAC MOTOR CAR CO., DETROIT, MICH.

The Cadillac Motor Car Co. has had an apprentice school since 1907. Boys 18 years of age and over who do not use cigarettes or intoxicating liquors are indentured for two years, and are required to attend the school in which the machinists' trade is taught. At present 75 apprentices are in school. School is in session throughout the year. Instruction is given every week day from 12.30 to 1.30 p. m. Each pupil attends one day per week, and is instructed in free-hand sketching, reading blue prints, micrometers, calculating speeds and feeds, lathe and milling machine gearing, and in handling automobile parts.

There are two instructors, one gives his entire time to instructing the boys in the factory, the other divides his time between shop and class-room instruction and in the indenturing of new boys.

Up to date 30 boys have graduated and about two-thirds of them are still in the employ of the company.

There is also an evening class in tool and jig designing for the benefit of graduated pupils and others who have had enough experience to understand the work.

LAKESIDE PRESS, CHICAGO, ILL.

The school for apprentices of the Lakeside Press, located at Chicago, Ill., was established in 1908, by the R. R. Donnelly & Sons' Co. (printers).

The school purports to have for its object a system of apprenticeship training, both theoretical and practical, in the printing trade, for the whole period of apprenticeship consisting of seven years; the first two years of which are given to preapprenticeship training, in which the instruction is confined to composing. During the subsequent five years, composing, press work, and engraving are taught. It is claimed for this system of instruction that it equips workmen with a thorough practical and theoretical knowledge of the trade.

Boys 14 and 15 years of age who are grammar-school graduates and who have been accepted as apprentices are required to attend the school. In order not to disturb class arrangement pupils must enter the school either in February or July.

During the preapprenticeship school is in session Monday to Saturday throughout the year, and pupils are divided into two groups, the hours of instruction being $8\frac{3}{4}$ and $10\frac{3}{4}$ per week, one group receiving $8\frac{3}{4}$ hours one week and $10\frac{3}{4}$ hours the next week, while the other receives $10\frac{3}{4}$ hours one week and $8\frac{3}{4}$ the next. The subjects taught during the first year are applied arithmetic, algebra, bookkeeping, English, and elementary sciences; during the second year English, applied arithmetic, bookkeeping, plane geometry, elementary elec-

tricity, physiography, and elementary mechanics are taught. After the preapprenticeship of two years in day school, pupils attend evening school Tuesday and Thursday from 6 to 7.15 p. m. and receive instruction in applied drawing one hour per week and in applied mathematics one and one-half hours per week. School is in session 30 weeks per year. A vacation of two weeks with pay is granted to each pupil whose average standing for the year is 95 per cent or over.

Two teachers are employed in the school work, one for theory and one for practice. The present teacher of theory is a graduate of the Milton College, Wisconsin, has had a special academic course at the University of Wisconsin and had 20 years' experience as a teacher before entering upon employment in this school. The teacher of practice was a master printer, conducting a business for himself before entering upon his present employment. In addition to these two teachers pupils have the benefit of teaching by skilled workmen of the shop beside whom they work during a portion of each day.

The schoolroom is located on the sixth floor of the Lakeside Press Building and is equipped with type, cases, stands, and school desks. There is no fee for admission to the school nor is there any expense to the apprentice for instruction therein, the books used being furnished free of cost.

Apprentices are paid from the beginning. In addition to the wages the pupils of the school are paid a bonus of $25 a year, payable semiannually, provided their monthly standing in the school is 95 per cent or over for six consecutive months.

NORTH END UNION SCHOOL OF PRINTING, BOSTON, MASS.

The North End Union School of Printing was established in 1900 as an evening school by the master printers of Boston. After four years it was changed to a day school. Persons 16 years of age and over are accepted as apprentices by master printers of Boston, and are required to attend school the first year of the five-year apprenticeship. The school aims to give the pupil an intelligent start in his trade and to give instruction in the elements of printing, so that with subsequent practice the pupil may become a skillful workman. Fifteen apprentices were enrolled in school January 1, 1910. School is in session from September 1 to August 15, and instruction is given Monday to Friday from 7.20 a. m. to 12 m. and from 1 to 5 p. m.; Saturday, from 7.20 a. m. to 12 m. Practically the entire time (48 hours per week) is given to shop-practice work, theory of the trade being given only in connection with practical work and by fortnightly lectures.

The course of instruction embraces job and advertising composition and platen press work. The school is run entirely in the interest

of apprentices. It accepts printing from the Printers' Board of Trade and the Boston Typothetæ. Its expenses are paid partly by the contributions of employing printers and partly by the tuition fees. Tuition is $100 per year.

The board of supervisors, consisting of six employing printers, one philanthropist, and the conductor of the school, look after the school's interests, pass upon all applicants, see that they are indentured, etc.

Only a limited number of apprentices can be accommodated, and vacancies occur only as pupils graduate or drop out.

The North End Union also maintains a class in plumbing with 35 pupils enrolled. The advisory board for this class is composed of five master plumbers. The tuition is $10 per term of 50 evenings. The school is in session from 7 to 9.30 p. m. two evenings per week. Only the elementary principles of the trade are taught.

SOLVAY PROCESS CO., SOLVAY, N. Y.

The Solvay Process Co., manufacturers of soda ash, caustic soda, crystals, crown fillers, calcium chloride, aqua ammonia, coke, and tar, established an apprentice school in 1908. Apprentices are given two years' instruction in general mechanics, including elements of the following trades: Machinists, plumbing, steam fitting, blacksmithing, carpentry, and sheet-metal workers. No boy serves an apprenticeship in any one of these trades, but receives instruction and some training in all, the object being to produce, not machinists, plumbers, etc., but all-round mechanics. In June, 1910, 30 pupils were attending school. Boys 16 to 18 years of age, who are able to read and understand the terms of employment printed on the back of the application, and who are personally known to the committee in charge of the school or who are recommended to the committee by departmental foremen, are accepted as apprentices. All apprentices are required to attend school.

The educational work here is on the half-time plan, there being two groups of apprentices. The school is maintained in a building adjoining the plant. One week one group of boys work in the factory six days; the next week they attend school from 8 a. m. to 3 p. m., with one hour intermission, five days. Saturday all boys are in the shop—the boy who has been in school during the week works with the boy whose place he will take in order to become familiar with the work he is to do the following week. School is in session 52 weeks per year.

Instruction is given in mathematics, free-hand drawing, strength of materials, preparation of reports, mechanics, and equipment. Shop work is made preeminent and the school supplemental. While

working in the shop the boy is under the supervision of shop foremen, and is on regular work at all times. The schoolroom instruction is made to correlate strictly with shop work.

The school instructor is expressly forbidden to demonstrate any work of the shop or interfere with shop methods; he must confine himself to reporting his criticisms to the company committee in charge.

MANUFACTURERS' ASSOCIATION, BRIDGEPORT, CONN.

The Manufacturers' Association of Bridgeport, Conn., has a school for machinists' and tool-making apprentices, which was established in 1908. The school is operated for the association by the Young Men's Christian Association. Persons 14 years of age and over are accepted as apprentices by members of the Manufacturers' Association and are required to attend school two years. Twenty-five machinists' apprentices and 21 tool-making apprentices were in school June 1, 1910.

The school year consists of 210 hours. Instruction is given Monday to Saturday from 10 a. m. to 12 m. and from 4 to 6 p. m. Each pupil attends school six hours per week. Three hours per week are devoted to mechanical drawing and free-hand sketching during the first year and one and one-half hours during the second year; three hours are given to shop mathematics during the first year and four and one-half hours during the second year.

CHAPTER V.

COOPERATIVE INDUSTRIAL SCHOOLS.

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INTRODUCTION.

While evening continuation classes have been regarded as distinctly beneficial to adult pupils, their advantages for young boys have been questioned. It has been generally conceded that for boys between the ages of 14 and 18 years study for two or three hours at night is too great a strain after a long working-day. Moreover, the fact that evening-school attendance by young boys requires their being on the street late at night has raised the question as to whether their efforts to secure an education were not attended by too great a risk.

The manufacturers took the first step in the movement to provide day instruction for young employees and established apprenticeship schools, or courses of instruction in their own shops, where their own apprentices were required to attend and receive instruction in subjects closely correlated with their work. The apprentices were paid for the time so spent. These schools are treated fully under the heading of Apprenticeship Schools, Chapter IV.

These apprenticeship schools serve their purpose very well, so far as the manufacturer is concerned, but unless there is a large number of apprentices employed the manufacturer usually does not feel justified in conducting such a school. Moreover, in any case, the school is expensive, and from the boy's point of view the instruction is limited; there is no instruction for general culture, the school giving only such studies as pertain directly to the work in the shop, usually mathematics and mechanical drawing. The next step was the cooperation with educational institutions to give the theoretical and cultural education, while the shop training is given in the establishment. This puts the training within reach of a much larger number. Cooperation is effected in a variety of ways; almost every locality having a scheme of cooperative education has planned it to meet the needs of that particular locality.

While cooperative schools differ materially in their operations, one group is quite distinct—the cooperative half-time schools, in which the pupil is in the school half the time and in the employer's shop half the time.

The other cooperative schools, for convenience termed part-time schools, provide only short periods of instruction each day or week, or provide instruction for only a few weeks in the year; all, however, under a cooperative arrangement.

COOPERATIVE HALF-TIME SCHOOLS.

The most common arrangement for a cooperative half-time school is one in which the pupils, usually apprentices, spend alternate weeks in school and in shop, one boy being in the school while the other is in the shop. This plan requires two boys to each job. In this week-about system the school work is closely correlated with that of the shop and comprehends more or less cultural work, such as industrial geography, industrial history, chemistry of materials, shop physics, as well as civics, English, and spelling.

In some of the schools the shopwork does not begin until the second year, all of the first year being devoted to schoolroom work. In the cooperative system there may be shop coordinators whose functions are to coordinate the practice in the shop with the instruction in the school by teaching the pupils one week in school and the next week in the shop.

The school at Fitchburg, Mass., was the first of this type to be established and is the furthest advanced in its development. The "Fitchburg plan" is generally spoken of as an adaptation of the plan as worked out at Cincinnati University. However, there is little resemblance beyond the fact that under both systems the boy alternates weekly between shop and school. In the Fitchburg plan there is no coordination in teaching.

The school at Beverly, Mass., is a half-time school, differing in detail from the Fitchburg school, one difference being in the plan of coordinating the instruction in school and shop.

The Technical High School of Providence, R. I., the high schools of Cincinnati, Ohio, and of Freeport, Ill., have cooperative courses which are similar to the Fitchburg school in all important details. In Providence and Cincinnati the course was established in response to a request from manufacturers. In Freeport the Commercial Club of the city took the initiative. In Providence, at present, the work is confined to training for boys apprenticed to the machinist trade. In Cincinnati and Freeport the schools are open to pupils from any trade.

Lewis Institute at Chicago, Ill., maintains a cooperative course on a slightly different basis, but on the whole the course is sufficiently similar to warrant including it in this classification. It is the only philanthropic school in this group.

The following table shows schools which have adopted a cooperative half-time plan, and gives certain data concerning them:

COOPERATIVE HALF-TIME SCHOOLS.

Name of school and location.	Year of establishment.	Years in course.	Weeks of school in year.	Hours of school attendance per week.	Pupils entering must have passed—	Minimum age for entrance.
Fitchburg High School, Fitchburg, Mass....	1908	4	[1] 40 [2] 20	[3] 23⅓	Grammar school..	15
Beverly Independent Industrial School, Beverly, Mass.	1909	2	25	[3] 38¾	Sixth grade.....	14
Technical High School, Providence, R. I....	1910	4	[1] 40 [2] 20	[3] 23⅓	Grammar school graduates who may, after 3 months' trial, be accepted as apprentices.	14
Freeport High School, Freeport, Ill.....	1909	4	[1] 40 [2] 20	[3] 26½	Entrance examination to high school.	[4] 14
Lewis Institute, Chicago, Ill.....	1909	2	24	[3] 40	Grammar school..	16
Cincinnati High School, Cincinnati, Ohio[5]..	1910	4	([6])	([6])	Eighth grade.....	([6])

[1] First year spent entirely in school.
[2] Second, third, and fourth years.
[3] Pupils work regular shop hours during the alternate "shop week."
[4] Seldom enter before 15 as law prohibits employment of children under 16.
[5] This school does not appear in general tables.
[6] Not reported.

A description is given in the following pages of the above-named schools except the Freeport (Ill.) High School.

FITCHBURG HIGH SCHOOL, FITCHBURG, MASS.

The Fitchburg (Mass.) High School's cooperative industrial course, which aims to give boys of high-school age an opportunity to learn a trade and at the same time continue their school training, was inaugurated in September, 1908. Owing to the fact that machine and machine-tool manufacturing is one of the leading industries of Fitchburg, the machinist's, pattern-making, and saw-making trades are taught. However, the school announces its intention of providing training in any other trade which the industrial interests of the community make feasible.

The movement was urged by several prominent manufacturers of Fitchburg who had made somewhat of a study of several plans. The seven manufacturers cooperating have agreed to give employment to a specified number of boys. The plan adopted is as follows: The first year must be spent entirely in school. The cooperative course is planned especially for pupils who are preparing to enter industrial pursuits, and omits much of the purely cultural work of the regular academic course. The boy may enter the cooperative course on entering the high school, or, having entered some other course, he may change to the industrial course any time during the early part of the

first year. Many boys after beginning some regular course are attracted to the industrial and change to it. The subjects covered in the first year and the number of 40-minute periods given to each per week are as follows: English and current events, 5 periods; arithmetic (tables and simple shop problems), 5 periods; algebra, 5 periods; free-hand and mechanical drawing and bench work, 8 periods. These studies are made to correlate closely with shopwork.

The "bench work" which the pupils receive in the manual-training shop of the school during the first year consists of instruction in the operation of lathes, planer, drilling machines, bench and floor work, and such other machine work as pertains to the particular branch of manufactures of the shop where he expects to be employed.

At the end of the first school year the pupil, with the assistance of his teachers, decides upon a trade and enters a shop (July 1) to serve his two months' trial period during the school vacation. During these two months he is thoroughly tried out for his fitness and ability for the trade, and his adaptability to it. If at the end of the two months he has given satisfaction to the employer and desires to continue in the trade he is regularly indentured for three years. A boy must be 16 years of age before he can enter the shop. By the terms of the indenture the employer reserves the right to terminate the agreement when he sees fit, but if the boy quit he forfeits a bond of $100. The employer also reserves the right to discontinue the regular work at the trade when conditions warrant it, but he agrees to keep the boy employed at some other work at the regular wage. At the beginning of the following school year, i. e., in September, the boys are divided in pairs. It is at this point that the actual cooperation begins, each boy spending a week in the shop and a week in school. From Monday to Friday one boy spends the entire day in the factory, and the other attends school, from 8 to 1. In addition to the schoolroom work three hours per week of home study are required of each boy during his school week. On Saturday both boys work in the factory in order that the boy who has been in school may sufficiently acquaint himself with the work his alternate has been doing to take it up and carry it on the following week, while his alternate is in school.

The boys work in the shop during all school vacations, with the exception of two weeks' vacation in the summer.

The studies in the second, third, and fourth years and the number of 40-minute periods devoted to each per week are as follows:

Second year.—English, 5 periods; shop mathematics, 5 periods; physics, 4 periods; civics, 2 periods; mechanism of machines, 5 periods; free-hand and mechanical drawing, 6 periods.

Third year.—English, 5 periods; shop mathematics, 5 periods; chemistry, 4 periods; physics, 4 periods; mechanism of machines, 5 periods; first aid to the injured, 1 period; free-hand and mechanical drawing, 6 periods.

Fourth year.—English, 5 periods; commercial geography and business methods, 2 periods; shop mathematics, 4 periods; mechanism of machines, 4 periods; physics, electricity, and heat, 4 periods; chemistry, 6 periods; free-hand and mechanical drawing, 5 periods.

These studies are closely correlated with the shopwork. English includes forms of business papers and spelling. Familiarity with shop terms and their significance is an important feature of this work. Current events and industrial history includes a study of daily happenings in the industrial world, the history of iron industry, the factory system, and new inventions, and the reading of mechanical journals. The shop mathematics deal with problems on cutting speeds and feeds, gearing, strength of materials, and general cost figuring. Mechanism includes a study of the construction and use of the various machine tool parts. Physics becomes the study of the laws underlying mechanics, the study of working examples is emphasized. Chemistry takes up the nature and qualities of metals and salts, and tests that can be ordinarily applied to fractured metals, hardening and improving processes. Commercial geography comprehends the study and source of supplies of the various industries, methods of transportation, cost of materials, railway systems, waterways, etc.

Unlike the plant at Beverly there is no regular shop instructor, or coordinator, but the school instructors of shop practice spend as much time as is possible in the shop, observing the work of the pupils. The shop foremen give such shop instruction as is necessary. If a pupil feels that he is kept too long on one job, or for any reason is dissatisfied with his shop assignment, he may appeal to the director for an adjustment of his case.

There are three teachers in the school—the English teacher is the regular high school English teacher; the science teacher is a Harvard graduate and has had four years' experience as a chemist; and the teacher of shop methods and operations spent two years at the Massachusetts Institute of Technology, and has had several years' experience as a carpenter, machinist, and draftsman.

The school board, composed of 18 members, elected by the voters, has the trade interests represented. An iron molder, a superintendent of a paper mill, a foreman in a cotton mill, a celluloid manufacturer, a contractor, a printer, a plumber who is also a representative of the Central Labor Union, are among the number. The remaining members are business or professional men. There is a subcommittee of six members on high schools who take great interest in the cooperative course. None of the cooperating concerns are represented on this board, neither do they contribute any money to the support of the school. Instructors are paid entirely by the school, and the director is responsible to the school committee.

The boys' wages begin when they enter upon the trial months. The rates are higher than the apprentices received prior to the inauguration of the school feature. The fact that the part-time apprentice can earn as much, or more, than the boy who takes an ordinary unskilled job in a store or office forms a strong incentive for the boy to continue in school, and it makes it possible for some boys to remain in school longer than they otherwise could.

The question has been raised as to the physical strain of working the regular shop hours, but the director regards the fact that no complaints have been made as sufficient evidence that the work is not too hard, and the fact that the industrial course has its quota of boys entered for the various athletic contests bears out the assumption.

The cooperating manufacturers believe that the required indenture is one of the strong features of the Fitchburg plan. It is a business contract, it means something, and serves to hold at his job the boy who would otherwise drift after the novelty had worn off.

The criticism has been made that the school is too dependent upon the manufacturers, and that should they withdraw their cooperation the school would cease to exist.

The manufacturers (The Fitchburg Iron Workers' Association) who have entered into the plan pronounce it "an unqualified success." The Central Labor Union has not officially indorsed the school though it has offered no opposition. The members feel, according to the statement of an officer of the union, that the school is too much in the hands of the manufacturers to warrant their indorsing it until it has been in operation long enough to prove its worth. Some express the fear that the boys will be exploited by individual employers. However, it is a part of the school committee's duty to see that no exploitation is possible, and this has been done, in one or two cases, to the satisfaction of all concerned.

BEVERLY INDEPENDENT INDUSTRIAL SCHOOL, BEVERLY, MASS.

The Beverly cooperative industrial school plan instituted in 1909 is another half-time scheme of cooperation between the public school and the manufacturer. The boys alternate one week in the school and one week in the shop, but beyond that point of resemblance the Beverly plan is quite different from the Fitchburg plan. It aims to give elementary instruction in the machinists' trade to any boy who can qualify for entrance.

For some time prior to 1907 an evening trade school had been conducted in Beverly, but the superintendent of schools and others interested felt that it was inadequate, and they were instrumental in having a local committee on industrial education appointed to study the needs of Beverly for a day school. This committee was made up of a representative of each of the following interests: The

manufacturing interests, organized labor, agricultural interests, industries for women, and the commercial interests of Beverly, the school board, and the superintendent of schools. After careful study the committee reported in May, 1909, upon the plan which was put into operation in September of the same year.

At present the work of the school is confined to the training of machinists. The United Shoe Machinery Co., the largest manufacturing interest in Beverly, furnishes a practice shop equipped with the necessary tools and machines to accommodate 25 boys, making the possible capacity of the school 50. The public school furnishes the schoolroom and laboratories for the theoretical work. Any boy of 14 who has completed the sixth grade is admitted to the school. The length of the course has not as yet been determined, but will be planned so that when the boys have completed it they will be ready to enter into a regular apprenticeship. There is at present, however, no apprenticeship indenture at the United Shoe Machinery Co. shops, but it is planned to introduce in the near future some scheme of apprenticeship regulation.

As the capacity of the school is limited to 50 boys, a waiting list is kept, and boys are admitted as vacancies occur.

During the two years of the school course school is in session 50 weeks, August 1 to July 16. One week half of the boys are in the factory; the next week, accompanied by the shop instructor, the same boys spend 38¾ hours in school (Monday to Friday), while the boys who have been in school the preceding week work in the shop under the instruction of their teacher. The theoretical work, done at the high-school building, comprehends instruction in shop mathematics (including the use of micrometers), science (mechanics and industrial chemistry), mechanical drawing (including blue-print reading), civics and industrial economics, arithmetic, and business forms and practice.

The practice shop uses no so-called raw materials. Pupils work upon machine parts (castings) brought directly from the foundry of the United Shoe Machinery Co. for certain operations to be performed upon them according to blue prints and drawings furnished by the company. Under the direction of the instructor each boy performs several different operations upon a casting. The company inspector tests the work, and if it is accepted it passes into the general stock of the company.

The boys are given individual instruction in setting up work on the various machine tools used in the United Shoe Machinery shops and in running the machines to the best advantage. The instructor keeps a record of each machine tool upon which the boy has worked so that he will not be kept too long on any one machine. One week

is usually considered sufficient to master an operation. Besides the instruction on machine tools the boy is instructed and given practice in bench work.

Between August 1, 1909, and January 1, 1910, about 25 boys left school for various reasons. Since that time the process of selection has been more rigid and fewer boys have dropped out.

Two thoroughly trained and experienced instructors or coordinators are employed to teach shop theory in the school and practice in the shop. An assistant shop instructor gives all of his time to instructing in the shop. The boys are in two sections—A and B. Section A, under one instructor, is in school one week. Section B, under the other instructor, is in the practice shop. The next week the sections change, but they are still under the same instructor. The three instructors give all of the purely trade instruction, and three regular high-school teachers teach arithmetic and business practice, science, and civics.

The expenses of the industrial school are borne jointly by the public school authorities and the United Shoe Machinery Co. The school is so organized as to be eligible for State aid through the provisions of chapter 540, Acts of 1909, providing that the Commonwealth shall refund to the city one-half of the cost of maintenance incurred by the city. The high-school building is used for school work. The salaries of the three high-school teachers and one-half the salaries of the two shop instructors are paid from the school funds, the other half being paid by the United Shoe Machinery Co. The United Shoe Machinery Co. has provided a room for the practice shop and furnished shop equipment valued at $25,000. The company keeps a separate account for the practice shop, debits it with all cost of maintenance, and credits it with the full value of all the product accepted. One-half the piece price is paid to the boy; the other half goes to maintain the practice shop. The company makes good any deficit between this latter one-half and the cost of maintenance of the practice shop. During the first five months of school the deficit made up by the company was $1,800. It is hoped that as the system is perfected the deficit will become less. The United Shoe Machinery Co. in its contract reserves the right to withdraw its cooperation at any time it wishes to do so.

It would appear that one of the greatest handicaps of the Beverly school is its complete dependence upon one manufacturing concern. The United Shoe Machinery Co. furnishes such material financial aid that should the company choose to withdraw its cooperation the school might be compelled to discontinue its work.

TECHNICAL HIGH SCHOOL, PROVIDENCE, R. I.

The cooperative industrial course of the Providence Technical High School is based on the half-time plan of cooperation. The school was established in June, 1910, the shopwork beginning in July and the school work in September of the same year. A total of 32 pupils, apprentices in the machinist trade, were enrolled.

The plan includes one year of academic work with shop practice in carpentry and forging, all taken in the school, and three subsequent years during which the pupils alternate between the school and the cooperating shop.

To be eligible for admission to the cooperative classes a boy must be at least 14 years of age and must have completed the grammar school. At the close of the first year he must enter a shop for a trial of three months, during which are tested his ability and his purpose to take up the trade. If his work is satisfactory, he begins the actual cooperative work of the course in September.

The first year $16\frac{2}{3}$ hours per week are given to theoretical work and $6\frac{2}{3}$ hours per week to shop exercises. In the second, third, and fourth year $23\frac{1}{3}$ hours are given to schoolroom work one week, with an alternate week of regular shop hours in the place of employment. In the school course the subjects for the four years are as follows:

First year.—English, mathematics, drawing, physics, current events.

Second year.—English, mathematics, drawing, physics, chemistry, American history, mechanism.

Third year.—English, mathematics, drawing, physics, industrial history, current events, mechanism.

Fourth year.—English, mathematics, drawing, chemistry, commercial business, mechanism, and electricity.

Bookkeeping and commercial geography are given incidentally.

The cooperative classes use the building and equipment of the Technical High School. The equipment is valued at $6,500. Textbooks are furnished free of charge, and a reference library is at the disposal of the pupils.

School sessions are held Mondays to Fridays, inclusive, from 9 a. m. to 3 p. m., with 20 minutes' recess for lunch.

After the first year all pupils spend Saturday in the shop. During the first year 40 weeks are spent in school; during the second, third, and fourth years 20 weeks are spent in the school, and the alternate weeks are spent in the shop. Legal holidays and a two weeks' shop vacation in summer are given. When the school is closed on days other than legal holidays the boys work in the shop.

This cooperative plan has met with general approval. Associations of employers and of employees indorse it, and the school authorities

approve it. It is still too early to predict the results or to forecast what other trades may be represented by the attendance of apprentices in the future.

LEWIS INSTITUTE, CHICAGO, ILL.

The cooperative course for apprentices was established at Lewis Institute in 1909 through the efforts of the Chicago branch of the National Metal Trades Association. The secretary took an active interest in securing the cooperation of the metal manufacturers of the city. This cooperative arrangement was somewhat difficult to establish, since the gain to the employer was doubtful, the financial sacrifice required of the apprentice a serious obstacle, and the securing of boys of ability and perseverance in both shop and school a difficult matter.

The purpose of the cooperative classes is to increase the general industrial efficiency of apprentices in the metal trades. The director of the institute determines what work shall be taken by the pupils, whose individual needs and capabilities are carefully considered.

Lewis Institute has a self-perpetuating board of managers composed of 11 members who are men prominent in industrial, political, educational, and professional lines. Five members of the board constitute a board of trustees, who are charged with the control of the finances of the institution. The director of the institute, while responsible to the board of managers, is practically independent in his administration of the affairs of the school. The employers who participate in the cooperative arrangement have no control whatever over the school, but they or their managers or superintendents keep in close touch with the head instructor in the cooperative course.

Since all the apprentices in the course are metal-trades workers, the shop practice is arranged to cover problems of the various occupations in these trades. The first-year boys have foundry practice during 12 school weeks of the combined winter and spring terms and 6 school weeks of pattern making during the autumn term. The second-year boys have machine-shop practice for 12 school weeks of the combined winter and spring terms and 6 weeks of forge practice during the autumn term.

The conditions of admission to the cooperative classes are as follows: Applicants must be apprentices between 16 and 21 years of age and be recommended to the school by an employer or to an employer by the school. No entrance examination is required, but the candidate must have had a grammar-school education. All applicants must be willing to make the necessary sacrifice of wages the attendance at school entails, as the apprentices are paid only for the time spent in the shop. No employer compels his apprentices to take the course, but if an apprentice enters he can not voluntarily

drop out without jeopardizing his employment. Enrollment may be made at any time during the year.

It had been originally intended to accept only such shop apprentices as had already been tried out for at least three months in the establishments participating in the cooperative classes, but, in order to secure a working quota of pupils and to supply the places of those who had dropped out, this rule had to be modified so that at present applicants are accepted without a three months' trial if they can satisfy both the institute and the employers as to their intention and ability to do the work outlined both in school and shop.

The cooperative course covers a period of two years—each year divided into four terms. The school work covers 24 weeks, the shop 24, making a total of 48 weeks in school and shop during the school year; 2 weeks additional shopwork is required. A 2 weeks' vacation from the shop is allowed all pupils during one of the school vacations. All Saturdays, except those occurring during the vacation, are spent in the shop. Each employer who participates in the arrangement has at least two boys, or one unit, in the course, by the alternation of whom in school and shop the equivalent of the continuous work of one boy for 48 weeks is secured.

In the following table the course of academic study and practice in the school shop is shown by subjects and number of weeks and hours devoted to each:

NUMBER OF HOURS PER WEEK AND NUMBER OF WEEKS GIVEN TO EACH SUBJECT TAUGHT.

Subject.	Weeks per subject.	Hours per week.	
		First year.	Second year.
Chemistry	6	35	.....
English composition, literature, public speaking	18	5	.....
Machine sketching	12	10	.....
Mechanical drawing	6	10	.....
Physics	18	5	.....
Principles of mechanics	18	5	.....
Shop mathematics	18	5	.....
Applied mathematics	18	.....	5
Engineering principles	18	.....	10
English composition and industrial history	18	.....	5
Machine drawing	18	.....	10
Mechanical drawing and machine design, strength of materials, demonstration of electrical and engineering principles	6	.....	35
Practice work in school shop	18	10	10

During three terms, a total of 18 weeks, there are each week 5 hours of academic studies, 25 hours of trade cultural studies, and 10 hours of practice in the school shop.

In the summer term of 6 weeks no practice work is done in the school shop. In the first year summer term 35 hours per week are given to chemistry, which is presented by lectures, laboratory experiments, and textbook work.

In the summer term of the second year 35 hours per week are devoted to mechanical drawing and other trade cultural subjects.

Apprentices attend school from Monday to Friday, 8.30 a. m. to 12.30 p. m. and 1 to 5 p. m. except for 6 weeks in summer when the hours are 8 a. m. to 12 m. and 1 to 4 p. m.

The school terms in 1909–10 were January 3 to March 25, March 28 to June 17, June 20 to September 9, and September 26 to December 16.

The school is closed from September 12 to September 24 and from December 19 to January 2.

The institute is equipped for shop practice and for laboratory work in chemistry, physics, etc.

No certificate or diploma is given. A letter stating attendance and character of the school work accomplished will be given pupils who desire to secure apprenticeship credit with a new employer.

Since the course is still in its early stages there is no way to determine the percentage of pupils who will finish the course. A considerable number who entered have dropped out either because of failure to satisfy the school authorities or the employers, or because of financial inability to continue, or of removal to other localities.

The instructors of the trade cultural studies have had special preparation for their work in universities or other institutions of higher education. All had had teaching experience before coming to Lewis Institute. The three trade practice teachers had attended high schools, technical schools, or evening schools, all three having had actual shop experience, and from 1 to 19 years' teaching experience, respectively. Some difficulty has been experienced in retaining teachers qualified for teaching shop practice because of the policy of the director to urge them to secure actual shopwork during the summer, which results in offers of employment financially better than those of the institution.

The cost of materials for the cooperative classes for 1909–10 was $250.

The pupils make a marketable product, which becomes their own property if they pay the cost of the raw materials. Otherwise these articles are "scrapped" or worked over. No work is sold except on rare occasions, when a rummage sale of models, patterns, or other products which have accumulated is held.

The tuition of each pupil in the cooperative course is $50 per year, that is, for four terms of six weeks each. This amount is estimated by the institute as about one-half the cost of the instruction given. A registration fee of $5 as well as a deposit fund of $2.75 are also required on entrance. Any balance of the latter sum, which is intended to cover any expense of breakage in the chemistry laboratory and the charge for locker keys, is refunded.

When the course was first arranged the employer paid the apprentice for his time in the shop and also paid the $50 tuition to the school.

After a time it was thought advisable by employers to require the apprentices to pay their own tuition. This, however, was so prohibitive that a number of boys would have been forced to drop out of the class. At this point a philanthropist offered to pay the tuition of all boys in the cooperative course whose work proved satisfactory both to school and to employer on condition that the employers pay their boys a wage increase of 2 cents per hour, which in a year's time would amount to the $50 formerly paid for tuition. This offer included not alone the boys then registered in the school, but also any who might apply in the future, provided the number in any one year did not exceed 200, as the offer of financial assistance was limited to $10,000 per year. The plan of paying the apprentices one-half their wages each week has been adopted as likely to insure better attendance at school instead of the plan of paying full wages for the actual working week. It was further arranged that if apprentices who had passed the scale of wages of those boys already in the school determined to take the course they were to be paid at a rate equivalent to one-half the hourly rate they are earning at the time of entering the course plus 2 cents per hour the employer must pay extra to meet the conditions proposed by the gift.

The cooperative course is regarded by both school authorities and employers as merely supplementary to the shopwork of the apprentice. The school believes that the teaching of the trade belongs primarily to the shop, while the function of the school is to teach the fundamental principles of the trade and awaken an intelligent interest in the work at hand. There is no definite agreement as to the acceptance of the completed course as an equivalent of any part of the term of apprenticeship. In some shops the completion of the course is expected to cancel about one year of the four required in a stated term of apprenticeship. In the majority, however, the employers consider that any benefit desired from the school will not appear until the apprentice has thoroughly mastered his trade in the shop. They claim that the actual work is planned to develop an intelligent and comprehensive idea of the principles of the trade and to prepare the apprentice to assume later such executive positions as foreman or manager. It was generally felt that the school work did not directly benefit the boy in his actual shop practice, nor the industry through any immediate specific result, but that in general the work counted for more intelligent apprentices, for attention to work, and steady progress, and for a prospect of better qualified workmen on which the industry could depend in the future. None of the employers interviewed felt that their own particular kind of work was suited to the plan of alternate weeks of shop and school. Some stated that their continued participation in the cooperative plan was due both to their personal interest in promising boys in their industry, and to the fact that as members of the National Metal Trades Association they hoped that some of these boys would later be of benefit

to the industry when they had developed into competent overseers and superintendents.

The various employees' organizations reported their attitude toward the school as favorable, since the employers could not dictate the policy of the course, but were required to accept the curriculum and decisions of the school authorities.

CINCINNATI HIGH SCHOOL, CINCINNATI, OHIO.

The High School of Cincinnati instituted four-year industrial courses for boys and girls in 1910, which for the boys, and possibly to some extent for the girls, is to be cooperative in the third and fourth years. The cooperative feature is to be on the half-time plan. In the first two years the boys take all of the shopwork and drawing that are given in the four-year manual-training course. They will have double time for manual training, taking wood turning, pattern making, and cabinetmaking the first year, and forge, foundry, and machine-shop work the second year. Mathematics and science will be applied to their shopwork as specifically as possible.

In June of the second year the boys decide what shops or trades they desire to enter, and the head teacher of the department assists them to locate in shops as apprentices. If in the following September they prove worthy, an arrangement will be made for them to take week about in shop and school for the last two years of their course. This is designed to give the boys in the first two years an opportunity to select a trade intelligently, and to begin it at 16 under the conditions most favorable for becoming intelligent and expert workmen.

The plan for the girls is similar, the purpose being to give vocational training for self-support or for the intelligent direction of a home.

In the first two years all of the industrial work offered in a four-year domestic-science course will be taken. Sewing and dressmaking by hand and with machine, applied art, and cooking will be given the first year; millinery, dressmaking, dietetics, household arts, applied art, and chemistry the second year.

At the end of the second year the head teacher of the department will advise with the students as to the vocation they desire to follow. If millinery, dressmaking, salesmanship, or trade work is selected, students will be placed in commercial shops for the summer, and continue their school work on the alternate week plan, or at night school, making their school work closely fit their needs.

The new Ohio compulsory-education plan, which went into effect in May, 1910, requires that all children not otherwise employed shall remain in school until they have reached the age of 16 years. It also requires that all who have not reached the eighth grade shall continue their schooling until they are 16 years of age. Accord-

ingly the board of education is authorized to establish part-time day schools for those who are at work, and then may require all who have not completed the eighth grade to continue their schooling until they are 16 years of age. Those who are at work may be required to attend school eight hours per week between the hours of 8 a. m. and 5 p. m. Those not at work may be required to attend until they are 16 regardless of the grade reached.

COOPERATIVE PART-TIME SCHOOLS.

Another form of cooperation than that already described is the "part-time" school, in which pupils attend a school much less than half of the time, where they receive instruction in subjects closely correlated with their shopwork.

There are two types of part-time cooperative schools. In one type the pupils work regular hours in the establishment where employed, except a few hours a week when they are excused from shopwork to attend school. Another type, quite different, is one in which the part-time is not a part of a day or week, but a part of the year during the slack season.

The part-time plan, like the half-time plan, was started in Cincinnati. While its aim is very much the same, the school is fundamentally different from the cooperative half-time school. Usually it is more nearly an adaptation of the apprenticeship school to a cooperative scheme, with instruction and methods very similar to those of the apprenticeship school.

The instruction in the part-time school is provided by some educational institution which teaches shop arithmetic and mechanical drawing, and, usually, some English, spelling, and elementary industrial science. In some cases the school instructor is also a shop coordinator, in which case he spends a part of each week in the various shops. The schools here included differ in many details.

The following table shows the philanthropic and the public schools investigated offering part-time instruction and certain data concerning them:

COOPERATIVE PART-TIME SCHOOLS.

Name of school and location.	Year of establishment.	Years in course.	Weeks of school in year.	Hours of school attendance per week.	Minimum age for entrance.
Cincinnati Continuation School, Cincinnati, Ohio	1909	4	48	4	16
Franklin Union, Boston, Mass.[1]	1909	2	24	4	16
David Ranken, Jr., School of Mechanical Trades, St. Louis, Mo.	1910	2	46	7	16
Mechanics' Institute of Rochester, Rochester, N. Y.	(2)	3	26	4½	16
State Trade School, Bridgeport, Conn.	1910	2	35	4	16
Horace Mann School, Chicago, Ill.	1907	4	12	27½	16
James Otis School, Chicago, Ill.	1907	4	12	25	16

[1] Day classes on Saturday afternoon.

[2] Not reported.

A description is here given of the following part-time schools: Cincinnati Continuation School, Cincinnati, Ohio; David Ranken, Jr., School of Mechanical Trades, St. Louis, Mo.; Mechanics' Institute of Rochester, Rochester, N. Y.; schools for carpenters' apprentices, Chicago, Ill., including Young Men's Christian Association School and three public schools, namely, Horace Mann School, James Otis School, and Pullman School; State Trade School, Bridgeport, Conn.

CINCINNATI CONTINUATION SCHOOL, CINCINNATI, OHIO.

The Cincinnati Continuation School opened in September, 1909, for the purpose of permitting boys at work in machine shops operated by members of the Cincinnati Metal Trades Association to continue their studies, especially such studies as are closely connected with their work in the shops, the aim being always to coordinate with the training received in the shop, and to increase the intellectual efficiency of the boys.

The decreasing efficiency of apprentices in the metal trades had for some time been a matter of discussion and regret among members of the Metal Trades Association. Prominent manufacturers determined to take the initiative in the matter, and the following letter was sent to the superintendent of schools:

CINCINNATI, OHIO, *May 21, 1909.*

SIR: The manufacturers in the metal working industries of Cincinnati have realized for a long time that the boys coming to them for employment are very deficient in their education.

Statistics carefully gathered indicate that the average attendance of these boys in our public schools does not exceed five to six years. The lack of fundamental training greatly decreases their efficiency and consequently their earning capacity; it also retards the development of our manufacturing industries.

We have given much thought to a remedy for these conditions. To this end, some of the factories have established schools within their plants. This plan, however, is not feasible for the majority of factories. A committee appointed to consider ways and means has decided to establish classes in charge of instructors who are capable of teaching subjects especially adapted to apprentices, such as shop mathematics, mechanical drawing, etc., in which classes boys now employed shall receive some instruction every week.

The manufacturers consider this training of such importance that they have agreed on their part, that if you will establish these classes, they guarantee to furnish enough boys for at least one teacher, and to send their boys to school one-half day each week, and as an inducement to attend the school, they will agree to pay the apprentices regular wages during the periods of instruction.

The future development of our industrial interests upon which the growth of our city is so largely dependent will be materially advanced, we believe, by establishing such a plan of cooperation. The slight cost of operating these classes will be more than compensated by the resulting growth of our manufacturing interests which will inevitably follow efficient industrial education.

This letter was followed by a conference between the city superintendent of schools, the board of school directors, and a committee of metal-working manufacturers. At the conference a tentative plan was agreed upon whereby the school directors should furnish building, teacher, and equipment and the manufacturers should furnish 150 boys for a school which should have for its purpose the raising of the intellectual efficiency of the boys in question; the school to be in session each day of the week, and each apprentice permitted to attend one-half day each week (four hours) and to be paid at his regular rate for the time spent in school. Eighteen manufacturers entered into the agreement; 21 are now cooperating. The school opened with 198 pupils instead of the promised 150.

During the first year the school was under the supervision of the manual-training director of the public school, and funds for its support were drawn from the manual-training appropriation. During this first year the school was regarded as an experiment and frequent changes were made in program and policy, as conditions seemed to warrant. It was moved three times before it was permanently located in one of the intermediate school buildings, where it now occupies six well-equipped rooms. It has passed from the experimental stage to an established part of the public-school system, a committee on continuation school has been added to the board of directors, and $10,000 appropriated for next school year, but the fact must be borne in mind that its work is still in the formative period.

Although the director of the school in consultation with the city superintendent decides what subjects shall be taught, the employers sending boys are consulted in the matter and act in an advisory capacity. The director disavows any intention of confining the instruction to apprentices in the metal trades and states that if other trades will send their apprentices they will be cared for. No specific trades are taught, but such work in mathematics, science, history of industry, English, etc., as will correlate with the shopwork and increase the general efficiency of the boy is taught. At present but three trades are represented, the machinists by 175 pupils, pattern makers by 25, and electrical workers by 10.

Any apprentice 16 years of age or over whose employer will give him time to attend is accepted in the school. No pupil is compelled to attend, but most of the shops make employment contingent upon attendance, which, of course, amounts to compulsion.

Pupils are accepted at any time, the requirement being that they must enter within three months after entering the trade.

The entire course of study is not yet determined, and the results of the past year's experiments will be considered in working out the program in its final form. The course probably will cover the four years of apprenticeship.

The general plan is as follows: Each pupil spends four hours per week in school and the remainder of the week at work in the shop of his employer. It is proposed throughout the four years to devote 45 minutes of the time each week to mathematics, 45 to science, 1½ hours to theory of shop practice, 45 minutes to general culture, and 15 minutes to physical culture. Because boys representing each of the four years of apprenticeship are in school, and no two come from the same department, classification has to be made upon the basis of years of service until such time as the older boys now in school graduate. At such time as the third and fourth year apprentices have had the first two years in the school the program can be followed out more satisfactorily.

Mathematics during the first year deals with shop arithmetic. The instructor goes to the shops, sees what the boys are working on and what their difficulties are; he then prepares problems of which they can make practical application in the shops, with the result that the boys have frequently been able to solve problems upon which their foremen have failed. They take up the study of geometry the second year, algebra the third, and trigonometry the fourth. Little time is given to abstract rules and theorems; the practical application of the more complex shop problems is kept uppermost.

Under the caption of science, the first-year pupils study the geographic relations of shop materials, taking up the source of supply and the geography of material used. The second year is narrowed down to the manufacture and founding of iron. The third and fourth years the study of physics is taken up, not the ordinary high-school course in physics dealing with abstract subjects, but physics with reference to the practical problems of the shop.

In theory of shop practice, which receives twice the amount of time given any other one subject, the pupil devotes the first year to blue prints, learning first to read and use them, and later to make them. The director has prepared a special course in blue prints, known as "jigs." The second year's work will consists of lectures and discussions on shop conventionalities and their necessities. The third year on theory of shop practice will be devoted to discussion and answering questions submitted through the foremen's "question box," and in the fourth year a course will be worked out under the title of "the sense of proportion."

The general culture work has been, perhaps, the most difficult to work out. The school authorities have felt that some such work was absolutely essential, while the majority of the boys were inclined to the opinion that it was a waste of time. The problem that confronted the director was to give the culture work in such a way that the practical value would be evident. The first year is devoted to reading, writing, and spelling. Carpenter's Geographical Reader is

used and the work made to correlate with the study of geographic relation of shop materials. The spelling lessons consist of learning to spell the names of shop tools and machines. Up to the present time machine-tool catalogues have been used as textbooks. The American Machinist has in press an industrial speller calculated to furnish text for such spelling lessons. The director expects this course to fill a double purpose—not only will the boy be able to spell the names of the tools he uses, but he will also acquire a valuable shop vocabulary.

In the second year composition and reading are studied. For the composition the boys are instructed to bring in from the shop some piece of work which has been spoiled; the boy tells why the work was discarded, points out the errors, estimates the cost of material, and the loss on the work. He then writes the story he has told, and the composition, together with the discarded work, are filed away in the library. In the third year literature and history of trade take the place of reading and composition; civics is added, with the idea of training the boy to be an intelligent voter. In the fourth year this period will be devoted entirely to civics, the general subject being, "The man, a wage earner and voter." The course is not worked out in all details as yet, but the director expresses appreciation of the need for and also the possibilities of such a course and expects it to be a real course for the training of citizens.

Fifteen minutes of each session are devoted to physical culture; calisthenic drills and setting-up exercises are given with the view to counteracting the tendency to round shoulders, and to teach the proper carriage of the body.

Very few books other than technical journals are used either for text or reference.

No shop practice is provided at school, but the director, who is also a coordinator, spends two half days each week in the shops with the boys, and the shop foremen serve in the capacity of trade instructors. The boys who are attending school get much more real trade instruction in the shop than the ordinary apprentice gets.

There is a two weeks' vacation in midsummer and one week at Christmas, the plan being for 48 weeks of school per year; there is no stated opening or closing time as such. The resuming of work at the expiration of the midsummer recess can not be regarded as the opening of a new term; entrance at any time makes impossible any formal term arrangement.

In the beginning the manufacturers promised enough boys for one teacher, and only one teacher was engaged. It was soon found, however, that because of the necessity of mixed classes and giving individual instruction there was more work than one teacher could handle, and an assistant was added.

The director, a graduate of the Cincinnati High School, spent two years in the University of Cincinnati and three years working at the machinist's trade in six different metal-working establishments. He taught manual training in the city school one and a half years, for six years he taught in the Ohio Mechanics Institute, and at one time he conducted a private school for machine-shop apprentices in Cincinnati. His assistant attended Ohio Mechanics Institute four years. He also studied mechanical engineering for four years, during which time he was serving his apprenticeship in a machine-tool house. He worked four years as a journeyman in the railroad shops and two years as a draftsman.

The school is under the general direction of the board of directors of the city schools. This board is made up of 27 members elected by the voters of the city, 24 of whom represent the various wards; 3 members are elected at large. The board is made up largely of professional men, 8 are attorneys, 6 are physicians, 1 a druggist, and 1 a college professor, the remaining 9 represent a variety of commercial and manufacturing interests.

There is a subcommittee of this board composed of 2 physicians and 1 attorney, known as the committee on continuation school. There is no official advisory board, but the employers sending boys to the school are consulted, and so unofficially act in the capacity of advisory board.

The manufacturers in the metal trades accept the work of the school, hour for hour, in the apprenticeship of the boy. What the individual trade-unions will do in the matter remains to be seen; they are waiting until the results the school will obtain are more evident before they take any action.

The school is not old enough to know from experience what part it will have in the matter of advancement of the apprentices; it is to be expected, however, that some of the boys who have had the advantage of training will naturally rise above the rank of journeymen and fill the positions of "gang bosses" and foremen. Many of the workmen have expressed a desire to be admitted to the school.

A few unusually promising young men, who are not apprentices, are permitted to attend the school.

The chief objection which the labor unions have made (and this objection is made by unions whose trades are represented in the school) is that the usefulness of the school is restricted to workers in the metal trades, that no provision is made for woodworkers, boot and shoe workers, and many other trades largely represented in Cincinnati. The school announces that it is open to all trades, but it is alleged that as yet nothing has been done to attract others. The Central Labor Union has recently indorsed the school.

The manufacturers cooperating with the school are enthusiastic in their praises of its work. Instead of a decreasing output for the boys who spend four hours per week in school, it is found that there is no decrease in the output, and in many cases the output has been actually increased. The foremen of the shops have entered into hearty cooperation with the director; when the boys return to the shops they are quizzed by both workmen and foremen and the lessons are quite generally discussed in the shops.

DAVID RANKEN, JR., SCHOOL OF MECHANICAL TRADES, ST. LOUIS, MO.

The cooperative classes of the David Ranken, Jr., School of St. Louis, Mo., constitute one of its three departments. For a complete description of the school, see page 61.

The cooperative classes were organized at the suggestion of the St. Louis branch of the National Metal Trades Association for the instruction of apprentices in the machinist's and pattern-making trades. The association, through its shop superintendents, provides complete instruction in the use of tools and machines, leaving to the school the theoretical instruction. The school invites apprentices and employers of apprentices to avail themselves of the work offered in the cooperative classes.

Applicants for admission must be apprentices at least 16 years of age. During the first year of the school 30 apprentices of the machinist's trade received instruction.

The subjects studied are mathematics and drafting. Three hours per week is given to mathematics and 4 hours per week to drafting. The school year covers a period of 46 weeks, beginning in September. There is a week's vacation at Christmas.

The cooperative classes are divided into two groups, one of which reports on Tuesdays and Fridays and the other on Mondays and Thursdays from 8 a. m. to 11.30 a. m. The employers pay $15 per year tuition for each apprentice and at the same time pay them the regular wages for time spent in attendance at the school.

MECHANICS' INSTITUTE OF ROCHESTER, ROCHESTER, N. Y.

The Mechanics' Institute of Rochester (see p. 69) has a cooperative part-time course which is attended by seven machinist apprentices of the Gleason Works. These pupils attend the class from 1 to 2.30 p. m. three days a week for 26 weeks each year. The course of instruction extends over three years beginning about September 15 of each year.

Instruction is given in mechanical drawing.

The company pays the apprentices their regular wage for the time spent in school and also pays the tuition, $7.50 per term of three months.

STATE TRADE SCHOOL, BRIDGEPORT, CONN.

The State Trade School, of Bridgeport, Conn., has a day cooperative course which is attended by apprentices of the metal trades. At present the classes are made up of apprentices of the machinists' and toolmaking trades only.

Classes meet from 8 a. m. to 12 m. each day, and each pupil attends one session a week. Instruction is given in mechanical and free-hand drawing, shop mathematics, industrial history, and spelling. No tuition is charged. The pupils receive their regular wage for the time spent in school, and such books and lesson sheets as are used are furnished without cost.

This school is described in greater detail in Chapter III, Public Industrial Schools, page 116.

SCHOOLS FOR CARPENTERS' APPRENTICES IN CHICAGO, ILL.

In 1907 the need for better training among carpenters' apprentices was strongly felt both by the unions and by contractors and builders.

Upon representations made to the board of education by the joint arbitration board of the carpenters' unions and the carpenters' and builders' association, it was arranged to have certain public schools opened to the carpenters' apprentices for a limited time each year. As a result separate classes for carpenters' apprentices were conducted in two public day schools, namely, the Horace Mann Branch School and the James Otis School. The joint arbitration board extended the arrangement to the Central Young Men's Christian Association and also accepted attendance at Lewis Institute, the Pullman Public Evening School, and the Chicago Technical College as meeting the requirements of apprentices. Of the six schools named, this chapter describes four, the Horace Mann Branch School, the James Otis School, the Pullman Public Evening School, and the Central Young Men's Christian Association Day Apprentice School. Only a few apprentices were at the other two schools named.

The following rules laid down by the joint arbitration board, which is given jurisdiction over the apprentices, show the general plan under which the employers, the unions, and the apprentices work:

The contractor taking an apprentice shall engage to keep him at work in the trade for nine consecutive months in each year, and see that during the remaining three months of the year the apprentice attends school during January, February, and March, and a certificate of attendance from the principal of the school attended must be furnished to the joint arbitration board as a compliance with this requirement before he is allowed to work during the coming year.

A contractor taking an apprentice shall keep him steadily at work or school; failing to do so, he shall pay him the same as though he had worked for him.

In the three years of this apprentice school arrangement its progress has been retarded by many difficulties. The teachers found it undesirable to have these older boys in the same building with younger pupils. The principals tried but failed to get the board of education to adopt a uniform course of study for the apprentices, and found that the apprentices had to be grouped arbitrarily in grades probably unsuited to them in many instances. The apprentices themselves did not like school work nor school restraints, and in many instances had to give up jobs for which they had been drawing higher wages than the minimum scale fixed for them by the joint arbitration board. The last-named difficulty was claimed by many apprentices to be a hardship which their families could not stand. As a result the joint arbitration board has had its hands full to keep the arrangement going. In many instances they had to punish apprentices for nonattendance and bad conduct by postponing the issuance of their work cards, which, if the apprentices do satisfactory school work, are ordinarily issued for the quarter just following the terms of the school.

Although the school terms, subjects taught, teachers employed, and results obtained differ materially among the four schools, the joint arbitration board accepts the school work of each school as fulfilling their requirements. To illustrate: in the Mann day school the school attendance consumes nearly one-fourth of the pupil's apprenticeship, during which time he receives the minimum fixed scale of wages, while in the Pullman evening school attendance does not reduce the working days of the apprentice but allows him to keep on working at wages, in some instances higher than the minimum fixed scale. Those attending the Young Men's Christian Association school pay a tuition sufficiently large to quicken their desire for a greater amount of education, and they find there a regular course of study to be pursued progressively each year as they return. These pupils are said to be of a higher type than in the other schools because many of the apprentices aspire to become contractors and builders and want more technical education.

CENTRAL YOUNG MEN'S CHRISTIAN ASSOCIATION (DAY) APPRENTICE SCHOOL.

The Central Young Men's Christian Association (day) Apprentice School was established in 1908. The purpose in establishing the school was to give such instruction in the theory of the carpenter's trade as would supplement the practical knowledge which the apprentices get in their outside trade work.

While established primarily for carpenters' apprentices, anyone 14 years of age or older may attend the school if he thinks the course as outlined will benefit him. In addition to 42 carpenters' apprentices, 5 masons' apprentices are enrolled. When carpenters' apprentices

under the jurisdiction of the joint arbitration board elect to attend this school, the joint arbitration board sees that they do attend, it being necessary to make up any unexcused absence before the issuance of the April work card. Pupils may enroll in this school at any time if qualified to take up the class work then going on, but the course is progressive and can be taken up only with the class.

These classes are in operation from 12 to 13 weeks each year during the slack building season, beginning about January 1. The course covers three winter seasons.

In the first year there are five 90-minute periods per week for architectural drawing and five for elementary arithmetic, two 150-minute periods each week for plan reading and estimating, one for building construction and building law, and two 90-minute periods per week for business English, spelling, and penmanship.

In the second and third years there are each week seven 90-minute periods for architectural drawing, five for practical mathematics, by which is meant a combination of arithmetic, algebra, geometry, and trigonometry; two 150-minute minute periods for plan reading and estimating, and one for studying building construction and building law. Occasionally pupils are instructed in the use of the square.

The school is open from 9 a. m. until 12 m., every day from Monday to Friday, inclusive, and from 1 until 3.30 p. m. on Mondays, Wednesdays, and Fridays, and from 1 until 2.30 p. m. on Tuesdays and Thursdays.

At the close of each term a typewritten certificate is issued by the school which shows the apprentice's name, the length of his attendance, and his class record, which record shows the number of sessions in the term, the number of sessions attended, the number of excused absences, and the grade attained, all for each branch taken by the apprentice. Unless such a certificate is presented to the joint arbitration board, and unless when presented it shows satisfactory attendance, the apprentice does not receive his April work card.

The apprentices come under the instruction of four teachers, three teaching trade-theory subjects and one business English, spelling, and penmanship. Three of the four teachers are college or university graduates who have also had trade and teaching experience. The teacher of English has had no actual trade experience.

PUBLIC SCHOOLS.

In the three public schools mentioned the following subjects were taught during the scheduled year:

HORACE MANN BRANCH SCHOOL.—Spelling, English, American history, applied arithmetic, mechanical drawing, bridges and houses, science, manners, morals, hygiene.

JAMES OTIS SCHOOL.—Reading, writing, spelling, geography, history, language, arithmetic and geometry, mechanical drawing.

PULLMAN EVENING SCHOOL.—Mechanical drawing, including house plans and a little geometry.

The science taught at the Mann school consists (1) of the occasional use of a magic lantern showing illustrations of various phases of the lumbering industry, (2) talks upon sources of different kinds of timber and where and how to purchase it, and (3) some study of trees. There were no textbooks or reference books on industrial subjects in use at any of the three schools, except at the Mann school, where use was made of pamphlets on trees and forests, published by the United States Department of Agriculture. No shop or trade-practice work is provided for at any of the three schools. At the Mann school 13¾ hours, or one-half of the total time per week, is devoted to arithmetic and mechanical drawing, there being five 120-minute periods per week for the drawing and five 45-minute periods per week for applied arithmetic, the schedule of recitations being rather irregular, the teachers lengthening or shortening recitations as the occasion seemed to demand. The instruction is largely individual, owing to wide differences among the apprentices in their previous schooling. They are not separated as first, second, third, or fourth year boys, but divided into three groups graded according to their advancement. It is probable that the instruction would be more nearly vocational if the preparation of the apprentices in the common branches were more advanced and if more vocational teachers were available. At the Otis school, which is in operation 25 hours weekly, there are five 30-minute periods per week for arithmetic and elementary geometry, and five 120-minute periods per week for mechanical drawing, the remaining half of the school time being divided among the other subjects taught. At the Pullman evening school the whole time, five periods of 120 minutes, or 10 hours per week, is given to mechanical drawing, with a little geometry interspersed.

At the Mann school instruction is given from 8.30 until 11.30 a. m. and from 12 m. until 2.30 p. m. from Monday to Friday, inclusive, for a 12 or 13 week term beginning about the 1st of January. The hours at the Otis school are from 8 until 11.30 a. m. and from 12 m. until 1.30 p. m. on Monday to Friday, inclusive. The school opened and closed on the same dates as did the Mann school. At the Pullman evening school the hours are from 7 p. m. until 9 p. m. from Monday until Friday, inclusive, for 16 or 17 weeks; the school opens in October and closes in February.

All evening-school teachers must also be day-school teachers. The Mann school has three teachers, the Otis has six, and the Pullman has two who give instruction to the carpenters' apprentices. At the

Mann school one of the three teachers is a graduate of a university in Scotland, another is a normal-school graduate. The one trade-theory teacher at the Otis school has had training in mechanical drawing in a scientific school, while at the Pullman school both teachers, who are also required to be day-school teachers, have had manual-training work but are not graduates of higher institutions of learning. Of the six trade-theory teachers in the three schools all have had experience as teachers and some trade experience of different kinds, but only one has had actual experience as a carpenter.

For their work in the apprentice schools all but one of the 11 teachers receive 20 per cent per month additional to their regular salaries. The three teachers at the Mann school were reported as having taught in the apprentice schools since they were started in 1907 and have asked for that work each year. But at the Otis school there was difficulty in getting the day-school teachers to teach in the apprentice schools because they do not like the work.

As has already been stated the schools claim only to give the apprentices a start in the technical part of their trade. Usually the ordinary carpenter's practical knowledge of his trade is out of proportion to his theoretical or technical knowledge and on this account he loses time and wastes material. The aim of these schools is to correct this condition.

CHAPTER VI.

EVENING INDUSTRIAL SCHOOLS.

CHAPTER VI.

EVENING INDUSTRIAL SCHOOLS.

INTRODUCTION.

Evening schools were the first result of the movement inaugurated early in the nineteenth century for better educational opportunities for the working population, and later for increasing the efficiency of shop workmen.

The first evening schools were limited in purpose to providing a rudimentary education for men and boys who were employed during the day and who had had no earlier opportunity of obtaining an education. In this there was no purpose of correlation with shopwork nor of attempting to increase shop efficiency. The need of some correlation became evident and the modern continuation schools with courses in mechanical drawing, shop arithmetic, and allied subjects developed. As early as 1828 evening continuation classes were opened for men and boys employed during the day. These continuation classes benefited mechanics and apprentices who attended for the theoretical side of their trades, but offered no instruction to those who desired elementary practice training as a preparation for a trade or as special instruction for advancement in a trade. The demand for these two forms of industrial instruction resulted in the establishment of evening vocational schools and evening trade schools, so that the evening schools now embrace three forms of instruction—continuation, vocational, and trade. An evening school may include all three of these features or may adhere strictly to one.

The school authorities are not always able to tell to what extent their school is doing continuation work or preparatory work, since their classes may include persons who are already in the trade and persons who are preparing to enter the trade. For these reasons it is not deemed advisable to attempt to classify the evening schools.

The following table shows the philanthropic, public, and private evening schools investigated. All of these schools appear in the General Tables, Chapter XVIII.

LIST OF EVENING SCHOOLS INVESTIGATED.

Class and name of school.	Locality.	Year established.	Minimum age limit for entrance.
PHILANTHROPIC SCHOOLS.			
Franklin Union	Boston, Mass.	1905; [1] 1908	16
Massachusetts Charitable Mechanics' Association Evening Trade School.	do	1900	17
North Bennet Street Industrial School	do	1881	14
David Ranken, Jr., School of Mechanical Trades	St. Louis, Mo.	1910	15
Pratt Institute: School of Household Science and Arts	Brooklyn, N. Y.	1887	17
Pratt Institute: School of Science and Technology	do	1887	16
Hebrew Technical Institute	New York, N. Y.	1903	19
Henrietta Trade School (Negro)	do	1909	14
Italian Evening Trade School	do	1909	15
New York Trade School	do	1881	17
Preparatory Trade School	do	1903	12
St. George's Evening Trade School	do	1892	[2] 12
Mechanics' Institute of Rochester	Rochester, N. Y.	1885	14
Ohio Mechanics' Institute	Cincinnati, Ohio	1828	14
Berean Manual Training and Industrial School (Negro)	Philadelphia, Pa.	1899	14
Drexel Institute of Art, Science, and Industry	do	1891; [1] 1902	[3] 14; [4] 15
Hebrew Education Society	do	1890	14
Spring Garden Institute	do	1879	14
Temple University	do	1894	14
Carnegie Technical Schools: Margaret Morrison Carnegie School for Women	Pittsburg, Pa.	1900; [1] 1906	17
Carnegie Technical Schools: School of Applied Industries	do	[1] 1906	[5]
Watchman Industrial School (Negro)	Providence, R. I.	1908	17
Rhode Island School of Design	do	[6] 1877; [1] 1878	16
Virginia Mechanics' Institute	Richmond, Va.	1905	15
PUBLIC SCHOOLS.			
State Trade School	Bridgeport, Conn.	1910	14
South Manchester Evening School	South Manchester, Conn.	1906	14
Waterbury Evening High School	Waterbury, Conn.	1906	14
Armstrong Manual Training School (Negro)	Washington, D. C.	1902	16
McKinley Manual Training School	do	1909	14
Albert G. Lane Technical High School	Chicago, Ill.	1907	14
Lake High School	do	1907	14
Richard T. Crane Technical High School	do	1907	14
Central Evening Industrial School (independent [7])	Boston, Mass.	1908	14
Evening Industrial School (independent [7])	Cambridge, Mass.	1906	14
Chicopee Evening Industrial School (independent [7])	Chicopee, Mass.	1908	14
Bradford Durfee Textile School of Fall River (independent; corporation [7]).	Fall River, Mass	1904	16
Lawrence Industrial School (independent [7])	Lawrence, Mass.	1908	14
Lowell Textile School (independent; corporation [7])	Lowell, Mass.	1897	[8]
New Bedford Industrial School (independent [7])	New Bedford, Mass.	[9] 1908	14
New Bedford Textile School (independent; corporation [7])	do	1899	16
Evening School of Trades	Springfield, Mass.	1898	14
Newark Technical School	Newark, N. J.	1885	16
Sara A. Fawcett Drawing School	do	1908	15
Brooklyn Evening Technical and Trade School	Brooklyn, N. Y.	1905	15
Technical Evening High School	Buffalo, N. Y.	1904	18
Long Island City Evening High and Trade School	Long Island City, N. Y.	1905	16
Industrial Evening School (mostly Negro)	New York, N. Y.	1905	16
Stuyvesant Evening Trade School	do	1908	14
Trade School of Yonkers	Yonkers, N. Y.	1910	16
Cincinnati Evening School	Cincinnati, Ohio	1906	14
Technical High School	Cleveland, Ohio	1909	[8]
Columbus Trades School	Columbus, Ohio	1909	14
High Industrial School	Dayton, Ohio	1909	16
Evening Trades School No. 1	Philadelphia, Pa.	1906	15
Evening Trades School No. 2	do	1907	14
Evening Technical School	Providence, R. I.	1909	[8]
Milwaukee School of Trades for Boys	Milwaukee, Wis.	1906	16
APPRENTICESHIP SCHOOLS.			
Grand Trunk Railroad	Battle Creek, Mich.	1902	16
Union Pacific Railroad	Omaha, Nebr.	1906	16
Lakeside Press	Chicago, Ill.	1908	16
American Locomotive Co.	Dunkirk, N. Y.	1909	17
R. Hoe & Co.	New York, N. Y.	1872	16

[1] Opened.
[2] In electrical class, 14.
[3] Males.
[4] Females.
[5] Approximate minimum age for apprentices, 17; journeymen, 20.
[6] Incorporated.
[7] For explanation of this term, see page 95.
[8] None.
[9] Opened, 1910.

The following schools representing various phases of evening instruction are described in this chapter. The last two do not appear in the preceding table nor in the general tables, for reasons stated in their description.

Ohio Mechanics' Institute, Cincinnati, Ohio. Franklin Union, Boston, Mass. Virginia Mechanics' Institute, Richmond, Va. North Bennet Street Industrial School, Boston, Mass. St. George's Evening Trade School, New York, N. Y. Italian Evening Trade School, New York, N. Y. Preparatory Trade School, New York, N. Y. Stuyvesant Evening Trade School, New York, N. Y. Brooklyn Evening Technical and Trade School, Brooklyn, N. Y. Long Island City Evening High and Trade School, Long Island City, N. Y. Industrial Evening School, New York, N. Y. Evening Trades Schools, Nos. 1 and 2, Philadelphia, Pa. Evening Technical School, Providence, R. I. High Industrial School, Dayton, Ohio. Columbus Trades School, Columbus, Ohio. Technical High School, Cleveland, Ohio. McKinley Manual Training School, Washington, D. C. South Manchester Evening School, South Manchester, Conn. Armstrong Manual Training School, Washington, D. C. Milwaukee School of Trades for Boys, Milwaukee, Wis. Mechanics' Institute, New York, N. Y. Extension Evening Courses of Teachers' College, Columbia University, New York, N. Y.

A number of evening schools are described in other chapters of the report as follows:

Philanthropic industrial schools (Chapter II):

Carnegie Technical Schools: School of Applied Industries, Pittsburg, Pa., page 50. Pratt Institute, Brooklyn, N. Y., page 57. New York Trade School, New York, N. Y., page 81. Hebrew Technical Institute, New York, N. Y., page 77. Mechanics' Institute of Rochester, Rochester, N. Y., page 69. Hebrew Education Society, Philadelphia, Pa., page 86.

Public industrial schools (Chapter III):

Brockton Industrial School, Brockton, Mass., page 103.[1] Evening Industrial School, Cambridge, Mass., page 103. Central Evening Industrial School, Boston, Mass., page 103. Chicopee Evening Industrial School, Chicopee, Mass., page 103. Hyde Park Evening Industrial School, Hyde Park, Mass., page 104.[1] Lawrence Industrial School, Lawrence, Mass., page 104. Natick Industrial School, Natick, Mass., page 104.[1] New Bedford Industrial School, New Bedford, Mass., page 104. Newton Evening Independent Industrial School, Newton, Mass., page 105.[1] Taunton Industrial School, Taunton, Mass., page 105.[1] Walpole Industrial School, Walpole, Mass., page 105.[1] Worcester Industrial School, Worcester, Mass., page 105.[1] Trade School of Yonkers, Yonkers, N. Y., page 113.

[1] This school does not appear in Chapter XVIII, General Tables.

State Trade School, Bridgeport, Conn., page 116. Vocational School, Gloversville, N. Y., page 112. Newark Technical School, Newark, N. J., page 121.

Apprenticeship schools (Chapter IV):

Grand Trunk Railroad, Battle Creek, Mich., page 159. Union Pacific Railroad, Omaha, Nebr., page 161. Lakeside Press, Chicago, Ill., page 178. American Locomotive Co., Dunkirk, N. Y., page 176. R. Hoe & Co., New York, N Y., page 174.

Girls' industrial schools (Chapter VIII):

Pratt Institute: School of Household Science and Arts, Brooklyn, N. Y., page 293. Drexel Institute of Art, Science, and Industry: Department of Domestic Arts, Philadelphia, Pa., page 298. Temple University: Department of Domestic Art, Philadelphia, Pa., page 299. Carnegie Technical Schools: Margaret Morrison Carnegie School for Women, Pittsburg, Pa., page 305. Evening High School for Women, Philadelphia, Pa., page 305.[1] Cincinnati Evening School, Cincinnati, Ohio, page 304. New York Evening High School for Women, New York, N. Y., page 303.[1]

OHIO MECHANICS' INSTITUTE, CINCINNATI, OHIO.

In the list of schools which afford theoretical and technical training in the trades, the Ohio Mechanics' Institute, of Cincinnati, stands first in date of establishment among those founded by philanthropy. Certain classes of the evening school are the only classes of the institute within the scope of the present investigation.

The Ohio Mechanics' Institute is an independent school organized in 1828 by local business men who desired to afford supplementary education to artisans and to apprentices in the various trades. For a number of years instruction was given in the form of lectures, discussions, and industrial exhibitions. In 1831 an important educational feature was the establishment of a technical library, known as the Apprentices' Library. In 1856 evening classes in mechanical, architectural, and free-hand drawing were opened. From time to time shop equipment has been added which makes possible considerable practice work in connection with the theory of the trade.

The opportunities for employment in the various manufacturing interests of the locality are kept in view by the school. The following statement in reference to the course of study is made by the director. "In developing our course of study we have taken as our guide the needs of business in Cincinnati. To follow the methods in vogue elsewhere would be unjust to local industries that give employment to the many young people passing through this school. The need for trained men here is constantly kept in view." The decision as to the trades taught rests with the president of the school.

[1] This school does not appear in Chapter XVIII, General Tables.

The administration of the Ohio Mechanics' Institute is vested in a board of directors chosen by the members of the private corporation which holds in trust the institute and its property.

The number of pupils enrolled in the various trade classes is as follows: Machinists, 35; pattern making, 87; carpentry, 4; plumbing, 10; foundry, 15; applied electricity, 19; stationary engineering, 12; blacksmithing, 9; tool making, 5. White males at least 14 years of age are admitted to these classes. Pupils may enter at any time during the school year.

All courses are elective. Pupils may attend two evenings per week for one subject or may take several subjects and attend the maximum limit—ten hours per week. The majority of the pupils come for some specific phases of their trade, for drawing, mathematics as applicable to shop problems, or science. Mechanics who apply for instruction on some process or machine, or other workers who need some special instruction to enable them to advance in their trade, attend the classes in manual arts or shop practice.

The course consists of two sessions of two hours each per week. These sessions are usually divided into one hour of theory and three of practice. The work in theory consists of explanations given of the underlying principles of the trade. Pupils arrange their program of studies to harmonize with their daily shopwork; the school aims to give each pupil the work he feels most necessary to insure progress in his trade.

The school term covers 24 weeks, extending from September 25 to April 10. All legal holidays are observed and classes are suspended for 10 days at Christmas.

A technical library for reference is at the disposal of pupils in the different departments.

Pupils who complete the course in any subject receive a certificate which states the subject studied and the length of time devoted to it. A written statement of work accomplished and time spent is given for a partial course.

The three teachers of shop practice have had actual shop experience for 7, 12, and 19 years, respectively.

The original funds for the maintenance of the Ohio Mechanics' Institute were derived from the dues of the organization and from small gifts of money from persons interested. Until 1908 financial aid had been received in small amounts, but at that time a gift of $500,000 was received for the erection of a new building and in addition $50,000 were secured by subscriptions for its equipment. It is expected that the new building will be opened in 1911. Throughout its career the institute has had to depend on comparatively small amounts derived from subscriptions, membership dues, rents, and tuition. Much of the equipment, materials for permanent exhibitions, and books have been donated by manufacturers and others who desired to see the school a success. The present equipment is valued at $30,000.

All pupils pay tuition which varies from $5 to $10 per year according to the course elected. Usually tuition is paid in advance, but occasional exceptions are made for those unable to comply with this rule. An effort is made to give needy pupils the opportunity to benefit by the school through loans made from the funds of the institute.

Shop materials are provided by the school. In 1909–10 the cost of such materials was $300.

The product made by the continuation classes includes drafting tables, lathes, tools, and parts of machines. None of this is sold, but all is added to the school's equipment.

The Ohio Mechanics' Institute does not consider itself a trade school in the sense of teaching the trade as a whole and sending out its graduates as journeymen. Its chief work is theoretical and explanatory, while the practice work is employed principally as a means of developing some underlying principles of the trade studied. The school stands ready to give instruction and practice work unavailable in the shop. The courses are planned to develop the workman and make him capable of mastering the problems his trade may present. No claim is made that instruction in this school will shorten the term of apprenticeship, but the belief is held that by the aid of the school work the apprentice will make greater progress during his time in the shop and be prepared to advance more rapidly when his apprenticeship has been concluded. It is believed that the training given will ultimately bring some of the graduates to executive positions, such as foreman or manager, although it will not prepare them to assume such responsibility immediately on the completion of their theoretical or practice work in the classes.

One firm gives graduates one year's credit on apprenticeship.

The school is in constant receipt of requests for skilled workmen. It is willing to recommend competent men, but will not consider any offers of employment which partake of the nature of strike breaking.

The majority of the pupils are wage earners in the trade taken in the school at night. The attendance of this class has been the greatest evidence of appreciation of the work offered. By interest and attendance they have presented a strong argument in favor of the methods the school has pursued. There has been no opposition to the school, a condition which according to the president is due (1) to the policy of the institute to make no claim which it can not substantiate, (2) to the assertion that in the education of the skilled workman the shop is a necessary factor this school can not supplant, and (3) by consistent refusal to permit pupils to go out as strike breakers. Individual employers speak highly of the Ohio Mechanics' Institute. The opinion is held by prominent men who know the conditions of Cincinnati that the industrial development of the city is largely due to the training which has been furnished by the institute through the eighty years of its history.

FRANKLIN UNION, BOSTON, MASS.

Franklin Union, Boston, Mass., is a continuation school holding evening and Saturday afternoon classes for persons engaged in manufacturing or other industrial pursuits. It was established in 1905 and opened in 1908. The funds providing for its establishment were derived from a bequest made in 1791 by Benjamin Franklin to the town of Boston.

At the expiration of the time set by the will the sum of $322,490 was available for some purpose of public benefit. The question arose as to the nature of the public work to be established and various schemes were suggested. At first the trustees appointed to take charge of the bequest decided to establish a trade school and made a study of such institutions throughout the country. The labor organizations protested against a trade school, which resulted in delay until 1903 when the present continuation plan was decided upon as providing a most necessary opportunity for the secondary education of men already engaged in the trades. The funds available were inadequate for more than the provision of a building and its equipment. A philanthropist offered to duplicate the amount of the fund if the city would donate a site for the building. The city donated $100,000 for the ground. The philanthropic gift was put aside as an endowment fund from which the maintenance of the school was to be obtained.

The industrial conditions of Boston and its vicinity were considered in the selection of the trades in which secondary instruction was to be given. The decision as to the selection rests with the director and the board of managers. This board is composed of 12 members, who are appointed by the Massachusetts supreme court.

The pupils enrolled during 1909–10 were as follows:

Evening school.—Machinists, 61; electricians, 126; steam engineers, 75; sheet-metal workers, 10; stationary firemen, 50; gasoline engineers, 40.

Saturday afternoon classes.—Steam engineers, 20; electricians, 30; gas and gasoline engineers, 18.

Other classes of academic or purely technical character are conducted by the institution but are not considered as within the scope of this report. Candidates for admission must be males 16 years or older. Occasional exceptions are made to this rule when applicants under 16 who are specially qualified are permitted to enter the classes. In general all pupils must enter at the opening of the year, but if entrance is made at the opening of the second term the equivalent of the first term's work must have been covered elsewhere. All the pupils are employed during the day and, with few exceptions, in the trade studied at night.

The courses for machinists, electricians, and steam engineers cover two years; for sheet-metal workers and gas and gasoline engineers one year, and for stationary firemen three months. For an enumeration of subjects taught in the different trades see Table I.

The school is well equipped for laboratory and shop exercises.

The sessions are held from 7.30 to 9.30 on Monday, Wednesday, and Thursday evenings. Classes open about October 1 and close in March. All legal holidays and a short recess at Christmas are observed.

No textbooks are used, but notes, lectures, and problems are prepared by the instructors for their respective courses and are furnished to the pupils at cost.

A certificate is given for a completed course. No certificate is given for any partial course. It is stated that about 85 per cent receive certificates. The greatest number who leave before the completion of their course may be found in the group of electricians.

Nearly all of the teachers of practice have had practical experience in shops, and with few exceptions have had special instruction in technical schools and colleges. A number hold college degrees. So far no difficulty has been experienced in retaining qualified teachers.

The Franklin Union Building cost about $350,000. The equipment is valued at $75,000. The endowment provides an annual income of about $20,000, which is used for maintenance. Tuition fees are as follows: Machinists, electricians, steam engineers, sheet-metal workers, $6 per year; gas and gasoline engineers, $10 per year; firemen (stationary), $4.

In 1909–10, $1,300 was expended by the school for materials used in shop practice. There was no product.

The Franklin Union states definitely that it does not teach trades, but aims to give men already in the trades such theory and practice of their work as they lack and desire, so that they may advance to whatever position they are capable of reaching. The work of the school increases the efficiency of the workman, but the school maintains that in general the fundamental theory and practice of a trade must be learned in a commercial shop. It expects that many pupils who finish the various courses will rise to positions of foremen, superintendents, or other executives. Some pupils have discontinued their school work to take positions in other localities, secured by reason of increased ability and knowledge. Manufacturers and their employees regard the school most favorably as an opportunity to advance men whose early educational opportunities were limited, but whose ambition and ability lead them to seek means of increasing their knowledge and skill and thus prepare for the execution of any work called for in their trade. The school has experienced no opposition from any source. The employers and employees, both as individuals and as associations, are favorable to its purpose.

VIRGINIA MECHANICS' INSTITUTE, RICHMOND, VA.

The mechanical shops, or "the trade or shop department," of the Virginia Mechanics' Institute, of Richmond, Va., were established in 1905 by the committee on schools of the Virginia Mechanics' Institute. The purpose of the school is to thoroughly equip apprentices and to instruct them along such lines as are not usually included in trade apprenticeships. The school is not endowed, but the city council of Richmond, Va., annually appropriates funds to defray the expenses of the institute, and this amount has been increased from year to year as the demands have enlarged. It is the demand for well-equipped and intelligent workmen in the local industries that determines the nature of the trade school. The institute's committee on schools decides what subjects shall be taught.

The school sustains no relation to and has no affiliation with any industrial establishment or any other school. The affairs of the school are administered by a board of directors constituted of 24 members, and this board is selected by the members of the institute. The trades taught by the school and the number of pupils in each during the school year 1909–10 were as follows: Cabinetmaking, 4; wood-pattern making, 14; blacksmithing and forging, 6; machinists, 20.

Any young man of good moral character not less than 15 years of age may be admitted to membership in the school. A pupil may enter at any time during the school year. All the pupils of the school are engaged in trade employment during the day.

Two years constitute the course of instruction in each of the trades taught in the school. The subjects taught are as follows: In cabinetmaking, lectures on the relation between drawing and the mechanical processes, and specific lectures on cabinetmaking; in wood-pattern making, lectures on relation of drawing room to the shop during the first year of course, and during second year lectures on how to apply theory in the workshop; in blacksmithing and forging, lectures on drawing and how to apply drawing to the workshop; in machinists' trade, lectures on specialization in a workshop. The hours per week devoted to practice are eight and one-half and to theory one and one-half. The hours of instruction are from 7.30 to 9.30 p. m. from Monday to Friday, inclusive. The length of the school year is 30 weeks, from September to May. There is no summer term. A two weeks' holiday is given at Christmas. The school uses no textbooks in its course. On completion of courses pupils are given diplomas.

Three teachers are employed. They were secured from universities and colleges, have had practical shop training, and teach both the theory and practice of their trade. The school experiences some difficulty in retaining teachers duly qualified to teach trade work because of inadequate compensation.

The mechanical shops of the institute use part of the building and equipment which were provided for the institute from funds received from voluntary contributions. Pupils are charged $3 per year tuition fee for the first subject and $1 for each additional subject taken, payable in advance. No refund or abatement of this charge is made for absence or for late entrance. The cost of materials used by the school during the year was approximately $200, and this was defrayed by the school out of the fund for current expenses appropriated by the city. The city of Richmond furnishes gas free of charge.

The school holds no direct industrial relation to any of the trades. The fundamental object of the school is to so equip the pupil as to make him more efficient as a workman in the shop. It is stated that there is a special demand for the graduates of the school. The advantages afforded by the school are particularly appreciated by the manufacturers and the citizens generally. No opposition to the school has been manifested from any source; on the other hand, the general attitude toward the school is favorable.

NORTH BENNET STREET INDUSTRIAL SCHOOL, BOSTON, MASS.

The North Bennet Street Industrial School is a private enterprise which cooperates to some extent with the public-school system. It was established in 1880 as a means of directly benefiting the people of its neighborhood, which is a densely populated tenement quarter, in which the Italian, Hebrew, and American-born children face at an early age the necessity of becoming wage earners, but lack opportunity to prepare for any form of skilled industrial work. Throughout its history the school has had as a definite purpose "social betterment by means of such education as shall increase efficiency and respect for labor." It has attained this directly for the North End by conducting industrial classes and indirectly for the whole city by acting, since 1885, as an experiment station for the Boston public schools.

The evening classes, organized in 1881, for industrial instruction for both sexes are only a part of the work of the school. These classes, which are the only section herein considered, aim to give some technical skill and to increase the efficiency of those who have entered industry without proper preparation.

The selection of trades in which instruction is given has been the result of a study of the opportunities presented by the neighborhood for employment in such trades as printing, pottery, stone carving, woodwork, sewing and dressmaking. An additional purpose in the courses offered by the school is the elevation of standards of living and of conditions of labor.

The school, organized in 1880, is a corporation composed of men and women prominent in educational and financial circles. This corporation was reorganized in 1908 and the administration vested in an executive committee of nine members. There is also an advisory board composed of six superintendents of the public schools.

The school is independent in its methods and administration except for a certain cooperation with classes of grammar-school children who attend afternoon classes in manual training and domestic arts. Girls in the latter classes may receive advanced credit for their work if they desire to enter the Boston Trade School.

The subjects taught in the evening classes and the number of pupils in each are as follows: Woodwork (hand or bench), 42; wood-turning, 15; printing, 25; wood carving, 2; stone carving, 6; pottery, 45; cement work, 6; dressmaking (elementary), 16; dressmaking (advanced), 21.

Any person, male or female, who has sufficient ability and purpose may enter these classes provided he or she is of the required age, which varies in the trades.

As the instruction is largely individual, pupils may enter at any time, but, in general, entrance is made in October, which is the beginning of the school year.

Practically all the pupils in the several classes are in the trades studied in the school. A few are in other trades, but all are at work in some form of industry.

A full course in any subject covers a period of two years. The school is in session from October to April. Classes meet for two hours on Monday, Tuesday, Wednesday, and Thursday evenings. All classes meet twice each week, with the exception of those in printing, pottery, wood carving, and stone carving, which must meet once a week. A holiday of one week each is given at Christmas and at Easter. Attendance is affected during certain busy seasons because of the demands made by overtime work.

For those who complete the course in any subject a diploma is given. In this are stated the nature of the work studied and the length of the course attended. The popularity of the school causes it to have a long waiting list, so that pupils who enroll seldom leave before the completion of the course, except for most urgent reasons. In making a selection from the applicants who present themselves preference is given to those who give promise of regular attendance throughout the year.

No separate periods are set aside for the theory of the trades, but all trade instruction is given in connection with the actual shop practice.

The shops of the industrial classes are equipped with the necessary hand tools and machines required for satisfactory execution of the work.

There are seven teachers, all of whom teach the shop practice of their respective trades and incidentally any theory the lesson on hand presents. All of the teachers have had practical experience in the trades they teach. The school experiences some difficulty in retaining satisfactory teachers because of the growing demands for instructors in industrial branches.

The school owns three separate buildings, the total value of which is $59,000. The equipment is valued at $4,800. The industrial classes occupy the same rooms as the manual training and other classes of the institution. The school has no endowment fund, but is maintained by the dues of the members and by annual subscriptions and donations. Nominal charges for tuition add a small amount to the income. Pupils from 14 to 19 years, inclusive, pay 50 cents per course; those over 19 years pay $1; artisans who live outside the North End district pay $5 per course. The city of Boston appropriates $1,300 per year for the support of the library, to which all pupils have access. In 1909–10 a sum of $788 was expended for materials for the trade classes. The pupils do not earn anything in the school from their work nor is any of the finished work sold by the school.

The school does not consider its work as having any connection with the usual term of apprenticeship except that some of its pupils are apprentices in the trade studied at night. No credit is given by employers for time spent in the school, although advancement may be assured because of added skill or ability.

ST. GEORGE'S EVENING TRADE SCHOOL, NEW YORK, N. Y.

St. George's Evening Trade School, New York City, is one of the activities established by the Church of St. George in 1892. The aim of the school is to teach the rudiments of trades and to assist men and boys already in trades by theoretical and practical work related to the problems of their shops. The trades taught and enrollment for 1909–10 are as follows: Electrical work, 40; plumbing, 30; carpentry, 48; sheet-metal work, 16. The course for each is three years. About 17 per cent of the pupils finish the course. Pupils in carpentry take mechanical drawing one and one-half hours per week; pupils in the other trades take no theory except such as may be given incidentally during shop practice; the hours of shop practice vary according to the number of sessions attended during the week.

Sessions are held from Monday to Friday, inclusive, from 7.30 to 9 p. m. Some pupils attend three evenings, while others attend two. The school year consists of 28 weeks, commencing in October and closing in May. Pupils may enter at any time. Sessions are suspended on legal holidays, during two weeks at Christmas, and

one week at Easter. Tuition fees are nominal and range from 10 to 25 cents per month. No textbooks are used.

The trade teachers have had trade experience varying from 15 to 35 years and teaching experience varying from 4 to 13 years.

The building in which the trade classes are held is valued at $50,000, equipment at $1,000, both of which sums were gifts to the school. The expenses are maintained by subscriptions, which in 1909–10 amounted to $5,000.

The cost of materials during the year was $521. There was no marketable product.

The conditions of admission require applicants to be between 10 and 21 years of age and to attend some church. Recommendations from members of the parish or from clergymen of other churches are necessary to insure entrance.

The school is under the direction of a self-perpetuating governing board consisting of 11 members.

For those who desire to learn a trade the instruction aims to prepare for apprenticeship. Many of its pupils are too young to take up the actual shop practices, but they can be directed toward a trade and assured of sufficient equipment to take it up thoroughly as soon as they are ready to do so.

ITALIAN EVENING TRADE SCHOOL, NEW YORK, N. Y.

The Italian Evening Trade School is one of the activities of the Children's Aid Society of New York City. This school was designed for the education and social uplift of the Italians living in the congested section of the lower East Side known as the Five Points. A definite purpose by the society of teaching trades, or of at least giving preparation for the taking up of a trade, was not put into effect until 1909. The present trade classes are, strictly speaking, an experiment about which it is too early to predict results.

The pupils are of two groups, those who desire to learn a trade and those who wish to advance themselves in the trade in which they are already engaged. The majority of the pupils expect to work in that section of the city in which the school is located, hence the demands for workmen in the trades found in the vicinity are kept in view in the selection of trades taught.

While the school plans to teach the trades as thoroughly as any school may do, at present it is not able to do more than prepare for apprenticeships or give some slight aid to the apprentice by teaching such theories and practices as the shop has not time or opportunity to cover. As one of the schools of the Children's Aid Society the school receives aid from both State and city. The school committee

of the trustees of the Children's Aid Society, a board composed of 6 members, administers the affairs of the industrial classes.

The trades in which instruction is given and the number of pupils enrolled in each are as follows: Dressmaking, 15; power-machine operating, 14; printing, 12; sign painting, 22; carpentry, 15. Entrance to these classes may be made at any time of the year by any person at least 15 years of age who gives promise of regular attendance.

The length of the course for each trade is as follows: Dressmaking and carpentry, three years each; printing and sign painting, four years each; power-machine operating, one-half year. Sessions are held each evening from Monday to Thursday, inclusive, from 7.30 to 9.20. The school year opens on October 1 and closes on June 1. Holidays of one week each are given Christmas and during the month of April.

No theory is taught except when occasions may arise during the practice work in which some principle of the trade needs to be explained.

In general the shop practice, except in power-machine operating, is limited to the beginnings of the trade, such as the use of tools and materials through the construction of simple pieces of furniture, articles of clothing, small jobs in printing, or practice work in sign painting or lettering. The course in dressmaking is planned to cover three years and to send the pupils out equipped as efficient helpers in large establishments. There is considerable opportunity of employment for Italian girls in the needle trades both in the workrooms of dressmaking establishments and in shops in which the work is done on power machines. Because of the shorter time required for preparation in the latter the class in power-machine operating, as a means of acquiring ability to earn a satisfactory living, is regarded as the most practical of the industrial classes offered to the women and girls.

No textbooks are used. Pupils have access, however, to a few books of reference on the trades taught.

It has been estimated that only 20 per cent of the pupils enrolled left before the end of the year. None of those who left were in the sign-painting class and very few in carpentry. Certificates are given each year for the successful completion of the work covered in that time.

Five teachers are employed, one for each trade. Three of these teachers are graduates of trade schools, one is a graduate of the Teachers' College, of New York. With the exception of the teacher of sign painting all have had trade experience. The principal of the school as well as the teachers are directly responsible to the superintendent of schools of the Children's Aid Society.

No charges are made for tuition or for materials. Some support was received through contracts taken for printing, sign painting, and for articles made on the power sewing machines. In these trades the pupils earn a small amount, which is given to them after the expenses of the classes are deducted.

Most of the product of the trade classes is marketable and except the dressmaking, which is not yet sufficiently developed, is executed in response to orders from business concerns or private individuals. The Children's Aid Society calls upon the printing class for many of its notices, folders, and similar matter, orders for signs are constantly received in the sign-painting class, while the class in power-machine operating takes regular contract work.

In all the trades, except power-machine operating, no claim is made by the school that its instruction can be considered comparable to the actual work of the apprentice in the shop. It does claim to advance the apprentice by special instruction in his trade as well as to send pupils into the apprenticeship prepared to at once take up their trades. It hopes to eliminate that period considered generally as unavoidable, but frequently regarded as a wasteful expenditure of time, during which the apprentice is the errand boy or the printer's devil, and in which he is "tried out" by his employer. His work in the trade classes places him beyond this grade and makes him an advanced apprentice who has a liking for his trade and an intelligent grasp of its elementary practices.

In the course in power-machine operating the school claims to fit pupils to assume positions as experienced operators at advanced wages.

Despite the brief existence of the trade classes there is already a demand for the pupils in the printing, carpentry, and power-machine classes.

All the pupils are working during the day, some of them in the trade studied at the school. Some of these latter have received advancement in their shops, due to increased efficiency acquired in the school.

It is stated that there is no opposition but rather a general appreciation of the work of the trade classes among employers, the people of the neighborhood, and the social workers of New York. Associations of employers and of employees have not as yet concerned themselves with the school. The school authorities have watched it with interest and believe that its work is practical and efficient.

PREPARATORY TRADE SCHOOL, NEW YORK, N. Y.

The Preparatory Trade School, of New York City, was established in 1903 through the agency of the Twenty-first Ward Mission, which is composed of philanthropic men and women interested in the boys and

girls of the East Side. The school states as its object the effort to give these boys and girls a practical knowledge and love of trades and to make them good workmen and good citizens—in other words, to induce them "to invest in themselves." The trades taught are such as are found in the vicinity. The school endeavors to train boys and girls away from the unskilled and underpaid occupations which abound in the crowded sections of New York City. The need of workmen in the five trades taught has been ascertained by the members of the advisory board, who have recommended that instruction be given in these trades.

The school is independent and is governed by a self-perpetuating board of directors of 17 members, of whom 7 are women. There is an advisory board of 15 members, 3 of whom are women.

No claim is made by the school to teach the trades thoroughly—that is, to replace the work of the shop. The pupils receive either merely the rudiments of a trade and sufficient instruction to secure employment where they may be considered as apprentices, or such supplementary instruction in the trade at which they are employed as will help to advance them in their shop work.

The work of the trade classes follows the course begun in the manual training classes, which are conducted for children still in school. The preparatory training there received gives the child some knowledge of the use of tools and suggests the idea of a trade as a means of livelihood.

The trades taught and the number of pupils enrolled in each for 1909–10 were as follows: Carpentry, 36; plumbing, 26; electrical work, 15; dressmaking, 25; and millinery, 25. Any person between the ages of 12 and 23 who has had a grammar-school education may enter the school. Entrance to the various classes may be made at any time provided there is a vacancy to be filled. A waiting list of 100 pupils indicates the desire of young boys and girls to better their condition through the work offered by the trade classes.

The course for each trade covers three years. It is estimated that about 20 per cent complete the course and receive a certificate to that effect. Classes are held on Monday, Tuesday, Thursday, and Friday from 7.45 to 9.15 p. m. Pupils in carpentry and plumbing attend classes each evening; electrical work pupils attend three evenings; while girls and women in the dressmaking and millinery classes attend but two evenings per week.

The school year covers a period of 30 weeks, beginning in October and closing in May. There is no summer term. Classes are suspended for all legal holidays, for two days at Thanksgiving, and one week at Christmas. Charges for tuition are nominal—girls pay 10 cents in dressmaking and 15 cents in millinery per month—boys, 25 cents per month in any course taken.

No textbooks are used. A few reference books are at the disposal of the pupils.

In the classes in carpentry, plumbing, and electrical work one period of 90 minutes per week is devoted to mechanical drawing. No special course in theory is given in the other trades, but it is taught incidentally as the various processes are developed. The equipment for shop practice is inadequate and the quarters cramped.

The teachers of carpentry and of plumbing learned their trades in shops and worked at their trades for 20 and 14 years, respectively. The teacher of dressmaking reported some work of preparation for the trade teaching in the domestic arts department of a teachers' college. The teachers of millinery had no school training, but learned their trade in shops. One of the teachers of millinery, as well as the teacher of dressmaking, had conducted a business of her own. All trade instructors keep strictly to their own branch. So far the school has experienced no difficulty in retaining its teachers.

The Preparatory Trade School has no endowment fund, but is supported by private subscriptions and donations, which in 1909–10 amounted to $3,073. The tuition fees, which are nominal and imposed merely as a means of inculcating and fostering ideals of self-respect, add but a small sum to the income. Rented quarters are used as well as an annex built and owned by the school. The total equipment of the classes is valued at $1,000. In 1909–10 $467 were expended in materials. The trade classes do not make a marketable product, so that no income accrues to either school or pupils from such a source.

The directors are at present endeavoring to raise sufficient funds to erect and equip a schoolhouse suitable to the increasing demands for instruction in the trades taught and for the introduction of other trades for which there is a need of workmen in the vicinity.

The Preparatory Trade School definitely states its purpose as trade training rather than the thorough teaching of a trade. There is no question of covering the usual term of apprenticeship. The idea of the school is to give the pupil a good start in his trade or to help him by theoretical and by special knowledge to advance more rapidly than he otherwise would be able to do. The school authorities reported many of its graduates as employed in the trades at journeymen's rates and as steadily rising in their line of work. The school feels that much of this ultimate success is due to the proper foundation given in the trades by means of the thorough elementary instruction offered in the trade classes. A number of older pupils are employed in the trades they study in the school. All of those in the plumbing classes are apprentices in the trade. The instruction received assists these plumbers to successfully pass the examination for the master plumber's license.

The school has not antagonized any class by its claims or its methods. The class of pupils reached by the school does not make itself strongly enough felt in industrial circles to arouse vigorous criticism, favorable or otherwise.

EVENING VOCATIONAL SCHOOLS, NEW YORK, N. Y.

The New York Board of Education provides for four evening schools which give some vocational training. These are generally known as "evening trade schools," but under the definition used in this report they do not qualify as trade schools, but as continuation schools or as elementary vocational schools.

These schools are all under the general direction of the city board of education, which consists of 46 members. There is a subcommittee on vocational schools which has charge especially of these schools. All funds are supplied by the city board.

These schools are open only to young persons who are employed during the day. There must be a class of at least 15 before a new course can be established.

STUYVESANT EVENING TRADE SCHOOL.

The most important of these schools is the Stuyvesant Evening Trade School, which was opened September, 1908. The minimum age for entrance is 14 years. It is primarily a continuation school, as approximately 82 per cent of the pupils are already employed in the trade during the day. About 18 per cent are receiving elementary vocational instruction.

The enrollment by trades is as follows: Carpentry, 35; cabinet-making, 14; wood turning, 13; pattern making, 20; blacksmithing, 23; machinists, 27; plumbing, 55; electrical wiring and installation, 61; electrical machine operating, 44; steam engineering (stationary engines), 22.

The equipment used by the day manual training school is used for instruction in the evening school.

The school offers a three-year course in all trades mentioned except wood turning and stationary engineering, in each of which there is a one-year course, and plumbing and electrical wiring, in each of which there is a two-year course. Very few pupils, however, remain to the end of the course. Those already engaged in trade work come for specific instruction and remain only long enough to get what they want. For this reason a yearly certificate is given for 60 per cent attendance. The school does not make a product.

Some theoretical instruction is given in correlation with trade work.

The school is in session from 7.30 to 9.30 p. m. Monday to Thursday, inclusive, for 30 weeks, beginning in the middle of September.

BROOKLYN EVENING TECHNICAL AND TRADE SCHOOL.

The Brooklyn Evening Technical and Trade School was established in September, 1905. Some elementary vocational work is taught, but the majority of the pupils are employed at the trades during the day, so the main part of the work is continuation.

Unlike the Stuyvesant school, this school provides instruction for women also, but only about 25 per cent of the women are already employed in the trade. Others are taking it for home use.

The enrollment by trades is as follows: Carpentry and joinery, 28; cabinetmaking, 25; pattern making, 20; blacksmithing, 16; plumbing, 92; machinists, 60; printing, 28; electrical installation, 31; steam engineering, 20; elementary dressmaking, 70; advanced dressmaking, 70; elementary millinery, 30; advanced millinery, 35.

The school admits adults, also others who are at least 15 years of age and who have completed the grammar grade of the public school.

Such theoretical work as is given is in conjunction with the practical work. There is no separation of theoretical and practice work.

There is no very definite length of course. The students come largely to get some particular feature of the work, the instruction being for the most part individual. The courses are planned to correlate as much as possible, so that pupils who really want to take thorough work can take first one course, then another, and thus get a very good knowledge of their trade. They seldom take more than two years' work. Each year's course is complete in itself and it depends entirely upon the student whether he chooses to return and take more and higher work.

School opens the third Monday in September and continues for 120 evenings, being in session 4 evenings per week from 7.45 to 9.45.

The school does not make any product as such, but the boys do a considerable amount of repair work on the building, look after electrical installation, etc. The class in printing does some of the school work.

LONG ISLAND CITY EVENING HIGH AND TRADE SCHOOL.

The Long Island City Evening High and Trade School was organized in 1905. The minimum age for entrance is 16 years. Like the Brooklyn school, this school also gives courses for women. The enrollment by trades is as follows: Plumbing, 39; cabinetmaking and wood turning, 22; blacksmithing, 30; machinists, 56; electrical wiring, 26; millinery, 40; dressmaking, 104.

A three-year course is offered in cabinetmaking and wood turning and in machine-shop practice, two years in millinery and dressmaking, and one year in blacksmithing, electrical wiring, and plumbing.

School is in session from 7.30 to 9.30 four evenings each week from the third Monday in September to the middle of May (120 evenings).

Such theoretical instruction as is given is given incidentally with practice.

No product is made for sale. In the millinery and dressmaking classes the girls furnish their own materials and dispose of their own product. It is planned in the future to make a marketable product in these classes.

The work for men is much more complete than that for women, and has a larger proportion of pupils taking the courses for trade purposes.

INDUSTRIAL EVENING SCHOOL.

The New York Industrial Evening School was established in 1905. The majority of the pupils in this school are colored, the nature of the school is therefore somewhat different from the other schools here discussed.

Since there are few openings in the mechanical and building trades for negro men in New York, it is practically useless to teach them these trades. The industrial work is very elementary and is vocational rather than trade.

The enrollment by trades is as follows: Sewing and dressmaking, 138; millinery, 64; embroidery, 43; flower making, 24; electrical work, 24; carpentry, 10; janitorial work, 19.

There is also a class of 15 in cooking. While it is generally held in the New York schools that the instruction in cooking is for home use, it is less so for the Negroes than for others.

The only entrance requirement here is that the pupil be 16 years of age.

The length of course is an individual matter. A certificate is given at the end of each year, stating just what work has been done.

School is in session from 7.30 to 9.30 four evenings per week for 85 to 100 evenings. Sessions usually last from the last week in September to Easter.

No marketable product is made, but girls may furnish their own materials and make articles for themselves.

This school is a survivor of several schools that were once in existence for colored children in New York. These were abolished by legislative enactment, but still one or two remain, practically colored. Later an evening school was started here primarily for colored men and women. White people do attend, particularly foreigners, but the majority of the pupils are colored, and the principal is a colored man.

EVENING TRADES SCHOOLS, NOS. 1 AND 2, PHILADELPHIA, PA.

In addition to the Philadelphia Trades (day) School (see p. 123) there are two public evening schools, termed the Evening Trades School No. 1 and Evening Trades School No. 2, respectively. The former was opened in October, 1906, the latter in January, 1907. Both have been popular and have had to turn away applicants for admission to the various classes.

In this chapter only those points in which the evening schools differ from the day school are considered. In the matter of administration, selection of trades taught, and the criticisms of the work accomplished, the statements made in reference to the day school cover the evening classes.

All applicants must be able to read and write. The minimum age for admission to Evening Trades School No. 1 was formerly 15 years; in 1910 it was fixed at 16. In school No. 2 applicants must be at least 14 years of age.

The classes of Evening Trades School No. 1 use the building and equipment of the day trades school, while those of No. 2 use the annex of the Northeast Manual Training School, with as much of the equipment as is feasible and additional equipment necessary for trade instruction.

In the Evening Trades School No. 1 the trades taught and the number of pupils in each are as follows: Bricklaying, 10; carpentry, 23; plumbing, 98; printing, 42; electrical construction, 146; sheet-metal working, 41; pattern making, 19; house and sign painting, 14; and plastering, 12.

Six teachers are employed for teaching theory and 11 for shop practice. Of these latter all but 5 are teachers of the day classes also. All the teachers of shop practice have served as apprentices in their respective trades. Teachers of general subjects do not give instruction in the trades.

In the Evening Trades School No. 2 the same trades are taught as in No. 1, except printing and sheet-metal working, which were discontinued because of a lack of demand for them. In addition there is a course in steam and hot-water heating which is purely theoretical, with all the instruction given by means of lectures. The number of pupils in each trade is as follows: Plumbing, 18; carpentry, 26; pattern making, 19; bricklaying, 9; plastering, 9; house and sign painting, 10; electrical construction, 39; steam and hot-water heating, 17.

Evening Trades School No. 2 employs 11 teachers, 2 for theory and 9 for shop practice. All the teachers of shop practice have served apprenticeships and been actively engaged in their trades.

In both schools mechanical or architectural drawing may be elected merely as the theory of the trade or as the theory in conjunction with

shop practice taken in the schools. In both schools there are a number of pupils in each trade who are working during the day in the trade studied. In No. 1 the majority of the pupils are of this class, which makes the school to a considerable degree a continuation school. In No. 2 the majority of the pupils are taking up a trade as a new subject. The exception to this is the class for plumbers, practically all of whom are apprentices who are required by their employers to attend.

In both schools the most popular course is that of electrical construction. Many pupils are attracted to this trade, but a considerable number drop out before the completion of the course.

It is estimated that at least 70 per cent drop out of the school before the end of the third year. That so many pupils take but a partial course is due to the facts that some are merely experimenting and lose interest and others come for a specific part of their trade and leave when that is acquired. Free tuition tends to draw some persons of indefinite purpose and this has considerable influence on the tendency to discontinue during a course.

The length of the course for all trades except steam and hot-water heating is three years. This subject requires one year. Sessions are held each evening from Monday to Friday, inclusive, from 7.30 to 9.30. The school year, covering a period of 25 weeks, begins in October and closes in March. A certificate in which are stated attendance and progress is given at the close of each term.

Pupils attend alternate evenings if taking one subject. If they elect more than one they may attend a maximum of 10 hours per week. If one subject is studied an average of 5 hours per week is taken—that is, 6 hours one week and 4 the next. Pupils who take the theory of their trade as well as the shop practice alternate the two branches. In certain trades there is such a demand for instruction that two classes have been formed.

During 1909–10 Evening Trades School No. 1 received, as its appropriation from the board of public education, $7,806. Of this amount, $2,153 were expended on shop materials and $325 for janitor service. Heat, light, and power are furnished with the building. Evening Trades School No. 2 received $3,000, of which $1,000 was expended for shop materials and $663 for janitor service, heat, light, and power.

Pupils in the electrical construction course are furnished with a textbook. Pupils in other courses furnish their own drawing materials and the notebooks required.

No definite statement can be made as to the acceptance of the school work as an equivalent of any part of the usual period of apprenticeship, since the pupils enter the classes with widely varying degrees

of equipment and ability. In the plumbing and sheet-metal trades some employers who require their apprentices to attend the evening classes shorten the period of apprenticeship. The course in plumbing covers all that is required by the board of health in its examination of applicants for the license of master plumber.

EVENING TECHNICAL SCHOOL, PROVIDENCE, R. I.

The Evening Technical School, of Providence, R. I., a public continuation school, was opened in October, 1909. Its purpose is to provide industrial and technical training to persons employed during the day in certain local industries. It was established through the efforts of a branch of the National Society for the Promotion of Industrial Education. The administration of the school is in charge of a board of directors consisting of six members. A principal who is assisted by a supervisor is in charge of the classes. During the year 1909–10 pupils were registered in the various trades as follows: Plumbing, 20; machinists, 22; jewelry making, 13; silversmithing, 20; electrical wiring, 25; steam engineering, 6; blacksmithing, 18, pattern making, 22; domestic arts (including dressmaking and millinery), 21. The requirement for admission is employment in the trade studied in the school. Entrance may be made at any time of the year if there is a vacancy in the class desired.

The school is too young to have as yet determined the length of the course for each trade. Only one year had been outlined at the time of the investigation. Pupils in domestic arts attend six hours per week, four of which are given to shop practice. In all other courses the hours per week are eight, which are evenly divided between theory and practice. In each trade the theoretical work includes lectures, shop mathematics (except in domestic arts), and drawing, drafting, or plan reading.

Classes meet from 7.30 to 9.30 p. m. on Monday, Tuesday, Thursday, and Friday. The school year covers not to exceed 20 weeks from October to February, with a vacation of 10 days at Christmas.

Textbooks are furnished free of charge. No arrangement about awarding a certificate or a diploma has as yet been made.

Eighteen teachers are employed, 8 who teach theory and 10 who teach practice. Three reported merely a common-school education, one a high-school education, while the remainder—4 of whom hold degrees—attended colleges, universities, or technical schools in preparation for their work. All these instructors reported shop experience varying from 1½ to 20 years.

The classes are held in the building of the Technical High (day) School, whose equipment, valued at $47,334, is used also by the evening classes. During the year $1,185 were expended for shop

materials. No fees are charged except for nonresident pupils, who are required to pay $40 per year in advance. There is no school product.

The school work so far has received no recognition as an equivalent of any part of the regular apprenticeship. It merely supplements the actual shopwork. The classes have the approval of both employers' and employees' associations, the representative of the latter stating that organized labor is in favor of technical instruction for those who are serving a regular apprenticeship. Individual employers have not had time as yet to test the school by the work of its pupils. In general it may be stated that the community look favorably upon the school as affording an opportunity for practical instruction. No classes have shown any opposition to its work.

HIGH INDUSTRIAL SCHOOL, DAYTON, OHIO.

The Dayton (Ohio) High Industrial School, an evening school for boys 16 years of age or over who are employed during the day, was established in 1909 by the board of education of the city of Dayton. It is under the immediate direction of the city superintendent of schools.

The enrollment, by trades, is as follows: Cabinetmaking, 14; pattern making, 17; machinists, 89; forging, 17. In addition 76 men from various trades were enrolled in mechanical drawing.

There is no definite length of the various courses. It is planned to give the pupil instruction as long as he wants to attend. With the exception of mechanical drawing, which is taken as a separate course and not correlated with the trade courses, the time is given entirely to practice work; any theoretical instruction that is given is incidental.

The school is in session two hours per night for five nights a week. Sessions are held during 26 weeks of the year, beginning October 1. Pupils taking cabinetmaking and pattern making attend two evenings per week, while for forging and machine-shop practice only one evening is required.

The two teachers of mechanical drawing are regular manual training teachers of the high school and are men of technical education. None of the four trade teachers reported any schooling above the common schools nor any technical training. They are all practical workmen employed at their trades during the day.

The school is too new as yet to have determined its industrial position, but all who have come in contact with it in any way are favorably disposed toward it.

COLUMBUS TRADES SCHOOL, COLUMBUS, OHIO.

The evening classes of the Columbus Trades School were opened in 1909. The purpose of the evening classes is to afford opportunity to men and boys already employed in the trades to perfect themselves in their respective occupations and to fit themselves for advancement.

There are two trades taught—wood turning, in which there are 17 pupils, and pattern making, in which there are 40. The pupils use the shops and equipment of the day school.

The course in each trade covers two years. Sessions are held from 7 to 9 each evening from Monday to Friday, inclusive. The same holidays are observed as in the day classes. Any resident of Columbus, Ohio, 14 years of age or over may be admitted to the evening school. No tuition or other charges are made. Pupils spend all their time on shop practice. The day school is described on page 129.

TECHNICAL HIGH SCHOOL, CLEVELAND, OHIO.

The evening classes of the Technical High School, of Cleveland, Ohio, were established by the Cleveland Board of Education in January, 1909. They constitute a continuation school, the purpose and extent of which are to afford an opportunity to men and women employed during the day to broaden their training in the line of work in which they are already employed.

In the trade course for men the instruction is intended to supplement the imperfect and specialized training of modern shops by giving an opportunity to gain practice in a greater variety of work than is possible under the modern system of machine production.

The courses for women provide instruction along the lines which shall be most helpful in their daily vocational employment.

The affairs of the school are administered by a board of directors, consisting of seven members, elected by the people. The trades or occupations taught in the school and the number of pupils, by trades, in January, 1909, were as follows: Machine-shop practice (general), 46; sheet-metal pattern working, 30; pattern making, 30; pottery, 16; millinery, 20; sewing, 35; cabinetmaking, 15.

There is also a number of pupils who are taking the course in drawing. The indentured apprentices of the Sheet Metal Contractors' Association are bound by the terms of their apprenticeship agreement to attend the school. Pupils are required to enter the school either in October or January.

The course for all the trades taught is two years. Theoretical instruction is given by notes and blackboard exercises applicable to each trade, $1\frac{1}{3}$ hours per week being so devoted, while $2\frac{2}{3}$ hours are

given to practice work in the trade or vocation. Each class meets two evenings per week, the nights of instruction being Monday, Tuesday, Thursday, and Friday, and the hours of instruction for each class are from 7.15 to 9.15. The length of the school year is 20 weeks, beginning in October and closing in April, with 1 week's holiday at Christmas.

The school will confer a certificate of efficiency upon a satisfactory completion of the full course.

Sixteen teachers are employed; these teachers are secured from scientific and trade schools. The school has experienced no difficulty in retaining teachers duly qualified to teach trade work. The teachers are directly responsible to the board of education.

The school occupies the same building and uses the same equipment as are provided for the day Technical High School.

The fee for tuition is $5 for each term of 10 weeks, with a refund of $1.25 provided the pupil has attended 85 per cent of the time. During the school year 1909 the receipts of the school and the sources thereof were as follows: From the city, through the board of education, $300; from the Sheet Metal Contractors' Association for the tuition of its apprentices, $225; for tuition of other pupils, $1,998; total, $2,523.

The cost of materials used in the school during the school year was $200; the cost was met by the school funds. The school does not make any marketable product.

It is in contemplation that the school work will be accepted as the equivalent of a part of the usual period of apprenticeship in sheet-metal pattern work, but to what extent is not as yet known. The school does not pretend to teach a trade in the sense of turning out graduates who will be able to hold their own as general workmen in a shop.

All the pupils of the school are shop employees, and hence wage earners. It is stated that manufacturers appreciate the advantages afforded by the school. No opposition to the school, it is said, has been manifested. It is furthermore stated that the attitude toward the school of employers' associations, of employers singly, and that of others interested is favorable.

McKINLEY MANUAL TRAINING SCHOOL, WASHINGTON, D. C.

The evening course in the McKinley Manual Training School was opened December 1, 1909. Its purpose is to prepare industrial workers for better positions in the occupations in which they are now engaged, or for better paying occupations. The subjects taught have been decided upon as a result of the demand for skilled machinists, electricians, and other workmen in the Washington Navy Yard, in Government departments, and in the local building trades.

This school is a part of the public night school system of the District of Columbia, and is under the supervision of the District Board of Education. The principal of the day manual training school has direct charge of the evening instruction. Among the pupils in attendance on November 30, 1910, were 45 who were receiving training in cabinetmaking and wood turning, 73 who were doing electrical work, and 54 who were engaged in machine-shop work. It was estimated by the principal that approximately 75 per cent of these pupils were either preparing themselves for or already engaged in those trades in which they were being instructed in the school. The remainder were regarded as merely seeking self-improvement, with no intention of applying their knowledge to the earning of a livelihood.

The school accepts as pupils persons 14 years of age or older who are not enrolled in the day schools. Pupils may enter at any stage of the school year, but are encouraged to do so at the beginning of the year. The courses of instruction are indeterminate as yet, but it is planned to have a two or a three year course in each trade. Except in electrical work, in which pupils have two hours of lectures each week, no time is given to purely theoretical instruction. In cabinetmaking and wood turning and in machine-shop work, owing to the large enrollment, pupils are divided into two groups, one of which has one night of practice work in school each week and the other two nights. In electrical work, one night is devoted to lectures and two nights to laboratory and shop work each week.

The school is in session on Monday, Wednesday, and Friday of each week from 7.30 to 9.30 p. m. The length of the school year had not been definitely fixed at the time the school was visited. In 1909–10, owing to the limited funds available, it was necessary to close the school at the end of four months. In future it is planned to have a longer term.

Five instructors were engaged in 1909–10 in teaching the three subjects included in this report. Of these, one gave instruction in cabinetmaking and wood turning, two in machine-shop work, and two in electrical work. All five of these teachers had attended other than common schools and four had worked at the trade taught. One instructor is the author of a student's manual for machine-shop practice, which is used as a reference book by the pupils, while another is the inventor of a motor head speed lathe used in the school. All teachers in the night school in 1909–10 volunteered their services, but were given a small honorarium to satisfy the terms of the law.

Pupils of the evening school use the building and equipment provided for the day manual-training school. The equipment, par ticularly that of the machine shop, is modern and complete. No fee is charged for instruction in any of the subjects taught and no

deposit is required except a check fee of 25 cents, which is returned to pupils when tools are turned in.

Nothing that is produced in the school is offered for sale. In many instances pupils bring in materials and take home the finished articles, such as furniture, ornamental woodwork, and hand tools. Some hand tools are retained in the school. Shop materials used are furnished by the school and pupils.

SOUTH MANCHESTER EVENING SCHOOL, SOUTH MANCHESTER, CONN.

The South Manchester Evening School was established in 1906 for the purpose of supplying elementary training in carpentry and domestic arts.

The school was established by vote of the Manchester town meeting in response to an evident need of additional skill and efficiency in the carpenter's trade and in millinery and dressmaking. The school is a part of the regular public-school system of the city. Classes are conducted in one of the regular day school buildings.

Thirty pupils are enrolled in the carpentry trade, and 126 in dressmaking and millinery. Any person 14 years of age or over who is employed during the day is eligible for admission to the classes.

There is no definite length of course. At the end of the year each pupil is given a certificate stating what work has been done by him during the year. The work is so arranged that if pupils wish to continue from year to year they may do so.

School is in session from 7.30 to 9.30 four evenings a week. About one hour of the eight is given to theoretical instruction, which comprises lectures on the care and use of tools, etc., while the rest is devoted entirely to practice work.

Six teachers are employed for the night classes. All of these are practice teachers, teaching theory in connection with the practice. These teachers were all obtained from the trades; none of them reports scholastic training beyond the eighth grade.

The school does not make a product. Any articles made by the pupils (from materials furnished by them) are retained by them.

The school makes no pretense of taking the place of the apprenticeship or any part of it, but merely gives sufficient training to give the boy or girl an intelligent basis for learning the trade. Employers and employees who know the work of the school are very favorably disposed to it.

ARMSTRONG MANUAL TRAINING SCHOOL, WASHINGTON, D. C.

In this evening school classes are in session for two hours on three evenings of each week. The specific purpose of the night instruction, which was begun in 1902, is not to produce finished artisans but to teach the fundamentals of trades for the purpose of (1) increasing

the efficiency of those already employed at trade work and (2) preparing persons for entry into new trades. Pupils are advanced to a practical knowledge of all essentials in the trade work taught. These have been selected with respect to the opportunities for employment open to negroes in the local industries of Washington.

The equipment of the day school is used by the night classes, the shop practice of the latter being similar to though in some cases more advanced than that of the day classes. In the evening school there is no academic instruction. Such theoretical instruction as it is necessary for pupils to have is given incidentally in connection with their shop practice.

The enrollment by trades during 1909–10 was as follows: Electrical work, 25; automobile mechanician's work, 20; machine-shop work, 26; joinery and cabinetmaking, 22; steam engineering, 24; sewing and dressmaking, 207; tailoring, 20; millinery, 96.

In addition, 36 pupils studied cooking during the year.

A four-year course is offered in each trade except millinery, in which the course is two years in length.

Of the pupils in attendance upon the night classes, it is believed that a majority are seeking instruction that will fit them for trade work as a means of livelihood. In the case of males, almost all pupils are said to be preparing for trade careers. A small percentage are in school for the purpose of improving themselves in their present occupations, while the bulk are availing themselves of the opportunity of preparing for new lines of work. The object generally is to get out of unskilled work into a skilled trade. About 70 per cent of pupils are reported as remaining in school until the completion of their courses, most of the withdrawals occurring during the first and second years. At the end of the year each pupil whose work has been satisfactory is given a written statement by the principal showing the amount of work done. A certificate is awarded pupils who complete the full course of training.

Eleven teachers were employed in 1909–10 in giving instruction in the trade subjects covered by the investigation. Of these a majority were also teachers in the day school. Actual experience in the trade taught was reported by eight teachers and previous experience in teaching the trade by all of the teachers. All but three teachers had attended schools other than those of the common-school type.

This school being a part of the public night-school system of the District of Columbia, there is no charge for instruction. The cost of shop materials in 1909–10 was $557. In addition, some materials were furnished by pupils.

Any Negro 16 years of age or over who possesses a common-school education may be admitted to the school. No other restriction is imposed, and pupils are received at any time of the school year.

The metal and woodworking classes make some products, such as tools, cabinetwork, etc., which are used in the school. Some materials are brought in by pupils, who take home the articles when finished. No product is sold by the school. The length of the school year in 1909–10 was 23 weeks.

MILWAUKEE SCHOOL OF TRADES FOR BOYS, MILWAUKEE, WIS.

This evening school was established as a public school in 1906, one year after the day school which is described on page 134. It differs from the day school in that this is a continuation school, practically all of the pupils being employed during the day in the trades they are studying at night. The same buildings, shops, and equipment are used and the teachers are the same as those teaching in the day school. The trades taught are the same as in the day school, these being: Pattern making, with a class of 17 pupils; machinists and tool making, 41 pupils; carpentry and woodworking, 24 pupils; plumbing and gas fitting, 9 pupils.

Pupils who have worked in the trade are credited according to the knowledge of the trade they show; hence some may be graduated in one year or less, while for others several years might be necessary.

Instruction is given on Monday, Tuesday, Thursday, and Friday evenings from 7.30 to 9.30, from October 1 to April 30. Two hours per week are devoted to the teaching of theory and six hours per week to shopwork.

Pupils are admitted at 16 years of age and over and may enter the school at any time. No tuition fee is charged to residents of the city of Milwaukee who are less than 20 years of age. All nonresident pupils and resident pupils 20 years of age or older must pay a tuition fee of $4 per month. No charge for materials used is made of those paying tuition fees, but those getting tuition free are charged $1 per month for materials used.

In all other respects the data for the day and evening schools do not differ.

Both trade unions and employers' associations have expressed themselves as being favorably disposed toward the school.

MECHANICS' INSTITUTE, NEW YORK, N. Y.

The Mechanics' Institute does not fall within the scope of the investigation and does not appear in the general tables because its instruction is not directed toward any particular occupations, but owing to the fact that many of the courses of study may be taken as continuation or as trade preparatory work a sketch of the school is given.

The institute is one of the activities of the General Society of Mechanics and Tradesmen of the City of New York. The institute

was opened in 1859 as an evening school. It replaced a day school which had been maintained by the society. Free tuition is provided in the following subjects: Architectural drafting, mechanical drafting, free-hand drawing, modeling, mathematics, and science. The instruction is not given, however, with special reference to any particular occupations. The society maintains scholarships in the New York Trade School for those who wish to learn the actual work of a trade. Preference is given to students in the institute when such scholarships are awarded.

The subjects taught have been determined largely by local industrial needs, while some consideration is also given to the desires of those who present themselves for instruction.

A total of 1,892 pupils was enrolled in November, 1910. Some of these pupils attended more than one class. The classes were composed of mechanics representing many trades, clerks, and persons in semiskilled and unskilled occupations. No age is specified for entrance, but since the instruction is given for males who are employed during the day the assumption is that all are at least 14 years of age.

Entrance to classes must be made at the beginning of the year, except for such applicants as are on the waiting list and are sent for when a vacancy occurs. The school is so popular that absence without adequate excuse for two consecutive evenings is deemed sufficient reason for dropping pupils from the roll and offering their places to those on the waiting list.

The institute is governed by a committee appointed by the president of the society. This committee appoints the director and his 30 assistants, who are the instructors in the various subjects.

The course for each subject covers three years. Graduates in architectural drafting may take a fourth year in architectural design. In order to obtain a diploma two of the three years must be taken at the institute. In addition to this condition an average attendance of at least 80 per cent and the successful passing of an examination are required for graduation.

Classes are held from Monday to Friday, inclusive, from 7.30 to 9.30 p. m. Two evenings each week are generally given to each of the classes. The institute is in session 25 weeks, beginning in September and closing in April. Sessions are suspended on legal holidays, for 3 days at Thanksgiving, and for 10 days at Christmas.

Pupils are required to furnish their own textbooks as well as their drawing instruments and materials. A free circulating library is maintained by the society for the benefit of pupils and members.

The work of the Mechanics' Institute is regarded favorably by both the employing and employed classes. Graduates find no difficulty in securing positions for which their work has specially prepared them or in advancing in their own trades or lines of work.

EXTENSION EVENING COURSES OF TEACHERS' COLLEGE, COLUMBIA UNIVERSITY, NEW YORK, N. Y.

The evening courses of the School of Industrial Arts of Teachers' College, which is affiliated with Columbia University but under separate administration, are planned primarily to provide instruction for employed mechanics, and ultimately to prepare persons skilled in a trade for teaching that trade.

This school, while not quite within the investigation because of not having definitely formulated plans as to industrial education, is thought to be of sufficient interest and significance to be noticed in this report.

The director of the school, with the faculty, decides what subjects shall be taught. The considerations in selecting such subjects are, first, the trades for which there is a local demand; second, the ultimate aim of preparing some pupils for teachers; the third, the limitation of the equipment of Teachers' College.

The extension courses for those who desire to be teachers were established in 1906, but during the last two years a special effort has been made to interest men and women in the trades in the work of the school, and special classes have been designed to meet their needs. The evening work is only a part of the regular work of Teachers' College. The expenses of the school are met by students' fees.

The trade work could be taken as supplemental instruction by apprentices, but it is especially fitted to persons who have completed their apprenticeship and are employed, but who desire more of the technical knowledge of their trade.

The following are the trades or trade subjects taught: Mechanical drawing, machine design and construction, machine-shop work, woodworking (advanced cabinetwork, shopwork, wood turning, and pattern making), and elementary plant management.

Any man engaged in a trade during the day may take these courses. Each course is separate in itself and is made up of 50 sessions. The courses are so related that a man may return a second year and take up another course to get more advanced work in the trade in which he is engaged.

The work is given either on Monday and Wednesday or Tuesday and Thursday from 7.45 to 9.45 p. m., making a total of 4 hours each per week in each course. In each course there are at least 30 hours of lectures and 60 hours of shop instruction—that is, about one-third of the work is theory and two-thirds are practice.

An effort has been made to interest the labor unions in New York in the trade courses of the school. The organizer of the local union of eccentric firemen is enthusiastic about the work and has cooperated

with the school authorities, encouraging the members of his union to attend the classes in plant management. However, considerable difficulty has been encountered in fitting the work to the needs of the men. When the course in plant management was first given a considerable number of the class left because they were not fitted for the course, or it was not what they had expected. Most of those who remained to the end of the first year have returned, and through them others have been secured who were better fitted for the course. Thus each class becomes an experiment in itself. Attempts are still made to interest other unions in the work of the college, and to discover what the men would like and need.

Since the school is supported by tuition fees, the tuition has to be so high that most men and women actually in trade can not take the courses. The tuition fee is usually $20 for the 50 sessions. For the wood-turning and pattern-making course it is $25 for the 50 sessions; for plant management it is $20 for the 40 sessions. The directors of the school feel that they can not hope to secure many students from the trades until they can reduce the tuition. In addition, considerable prejudice is found among working men and women against going to college for work. They are familiar only with the old-fashioned college whose work was far removed from the practical needs of wage-earning men and women. The school management would like to make its work practical, thus convincing these men and women that they can find here what they need. The school is prepared to teach cooking, laundry work, and dressmaking, but so far almost no such student has been secured. Housewives and teachers will come, but the girls actually in the trade find the fees prohibitive, or do not know that the school can be of practical use for them.

The sessions last about 25 weeks, from the end of October to May.

There are seven teachers employed for the classes mentioned. Excepting two, who have only had trade experience, they have all had technical education, two being graduates in technical courses.

CHAPTER VII.

TEXTILE SCHOOLS.

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INTRODUCTION.

The primary purpose of the majority of textile schools at the present time is to train men as engineers and for supervisory positions who may be able to compete with foreign manufacturers in the production of the finer grades of cloth. With this end in view a textile department was added to the Pennsylvania Museum and School of Industrial Art, at Philadelphia, in 1884. Also, in 1895, the Legislature of Massachusetts passed an act authorizing the establishment of textile schools in cities having at least 450,000 spindles. Under this act schools were opened at Lowell, New Bedford, and Fall River. Courses of textile instruction arranged primarily to prepare pupils for supervisory positions are provided in several of the agricultural and mechanic arts colleges of the Southern States, as the Georgia School of Technology, the Mississippi Agricultural and Mechanical College, and the North Carolina College of Agricultural and Mechanical Arts. Some of the correspondence schools also provide textile instruction.

It is not the purpose in the present report to deal with schools of the type described above, except in cases where such schools may have, as a secondary feature of their instruction, departments or classes organized for the specific purpose of training for the manual textile occupations. The following schools, all of which in whole or in part aim to prepare pupils for manual vocations as distinguished from supervisory positions, have been included:

TEXTILE SCHOOLS INVESTIGATED.

Name of school.	Location.	Year of establishment.	Class of school.	Day or evening school.	Weeks in school year.
Bradford Durfee Textile School	Fall River, Mass.	1904	Public	Evening.	26
Lawrence Industrial School:					
(*a*) Day classes	Lawrence, Mass.	1909	do.	Day.	40
(*b*) Evening classes	do.	1908	do.	Evening.	20
Lowell Textile School	Lowell, Mass.	1897	do.	do.	20
Ludlow Textile School	Ludlow, Mass.	1907	Apprentice.	Day.	47
New Bedford Textile School	New Bedford, Mass.	1899	Public	Evening.	21
Paterson Silk Textile Institute [1]	Paterson, N. J.	1902	Proprietary.	Day and evening.	50
Secondary Industrial School	Columbus, Ga.	1906	Public	Day.	48

[1] The facts for this school have not been included in the General Tables, Chapter XVIII.

It is found that in the textile industries the continuation school, in addition to advancing a person in his present occupation, aims to advance him to other occupations in the industry or in a department of the industry. Some of these schools have technical courses and do a certain amount of technical school work, especially in connection with the dyeing part of the industry. This is a phase of continuation school work which differs from the ordinarily accepted meaning of the term "continuation" as defined in this report.

Another school, whose object is to make textile workers more efficient in their daily vocations, is the evening school opened in Lewiston, Me., during the winter of 1910. Courses were offered in carding, spinning and twisting, designing, and analysis, and about 50 pupils were enrolled. Owing to the short time elapsing since this school began operation, no report of its work has been attempted.

There are two distinct classes of people whose needs these textile schools seek to supply. First, young persons who have neither textile education nor experience, but who wish to learn the industry, or some of its occupations. Most of this class attend day sessions, where instruction in both the theory and the practical art of textile manufacturing may be had. Second, older persons engaged during the day in the textile or other industries, who wish either to advance within the textile industry or obtain a knowledge by which they may enter it. While most of these have experience in textile mills, they lack the knowledge of the theory and underlying principles of the industry which would make it possible for them to reach higher and better paying positions.

The textile manufactures of each locality largely determine the nature of the schools; and the boards of trustees or the companies, cooperating with the teachers, decide what subjects shall be taught. Between the public textile schools and the manufacturing establishments there is no direct or immediate connection, except in cases where a part-time cooperative system has been arranged with the manufacturers. In the two private schools, the Ludlow Textile School and the Paterson Silk Textile Institute, the connection is apparent from the fact that the companies, through their schools, seek to supply themselves with skilled workers.

Practically all the occupations of cotton, woolen, worsted, and silk mills, and of mills manufacturing jute and hemp yarns, jute bagging, twine, and webbing are covered by the courses of instruction in these schools. The four public textile schools of Massachusetts give, in addition, instruction in some trades connected with textile manufacturing.

The courses of instruction for specific occupations and trades vary from a few months to several years. But while the shorter courses include only theoretical instruction and practical work for a single

occupation, the longer courses embrace academic as well as trade instruction and usually cover a group of related occupations. Officials and teachers of textile schools believe that the pupils will become more efficient workers if given a broader training, including academic as well as theoretical instruction and practical work. The greater part of the academic instruction is confined to day sessions, and practically all the pupils taking it are young persons who have not yet been employed. In the evening sessions the larger part of the pupils are older persons already employed, who no longer care for academic instruction and who demand that everything taught them must have a practical value for their everyday life.

These schools have no summer terms. Their vacation periods within the school year are legal holidays, a week between terms where the year is divided into terms, and a few days or a week at Christmas and Easter. Most of the evening pupils work during the day, and some of the day pupils have various kinds of employment at night.

Outside of the academic subjects few, if any, regular textbooks are used; but the school principals or teachers in most cases have prepared sets of notes, problems, and texts to meet their needs. The teachers report that satisfactory textbooks on textile trade subjects can not be obtained. All of the five evening schools award certificates to persons who have completed the course. The Paterson Silk Textile Institute and the textile departments of the Lawrence Industrial School and of the Secondary Industrial School, of Columbus, Ga., award certificates or diplomas to persons who have completed the full day course. The Ludlow Textile School awards no certificate or diploma.

The Lowell, New Bedford, and Bradford Durfee (Fall River) schools have the same purpose and their courses of instruction are so nearly the same that only one of the three, that at Lowell, is described. But, while the New Bedford and Bradford Durfee schools have confined their work to courses in cotton manufacturing, with some attention to allied trades, the Lowell school gives complete courses in both cotton and woolen manufacturing and in trades related to those branches.

LOWELL TEXTILE SCHOOL (EVENING CLASSES), LOWELL, MASS.

The evening classes in the Lowell Textile School were organized February 1, 1897, for the purpose of enabling persons employed during the day either to perfect their knowledge of the occupation or department in which they work or to acquire knowledge of other processes.

The school was established and is managed by a board of trustees composed mainly of representatives of textile or textile-machine corporations. Associated with them, ex officio, are several officials of the State and city governments. The trustees have entire adminis-

trative control of all school matters and carry out their will through committees of their members. It is the policy of the board that a safe majority of their members shall be persons actively engaged in textile manufacturing and that the school work shall at all times be in accord with the conditions and needs of the local textile industry.

The time required of each pupil in the school is two evenings per week, but if a pupil wishes to take more than one course at the same time he may do so by coming more evenings per week. In none of the departments is the work divided definitely between theory and practice, with specific periods of time given to each, but on the contrary theory and practice are closely interwoven.

The theoretical work consists of lectures, talks, and explanations relating to the different occupations taught. Practice work is afforded in some occupations.

On January 1, 1910, there were 589 pupils enrolled in the several departments of the evening school. Included in this number were persons pursuing courses in steam engineering, electricity, mechanical and architectural drawing, free-hand drawing, machine designing, machine shop work, and other subjects related to the textile trades, in addition to the pupils in the many textile occupations proper. The number of pupils in occupations covered by the present investigation was 385. More than 75 per cent of all pupils were in their first year in the school.

About 30 per cent of the pupils leave the school without finishing the course of instruction. Probably one-half of these are young persons—some of them under 14—who come for a few evenings and then drop out. Other causes assigned for their leaving are lack of capacity, lack of interest in the instruction, and too little previous education.

Applicants for admission to the evening classes are required to furnish a certificate of graduation from a grammar school or school of higher rank, or pass an examination in English and arithmetic. There is no age limit on school entrance; the matriculation of pupils is restricted to the first six weeks of each term.

The time required to complete a given course in the school varies from one to three years, depending on its character. In some cases it is possible to pursue two courses together, but this always depends on the arrangement of the schedule for any particular year.

Instructors are employed to teach individual subjects or a group of subjects which cover a number of related occupations. Eleven of the teachers employed in 1909–10 were trained in textile schools, and five had courses in mechanical engineering at various institutions.

Twelve teachers had worked in textile occupations for periods of various lengths ranging as high as 31 years, and 15 had previous experience in teaching textile subjects or allied mechanical trades.

The teaching force in chemistry and dyeing is not included in the foregoing statement.

The school is housed in commodious new buildings, equipped with the best types of textile machinery. The buildings and equipment are used for both day and evening sessions. The number of evening pupils, however, is four or five times that of the day pupils.

There is no tuition fee for persons living in Lowell. Pupils from outside pay, in advance, a tuition fee of $5 per year for each course. To persons from Lawrence, the school furnishes free transportation amounting to $8.50 per year for each pupil. The deficit of $3.50 on each Lawrence pupil is made up from the $5 fees received from evening pupils from towns outside of Lowell, other than Lawrence, and from an annual income of $400 received from a fund in Lawrence known as the "White fund." The net result of this arrangement is that the school comes out about even, spending nearly all the tuition received from pupils from towns outside of Lowell and Lawrence upon transportation for Lawrence pupils. A breakage deposit is required in the course for chemistry and dyeing, $5 in the first and second years and $10 in the third and fourth years. The various materials which the school bought in 1909–10 cost $1,000, but materials to the value of about $4,500 were used in the evening session. Cotton and woolen manufacturers furnish material in an unfinished stage of manufacture to the school free. In some cases, too, pupils supply their own material (cotton or wool) and keep the product. Other than this, no marketable product is made, and pupils earn nothing from the sale of finished product.

There is constant demand for pupils and graduates of the school, as shown by the frequent inquiries and requests for employees that come from textile mills. The school does not attempt to teach trades as such, the purpose being to furnish additional instruction and training to persons already in the textile industry. It aims to give such persons a broader knowledge of their vocations and of the textile industry generally, so that they may become more proficient in their present occupations or rise to higher and better-paying positions. A considerable number of the pupils after taking an evening course sooner or later reach supervisory or other responsible positions. Industrial workers generally, including textile foremen, overseers, operators, and machinists have shown much appreciation of the school and its work. Textile employers, individually and as associations, are said to be strongly favorable to it. The movement for the establishment of the school arose among this class, and 15 of the 20 permanent trustees are concerned with textile manufacturing. These state that as a result of the training provided by the school the local textile industry has been advancing rapidly, especially in the manufacture of the finer grades of cotton, woolen, and worsted cloths.

LAWRENCE INDUSTRIAL SCHOOL (TEXTILE DEPARTMENT), LAWRENCE, MASS.

In the autumn of 1907 a school for secondary technical education was opened in some unused buildings belonging to the city of Lawrence. It used as a nucleus a small school which had been conducted for some time by the loom-fixers' union. Business men favored it, but feared the city could not afford the expense of proper equipment. It was started as an evening school for those already engaged in the various trades and included classes in loom fixing and calculations, mill arithmetic, textile designing, and cloth calculations.

The attendance increased and on January 20, 1908, the school was formally established under the act of 1906 allowing cities and towns to organize independent industrial schools under boards of trustees.

It was opened as an evening school under the joint control of the city and State on March 16, 1908. The day session was decided upon February 23, 1909, but was not opened until the following September. Both sessions directly prepare persons for manual occupations.

Its purpose is to meet "a distinct educational need by taking boys and girls of two classes: First, those who are not academically inclined, and, second, those who are obliged to go to work at an early age, and by giving them a practical training in the useful arts (textile) to increase their earning power."

The following wool and worsted textile occupations were taught in the day session in 1909–10: Sorting, scouring, carbonizing, dusting, picking, carding, warp preparation, weaving, gilling, combing, and designing, with 24 persons (all males) enrolled. Though not taught in 1909–10 because of the fact that the course was not fully laid out or the equipment all installed, the following subjects are to be included: Burling and mending, fulling, washing, drying, gigging, napping, steaming, brushing, shearing, pressing, measuring, and packing. For cotton, courses in picking, carding, drawing, spinning, twisting, spooling, warp preparation, and weaving are to be added.

Under the part-time system recently introduced into the school there were nine boys in 1909–10 who received instruction in the textile department on alternate half days or alternate weeks. These boys were not segregated, but were placed in the regular classes with other pupils.

The different textile occupations are grouped under the heading "textile arts," and the plan is to make a three-year course for the group as a whole. Each year's work is made as far as possible a definite and complete unit, so that if a pupil leaves at the end of any year he will have a complete training up to that point.

The academic subjects taught in the first year of the day course, with the number of lessons per week in each, are as follows: English,

two periods; civics, one period; industrial history, two periods; mill arithmetic, five periods; electricity, five periods. Each period consumes 50 minutes, making a total of 12½ hours devoted to academic work during each week of the school year. In addition, 6½ hours per week are devoted to talks and explanations of the work in hand.

The above five subjects form in no sense the theory of any particular occupation, but are taken by all pupils in textile arts and serve as a foundation for the work of the second and third years. In addition to these subjects the various textile occupations are taken up in order, and 4 hours of practice per week is given. The total requirement for the week is 23 hours. It is planned that the instruction will be less cultural and that each person will specialize in some division of textile manufacturing after the first year.

In the evening school the textile occupations taught in 1909–10 and the pupils enrolled were as follows: For wool and worsted—sorting, scouring, carbonizing, dusting, picking, carding, gilling, taken as a group, 43; mule spinning, twisting, spooling, combing, drawing, and spinning, warp preparation and weaving, taken as a group, 96; designing, 45; warp preparation and weaving for worsted only, 43. For cotton—picking, carding, and drawing, taken as a group, 15; spinning, twisting, and spooling, 15; warp preparation and weaving, 26; dyeing, 30.

Other occupations in which instruction will be given, though omitted in 1909–10, are burling and mending, fulling, washing, drying, gigging, napping, steaming, brushing, shearing, pressing, measuring, and packing.

As in the day school, the textile occupations are grouped as the "textile arts" and the course is to be two or three years in length, the time having not yet been determined. Dyeing is taught in separate buildings and will be a course of one or two years by itself.

No academic subjects are taken up in the evening school, but topics relating to textile occupations are discussed.

One evening per week is the unit of time required, but pupils may attend each of the five evenings if they so desire.

In both the day and evening schools, the minimum age limit for admission is 14 years. There is no maximum age limit. Instruction is free to residents of Lawrence. For nonresidents a charge of $100 per year is made in the day school and $25 per year in the evening school. Under the Massachusetts law, this tuition charge is borne equally by the State and the town or city from which the pupil comes. Entrance to the schools may be had at any time of the year.

LUDLOW TEXTILE SCHOOL, LUDLOW, MASS.

This is a private school established May 5, 1907, by the Ludlow Manufacturing Co. The purpose is to educate young male employees in the different occupations connected with the manufacture of jute and hemp yarns, jute bagging, twine and webbing, in which the company is engaged. The company maintains no regular apprenticeship system, but has designed a four-year course of education and training, both theoretical and practical, to take the place of apprenticeship.

Boys between 14 and 16 years of age who have passed the sixth grade of the public schools and also a physician's examination showing that they are in good physical condition are eligible for admission to the school. Application for the entrance of a boy must be made by his parent or guardian. The enrollment is at present limited to 30, and this number was enrolled during 1909–10. Whenever a vacancy occurs, a boy may be admitted.

The course of instruction as yet is somewhat tentative, but covers four years, the last year's work being not yet outlined. The academic subjects and the number of lessons per week given to each during the first three years are as follows:

First year.—Arithmetic, five periods; English, one period; geography, one period, history, three periods; drawing, four periods.

Second year.—Algebra, five periods; English, one period; physics, three periods; history, one period; drawing, four periods.

Third year.—Algebra, four periods; mill arithmetic, five periods; English, one period; mechanics, three periods; history, one period.

The time devoted to each lesson is 45 minutes, making a total of 10½ hours given to academic subjects during each week of the course.

For school work, the morning and afternoon sessions are three hours each, from 8.30 to 11.30 a. m. and from 1 to 4 p. m., respectively. The boys are in two sections, and alternate weekly between morning and afternoon session. Each section has in addition to academic work 4½ hours of manual training in woodwork each week. During the week when a section has its classroom work and manual training in the morning, it has five hours of practice work each afternoon and on Saturday, in the different textile occupations, making 30 hours of mill work per week, and a total for class work, manual training, and mill work of 45 hours per week.

The practice work in the mill, occupying five hours each week day, is spent by the boy in caring for different machines or doing whatever other work is assigned to him. During the first three years, such work includes sewing spindle bands, doffing, tending creels, supplying different machines with bobbins of the proper size and kind of yarn, packing cans, running lappers and calenders, making reels of twine, taking care of finisher cards, making tests of yarn for weight and

strength, sweeping floors, oiling machines, cleaning shafting, and repairing parts. Every three months each boy is transferred to another machine or to other duties, representing more advanced stages in the process of manufacture.

During the school year 1909–10 the company supplied funds amounting to $1,800 for the maintenance of the school. No fees are charged for instruction. Pupils receive pay for time spent in classroom at the same rate as for practice work in the mill, making a total of 45 hours per week for which they are paid. The hourly rates of pay are: First year, 8 cents; second year, 9 cents, third year, 10 to 12 cents.

SECONDARY INDUSTRIAL SCHOOL (TEXTILE DEPARTMENT), COLUMBUS, GA.

The Secondary Industrial School is an integral part of the public-school system maintained by the city of Columbus, Ga. It was established in April, 1906, and opened in December of the same year.

The textile department is intended to give boys 14 years of age and over who have finished the seventh grade of the public schools a training in both the theory and practice of cotton manufacturing that will prepare them to enter the industry as skilled operatives. The instruction given covers knitting and all the cotton manufacturing occupations falling within the carding, spinning, weaving, dyeing, designing, and finishing departments. Pupils may enter only at the opening of the half-year terms. The enrollment during 1909–10 was 10.

The different textile occupations taught are grouped under the head of "textile arts," and a three-year course of academic and theoretical instruction is given. Following are the academic subjects, and the number of 45-minute periods per week for each, by years:

First year.—Arithmetic, five periods; physics, five periods; grammar, five periods; history, four periods; drawing, five periods; theory of the occupations, five periods.

Second year.—Algebra, five periods; chemistry, five periods; rhetoric, five periods; history, four periods; drawing, five periods; theory of the occupations, five periods.

Third year.—Geometry and trigonometry, five periods; chemistry, four periods; English literature, four periods; history, four periods; drawing, six periods; theory of the occupations, five periods.

During the first and second years 21¾ hours per week are given to academic instruction and 17¼ hours to practice work; during the third year there are 21 hours of academic and theoretical instruction and 18 hours of practice. A certificate is given at the close of each year and a diploma upon the completion of the full course.

Three teachers were employed in 1909–10—one for teaching science and mathematics, one for theoretical instruction, and one for instruc-

tion in practice work in the textile occupations. The school has had some difficulty in retaining satisfactory teachers, due to the fact that better-paying positions can be obtained in textile mills.

Most of the boys in the textile-arts course in 1909–10 were sons or relatives of mill owners. The small attendance may be partly due to the fact that a business-training course also is given in this same school. Employers and employees are believed to be favorable to the school, but employees do not, it is said, fully appreciate the opportunities and benefits which it offers.

PATERSON SILK TEXTILE INSTITUTE, PATERSON, N. J.

The Silk Manufacturers' Association of Paterson, N. J., opened this school in April, 1902, their purpose being to supply themselves with efficient operatives by giving them a practical training in silk manufacturing that would enable them to begin work as skilled artisans. It is a proprietary school, all pupils being charged a tuition fee, which varies with the course taken. Here, as elsewhere, two distinct classes of pupils are found; first, young persons, both male and female, who have no silk-mill experience; and second, persons already employed who have experience but too little or no industrial eduction.

Although the day and evening sessions are separate, pupils frequently transfer from one to the other, so that it is necessary to regard the two sessions as a unit. The occupations taught and the enrollment therein during 1909–10 were as follows: Winding, 25; warping, 55; twisting and entering, 8; weaving, 46; loom fixing, 1. In some instances individual pupils were enrolled for more than one course. Besides these, 4 pupils took a course in "general knowledge" as a preparation for supervisory work and 17 pupils received instruction in designing.

The policy of the school is to refuse admission to orientals, but any other person of either sex who resides in Paterson or vicinity and who is 16 years old or over is eligible for admission and may enter at any time.

The school gives no academic or theoretical instruction, hence there is no teacher of theory, but, including the principal, there were six teachers of practice work in 1909–10. Teachers are responsible to the manufacturers' association for the proper performance of their duties and are chosen from among persons of thorough experience in the silk industry.

The school occupies rented quarters, for which it pays an annual rental of $1,000, including janitor service. Its equipment is valued at $8,000, part of which was donated by manufacturers of machinery and the rest by the Silk Manufacturers' Association. The school is

not entirely self-supporting. During 1909–10 the association supplied $500 in cash and $588.52 worth of raw materials for conversion into silk fabrics. Tuition fees amounted to $2,501.50; and products sold, together with custom work done for manufacturers, brought in $3,700.

Persons who have received a training in the school readily find employment in the silk mills of the city. Most of the evening pupils are employed during the day, and some of the day pupils have various kinds of employment at night.

Employers and mill operatives, especially warpers and weavers, have expressed appreciation of the school. Organized labor is said to be unfriendly to it, believing that it turns out partially trained persons who take the places of union workmen at wages lower than the union wage scale provides.

CHAPTER VIII.

GIRLS' INDUSTRIAL SCHOOLS.

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INTRODUCTION.

Trade schools for girls, or even schools that offer industrial courses which aim directly to fit girls for specific occupations, are not numerous. However, the interest in those which have been established is manifested both by a definite movement for the organization of other schools and by their influence on the economic and social problems of wage-earning women. The need of a study, not only of the schools but also of the local industrial conditions under which women work is recognized as essential before organizing industrial schools for girls in any community. Investigations of the opportunities for women in various vocations have been limited in scope and few in number. Where such investigations have been made the information secured has been exceedingly valuable to the schools, but what is true in one locality may not apply to others. In many cases a general conviction that girls should have, or were demanding, some vocational training has led to the introduction of dressmaking and millinery, with little knowledge of the local conditions of work, wages, hours, chances of employment and opportunities in the industry. This has frequently been done by committees of men who were unacquainted with the millinery and dressmaking trades and who did not know whether there were other vocations that offered better opportunities for girls. The advisory committees and directors of some of the schools likewise have frequently been men and women of little knowledge of women's occupations and opportunities.

It is noticeable that dressmaking and millinery are almost the only trade courses offered to girls at the present time. Power sewing machine operating is only another form of work on clothing. The dressmaking trade itself is so specialized that it is difficult to enumerate the subdivisions in the trade so that they may apply to all schools. The plain sewing courses are usually planned to train seamstresses—i. e., girls who are able to do plain sewing and mending in homes. A dressmaker's assistant, or improver, as the term is used in the trade, means a skilled worker who knows the sewing processes and can intelligently take directions from experienced sleeve, waist, and shirt makers. A dressmaker proper must have a

fundamental knowledge of all branches of the trade. The occupations of designing, drafting, fitting, etc., are the higher positions and are usually secured by working up from the lower positions.

The terms used for the subdivisions in the millinery trade are fully as indefinite as those of the dressmaking trade. Because of this lack of definiteness the term "assistant" is used here, as in the dressmaking trade, to mean the position of the worker skilled in the processes but who works under the direction of experienced workers. As in dressmaking, experience as well as knowledge of processes is necessary to be a finished milliner. The occupations of designing, copying, and trimming are the higher positions in this trade. An effort is now being made by the schools to define the terms designating workers in these trades so as to eliminate the present prevalent confusion when pupils seek employment.

Two of the schools, the Manhattan Trade School for Girls and the Girls' Trade School of Boston, have worked out a distinct department of the school as an employment bureau for their graduates. Thus they are enabled to keep in touch with conditions in the industries for which they are preparing girls.

In schools of the elementary short-time type, the usual purpose is to prepare girls of the poorer classes to become self-supporting as quickly as possible. The class of pupils for which these schools were established is especially characteristic of large cities, and this must be borne in mind in considering them. A large percentage of their pupils have not gone beyond the fifth year in the grammar school. The chief emphasis of the entire course is the practical character of the training. It is not expected that pupils will be finished dressmakers or milliners, but only that they will be qualified for work as assistants. As a rule, pupils must be of legal working age, in order to enter these schools. In the short period of school training an attempt is made to put the girls in proper physical condition for work, with enough instruction in the laws of health to enable them to remain so.

The advanced short-time schools are somewhat different in their general characteristics from the other types. Their pupils pay a tuition fee, and they are usually older and better able to profit by the instruction given. The school work is offered in courses, so that a pupil may take as much or as little as is desired, but these courses are fitted to the actual needs of the pupils for whom they are designed. The work is of high grade and is arranged to meet the needs of the trade. No academic subjects are taught, as it is expected that all such instruction will have been secured before entering the school. As the work in this type of schools is advanced in character considerable attention is paid to designing and costume sketching. These have been included in the present report only when they applied directly to the trades of dressmaking and millinery.

A third group of girls' schools offers longer and more theoretical instruction, but of a less pronounced trade character than that of either of the above types. Among these are public high schools with day courses for industrial training. Their entrance requirements often include graduation from the grammar school, and their courses are usually three or four years in length.

The first year's work in these schools is largely cultural while that of the remaining years is planned to be as closely related to their chosen vocations as possible. Training is given in all features of the pupil's work during her stay in the school.

In a fourth group of schools there may be included the evening schools for women. Some of these are public schools and some are philanthropic. The courses in these schools are offered for girls and women who are employed during the day Much of the work in them appeals particularly to girls who want it for home use. Many of those entering such courses do so because of a definite prospect of marriage and are taking it in preparation for housekeeping. Only such courses as appear to be largely for trade purposes have been described in detail in this chapter.

The instruction given in these schools is not limited to the processes employed in the different occupations taught, but includes cultural subjects, physical training, and regulations and laws which will affect pupils when they go to work. The aim is to make intelligent as well as skillful working women.

The following schools for women have been selected for description as being representative of the several types mentioned in the preceding paragraphs:

Elementary Short-time Schools.—Manhattan Trade School for Girls, New York, N. Y.; Girls' Trade School, Boston, Mass.; Milwaukee School of Trades for Girls, Milwaukee, Wis.; Clara de Hirsch Trade School, New York, N. Y.; Pascal Institute, New York, N. Y.; Chicago Girls' Trade School, Chicago, Ill.; Jewish Kitchen Garden Association and Trade School for Girls, Cincinnati, Ohio; Hebrew Technical School for Girls, New York, N. Y.

Advanced Short-time Schools.—Pratt Institute: School of Household Science and Arts, Brooklyn, N. Y.; Drexel Institute: Department of Domestic Arts, Philadelphia, Pa.; Temple University: Department of Domestic Art, Philadelphia, Pa.; Mechanics' Institute: Department of Domestic Science and Art, Rochester, N. Y.

Public High Schools with Day Courses.—High School of Practical Arts, Boston, Mass.; Washington Irving High School, New York, N. Y.

Evening Schools.—New York Evening High School for Women, New York, N. Y.; Cincinnati Evening School, Cincinnati, Ohio; Evening High School for Women, Philadelphia, Pa.; Carnegie Technical Schools: Margaret Morrison Carnegie School (evening courses), Pittsburg, Pa.

A brief description of the School of Domestic Science and Domestic Art, Rochester, N. Y., is also given as an illustration of preparatory trade work in a public school.

Different schools of the classes mentioned train for different grades of work, but none of them pretend to turn out finished dressmakers or milliners. Even in those schools offering the most thorough training it is held that experience and speed can be gained only under trade conditions. A few schools have commercial shops in connection with the school in which experience may be gained. With the fundamental knowledge of the processes of the trade in their possession, pupils can advance under actual trade conditions just as rapidly as their ability and the extent of their training permit.

The wages paid to women in trades, except in the higher positions, are not sufficient to warrant long and extended training. The advantage that the school-trained girl has, however, is that she knows all the processes of her trade, while the girl who has learned in the shop seldom gets an opportunity to learn more than one process. Moreover, the young unskilled girl who goes to work in a shop supposedly as an apprentice often spends most of her time in running errands. Skilled workers in the modern shops do not have time to train girls, and few positions in which the proprietor is willing to supply the training are to be found. Employers have usually been found to be indifferent in regard to industrial education until, from experience, they have learned the superior efficiency of the school-trained girl.

Training in cooking and housekeeping has not been included in the present report unless it was very clearly shown that it was being taken for the purpose of wage earning and not merely for home use. In most schools for girls some work is given in cooking. In the elementary short-time schools it is largely with the idea that the girl will learn what is the best diet on which to keep herself in good health. She has no time to learn home making, as such, any more than she has time for cultural subjects. However, her training and skill, by giving her better standards of work and better wages, indirectly prepare her for better living and for making a better home.

There are also courses of applied art which are opening up new fields of work for women. Applied or industrial art is very closely related to trade work, and many of the well-organized schools are beginning to offer such courses because of the demand of manufacturers of wall paper, oilcloth, textiles, lace curtains, and rugs, and of publishers of books and fashion plates, also decorators, etc., for women who have training in applying their natural artistic abilities. Two schools not included in the report, which have been established directly to meet this demand and which are entirely for

women, are the New York School of Applied Design for Women and the Philadelphia School of Design for Women. Both of these schools take any young girl applicant showing ability in drawing and give her practical training in applied art for a period ranging from two to four years.

MANHATTAN TRADE SCHOOL FOR GIRLS, NEW YORK, N. Y.

The Manhattan Trade School for Girls, of New York City, is a short-time public day school, the purpose of which is to train girls to be self-supporting as quickly as possible. It was established on a philanthropic foundation in 1902 and so continued until September 1, 1910, when it was taken over by the public-school board of New York City, thus becoming a part of the public-school system. After investigation the board of administrators originally in charge of the school decided to offer instruction in occupations in which there is the greatest demand for female workers. Thus courses were provided in general power sewing-machine operating, special power sewing-machine operating, straw-machine operating, dress and garment making, millinery, lamp-shade and candle-shade making, novelty work, and sample mounting. The scheme of instruction developed under the former directors obtains under the public-school authorities.

Any girl between the ages of 14 and 17 years who desires trade education may be admitted to the school either upon graduation from a grammar school or upon examination by the principal of the school in reading, writing, common and decimal fractions, weights and measures. Recommendation is also required from the principal of the school last attended. Large numbers of the applicants are girls who have not finished the eighth grade of the grammar schools. Those who are under 16 are required to furnish working certificates.

Girls are usually directed to the school by some one interested in them and who knows of its work. In June, 1910, there were 270 pupils in attendance. Of these, 163 were in the dressmaking class, 54 in machine operating, 29 in novelty work, and 23 in millinery. One girl was studying drawing only.

The length of time spent on any one line of work in the school varies with the course taken, the economic pressure upon the girls, and the ability of individual girls. The following, however, represents the length of time for each course as nearly as can be determined by the director:

	Years.
Simpler work of dressmaker's assistants	1
Simpler and expert work of dressmaker's assistants	1¼
Plain electric sewing-machine operating	⅔
Operating plain electric sewing machine and special sewing machines, as Bonnaz, tucking, buttonhole, hemstitching, etc	1
Millinery as far as the making and covering of frames	½ to ⅔
Novelty work and sample mounting	½ to ⅔

The largest number of pupils enter in July, after other public schools close. Those entering at this time for a year's training naturally finish their course in the following July, a season at which trade is so dull that there is a good chance of their remaining in the school a few months longer for additional training. Sometimes the management takes advantage of this dull time to send the more needy ones into the country for a few weeks after a year's work in the school, so that when business grows brisk again in the fall the girls are better prepared in both health and training than if they had gone out at the end of the prescribed year. On the other hand, entering at this time is no disadvantage to girls taking the shorter courses or to the girls of exceptional ability who are able to complete the longer courses in less than the usual time, since both classes are ready to go out in the early spring when work is plentiful. The school does not pretend to give complete training in dressmaking or millinery. The pupils are too young and their time in school is too limited by their necessity for earning wages to be able to take advanced training. The girls earn nothing while attending the school.

The school training includes both trade and academic work, the latter including arithmetic, English, civics, textiles, and drawing. For this work they are graded according to their previous school experience and not according to the trade course they have elected. They are also required to take health or physical culture, and may elect cooking. All pupils have 25¼ hours of practice or trade work each week and 7½ hours of academic work. In addition there is an hour each week devoted to physical culture, and one-fourth hour each day to talks on ethical subjects and such subjects as factory legislation, relation of employer to employee, trade unionism, etc. At the end of the day one-fourth hour is devoted to preparing themselves and their workroom for leaving. The academic work is taken up in the first half of the course and is modified as the pupil advances. The eighth-grade graduates drop all such work after a few months.

The school is in session from Monday to Friday, inclusive, between the hours of 9 a. m. and 5 p. m. for 48 weeks in the year, with a week's vacation at Christmas, Easter, Fourth of July, and Labor Day. During July and August there is no academic or gymnasium work, and the school closes at 3 p. m. daily. Otherwise the work is the same the year around, with no other variation in hours. There is no suspension of work for a busy season in the trade except in the case of straw sewing. The course for straw sewing is about 17 weeks in length, and it is so planned that at the opening of the trade season a class is ready to go to work. If this were not so planned, a girl would not be able to secure a position when she has finished her school course. The teacher also goes into the trade and works during the season so that she may be in touch with the trade for her next class of girls.

Drawing as taught in the school is very closely related to the practice work and centers about the problems of each department. The aim is to give each pupil an elementary art training for her occupation which will enable her to be more accurate and adaptable in the workroom, and consequently open the way to a higher wage. In the first place girls are taught measurements by rule and free hand, and proportion in related lines and sizes as found in hems and margins.

The girls taking machine operating draw lines—horizontal, vertical, oblique, curves, and square corners. If they have some natural ability, more work is given, such as borders consisting of straight lines; squared-off designs; continuous curved line designs; patterns for special machine work and Bonnaz work; color; and exercises in perforating and stamping.

The girls who take up dressmaking begin on lines such as are used in making hems and tucks, piecing on the bias and mitering corners; also angles and figures are drawn with a view toward an intelligent use of patterns for waists and skirts. Later, simple designs for shirt waists, braiding, revers, cuffs, vests, and yokes are made. The proportion of figures and color harmony in dress are studied. Copying is done from magazines for trade technicalities.

Those taking millinery study lines much as the dressmaking girls do, but later are given more work in drawing to illustrate the putting together of bias facings and mitered and square corners. They also get studies in color harmony and application and some sketching of models to illustrate how art principles can be applied to hats.

In the novelty department the girls are taught to draw straight lines and square corners, to fold on a line, to miter corners, to make good letters and figures, and to appreciate good proportions. They are taught how to cut and place their materials on the cases so that the design will appear to the best advantage. The training in color aids them in selecting the best shades of ribbons and linings to use with the figured cretonne coverings of many of the boxes. For pupils who show unusual ability in art and can stay longer than the ordinary course a special course is planned. This consists of practice work in costume sketching for making records in dressmaking workrooms; stamping and perforating.

In arithmetic they are taught to make out bills, to keep simple accounts, and are given problems involving measurements of boxes, hats, trimmings, and other materials, and estimating the cost of materials and labor used in the processes of the trades. They are taught to keep an account of what they spend for food, clothing, rent, and recreation and to show what they could save from a wage of $6 a week after meeting their necessary expenditures. In English they are taught to write business letters and short compositions on textiles and their manufacture. The latter are based on their reading lessons.

In civics they are taught the labor laws which will apply to them, as well as tenement and factory regulations and the purpose of and need for such regulations. These are presented in very simple form either orally by the teacher or in pamphlets.

DRESSMAKING DEPARTMENT.

In the dressmaking department the purpose is to train girls to be improvers and finishers or assistants on skirts, waists, and sleeves. The department is divided into sections: The elementary section is where simple hand and machine sewing is taught. A large number of the pupils when they enter do not even know the use of a needle.

The school furnishes all materials for the articles made, all of which have a trade value and are sold to customers or to pupils for about the cost of the materials. Articles are made in cotton, linen, and silk. Each girl must furnish her own thimble, needles, scissors, tape measure, emery, and white apron. The work of this elementary section is largely class instruction with individual criticism. The girls are taught the proper position of their bodies while at work and the proper handling of their work. Individual records are kept, not only of the grade of the work done, but of the time taken to finish a given piece of work. It usually takes from two to three months to complete the work of this section. Before a pupil is allowed to go into the intermediate section a test is made of her ability to work and also to think and carry out ideas. If she is not fully prepared she remains longer.

In the intermediate section the emphasis is placed on machine rather than hand work, and all garments are made for orders from individuals or business houses. The price is that of the trade as nearly as it can be determined, and the girl must not only make the garment right, but also work up her speed. The girls of this section usually do independent work under supervision.

The articles made for order are: Princess and maids' fancy aprons, women's dressing sacks, nightgowns, kimonos, lounging robes, house dresses, chemises, drawers, skirts of cotton, mohair, and silk, collars, and corset covers; children's nightdresses, night drawers, drawers, skirts, rompers, dresses, and aprons.

After the training of the intermediate section the girls are kept from one to two months in the department where swimming and gymnasium suits are made. Here speed and accuracy are acquired through repetition of the same process. The swimming suits have been patented, and these and the gymnasium suits are sold to wholesale houses at the trade price.

In the making of fine handmade underwear, waists, and dresses there is an opportunity for earning a living for young girls who can not take time to learn the entire dressmaking trade. Consequently, after

the training in accuracy and speed the girls are given fine detail work for about three months on the daintiest cotton materials. Special attention is given to white hand embroidery, fine underwear, waists, and baby clothes.

The highest section of the dressmaking department is the "business" shop.

The aim in this shop is to reproduce a moderate-sized dressmaking establishment, giving the girls experience in an actual workroom under trade conditions obtaining outside the school in commercial establishments. In the workrooms are tables devoted to separate kinds of work, each in charge of an instructor with practical trade experience, who prepares and supervises the work for each girl. As fast as a girl becomes efficient in any particular part she passes on to another table for experience on another part of the work.

The work for the shop is supplied by custom orders. Customers come to the school, where estimates are made, measurements taken, and dates for fittings fixed. The information relating to the customer is recorded on blanks, materials are purchased, garments cut, and the different parts are delivered to the tables where such work is done. All materials used are recorded, and bills are made out in the main office. A stock room is maintained, and the stock clerk delivers goods only on signed requisitions with the amount withdrawn noted on each package.

The work in this section covers all work on linings, the making of shirt waists, and nurses' uniforms, plain skirts and trimmed skirts, trimmed waists and sleeves. The garments produced are shirt waists, fancy dressing sacks and wrappers, nurses' and maids' uniforms, dancing dresses, elaborate waists, street, afternoon, and evening gowns, and tailored suits. All varieties of materials and trimmings are used.

No attempt is made to teach the girl cutting, fitting, and draping. The reason given by the school is that a 16-year-old girl on account of lack of judgment and experience could not obtain or hold a cutter's, fitter's, or draper's position. Each girl has an opportunity to see and assist in the preparation of work. No girl makes a complete garment in the trade shop, but is given practice on every part of the garments made.

The trade shop is managed by a dressmaker with many years' experience in managing a shop of her own. Beside the trade instructors, who supervise the work at each table, a man tailor and several experienced workers are employed to do the parts of the work which are not taught to these young girls or parts which involve much repetition of the same processes.

The dressmaking department is kept in touch with trade conditions through personal visits and through houses which purchase its product and from whom stock is bought. Also, a committee of business men and women has been formed to pass judgment on the trade side of the work, its quality, and the cost and market value of the output.

POWER SEWING MACHINE OPERATING DEPARTMENT.

The aim of the power sewing machine operating department is to make an all-round operator who is thoroughly trained in the intelligent use of the power sewing machine. Thus a girl in the school learns to construct complete garments of various kinds and at the same time learns how to keep her machine in good condition.

There are five sections in the operating department. (1) The elementary section, the work of which usually takes about 2 months; (2) the intermediate, taking about 4 months; (3) and the advanced, taking about 6 months, make up the first three. All pupils must take the work of these three sections at least. Then they may take either (4) training on special machines of various kinds or (5) the straw sewing machines.

All materials for practice work are furnished by the school, and the products are either sold to pupils at cost if badly made, or sold in the market at trade prices if well made. The development of this department was planned by an experienced woman in the trade, who worked out a plan of time payments similar to the piece system employed in the trade. Each piece of work has so much time allowed for it. If a girl fails to do the work in the given standard of time she loses in the minutes credited to her. Likewise, all the time she can make over the standard is credited and given to her at the end of the course. Thus not only are the students taught the value of time, but trade conditions are, in a sense, reproduced for them.

MILLINERY DEPARTMENT.

The aim of the millinery department is to train assistants, improvers, frame makers, and preparers for wholesale and custom-work rooms. The training given is planned to cut off several seasons for the learner. When this department was first opened, training for copyists, designers, and milliners—i. e., trimmers—was included, but it was afterwards shortened to a more elementary preparation, due to a feeling of dissatisfaction with this trade for young and partly skilled workers. Contact with millinery shops in New York showed that the beginning wage for young workers was very small, seasons so irregular, and advancement so slow that the girl who must support herself, in the majority of cases, became discouraged and drifted into some other occupation. Also short, irregular, and seasonal engage-

ments are almost inevitable, and it takes both long experience and exceptional ability for a girl to rise to the higher positions of the trade. For the young girl who is forced into wage earning the trade is looked upon with disfavor by the school authorities, and they discourage girls from taking millinery training. If the girl decides to take the millinery work, she is watched carefully to see if she is adapted to it. If she is a mediocre worker, she is urged to go into another department. If an older girl wishes to take the instruction and can spend more time than the usual 6 months, she is given training in the more advanced work of millinery.

Six months are needed to cover the course. It consists of instruction in all the various details of elementary millinery work. The machine work for millinery is also taught. Since hats are not made for the trade and the time is so limited, instruction is not as satisfactory as in other trades, and there seems to be a question of the value of any millinery teaching under present conditions.

Because millinery is a seasonal trade each girl is advised to take either lamp or candle shade making in the novelty department or straw sewing in the operating department in addition to the regular millinery course. The instruction in these two departments aims to prepare girls for obtaining employment during the dull seasons of millinery. However, there is a tendency indicated from a study of the records for the girls to stay in other occupations rather than to return to the millinery trade.

NOVELTY DEPARTMENT.

The aim of the novelty department is to teach the use of paste and glue in sample mounting, novelty work, and jewelry and silverware case making, and also to provide a short course in lamp-shade and candle-shade making for girls who have a dull season during November, December, and January.

Sample mounting consists of pasting or gluing samples of all kinds of materials on cards or in books to be used by salesmen in selling goods.

Novelty work consists mainly in the covering and lining of cases and boxes with different materials. The school furnishes all materials. It takes from eight months to a year, depending on the girl, to complete the work for this course. About the same length of time is required for the jewelry and silverware case making.

All pupils who enter the novelty department take a short course in sample mounting to learn the use of paste and glue. Some then go into the novelty work and others take up a greater variety of work in the sample mounting. Those who take the lamp and candle shade making course come from millinery or sewing classes, where

they have learned the use of the needle.. They do not take the sample mounting.

A certificate, showing the department where the course was taken, is given each girl on the completion of her course in the school. Also a certificate is given a girl if she has completed 6 months' satisfactory work in the school and has proved satisfactory after obtaining employment, even though she has not completed the prescribed work of the school.

A small percentage of girls do not remain after the first test in the school—i. e., the first month. This percentage was large at one time, because the first test work was made severe. Now the first work is made attractive by letting the girls see the connection between their first work in the school and the trade they have chosen. Consequently the percentage leaving has been greatly reduced. After 6 months of work a very small per cent leave, usually because they have to go to work to supplement a family income.

The teaching force of the Manhattan Trade School for Girls in 1909–10 consisted of 29 teachers and their assistants. In addition, a physician, a physical director, and 2 assistants, and an office staff of 11 were employed. Twenty-one of the teaching force were engaged in teaching practice work in the occupations covered by the investigation. Among these are the supervisors of the sewing departments, the dressmaking shop, the power sewing machine operating department, the novelty department, and the millinery department. The supervisors not only teach, but they direct the work of the teachers under them, plan the character of the work and the output of each kind of article made, secure orders, keep in touch with the trade in so far as is possible, and in general see that their department is run in a businesslike way and with as much educational value to each pupil as possible. Since many of the practice teachers have only trade training, the supervisors must instruct them how to teach. Thus they have to be women of more or less broad educational training, as well as trade experience. The teacher who originally organized the machine-operating department was a woman with long experience in the trade. Her successor is a college graduate and has made the subject of industrial education her specialty. The assistant teachers had their entire training in the industries and keep in touch with them by continued visits to manufacturing establishments and also by inviting criticisms of their school work and methods from men in the business. In addition to the practice teachers there is an art teacher and her assistant and two teachers of the correlated academic subjects.

The school has had more difficulty in obtaining teachers for their work than in retaining them after they are once secured. The great need has been to secure teachers with the combined qualifications of

trade experience and training as a teacher. The policy adopted by the school in general has been to secure a woman of broad educational training and with some trade experience for supervisor of a department and let her get her assistants from the trade and train them to teach.

The former board of administrators, under whom the school was established and who developed its policies, was largely made up of women of wide philanthropic interests, with a few men who had also taken an active interest in the school. The advisory board was made up almost entirely of people connected with educational and social institutions. The school began its work in a large private house, which was equipped to accommodate 100 pupils. Within 4 years it became necessary to procure a larger building. In June, 1906, the school was moved to a business building with sufficient accommodations for 500 girls. The cost of the building was $175,000, to which was added $5,000 for improvements. It was bought through contributions secured by the board of administrators. The present equipment is valued at $11,467. The whole cost of equipment has been covered through donations secured by the board of administrators.

The total cost of the school for 1909–10 was $75,498. No fees of any kind are charged for instruction, and, as described later, some pupils receive financial assistance to enable them to attend the school.

The cost of materials for trade orders for the year ending June 30, 1910, was $8,607. Over $2,000 more was spent for materials for general school supplies. The funds for all materials were formerly voted from the general maintenance fund of the school by the board of administrators. Now they are furnished from the funds of the city board of education. Since all products of the school are sold, the cost of materials is more than met by the sale of products. However, the receipts from products do not cover the total expense of the school, which is given above. The following are the amounts received from each class of products sold by the school for the year ending June 30, 1910, exclusive of art work amounting to $40.35:

Dressmaking	$16,719.99
Sewing-machine operating	2,337.90
Novelty work	1,714.40
Millinery	177.34
Total	20,949.63

Everything that is made in the school, even to the practice work, is sold. For that reason practice models are used which are also trade models. This insures constant practice on the same kind of work which will be found in shops outside the school. The kind of articles made have already been described under the work of each department. The school is not self-supporting, nor can it be, because the education and needs of the girls must always be consid-

ered, rather than the product made. Thus, just as soon as the girl becomes really valuable as a trade worker, she is placed in a position in the trade where she can earn wages.

In establishments where the work of the Manhattan Trade School for Girls is known, the school training of the girl is accepted for as much of the period of learning as the school pretends to teach. It is the aim of the school to teach all branches of dressmaking as far as the work of a dressmaker's assistant goes, so that when a girl goes out to work she is not simply adept in one feature and wholly ignorant in others. At the present time, when a girl leaves the school, she can secure a position as an improver, finisher, or assistant, and sometimes an even more advanced position. In sewing-machine operating and novelty work the girls get a training that enables them to secure higher positions at the start than in dressmaking and millinery.

Employers in New York are coming to know the work of this school, and there has been a steady demand for pupils of the school. During the 10 months from August, 1909, to May, 1910, there were 724 calls made to the school for pupils. From the first the school has made some provision for placing its pupils in the positions for which they are trained. In October, 1908, a placement secretary was engaged and a school bureau opened. The placement secretary keeps in constant touch with the departments and obtains detailed information about the character, the work, the ability, and the physique of each girl. The placement bureau has four distinct features connected with its work. First, it secures suitable positions for girls leaving the school either through necessity or upon completion of their courses. Second, it serves as a means of connection between the school and the trades and between the school and its former pupils. Third, it gathers data about trade conditions, which will be helpful in the departments or in deciding school policies. Fourth, it keeps cards of record for each girl. In connection with the first feature of the work, the placement secretary interviews both girls and employers; the employers are induced, if possible, to visit the school, and the girls are assisted in applying for positions. It is the aim, likewise, in securing positions for girls, to place them in positions which they are fitted to fill successfully and where their work will be congenial to them.

It is the policy of the school not to place any girl in an establishment until it has been visited, so that the desirability of the establishment, as to sanitary conditions, hours, wages, and opportunity for advancement, may be known.

The greatest appreciation of the work of the school has been shown by the parents and the girls themselves. Employers who have taken on a sufficient number of pupils to know the work of the school, and who have found the girls efficient for their work, have been much

interested in this school. However, some employers who have been most appreciative do not pay the best wages. They are at the head of concerns which employ so many girls that there is not much latitude in the way of wages, and advancement is very slow.

Some criticisms have come from employers in cases of misunderstanding because of an unfortunate placement of a girl in a position which she could not fill. This was true particularly before a placement secretary, who devotes her entire time to placing girls properly, was secured by the school.

Discipline is maintained in the school by means of a student council elected by the pupils from the members of each class. The ones elected are chosen for executive ability and good character. They meet once a week with one of the supervisors, to discuss questions of general school discipline and regulations. Each member is responsible for maintaining order in her class when it is not under other supervision, for settling disputes among the girls, and for reporting disobedience to school laws. If a particular girl has continued to cause trouble for a teacher, she is often turned over to the student council, to see if they can not help her to improve her conduct. If a girl continues unruly and disturbing in her classes, the director takes her case in hand and, after consultation with her teachers, decides what is best to do. Her parents are notified, and the girl is given every chance to change her conduct. The secretary of the students' aid committee visits her home and learns if there is anything in her home influences which can touch her. The doctor is consulted as to her physical condition. If nothing can be done, the girl is then dismissed from the school. Since some of the girls in this school come from the worst sections in the city, it is not unusual to have difficult matters of discipline to deal with. On the whole the pupils are much more free than in the ordinary school. Discipline is made a question of the pupil getting control of herself, as she would have to do in the trade.

The families of many of the girls in the school are in such extreme poverty that a system of aid was established to enable such girls to stay in the school. If they come recommended by some charitable institution, church, hospital, school, or social settlement which knows the family, no further investigation of the necessity for aid is required. In other cases, if there is indication that aid is necessary for attendance, an applicant is admitted for a "trial month," during which time she is tested for her ability and character, and the condition of her family is investigated by a member of the school staff who is secretary of the students' aid committee. This committee and the secretary are still maintained by the former board of administrators to look after the needs of very poor girls. The committee consists of representatives from 16 social settlements. If it is found

that a girl needs help, she is assigned to the settlement nearest her home and goes there weekly for her money. The amount is fixed after a careful consideration of the income and the expenses of the family. An envelope showing the amount due the girl is sent from the school to the settlement worker, and on this is indicated any absence or tardiness. The member of the committee inquires into any irregularity in attendance and, if necessary, reports to the parent. The assistance depends upon regular attendance and interest in work.

A careful physical examination of each girl is made by the physical director and a woman physician and she is given such attention as may be necessary before she is expected to do much work in the school. Some of the girls are found to be so undernourished that good work is out of the question. Such girls are urged to take the cooking lessons, which are elective, and this enables them to have at least one nourishing meal a day. The girls in the cooking class prepare luncheons for sale to pupils and teachers and have their own luncheons free of charge.

Records of the physical condition of every girl are kept by the school. A very large percentage of the girls are found to have some physical defects. Where defects or diseases are found the parents are notified and asked either to send the girl to the family physician or to allow the school doctor to attend to her case or send her to a dispensary or hospital for free treatment. After the examination by the physician the girl is given instruction by the physical director in personal hygiene. Particular emphasis is placed upon proper standing and sitting while at work. Physical training continues throughout the time that the girl spends in the school, the aim being to have every girl in good physical condition, with at least a knowledge of the fundamental principles of health and hygiene.

GIRLS' TRADE SCHOOL, BOSTON, MASS.

This institution is very similar to the Manhattan Trade School for Girls, of New York City. It was established in 1904 by a group of philanthropic women of Boston, but became a public school in September, 1909, under the industrial education law of the State. Its purpose is to prepare pupils to be dressmakers' assistants and milliners' assistants, known in the trade as preparers and improvers, and power sewing machine operators on both straw and cloth work.

The course of study offered in this school, together with the methods of instruction, must be approved by the State board of education in order to get the subsidy provided by the State law. The control of the school is in the hands of the school committee of Boston. There is in addition an advisory committee consisting of the women who directed the school when under private control. The courses taught

in this school were selected by its founders because of the demand for skilled help in these trades in Boston. On the completion of the course the pupil is placed in a position in her trade and at the expiration of three months, if her work is satisfactory, she is granted a certificate by the school.

The enrollment was 159 in May, 1910. Of these, 110 were in the dressmaking classes, 23 in the millinery class, and 26 in the power sewing machine operating class. The minimum age for admission to the school is 14, the maximum 18. Pupils may enter the school at any time during the year. They are not afforded an opportunity to earn anything in the school. The courses are arranged so that one year's work is provided for each trade. The pupils devote 6½ hours per week to academic work and 28½ hours per week to trade work. In addition 15 minutes each day is given to physical training and 15 minutes to opening exercises. The subjects taught and the time given each week to each subject are as follows: English, spelling, and arithmetic, one-half hour each; drawing, three hours; household science, two hours. The academic work is adapted as nearly as possible to the work of each trade course. In drawing they are taught the lines and designs to be used in their trades. One pupil in each class (selected because of ability) is taught pattern cutting and design modeling. These special pupils spend one and one-half hours each week in this work.

There is a regular school physician supplied by the board of education, and on his advice girls in need of medical attention are sent for treatment to their own physician or to the various dispensaries and clinics open to the school. In the physical training class instruction in personal hygiene is given, and to the advanced classes frequent health talks are given by visiting physicians.

During the first month in school the girls are taught to make a workbox equipment, consisting of workbag, spool case, pincushion, two work aprons, etc. In making these all the simple hand and machine stitches, seams, bias folds, bias seams, and the principles of measuring are taught. During the next two months the dressmaking pupils make children's simple garments, as rompers, simple dresses, underwear, and Russian suits. In the next two months finer garments are made, as underwear, involving the use of lace and embroidery, and children's coats and bonnets. Then the elementary dressmaking, which consists largely of making unlined dresses and shirt waists, is taken up. This work lasts for about three months. The school furnishes all the materials used and the product is sold. During the last four months more advanced dressmaking is taught. The practice work is on garments made to order for patrons of the school, and consists of all kinds of dresses and waists except tailored suits. The pupils are not taught drafting, cutting, nor fitting, but rather the

work of a dressmaker's assistant, such as work on linings, sleeves, skirts, waists, and finishing, under supervision. The foregoing illustrates in a general way the work of the school, but the length of time a pupil stays depends upon her adaptability and previous experience.

The millinery pupils after the first month make wire frames on models made by the most advanced pupils. Following this they cover frames with various kinds of materials, make buckram frames, make over hats, sew straw, and make simple hats that would cost less than $5. During the latter part of the course the millinery pupils are taught to make jabots, hatbands, ornaments, and fancy articles for the purpose of finding employment at such work during the slack season of the millinery trade. This is called the millinery extension course.

The pupils learning the operating of power sewing machines are first taught the management and care of the machine, then simple stitching without basting and the making of sheets and pillowcases. Finally, hospital garments, shirt waists, and underwear are made. They also learn to operate a tucking machine, a two-needle machine, and a buttonhole machine. In the straw sewing (on power machines) the pupils are taught the sewing of various kinds of straw. In this also the aptitude of the pupil determines the time required to learn the work, the time varying from six months for a clever girl to a year for the less clever. It is the aim of the school to teach all pupils who take power sewing machine operating both cloth and straw sewing, so that the operating on cloth may furnish them employment during the slack season of the straw-sewing trade.

The school hours are from 8.30 a. m. to 5 p. m. on Monday to Friday, inclusive. One hour is allowed for luncheon. The 1909–10 term of the school opened September 15, 1909, and closed June 22, 1910. The regular summer term is scheduled to begin July 5 and close the last Friday in August. The work of the summer term is not essentially different from that of the winter term, but the hours are from 9 a. m. to 3 p. m. and fewer pupils attend. There is a week's holiday at Christmas and also at Easter. No reference or textbooks on industrial subjects are used. Textbooks for the academic subjects are furnished free.

There were two teachers employed in the school in 1909–10 for instructing girls in practice work in dressmaking, two for teaching millinery, and one for teaching power sewing machine operating. The teachers of general subjects do not give instruction in the trades. The school has experienced difficulty in retaining trade teachers because of the better salaries offered by other institutions. The school is housed in a building bought by the city for $40,000 in September, 1909. The equipment is valued at $3,000 and was furnished partly by the founders of the school and partly by the

public-school authorities. Half of the expenses of the school are met by the city and half by the State. There is no tuition fee charged to residents of Boston. The tuition for nonresidents of Boston is paid by the town from which they come. The estimated cost of materials used in the school from September, 1909, to May, 1910, was $4,200. As already noted, the products are sold, and the receipts more than cover the cost of materials. The products consist of straw hats, underwear, aprons, shirt waists, dresses, millinery goods, jabots, embroidered novelties in neckwear, etc. The school has regular customers who purchase these articles.

The school authorities consider that it would take two or three years for a pupil to learn in a shop what she learns here in a year, depending, of course, upon the individuality and experience of the pupil. They report that it takes from one and one-half years to three years to make a finished dressmaker or milliner out of a graduate of the school, depending on the pupil and the opportunities afforded by the shop in which she finds employment. The power sewing machine operating graduates of the school have only to work up their speed in order to be rated as skilled operators. The school reports a greater demand for its pupils than can be supplied and that they never have difficulty in placing qualified pupils in positions. Graduates of the school are said to have the reputation of being more adaptable and responsible than those who receive their training in a shop; as a consequence the graduates can hold their own as general workwomen. Employers of graduates of the school are reported as showing great appreciation of the school and its work. An attempt was made in a few cases to afford pupils trade experience by placing them in shops before the completion of their course in school. This proved a failure, because they refused to give up their wages and employment and return to the school.

The school employs two women as vocational assistants whose duty is twofold in character—to connect the school and the home and the school and the shop. By visiting the home it is discovered how much of responsibility the girl will be expected to assume as a wage earner, and how soon it will be necessary for her to meet that responsibility. These conditions, taken into consideration with the girl's own tastes and inclinations, help to determine the trade the girl will take up. The shops applying to the school for girls are also investigated, and reports on workroom conditions, light, air, etc., are made. After a girl is placed the vocational assistant keeps in touch with her, advising her in the emergencies that arise, and adjusting relations between her and her employer when necessary.

The school is planning to introduce a two-year course of study in the near future.

MILWAUKEE SCHOOL OF TRADES FOR GIRLS, MILWAUKEE, WIS.

Another institution which resembles the Manhattan Trade School for Girls, of New York City, is the Milwaukee School of Trades for Girls. This school was organized late in 1909 by the board of school directors of the city of Milwaukee, through the authorization of the State legislature. The trades in which instruction is given are millinery and dressmaking. In May, 1910, there were 43 pupils in millinery and 47 pupils in dressmaking, making a total of 90 pupils. The selection of the trade work to be taught was made by the advisory committee on trade schools and approved by the school board. Local trade conditions and the opportunities for employment were considered in reaching a decision.

The expense of the school is met by the city. A building was remodeled at a cost of $3,800 to fit the needs of the school. The equipment is valued at $4,500. No fees are charged for instruction except to nonresidents of Milwaukee and persons over 20 years of age. Any girl who is 14 years of age, or over, who can read and write English and knows the elements of arithmetic can attend the school. Pupils can enter at any time during the year. They do not earn anything while in the school either in wages for part-time work or from the sale of finished products.

The hours spent each day in the school are from 8:30 in the morning until noon and from 1 p. m. to 4.30 p. m. Instruction is given from Monday to Friday, inclusive, and the school is open 50 weeks in the year. The correlation of academic and practice work of the trade and the time spent on each are modeled on the plan of the Manhattan and the Boston trade schools for girls, and do not need further description here. The cooking course is emphasized somewhat more in this school than in the two already described. The school was still too young when visited to make definite statements concerning the plan of the practice work, the length of time which the girls will spend in the school, the demand in the trade for graduates, or the placing of pupils.

There were seven teachers employed in the school in 1909–10. Of these, two gave instruction in dressmaking and two in millinery. The remaining teachers were the director, a teacher of academic subjects and physical culture, and a teacher of cooking. One teacher of dressmaking and one millinery teacher were women of long experience in the trade. The second teacher of millinery had two years' experience in teaching that subject.

All materials for practice work are furnished by the city, and the hats and dresses which are made are sold in the open market.

CLARA DE HIRSCH TRADE SCHOOL, NEW YORK, N. Y.

The Clara de Hirsch Home for Working Girls, of New York City, was founded April 30, 1897, but was not opened until October, 1899. One of the prominent features of the institution is its trade-training department, or school, the purpose of which is to fit young girls in as short a time as practicable for trade work, as a means of livelihood. The affairs of the institution are administered by a board of directors, consisting of 13 members, mainly wealthy women of varied philanthropic interests. An advisory committee, composed of six members chosen from among the directors, with the addition of the school principal, has direct supervision over the school work. The board of directors is a self-perpetuating body, and the members of the advisory committee are chosen by the board of directors. The aim of the school is to give trade training to very poor young girls and to immigrants who are unacquainted with the English language. The natural drift of such girls is into unskilled needlework, for which there is a great demand in New York. It was believed by the directors that this drift could not be stemmed even were it attempted, and that it was better to train girls to such skill in this work as would enable them to earn a decent living than to try to divert them from it. The decision as to the subjects to be taught was made by the board of directors upon the recommendation of the principal of the school. At first only hand sewing was taught, but in 1902 dressmaking was included and in 1904 millinery. The trade courses offered in the school and the number of pupils in each on June 1, 1910, were as follows: Hand sewing, 16; sewing machine operating (including underwear making), 25; millinery, 18; dressmaking, 12; total, 71.

The pupils of the school are composed of two classes, viz, those who reside in the home and those who reside outside. Ninety per cent of all pupils must be Jewish girls. Girls not less than 14 and not over 17 years of age are eligible to admission to the school. Occasionally a girl over 17 years of age is admitted. It is the policy of the school to give preference to those girls who are dependent and most in need of the school's instruction, and the case of each applicant is carefully investigated by the school authorities before action is taken. Pupils are admitted at any time during the year. After six months of training the dressmaking girls are paid $1 a week. By far the largest number of the girls have their board, room, and laundry furnished to them without cost. Only 10 out of the whole number of pupils in 1909–10 were nonresidents.

The school program is elastic and is adapted to the needs of the pupils, the instruction given being individual in type. The pupils in the millinery class are expected to complete the course in from six months to one year; those in hand sewing and machine operating,

including underwear making, in from one to one and a half years; those in dressmaking in one year. Upon entering the school the pupil is admitted to the hand-sewing class, and as soon as she becomes skilled in one department she is passed on to another.

Besides mere practice work, the following articles are made or worked upon in the hand-sewing class: Towels, napkins, aprons, flannel skirts, hemstitched handkerchiefs, stockings in need of darning, skirts and shirts in need of patching, embroidered napkins, curtains, aprons, and uniforms in need of buttons and buttonholes. The time for this work varies very greatly. Some girls can finish it in three months, others take a full year.

In the sewing machine operating class the girls are taught the use of the foot-power sewing machine very thoroughly, including the use of all machine attachments and the care of the machine. The school also owns one electric-power machine, and each girl learns the use of this machine. All kinds of stitching and all kinds of operations which can be performed on the sewing machine are taught in the making of colored and white aprons, zephyr petticoats, gowns, drawers, yokes on shirts, corset covers, white or black sateen skirts, students' house dresses, fancy pieces, such as infants' dresses, embroidered sofa cushions, hand-embroidered underwear, kimonos, and household articles, such as dresses, aprons, curtains, towels, and napkins. Some girls have completed the course in four months and others have taken a year for it. After the completion of this course girls may go to work if they desire. If they remain, they go into the dressmaking department, which is managed on business principles and is conducted more like a workshop than a classroom. The woman who has charge of the work is a competent dressmaker who conducted an establishment of her own before coming to the school.

The millinery department is in charge of a practical milliner who has had experience in several millinery establishments in New York City and who keeps very closely in touch with the trade through these shops. Her department is managed as a business shop, and custom hats are turned out for customers of the school. The aim is to have the pupils get a training very closely resembling what they will find in the trade.

An hour on one evening in the week is given over to physical training and one evening to instruction in mending and darning—i. e., the care of their own clothes. Each girl on entering the school is examined by the physician, who is a regular member of the staff of the home, and if any treatment is necessary she receives proper care immediately. Since many of the girls are ignorant and uncared for in the extreme, much emphasis is placed upon teaching them the fundamental principles of proper living and care of themselves. As the largest percentage of the girls are under the constant care of the

school authorities, they can see not only that such instructions are carried out, but also that the girls have nourishing food to eat and proper social recreation. The school authorities place as strong emphasis on the direction of the girls' activities outside of actual trade training hours as upon the actual training for earning wages. In the evenings the pupils also have the opportunity to mingle with girls who are out earning their living, but who continue to live in the home.

All the pupils of the school, no matter what trade they are learning, are taught elementary arithmetic, reading, composition, and history, The normal division of time is 3⅓ hours a week devoted to these subjects and 27 hours a week devoted to practice work. There are four classes in these subjects, which are graded according to the relative advancement of the pupils. The most elementary, or primary class, is composed, in the main, of immigrant girls who have had little or no schooling. Occasionally there is a pupil who is unable to speak the English language, and in such case she is instructed individually until she has learned enough to fit her for one of the four regular classes. There is instruction in these subjects daily from Monday to Friday, inclusive, of each week, but the periods apportioned to each subject are changed from time to time, as the needs of the classes may demand. There is one exception to this class program, viz: During the last six months in the dressmaking department the pupils are given no academic instruction, but are required to devote the entire time to the trade. The school year is comprised of 48 weeks, beginning September 1 and closing July 31. No textbooks are used in the school. The school confers neither diploma nor certificate upon the pupils on completion of the courses. For the school year 1909–10, of the millinery pupils about 20 per cent left the school before completing the course, and about 8 per cent of the hand-sewing and machine-operating pupils left. None of the pupils of the dressmaking class left during the year.

Five teachers are employed by the school, one for academic and four for trade instruction. The academic teacher was obtained from a college and the teachers of practice work from the trades. The school has experienced no difficulty in retaining teachers qualified to teach trade work.

The school occupies a part of the building which constitutes the home. The institution was endowed by its founder, and out of the income arising from the investment of this fund the school derives such revenue as is necessary for its maintenance. A tuition fee of $2 per month is charged to those pupils of the school who are not residents of the home, provided such pupils can afford to pay it; if not, instruction is given free of charge. Orphan institutions or relatives of resident pupils sometimes pay from $1 to $3 a week for their board, room, and trade instruction. Provision is made for from 30 to 40

free pupils who have no one who can pay anything for them. The cost of materials used in the school during the year, April 1, 1909, to March 31, 1910, was $2,422.95. The school's marketable products are hats and dresses, and these are sold to private individuals who order such articles. During the year April 1, 1909, to March 31, 1910, the receipts to the school from articles made therein and sold were as follows:

Dressmaking	$3,298.97
Millinery	784.83
Hand sewing and machine operating	171.59
Total	4,255.39

Thus the cost of materials for the school year was more than covered by the sale of products made from these materials.

The primary object of the Clara de Hirsch Home is to furnish a home for working girls. The school of the home undertakes to so instruct its pupils in the trades work taught as to supersede the necessity for a period of learning in those occupations. It is stated that immediately upon the completion of their courses, the pupils can enter the trades mentioned and receive wages from the very beginning, ranging from $5 to $8 a week. It is also stated that there is frequent demand by employers for pupils of the school. The attitude toward the school of those acquainted with its operations is favorable. The fact that for the greatest number of the pupils the school can take entire direction of them for the period of time that they are receiving instruction, gives an opportunity to send out healthy girls of regular habits as well as trained workers.

PASCAL INSTITUTE, NEW YORK, N. Y.

The main course in Pascal Institute, of New York City, is a dressmaking course, the purpose of which is to fit young girls to be seamstresses and dressmakers' assistants in small shops in the city. The school also offers courses in dressmaking and millinery for pupils with some experience in those trades. Private lessons are given to dressmakers, milliners, cooks, and nurses. The school was established in December, 1898, by the present director, a woman with long experience in looking after poor children in the city, who felt the need of trade training for girls in unskilled occupations. She was assisted by the head of a large dressmaking establishment and others who donated the money to start the school. These have since formed themselves into the "Pascal Institute Association" for the purpose of supporting the school financially, either by donations from among themselves or others. The board of directors are practically all philanthropic women. An advisory board made up of ministers and philanthropists is chosen by the board of directors. The director has entire

charge of the school and introduced instruction in the dressmaking trade because of the demand in shops of the city for trained workers and in the homes for trained seamstresses. Both day and evening instruction is given to girls and women who want sewing and cooking for distinctly home work, but that feature of the school is not included in this report. There are several small dressmaking establishments which employ girls from the school and there is said to be a steady demand for trained seamstresses for work by the day. The girls are not trained for or placed in large dressmaking establishments.

In the regular dressmaking course there was an average attendance in January, 1910, of 36 pupils. Any girl 14 years of age or over, who applies may attend the school and may enter at any time. The length of the regular course is somewhat indefinite, but covers about nine months, depending on the ability of the pupils. They begin with plain sewing and work into dressmaking as they advance. Before the course is finished they are taught a little of all features of dressmaking, even to some instruction in costume designing. Some attention is also given to remodeling and renovating clothes. In addition, they receive some instruction in millinery. If a girl shows a bent in that direction, she may branch off and do all her work in millinery. Each day the pupils have a cooking lesson, and before they leave the school are taught the proper serving of a meal. The aim of the cooking lessons is to give each girl knowledge of the proper preparation of very simple home food and the serving of that food to a small family.

The school makes underwear and dresses for private customers who usually furnish their own materials. When they do not, the school buys the materials and sells the finished product. The hours of instruction are from 9 a. m. to 5 p. m., with an hour for lunch and a quarter of an hour for opening exercises. All the rest of the day is devoted to practice work, except the time (about an hour) allowed for the cooking lesson. Instruction is given on every week day except Saturday. The school year is 42 weeks in length, from the middle of September to July 1. The school is also open six weeks in summer, but the work is not strictly trade work. Each girl who completes her course and leaves the school is given a letter stating what she is able to do.

There are five teachers employed in the school including the cooking teacher. Two teachers have had trade experience.

The school rents an old residence in the center of the uptown district of New York. It has an equipment valued at about $500. The regular day pupils pay $5 a month for instruction. All pupils who take special work pay by the number of lessons which they take. As the purpose of the school is to reach poor girls primarily, six scholarships have been established for girls who are not able to pay the tuition. There is said to be more of a demand for these scholarships than there is money with which to supply them.

CHICAGO GIRLS' TRADE SCHOOL, CHICAGO, ILL.

This is a charitable undertaking, started under the auspices of the Chicago Boys' Club, an incorporated organization of business and philanthropic men interested in the welfare of very poor boys and girls of the city. It is supported entirely by bequests and voluntary contributions from interested people. It was opened in November, 1907, but the enrollment is still very small—a total of 18 pupils at the time the school was visited, 8 of whom were learning millinery and 10 dressmaking. The purpose of the school is to gather in very poor girls, keep them from the street, and fit them to earn a living in more skilled occupations than those into which they would otherwise drift. Dressmaking was introduced because it was known that there is a very large number of unskilled girls in the sweatshops of Chicago who might be trained to do skilled work in the sewing trades. Likewise it was known that Chicago is a great wholesale millinery center and that large numbers of women and girls are employed in this trade. No certificates for completed work are given by the school, but when a girl is considered competent to take a position in her trade, the school finds a place for her. Except in rare cases, the school does not recommend pupils who have been in the school less than a year, and a pupil is encouraged to stay longer if possible. Thus the skill of the girl on leaving the school depends to a very great extent on the time spent in the school. In some cases, since many of the girls come from very poor families, either the Charity Organization Society or the Chicago Boys' Club pays a wage to the family of a pupil in order that the child may continue to attend. In such cases the pupils are compelled to attend regularly. Sometimes the aid consists only in paying the pupil's car fare to and from school.

Any girl between the ages of 13 and 21 may attend the school. There is no academic work, all the time in the school being devoted to practice work. Sessions are held daily from 9 a. m. to 4 p. m., with 1½ hours of noon recess, from Monday to Friday of each week. The school is open 52 weeks in the year. Two teachers are employed, one a milliner with 10 years' experience in the trade, the other a dressmaker with 4 years' experience. The girls taking the millinery work all expect to go into the trade. Some of the girls take the dressmaking for home use. Custom work is done largely on orders from friends of girls in the school and articles are made up and sold in a public exhibit. Materials are furnished by the school.

At present the school occupies two small rooms over a tailor shop in a three-story tenement house. The equipment is valued at about $250. During the year 1909–10 about $200 was spent for materials to be used in the school. No fees are charged to pupils.

JEWISH KITCHEN GARDEN ASSOCIATION AND TRADE SCHOOL FOR GIRLS, CINCINNATI, OHIO.

The Jewish Kitchen Garden Association and Trade School for Girls, of Cincinnati, Ohio, is primarily a charitable institution, but having a trade-school feature which is worthy of description here. It was established by the United Hebrew Charities of that city to keep girls from going into unskilled factory work. The purpose of the instruction is to fit very poor girls to enter the millinery and dressmaking trades. The dressmaking course was established in 1893 because of a demand for skilled seamstresses to do sewing by the day in homes. The millinery instruction was introduced in 1909 when a group of wholesale milliners agreed to give positions to graduates of the school. The board of directors of the school is the executive committee of the United Hebrew Charities, but they act upon the advice of an advisory committee. It is expected that the instruction given in the school will cover the period of time necessary to learn the essentials of millinery trade. The training given in dressmaking is expected to make skilled seamstresses. There were enrolled in the school in 1910 fifteen pupils in the dressmaking class and nine pupils in the millinery class. Any Jewish girl 12 years of age or over who will come regularly is accepted as a pupil in the school and can enter at any time during the year. The school does a great deal of custom work and each pupil is paid according to her experience and ability. The older girls frequently go to private homes to sew by the day. When doing this they earn from $1 to $1.50 a day. When a piece of work is being done in the school the time which each girl spends on the article is carefully recorded and she is paid on a time basis. The more experience and skill possessed by the girl the more she will earn in an hour. Each girl is paid on Friday for all work done during the week. Many of the girls are so poor that they are dependent on this money, and could not attend the school unless they earned something. During the year 1909–10 $1,801 was paid to students in this way.

Each girl gets individual instruction and is given a certificate when the director believes her proficient. There is no set course of study or prescribed length of time for any subject. The number of pupils in the school varies greatly during the year. Plain sewing is the beginning of the dressmaking course. Some pupils take only plain sewing and then go out and do work by the day. Others take up more advanced work in dressmaking. They have to be proficient in both before they can graduate and obtain a certificate from the school. Embroidery is also taught in connection with the dressmaking course, but is purely voluntary. A few take embroidery after the plain sewing work. The first work done is usually

more or less faulty and is sold for about two-thirds of the market price to patrons of the school who are willing to take such work. Materials are usually furnished by customers and money paid in by them is divided among the girls. The millinery course is still very unsettled. For beginners an attempt is made to follow a regular course, but some girls enter the school during the slack season in the trade to get practice on more advanced work than they have been doing. No academic instruction is given in the school. The entire day from 8 a. m. to 5 p. m., with the exception of an hour at noon and 20 minutes in the middle of the forenoon and afternoon, is devoted to practice work. Instruction is given from Monday to Friday, inclusive. On Sunday morning there are sewing classes for school children, and some of the pupils of the trade school attend these classes either as pupils or teachers. Such attendance is voluntary. The school is open throughout the year.

Three teachers are employed, a practical dressmaker and her assistant and a practical milliner.

A part of a settlement house is used for this school, and the equipment consists of tables and ordinary sewing machines. No fees of any kind are charged for instruction. Rather, the pupils earn money while getting their training in the way already described. The school has found that there is a greater demand for dressmakers and seamstresses from the school than they can supply. Several of the graduates of the school have establishments of their own.

HEBREW TECHNICAL SCHOOL FOR GIRLS, NEW YORK, N. Y.

The work of the Hebrew Technical School for Girls, of New York City, began in an East-Side Sabbath school 30 years ago. It was organized as a day school in 1897.

The school is nonsectarian, but its membership is largely made up of Jewish girls and its finances are exclusively under Jewish control. The teachers of the school are non-Jewish. The work of the school is divided into two sections, viz, the commercial course and the industrial course. For the purposes of this report only the industrial work of the school will be considered. The purpose of this course is primarily to equip girls for home makers, through a proper course of mental, ethical, and physical training. However, it was discovered that they must first be prepared to earn their living, for the records show a very large per cent who go into gainful occupations. The school recognizes this economic need of its pupils, and gives them such instruction as will enable them to leave the school prepared to be dressmakers' and milliners' assistants. A series of "scholarship funds" has been established in the school, the interest on each of which provides for the free education of one girl each year. Twenty-five hundred dollars establishes one of the funds. These

"scholarship funds" provide an endowment tending to the independence of the school and the enlargement of its work. Thirteen of these "funds" have already been created. The school has no relation to or affiliation with any industrial establishment or any other school. Its affairs are administered by a self-perpetuating board of trustees and an advisory committee on education chosen by the trustees. The board of trustees is made up of 29 men and women of philanthropic interests; while the advisory committee is composed of 3 prominent educators. The occupations taught in the school are dressmaking, embroidery, and millinery. The number of pupils in these courses on July 12, 1910, was 110. Girls who are able to attend the public high school are not accepted as pupils and those who are accepted must promise to remain pupils of the school at least 18 months. The minimum age at which pupils are accepted is usually 14 years and the maximum age is 17 years. Pupils are permitted to enter either on September 1 or March 1 of each year. The economic pressure upon the families of some of the girls is so great that many girls without outside aid would not be able to attend the school. Such families are given regular weekly aid by some patron of the school until the girl can finish her course. The subjects taught, exclusive of shopwork, are arithmetic, composition, literature, drawing, physiology and hygiene, ethics, gymnasium work, swimming, and music. Pupils give 15¼ hours to practice work, 9 to academic subjects, 1½ to cooking, and 6¾ to physical training, ethical training, and music. A total of 32½ hours per week are devoted to school work. The hours of instruction are from 8.30 a. m. to 12 m., and from 1 to 4 p. m., from Monday to Friday, inclusive. The school is open the whole year and vacations are granted only under order of a physician. However, work during the summer is made much lighter and there is more gymnasium practice and swimming.

In the time devoted to practice work the pupils are first taught the rudiments of sewing. As they become proficient, they make simple garments, as aprons and underwear. As these are more or less faulty, they are sold at cost to pupils. Then the making of more elaborate underwear and shirt waists is taught, as well as hand embroidery. This is called the manual order division, because garments are made to order here for customers. All girls get some instruction in millinery, and at the end of the more elementary work can begin to specialize. Those who seem to be most fitted for millinery and wish to earn their living in that line of work get more instruction in the making of hats. Others take more advanced instruction in dressmaking and make dresses for themselves and others.

The largest amount of the materials used are furnished by the school. Pupils furnish material for articles made for themselves or buy it at cost from the school. Recently a school shop has been

established to provide further practice for girls after they have finished the regular school course. It is planned to give a six months' course in the school shop to graduates who can devote their entire time to practice work. While getting this added training, they are paid a small wage—$2 per week at the start and more as they advance. No such provision is made for millinery girls; so they have to be placed in the trade to get experience. The school maintains an employment bureau to secure positions for graduates. The greatest demand for pupils of the school comes from small shops and manufacturers where careful work is wanted. It is said that large manufacturers will not pay what the girls are worth.

The fundamental principles only of the dressmaking and millinery trades are taught in this school. Speed must be obtained in the trade, and it is believed that a graduate of the school with proper opportunity can become an expert in one branch of the trade in a year. At present all advanced training for a finished dressmaker has to be secured in shops, and frequently a girl never gets the opportunity for such training. A few of the graduates of the school are now forewomen or hold responsible executive positions, but they have grown into these and are not directly prepared by the school for such positions.

Six teachers were employed in 1909–10 to give instruction in practice work in dressmaking, embroidery, and millinery. Two of these teachers had actual experience in the trade taught and all six had previous experience in teaching the trade. The school has experienced difficulty in retaining teachers qualified to teach trade work, and in order to meet this difficulty it has been found necessary to advance their salaries. The need for normal industrial schools is regarded by the officials of this school as being very great.

The building occupied by the school cost $432,000, the money for the purpose having been donated by different persons. The school equipment for trade instruction is valued at $2,000. The financial assistance received by the school during the year 1909–10 amounted to $49,771.76, this sum being derived from voluntary contributions. There is also a fund known as the "Pupils endowment fund," amounting to $5,120.87, which is made up of small amounts contributed weekly by former pupils of the school. The regular initiation or entry fee to the school is $2, and then 5 cents a week is exacted as fee for instruction. However, if after investigation it is found that the family of an applicant is too poor to pay the entrance fee or the fee for instruction, a free scholarship may be granted to such applicant. The cost of the materials used in the trade practice work during the year 1909–10 was $2,960.74, and this was defrayed out of the general school funds. The school makes for sale underwear, dresses, and fancy articles. These are disposed of through private orders.

The school derived revenue from sales of these articles during the year 1909, as follows:

Dresses, including a small amount of custom work	$2,219.88
Shirt waists, underwear, aprons, etc	631.06
Simple articles sold to pupils	104.26
Total	2,955.20

PRATT INSTITUTE: SCHOOL OF HOUSEHOLD SCIENCE AND ARTS, BROOKLYN, N. Y.

Pratt Institute, a privately endowed school established in 1887, has a department which offers short courses in dressmaking, sewing, and millinery to girls who are at least 17 years of age and who show especial fitness for the work. Because of the age and experience of the pupils, instruction can be given in the more advanced parts of the work. The department for trade training is only one division of the work of the School of Household Science and Arts, which includes a department for training home makers, a normal department of domestic science, and a department for dietitians and institutional housekeepers.

Both day and evening instruction in the dressmaking and millinery trades is given. The evening trade classes were established in 1887, but the day trade classes were not started until 1891. Special courses, such as drafting and draping, costume drawing, dress design, and power sewing machine operating were first offered in 1902, 1904, 1905, and 1906, respectively. The day classes in 1909–10 included 247 pupils in dressmaking, 60 pupils in plain sewing, and 63 pupils in millinery. In addition, there were 56 pupils engaged in the study of dress design. The day work of the school is arranged in courses, three months in length, so that a girl may take as little or as much of the trade as she desires. The course in plain sewing is designed to fit applicants for the dressmaking course and also to train seamstresses. It includes practice in the use of foot and power sewing machines, practical mending, the drafting and making of undergarments, and a study of design and its application to embroidered undergarments. At the end of this course, if the girl is proficient, she may enter the first term of the regular dressmaking course. This course is made up of four terms, each three months in length, three of classroom work and one in the school dressmaking establishment. If all this work is taken, the pupil is entitled to a certificate from the school as a dressmaker. Some pupils get positions and leave at the end of the classroom work, and are then only given certificates stating the amount of work taken. During each three months' term of classroom work in this course pupils must furnish material for one model garment. Work is also provided by the school and so planned as to give the pupils freedom in handling different materials and in

adapting designs for and fitting various figures. Costume sketching and the study of color combinations in the designing of gowns are given. Embroidery is also taught. To secure practice work for this course, gowns are made for teachers, for wives of members of the faculty of other schools of the institute, and other people who will agree to come for fittings at a convenient time for members of the class and who will also allow teachers to select such materials and designs as will be of greatest educational value to the pupils. Because of this inconvenience, no charge is made for labor on the gowns. Each pupil takes entire charge of a gown from the designing and drafting to the fitting and finishing. By doing this it is expected that she will be fitted at the end of the classroom work to go to the school dressmaking establishment ready to do all the different kinds of work which may be assigned to her. Instruction in this class is entirely individual, because girls are working on different garments and no two can advance in the same way. Advance depends very largely on the pupil's knowledge and experience previous to entering the school. Some have a greater knowledge of the trade at the end of their course than others, but no girl is allowed to leave until she is proficient in all practice work as outlined for the course. In the first term shirtwaist suits and unlined dresses are made, with practice work in operating power sewing machines. In the second term lined and tailored dresses are made, with instruction in modeling in paper and crinoline, draping, and block pattern making, and practice in embroidery stitches as applied in the ornamentation of gowns. In the last term street suits, reception and evening gowns are made.

In the first part of the course special study is made of proportion, line, form, and elementary color in gowns and their relation to the individual. Gowns are sketched in pencil. Later there is quick sketching of gowns, more study of color combinations, the drawing of simple designs for embroidery for dress decoration, and the application of such designs in the sketching of gowns.

In the latter part of the course instruction is given in the keeping of accounts with lectures on trade economics and civics. Two half-hour periods each week during the entire nine months in school are devoted to physical exercise and instruction in hygiene. A woman physician is on the staff of the school, as well as a physical director, to care for the health of the girls and give them necessary personal instruction.

The regular school hours are from 9.10 a. m. to 12.25 p. m. and from 1.20 p. m. to 4.05 p. m. on five days in the week, Monday to Friday, inclusive. When working in the dressmaking establishment, the pupils work five and one-half days a week from 8 a. m. to 12 m. and from 1 to 6 p. m. Monday to Friday, and from 9 a. m. to 12.30 p. m. Saturday. The desire here is to reproduce trade conditions as far as

possible. This workroom is in charge of an experienced dressmaker, and orders for gowns are taken from the general public at the usual trade prices for similar work. A few experienced workers are regularly employed so that pupils may secure benefit from observation as well as their own practice. However, the aim is to develop initiative and a sense of responsibility with proper appreciation of time, and thus to fit girls to advance rapidly when once they enter the trade. They are paid a small weekly wage while in the workroom for satisfactory work with regular and prompt attendance. This more than covers the tuition, so that they have no added expense for the time required of them in the dressmaking shop. The tuition fee in the dressmaking and millinery courses is $20 per term of three months. In the plain sewing course the fee is $15 per term. However, for worthy pupils who are not able to pay tuition at the time of taking the course, the director may recommend to the trustees that the amount of the tuition be loaned to the pupil repayable with interest within two years after graduation.

For girls who wish special preparation for positions involving costume sketching and designing, there is an added course which takes one year to complete. A knowledge of both hand and machine sewing and some knowledge of drawing are required to enter the course. The work includes costume drawing in pencil, pen, and ink; pattern drafting, designing, and modeling in paper and crinoline; designing for embroidery and dress decoration and the carrying out these designs on Bonnaz and perforating machines. Illustrated lectures are given on the evolution of dress and particular attention is paid to the study of textiles. Also instruction is given in trade economics, civics, accounts, and physical training.

The millinery course is three months in length and the purpose is to prepare pupils to enter the millinery trade. They must be able to do simple hand and machine sewing on entering or they will first have to take the plain sewing course. Pupils must furnish all their own materials. The course includes designing, drafting, and making of buckram and wire frames and the study of form, line, color, and textiles. Plain and covered hats, with various finishings for brims, bows, children's hats, and all styles of hats according to the season are made. The covering of wire frames with straw braids and other materials and the renovating of old materials are included with the work. There is also practice in pencil sketching of bows and simple hats, time study of color and textiles related to different types of people, keeping of accounts, and talks on trade economics and civics. The school maintains no shop for further practice work in this course.

Men are admitted to both the millinery and dress design courses and among the pupils of 1909–10 there were four men.

As has been said, no pupils are taken under 17 years of age, and in millinery and dress design the practice is to admit none under 18 years of age, and they are usually older. The first term is considered probationary, and if it is found that girls are not suited for the trade they have chosen, or are incapable, they are asked to go into another department or to leave. Pupils must enter at the beginning of each course. Terms begin in September, January, and April. Applicants for plain sewing and millinery can enter at any one of these times, since these courses are only three months in length. In the dressmaking course and the dress design course, each of which is a school year in length, the pupil must enter in September. The school is in session 37 weeks in the year, from the last part of September to the middle of June. There is no summer instruction.

Pratt Institute is not a local school, and local industries were not considered particularly in establishing the trade courses. The school is kept in touch with trade conditions through the teachers and through advice and criticism secured from people in business.

There were 10 teachers of dressmaking, sewing, and millinery employed for both day and evening trade work in 1909–10. A number of the teachers have had long trade experience and educational training also, but it is said that the school has found it exceedingly difficult to get teachers trained in this way. The aim of the school is to keep all theory and practice work very closely related, so each teacher must be able to teach both the theory and practice of her trade. For instance, designs are made for a specific garment and immediately carried out on that garment. Patterns are drafted in the same way and the instructor who teaches designing or drafting must also be able to teach the making of the whole garment. Great need is felt for teachers with a thorough knowledge of all features of the dressmaking trade and also with enough normal training to be able to impart their knowledge to others. The school attempts to meet this need to some extent in its own normal department, and capable girls after completing the dressmaking trade in the school are often urged to take up the normal training also, then get some trade experience and become trade teachers.

No textbooks are used in the school. Each dressmaking instructor has a blue-print book of drafts for garments made in the school. The institute has a large library, and books of design are sent over to the classes to be used for reference.

The aim of the day trade courses which have been described is to teach girls all the principles and a majority of the methods involved in the dressmaking and millinery trades. The school makes no effort to train girls for executive positions, but does expect to give them such a thorough knowledge of their trade that they can advance rapidly and if they show executive ability can later set up shops for them-

selves. An effort is always made to direct girls into trades for which they are fitted. Others are encouraged to take up institutional housekeeping. The working housekeeper's course is a year in length and fits women to take positions as housekeepers or matrons in institutions, large establishments, or lunch rooms. The course includes three terms of three months each and a probationary term of three months as a working housekeeper in some institution.

The evening trade courses of the School of Household Science and Arts are largely continuation classes for people already earning their living in the trades studied. There are some pupils who are in other lines of work during the day and who desire some practice work to enable them to enter one of the trades in which instruction is given. There is a course in plain sewing in which, in 1909–10, there were 26 pupils; a course in dressmaking in which there were 53 pupils; and a course in millinery in which there were 34 pupils. In addition to these there is a course in costume drawing in which there were 45 pupils, and a course in drafting and draping in which there were 8 pupils in 1909–10.

The plain sewing includes instruction in hand and machine sewing and the use of machine attachments applied directly to the garments made. Aprons, undergarments, dressing sacques, and kimonos are made from bought patterns and instruction is given in the drafting of undergarments and in darning and mending. This course is given in two terms of three months each and the tuition fee is $2.50 for each term, instruction being given on two nights each week between the hours of 7.30 and 9.30 p. m. The dressmaking course is also two terms in length and instruction is given on two nights in the week. The tuition fee is $5 a term. This course includes the making of plain shirtwaist suits, fancy unlined dresses and lined dresses for house and street wear. Pupils fit each other and furnish all their own materials. There are two evening courses in millinery. The first is elementary, while the second is for former pupils and milliners with considerable experience in the trade who come for practice work in making and trimming hats in the new styles of the season. This latter course is given on only one night in the week, while pupils in the elementary course have two nights. The tuition fee is $2.50 for a three months' term in the advanced course and $5 for a term in the elementary course.

The class in drafting and draping is for dressmakers of considerable experience who wish to learn a free-hand method of drafting and impression taking and draping according to the latest styles. The costume drawing class is also for dressmakers of considerable experience who wish to get practice in quick sketching of hats and costumes and training for the eye in good line, form, and color. Both these classes are taught two nights each week and the tuition fee is $5 for a three months' term.

Because the pupils in the evening classes are all earning their living during the day and come to the evening classes for the definite purpose of advancing themselves they are very much in earnest. Every effort is made to make the work practical and to give just what is most needed by each girl. The instruction is largely individual, and the classes are kept small to make this individual instruction possible.

DREXEL INSTITUTE OF ART, SCIENCE, AND INDUSTRY: DEPARTMENT OF DOMESTIC ARTS, PHILADELPHIA, PA.

The trade work in the department of domestic arts of Drexel Institute is very similar in character to the same department at Pratt Institute, of Brooklyn. It consists of advanced short courses in trade instruction during the day in sewing, dressmaking and millinery, and a series of evening courses in the same subjects. In February, 1910, there were enrolled 232 women in the day courses of sewing, dressmaking, and millinery, and 111 in the evening courses.

In the day school the work in plain sewing is not designed to make finished dressmakers, but may be taken as preliminary to the regular dressmaking course for practical dressmakers in case an applicant is not fitted to take the advanced work on entering the institute. The sewing course is a year and a half in length, but instruction is given on only two days a week for two hours each day. The regular dressmaking course is a year in length and pupils are in school 26 hours each week. The school year is 36 weeks in length and pupils may be admitted at any time. During the last half of the year dressmaking pupils may get additional practice work by executing orders on their own account. They also get instruction in drawing and water color for costume sketching and designing, in the keeping of accounts, in business forms and correspondence, and physical training in the gymnasium. There is no academic instruction in these courses.

There is an elementary short course in millinery to correspond with the plain-sewing course, which may be taken as preliminary to the full-time course for training practical milliners. In the last-named course, as in dressmaking, there is instruction in drawing, business customs and accounts, and physical training. The millinery course is a school year in length and pupils have 19 hours per week in school.

No girl is admitted to the school who is under 15 years of age, and no one is admitted to the full courses in millinery and dressmaking who is under 18 years of age. In addition, applicants must present as a test for admittance a piece of finished work—either hat or dress—to show that they are competent to do the work. The tuition fee for the dressmaking course is $35 per term or $70 for the year's work, and for millinery it is $30 per term or $60 for the year. Because of the age and previous experience demanded for admittance to these

courses a high grade of work can be taught. Pupils must furnish all their own materials for their practice work. They are allowed to sell the finished product and can earn something in this way while attending the school.

The evening trade courses in millinery and dressmaking follow the general plan of the day courses. Pupils in each course have four hours of instruction per week. The courses are planned as half year terms, but to obtain a certificate in the advanced dressmaking and millinery courses a pupil must spend three years in the school. The evening school is in session for 24 weeks in the year. Tuition fees differ for each year's work and for each course. Further details of this school are given in the tables at the end of this report.

TEMPLE UNIVERSITY: DEPARTMENT OF DOMESTIC ART, PHILADELPHIA, PA.

This institution has a department of domestic art in which short-time day and evening courses in dressmaking and millinery are offered. The school year comprises 36 weeks in the day school and 32 weeks in the evening school, and each course is completed in one year's time. The hours of instruction vary considerably among the several trade courses, from $1\frac{2}{3}$ hours per week in sewing, as a preparation for the dressmaking course, to 19 hours per week in the combined dressmaking and millinery course. The principal facts concerning this school are given in the tables at the end of this volume.

MECHANICS' INSTITUTE, OF ROCHESTER: DEPARTMENT OF DOMESTIC SCIENCE AND ART, ROCHESTER, N. Y.

This school in its work for girls is very similar to Pratt Institute, of Brooklyn. A description of its principal features appears on pages 69 to 72 of this report, and the courses given may be seen in Table I.

There is also a course in lunch room and restaurant management for women, a lunch room operated in the institution furnishing the practice work.

HIGH SCHOOL OF PRACTICAL ARTS, BOSTON, MASS.

The purpose of this school is, first, to give thorough training in dressmaking and millinery, with some instruction in domestic science as a secondary feature, and, second, to give training in domestic art and science for such vocations as matrons and working housekeepers of large establishments. Each course is four years in length and is planned not only to give training for the vocations chosen, but also a good cultural education of the high-school grade in addition. The school was established in September, 1907. In May, 1910, there were

227 pupils studying dressmaking and millinery and 88 studying household science. The school admits any girl who has graduated from a grammar school or can pass a satisfactory examination and is 13 years of age. Tuition is free to residents of Boston, while nonresidents are charged $90 per year. The vocations taught were selected after a study of local conditions, because it was thought that they would attract those who were expected to enter the school. Pupils enter regularly in September, but those who are properly qualified may enter at other times. The school year embraces 40 weeks. The daily sessions begin at 9 a. m. and end at 2.17 p. m., with an intermission of 37 minutes for lunch. Instruction is given on five days of the week.

During their first year in the school, all pupils pursue the same course, no choice of a vocation being made until the beginning of the second year. After this they may specialize in dressmaking, millinery, or household science, as they prefer. The dressmaking and millinery courses aim to give ideals, taste, and skill which shall have money-earning value for the possessor. The course in household science is offered to girls who desire to make an intelligent study of household sanitation, furnishing, decoration, and care.

The academic subjects studied and the number of hours per week devoted to each during the first year of the course are as follows: Algebra, 3; drawing, 3; English, 3¾; history, 1½; music (choral practice), ¾. In addition, all pupils give 1½ hours a week to physical training and 1½ hours to preparation of their lessons in school. The time given to instruction in sewing, cooking, and housekeeping amounts to 7½ hours per week.

In the second year the academic studies and the hours per week given to each are: Chemistry, 3; drawing, 3¾; English, 3; geometry, 1½; history, 2¼. Forty-five minutes in each week are devoted to choral practice and an equal time to physical training by all the girls. Dressmaking pupils have 1½ hours of cooking and housekeeping instruction and 6 hours of practice work in dressmaking each week. Pupils specializing in millinery give 1½ hours to cooking and housekeeping, 1½ hours to sewing, and 4½ hours to millinery work each week. Girls taking the domestic-science course devote 1½ hours to sewing and 6 hours to housekeeping during each week.

The subjects studied in the third year, with the hours per week required by each, are: Drawing, 3¾; English, 3; history, 2¼; physics, 3. All pupils in this year give three-quarters of an hour weekly to choral practice and an equal time to physical training. Study periods occupy 1½ hours per week. In addition to the foregoing subjects, dressmaking pupils have 1½ hours of instruction in cooking and housekeeping and 6 hours of dressmaking practice each week; millinery pupils have 1½ hours of cooking and housekeeping, 1½ hours of sewing,

and 4½ hours of millinery practice per week; and pupils in the domestic-science course have 1½ hours of sewing and 6 hours of housekeeping instruction per week.

The fourth-year academic subjects and the hours devoted thereto each week are: Drawing, 3¾; economics, 1½; English, 3¾; history, 2¼; hygiene, 2¼. Choral practice and physical training are given three-fourths of an hour each per week. In this year dressmaking and domestic science pupils receive 1½ hours of instruction in millinery each week in addition to 6 hours of practice work in their respective vocations. Pupils in the millinery course have 7½ hours of practice work per week.

During the first year all the girls have plain sewing. They learn all the different stitches they will have to use, including embroidery stitches and machine stitching. These are applied in the making of a complete set of underwear for themselves. In the second year unlined dresses and shirt waists are made. The girls who have chosen dressmaking must make several of each kind of garment, but the girls who have chosen millinery or housekeeping make only one garment of each kind. In the third year silk and wool dresses are made, and in the last year the dressmaking girls make gowns of all sorts, including tailor-made, reception, and evening gowns. Some order work from outside is done during this last year. During the entire course each pupil must measure, draft, cut, and fit each garment which she makes and in some cases design it as well. The designs to be applied to the garments are made in the drawing classes.

In the second year the girls who have chosen millinery make wire frames, cover bandeaux, and begin to cover hat frames. The next year hats are made. The hats are increasingly difficult as the pupils advance, but the kind depends entirely on the fashion of the season. In the latter part of their course the girls are taught the making of fancy neckwear and other fancy articles.

For the girls who have chosen the housekeeping course there is practice in the care of a house, cooking, marketing, planning meals for persons of different occupations and for institutions. In addition to this instruction, the aim is to give the girls who have chosen the other two vocations enough practice in housekeeping and cooking to give them the highest ideals of home life, just as the aim is to give the girls of the housekeeping course enough instruction in sewing to enable them to make their own clothes.

The aim of the drawing instruction is the cultivation of taste through a study of the principles of beauty and their application to the problems of dress and the house. The course includes drawings for the workshop; mechanical drawing which necessitates accuracy

in measuring; composition and design which include the analytical study of the principles of beauty and color harmony; costume design and house furnishing and decoration, which are two specialized features of the art work.

The work in mathematics and science is as closely related to the vocations as possible. As an illustration of some of the practical problems, the housekeeping girls must learn household bookkeeping, the millinery girls must learn the bleaching of straw for straw hats by sulphur dioxide, the dressmaking girls must study dyes and the effect of certain chemicals on textiles, and in addition all the pupils must make a thorough study of heating, plumbing, and ventilating as applied to home and institutional housekeeping.

The materials used for practice work in dressmaking and millinery are practically all furnished by the pupils, and the finished articles are retained by them. Occasionally girls sell a considerable amount of work, both of articles made in the school and outside.

The school is under the direction of the school committee of Boston and is maintained by public school funds. The director states that the decrease in number during the school year is less than in the ordinary high school. A diploma of high-school grade will be awarded to graduates of the school.

WASHINGTON IRVING HIGH SCHOOL, NEW YORK, N. Y.

Another public high school for girls which offers instruction of an industrial nature to its pupils is the Washington Irving High School, of New York City. Industrial training, however, is only one feature of this school's activities. There is, in addition, a commercial department, a teacher's preparatory department, a department for training librarians and a department for training designers. In the industrial department the occupations taught are dressmaking and hand bookbinding. The needs of local industries were considered in introducing this instruction, and it is expected that other vocations will be introduced as the school develops. The entire course in this department is planned to cover three years. The first year is given over entirely to academic or cultural work and the course is the same for all pupils. At the end of the first year the pupils can specialize in either dressmaking or bookbinding, and devote the remaining two years to preparation for those occupations. In October, 1910, there were 173 dressmaking pupils and 16 bookbinding pupils in attendance. The studies of the first year are drawing, elocution, English, mathematics, music, domestic science, and French, German, Latin, or Spanish. Pupils also spend one and one-half hours per week in physical culture.

In the second and third years the subjects studied and the number of hours per week devoted to each by all pupils in dressmaking and bookbinding are as follows: English, 3¾; French or German or Latin

or Spanish, 3¾; music, ¾; elocution, ¾; physical training, 1½. In addition to the foregoing studies pupils have 14¼ hours of practice work per week in their respective trades during the second year and 15¾ hours during the third year. Study periods occupy 1½ hours per week in the second year.

The school year comprises 38 weeks, from the middle of September to the last of June. Pupils may enter the school at any time. The hours are from 8.45 a. m. to 12 m. and from 12.30 to 2.30 p. m., Monday to Friday, inclusive. To be eligible for admission to the school girls must be at least 13 years of age and must have completed the elementary school work or pass an equivalent examination. There is no charge for tuition to residents. More than 90 per cent of the pupils are said to remain in school until the completion of their courses.

This school was established in 1902 and several classes have been graduated. The demand for pupils of the school by employers about the city is said to be greater than the supply. There is no employment bureau in connection with the school, but the teachers assist in placing pupils in positions so far as possible. The pupils are taught the processes of their trades in the school, but it is expected that trade methods must be learned by actual experience.

The pupils furnish all their own materials except for the very first practice work, and have their products to keep or sell as they please. Some are sold in the school salesroom, but all proceeds for such products go to the pupils who made the articles and who have furnished or paid for the materials.

NEW YORK EVENING HIGH SCHOOL FOR WOMEN, NEW YORK, N. Y.

The New York Evening High School for Women was established in September, 1907, for the purpose of teaching the application of art to industry in an effort to meet the local demand for the services of women artistically trained in certain industries. It was believed that a large field for self-supporting women could be found in the art and handicraft side of women's industries. This field is still new, with no established lines of work as yet, and has called for much experimentation and study. Dressmaking is taught with the emphasis on designing, cutting, and fitting. In millinery, only the designing feature of the trade is taught. The women who take these courses are employed during the day.

The work of the school is arranged in courses, and in addition to the regular dressmaking and millinery work just mentioned there are related courses in embroidery, with design, costume illustration and design applied in a variety of ways. Instruction is also given in bookbinding and leather art work.

There is also a course in hand leather work and hand bookbinding, which is expected to supply the demand for hand leather workers in the leather stores in New York and for hand bookbinders in small binderies.

The number of pupils in the dressmaking course in 1909–10 was 60 and in the millinery course 45.

The period fixed for class work in each of the occupations taught in the school is two years, but under certain conditions this period may be extended. The aptitude and ability of the pupils are the considerations that chiefly determine the period of class work. Class sessions are held four evenings of each week, from Monday to Thursday, inclusive, and pupils are required to attend two class sessions weekly. Moreover, they may come on the other two evenings in the week and work individually. The hours of class work, including such oral instruction as may be necessary, are from 7.15 to 9.30 p. m. The school year comprises 30 weeks, beginning in September and closing in May. A week's holiday is allowed at Christmas and at Easter. A certificate is granted to each pupil who satisfactorily completes her course. It is stated that by reason of a variety of causes, such as leaving the city, loss of position, sickness, etc., about 20 per cent of the pupils leave the school before the completion of the course.

Any woman of good moral character, who is not less than 16 years of age and who has completed the high-school course or received an equivalent education, may be accepted as a pupil of the school. While pupils are advised to enter the school at the beginning of the term, they are permitted to enter at any time during the school year.

The school uses the building provided for a public day high school. There is no fee for tuition and the pupil is at no expense in connection with her school attendance beyond supplying the material she uses in her school work. The school does not as an institution make a marketable product, but each pupil is permitted to hold as her own any article she may make in connection with her school work and sell it, if she sees fit, for her individual profit.

The facts for this school have not been included in the tabular presentation at the end of the report for the reason that its work is still too undefined to determine how much is being taken for trade purposes and how much for purely cultural or home use.

CINCINNATI EVENING SCHOOL, CINCINNATI, OHIO.

The public evening school of Cincinnati, Ohio, differs from the New York school in that it teaches the ordinary practice work of the dressmaking and millinery trades and does not put any special emphasis on the higher branches. The millinery courses, in which there were 200 pupils in 1909–10, are distinctly trade courses for women already in the trade or those contemplating going into the trade. Cincinnati

is a wholesale millinery center, so there is employment for a large number of women in this trade. The millinery pupils are required to furnish their own materials. The planned course is two years in length. There were in addition 180 pupils in the dressmaking courses and 28 in art-needlework courses in 1909–10. While these may be taken for trade purposes, many of the pupils are in other lines of work and are believed to be taking them for home use only. For this reason the data for these two courses have not been tabulated. The work of the school is under one director, but classes are held in various school buildings over the city. One building has classes for colored girls entirely. The teachers are practical milliners and dressmakers, and there is said to be no difficulty in securing trade people for this evening work.

EVENING HIGH SCHOOL FOR WOMEN, PHILADELPHIA, PA.

In this school there were 155 pupils in the dressmaking courses in 1909–10. A practical dressmaker has been secured as a teacher and this has drawn a number of women to the school who are at work in the trade during the day and who wish to learn drafting according to the present fashion. It is the aim of the school to extend this trade side of the work and attract more women whose purpose is to take up the trade as a means of livelihood.

Like the New York and Cincinnati schools, this institution is a part of the city public-school system and is under the control of the city board of education. It was established in 1905.

The school is open to any girl 14 years of age or over, but a majority of the pupils are women. Because of the limited accommodations in the school, applicants for admission are required to pass a competitive examination in sewing and arithmetic. Persons successfully passing this examination are placed on a waiting list and are admitted as fast as vacancies occur. As comparatively few pupils in the school are known to be taking the dressmaking course for trade purposes, the facts for this institution have not been included in the General Tables, Chapter XVIII.

CARNEGIE TECHNICAL SCHOOLS: MARGARET MORRISON CARNEGIE SCHOOL (EVENING COURSES), PITTSBURG, PA.

The Margaret Morrison Carnegie School, one of the Carnegie Technical Schools of Pittsburg, Pa., was opened in October, 1906, with day and evening courses. The evening instruction is designed primarily to increase the efficiency and earning power of females who are employed during the day and who are dependent upon their earnings for their livelihood. The school does not attempt to develop experts, but offers helpful instruction to those who have not had an

opportunity to acquire the theoretical foundation and breadth of training necessary to an intelligent exercise of their chosen pursuits. In common with other units of the Carnegie Technical Schools system, its support is derived from the endowment fund established by Mr. Andrew Carnegie. General rather than purely local conditions have been considered in determining the courses to be offered. As conducted in 1909–10 the courses in sewing and dressmaking and in millinery which fall within the limits of this report were arranged to cover three and two years, respectively. On May 1, 1910, 79 pupils were enrolled in sewing and dressmaking and 42 in millinery. The minimum age at which pupils are admitted to the school is 17 years. No written tests for entrance are required, but each applicant must in a personal interview satisfy the interviewing officer of her fitness to pursue profitably the work of the school. Pupils may enter at any time prior to the Christmas holidays. The classes are in session for 30 weeks each year, from the second Monday in October to the first Friday in May, from 7.30 to 9.30 p. m., on Monday, Wednesday, and Friday.

In the sewing and dressmaking course one year is devoted to the elementary principles of hand and machine sewing, after which the work of practical dressmaking is taken up. The course in millinery begins with one year of constructive work, followed by one year of advanced study of line, color, and trimming.

No academic instruction is given in these courses, the entire time of pupils being devoted to practice work. A certificate is given to a pupil completing a regular course. During the 1909–10 term about 22 per cent of the sewing and dressmaking pupils left the school before the completion of their courses, largely on account of overtime requirements in their regular day employment. The number of pupils in the millinery course who left was only about 2 per cent of the enrollment.

There were six teachers engaged in teaching the practice work of these two courses in 1909–10, all but one of whom had had actual trade experience, supplemented in one case with a normal industrial course. All six of the teachers reported previous experience in industrial teaching.

Pupils who are residents of Pittsburg pay $5 per year for instruction, all others $7. All pay, in addition, a general fee of $2 to defray, in part, the cost of instruction, material, etc., and 50 cents for maintenance of student organizations. A breakage deposit of $1 is required. These fees are paid by pupils irrespective of time of entrance or leaving the school.

This school, like the other Carnegie Technical Schools, is under the supervision of the board of trustees of Carnegie Institute. The officers of administration are identical with those of the School of

Applied Industries described elsewhere in this report (p. 50). The school building, which is used by both day and evening classes, represents, together with the equipment, an expenditure of approximately $600,000. No product of any kind is marketed by the school.

SCHOOL OF DOMESTIC SCIENCE AND DOMESTIC ART, ROCHESTER, N. Y.

This school was opened in September, 1909, by the city board of education of Rochester and the State division of trade schools as a school for home makers. The plan first adopted proved unsuccessful, as pupils conceived the idea that they were being trained for domestic service, and hence were dissatisfied. In addition, there was manifest a tendency on the part of other schools to send their undesirable pupils to this school, which added to the existing dissatisfaction. The school was entirely reorganized in September, 1910, making the home-making course incidental and instruction in dressmaking and millinery the primary purpose of the school. The school is in session on five days of the week, Monday to Friday, inclusive, from 9 a. m. to 12 m. and from 12.30 to 3.30 p. m. All the pupils are required to devote 5½ hours each week to cooking and 13½ hours to such subjects as arithmetic, English, industrial geography and history, spelling, designing, and hygiene. Instruction in civics is brought out in connection with the industrial geography and history. The remaining 11 hours in the week are given over to trade practice work. In December, 1910, there were 27 girls receiving instruction in dressmaking and 14 in millinery. In addition there were 16 girls taking the home-maker's course, with practice time evenly divided between dressmaking, millinery, and cooking.

In introducing the work of dressmaking and millinery in the school, local industries were not especially considered, but rather the general demand for girls skilled in these trades. The training given, which covers two years, is planned to make them efficient helpers or assistants.

Two teachers were employed for giving trade instruction in 1909–10, of whom one taught dressmaking and the other millinery. Both teachers had had considerable experience in the trade, as well as in teaching. No fee is charged for tuition.

A year's work in this school consists of only 40 weeks, since there is no summer session. The school year begins in September and ends in June. Any girl, at least 14 years of age, who has finished the sixth grade may attend this school and she may enter at any time. Garments and hats are made from materials furnished by the pupils and are retained by themselves. The only product sold by the school is cooked food for lunches.

CHAPTER IX.

NEGRO INDUSTRIAL SCHOOLS.

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NEGRO INDUSTRIAL SCHOOLS.

INTRODUCTION.

In any discussion of the schools for Negroes it must be borne in mind that they should not be compared with the schools for whites, or judged by the same standards, as in almost every instance they are hampered by lack of funds, and in many cases it has not been possible to obtain for the low salaries they are able to pay the services of teachers experienced either in trade work or in teaching. While thus hampered they still must aim to give a good training in industrial work, for in practically all trades the regular apprenticeship is not open to the Negro youth, so if a school starts a boy (or girl) in a trade it must give sufficient training to enable him to compete with the man who has served an apprenticeship.

The attitude of the Negroes themselves has made the progress of these schools difficult. When the school at Hampton, Va., first opened its doors there was general opposition on the part of the Negroes, because of the feeling that to engage in any manual labor was a reversion to slavery. They were, and many still are, anxious to be employed in occupations other than manual, but the work of Hampton and Tuskegee has broken down the opposition to a great extent.

There are few industrial schools for Negroes in the North. These schools aim primarily to fit the Negro for a trade and to adapt him to the conditions of life in the city. Some were established prior to the Civil War, for the education of the freed Negro. The schools in the North are very diverse in their character and are treated individually in the pages following. The majority of the Negro schools, however, are south of the Mason and Dixon line, and all these have been established since the close of the Civil War. The first of these schools, the Hampton (Va.) Normal and Agricultural Institute, was established in 1868, and practically all others are patterned after it. These southern schools differ radically both in method and ultimate aim from the schools of the North. While the northern schools are preparing their pupils for life in the city, the schools of the South are doing all that they can to discourage their pupils from seeking city employment. Those foremost in educational work among Negroes in the South have come to the conclusion that the future welfare of the

colored people depends upon their ownership of farm land and upon their intelligent cultivation of the same. This field is free from competition and from race feeling. Owners of large tracts are willing, as a rule, to stock and rent subdivided tracts of land to Negro tenants who can intelligently farm them. The goal is pretty well set forth in the prospectus of one school which aims "To train them (the Negroes) to be intelligent, faithful, and trustworthy; to instill in them right moral principles; to teach them dignity of labor; to encourage them to buy homes and farms and to become good and desirable neighbors and citizens."

While the teaching of agriculture is the main industrial work of these schools, they are also giving trade training to those who want it. Generally, the boy whose future is on the farm gets sufficient trade training to do the necessary work there, enough blacksmithing to shoe his own horses, tire his own wagon wheels, and mend his own plow; enough carpentry to shingle his own roof or build his own barns, etc. Others who intend to follow a trade get sufficient specialized training to enable them to compete with journeymen who have served an apprenticeship.

The same is true of the girls. The primary aim of the work for girls is to fit them for home makers; to teach them what they need to know of cooking, sewing, laundering, care of children, nursing, and house sanitation, in order to enable them to do the things necessary in every well regulated home. But in addition to this the girls are given training for employment as seamstresses, laundresses, nurse maids, milliners' helpers, and cooks.

The discussion of individual schools in this chapter is limited to those departments which prepare the pupils to go into gainful occupations in the trades. Practically all of these schools, in addition to the industrial training offered, are preparing people to spread the gospel of "Back to the soil" among the Negro population who never come in contact with the schools. To this end there is a normal department connected with the majority of the schools which trains teachers for work both in the grades of the public schools and in the industrial schools.

In all of these schools there exists also the general idea of uplift and enlightenment. With very few exceptions academic work is required in connection with the trade or agricultural instruction.

The tuition is nominal in all of these schools. The people for whom they are intended are unable to pay much of a tuition fee. A small charge is usually made for the purpose of engendering self-respect on the part of the pupils, but it is not large enough to contribute materially to the support of the institutions, which must depend almost entirely upon the contributions of philanthropically inclined persons and upon public support.

The schools named in the following list were visited for the purpose of obtaining the data which are included in the present report. The principal facts relating to each institution have been reduced to tabular form and will be found in greater detail in the presentation by class of school and State appearing elsewhere in this report.

SCHOOLS FOR NEGROES.

Name of schools.	Location.	Year of establishment.	Class of school.	Day or evening school.
State Agricultural and Mechanical College.	Normal, Ala.	1875	Public	Day.
Snow Hill Normal and Industrial Institute.	Snow Hill, Ala.	1894	Philanthropic.	Do.
Tuskegee Normal and Industrial Institute.	Tuskegee, Ala.	(1)	do	Do.[2]
Lincoln High School	Fort Smith, Ark.	1902	Public	Do.
Armstrong Manual Training School:				
Day school	Washington, D. C.	1901	do	Do.
Evening school	do	1902	do	Evening.
Alcorn Agricultural and Mechanical College.	Alcorn, Miss.	1878	do	Day.
Manual Training and Industrial School for Colored Youth.	Bordentown, N. J.	1894	do	Do.
Henrietta Trade School	New York, N. Y.	1909	Philanthropic.	Evening.
Industrial Evening School	do	1905	Public	Do.
High Point Normal and Industrial School.	High Point, N. C.	1891	Philanthropic.	Day.
Berean Manual Training and Industrial School:				
Day school	Philadelphia, Pa.	1899	Philanthropic.	Do.
Evening school	do	1899	do	Evening.
Avery College Training School	Pittsburg (Allegheny), Pa.	1849	do	Day.
Watchman Industrial School	Providence, R. I.	1908	do	Evening.
Voorhees Industrial School	Denmark, S. C.	1897	do	Day.
Mayesville Industrial and Educational Institute.	Mayesville, S. C.	1885	do	Do.
Claflin University	Orangeburg, S. C.	1883	do	Do.
Hampton Normal and Agricultural Institute.	Hampton, Va.	[3]1868	do	Day and evening.
St. Paul Normal and Industrial School.	Lawrenceville, Va.	[4]1883	do	Do.

[1] Sewing, 1883; carpentry, 1884; other trades, 1886 to 1906.
[2] Also has evening academic classes.
[3] Indians admitted in 1878.
[4] Opened in 1884.

The following schools have been selected for description in the subsequent pages of this chapter:

Hampton Normal and Agricultural Institute, Hampton, Va.
Tuskegee Normal and Industrial Institute, Tuskegee, Ala.
Snow Hill Normal and Industrial Institute, Snow Hill, Ala.
Berean Manual Training and Industrial School, Philadelphia, Pa.
Watchman Industrial School, Providence, R. I.
Alcorn Agricultural and Mechanical College, Alcorn, Miss.
State Agricultural and Mechanical College, Normal, Ala.
High Point Normal and Industrial School, High Point, N. C.
Mayesville Industrial and Educational Institute, Mayesville, S. C.
Claflin University, Orangeburg, S. C.
Voorhees Industrial School, Denmark, S. C.
St. Paul Normal and Industrial School, Lawrenceville, Va.

In addition to these schools, the Armstrong Manual Training School of Washington, D. C., offers courses that are within the limits of the present investigation. A description of the day industrial work in this institution will be found in the chapter on public schools, page 131 of this report. The evening work is described in the chapter on evening schools, page 240.

In addition to the schools hereinbefore named, there is a large group of schools giving some industrial training to the Negro, but which are not included in this report because of the large proportion of time devoted to academic work. In many of the so-called manual training departments of the public Negro schools, both north and south, effective training is given in the elements of trade work.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE, HAMPTON, VA.

Hampton Normal and Agricultural Institute, a school for Negroes and Indians, located at Hampton, Va., stands for varied activities. It comprehends a normal training school, an agricultural school, and a department called the "trade school." The last-named department is the only one which comes within the scope of this report.

Hampton Institute was founded in 1868 for the purpose of providing a practical education for children of ex-slaves. Ten years later, by contract with the Federal Government, Indian pupils (limited to 120) were admitted. These Indian pupils are on a somewhat different basis from the Negroes, being there as wards of the Government.

To quote the words of its founder, Gen. Armstrong, Hampton's purpose is "to train selected youth, who shall go out and teach and lead their people, first by example, by getting land and homes; to give them not a dollar that they can earn for themselves; to teach respect for labor; to replace stupid drudgery with skilled hands; and to these ends build up an industrial system for the sake not only of self-support and intelligent labor but also for the sake of character."

Gen. Armstrong had a firm belief in the moral and ethical value of manual labor, and the problem of Hampton Institute through these 42 years has been how to use industry in such a way as to obtain the greatest results in character and mental force, and so to combine the work of the hand with classroom instruction that each should help the other.

The institute is neither a Federal, State, nor denominational school. The funds for its maintenance are obtained chiefly from gifts and bequests of private individuals. In 1870 it was chartered by a special act of the General Assembly of Virginia, and thus became an independent organization, controlled by a self-perpetuating board of trustees from various sections of the country, the secretary of this board being the executive head of the institute. The department for trade instruction has no specific bequest, but draws upon the general fund for such financial aid as is needed.

The principal, in consultation with the faculty, decides what subjects shall be taught. Much practical work is given, because, unlike the white boy of the North, who after receiving some industrial training may be admitted to his trade as an apprentice, the Negro on leaving an industrial school must start to work at his trade at once, few places being open to him as an apprentice.

During the year 1909–10, 241 students were enrolled in the trade classes as follows: 28 blacksmiths, 44 bricklayers and plasterers, 49 carpenters, 10 cabinetmakers, 13 machinists, 10 painters, 8 printers, 8 shoemakers, 17 steam fitters and plumbers, 37 tailors, 2 tinsmiths, 1 upholsterer, 14 wheelwrights.

Hampton's primary function is to train up leaders among the Negro race, and the selection of students is made with this end in view. Candidates for admission must be at least 17 years of age, and must pass an examination in arithmetic, English, and geography. Before a boy is admitted to the trade classes, he must have completed at least one-half the academic work of the "junior" or first-year class. In addition to fulfilling the mental requirements, all applicants for admission to the institution must pass a physical examination and must furnish evidence of good character. No pupils are admitted after the opening date except by special dispensation of the faculty, which is granted only in extreme cases.

Pupils are admitted to the trade classes only as vacancies occur. An applicant for whom there is no vacancy may do one of two things: Enter the regular day school and defer his trade training until the next year, or he may enter the "work class" and obtain his academic instruction in the evening school. This "work class" is for pupils who need to earn money with which to meet expenses later in the course.

The pupils in the trade classes do not give any time to work for wages outside of the school in connection with their trade course. They are, however, given an opportunity to earn money while at school. If a pupil otherwise acceptable has not sufficient funds to pay the necessary expenses, or if his application is received after the quota of his chosen trade is filled, he is allowed for the first year to give his entire time to productive labor for the institution in the "work class," and is credited for the value of the work. He must, however, keep up his academic work in the evening. The work done is not trade work, but any work of the institution, skilled or unskilled, needing to be done, that the boy is qualified to do. Pupils usually earn from $15 to $20 per month during a "work year."

In addition to this, pupils who are not in the "work class" or trade classes have one day per week on which they work for the institution and are credited therefor. In such cases they work at whatever labor is to be done at the school.

The trade course covers a period of three years. A certificate is given for the completion of the trade course, but no diploma is awarded unless the equivalent of the four years' academic work also has been completed.

Pupils pursuing trade subjects receive school room instruction on five evenings of each week during the academic year (October 1 to June 1). In addition to this each student has one hour each day for study of academic subjects from 6.30 to 7.30 a. m. The evening sessions of the academic classes are from 7 to 9 p. m. This time is divided into three periods of approximately 40 minutes each. The course of study that is covered by a day school pupil in one year requires two years in the evening school. The academic evening school therefore represents eight years of work while the academic day school has a four-year course. No one spends eight years in the evening school, however. A pupil may take some work in day school before beginning his trade course or after completing it, and a good many never finish the academic work.

When a pupil enters the trade classes he also enters evening academic classes at that point for which his previous schooling has prepared him, and continues this course as long as he remains in school. So pupils of different grades of academic advancement will often be found in the same trade class.

Following is the academic program of the evening school:

Junior class.

First year subjects.	Number of periods (40 minutes each) per week.	Second year subjects.	Number of periods (40 minutes each) per week.
Arithmetic	4	Arithmetic	4
English	6	English	6
Physiology	4	Science (elementary)	4
Singing	1	Singing	1

Junior middle class.

English	5	Agriculture	4
Geography	4	English	5
Arithmetic	4	Bible	4
Current events	1	Current events	1
Singing	1	Singing	1

Senior middle class.

History	4	Geometry	4
Literature and English	5	English	5
Chemistry	2	Literature	3
Physics	2	Animal industry	2
Current events	1	Business	1
Singing	1		

Senior class.

First year subjects.	Number of periods (40 minutes each) per week.	Second year subjects.	Number of periods (40 minutes each) per week.
English	5	Algebra	2
Literature	3	Economics	5
Business	1	English	5
Singing	1	Psychology	3
History	5		

In addition to the above outline of academic work done in the evening, a course in mechanical drawing (four hours per week) is given as a part of the training of all trade pupils, excepting tailors, shoemakers, and painters. These have one hour per week of free-hand drawing instead.

Great emphasis is placed upon the teaching of civics, both in the classroom and in the shop. Constant precept and example serve to supplement and drive home the lessons brought out in classroom discussion. The danger of impulsive and uncontrolled action, whether in social, religious, or political matters, is emphasized on all occasions.

Every trade pupil devotes eight hours per day for six days of each week to his trade, including drawing, and two hours to academic work on five evenings of the week, from October 1 to June 1. During the summer months he has no academic work, but devotes nine hours per day to commercial work at his trade.

In order to give the pupils the best experience possible, as much commercial work is taken in each department as can be advantageously handled. As soon as a pupil is sufficiently skilled he is put on productive work under the direction of the instructor; for such work he receives compensation.

An additional school building was erected during the past year on which practically all of the bricklaying, tinsmithing, plastering, steam fitting, and painting was done by the pupils in those several trades under the superintendence of instructors. All of the building operations on the grounds and the repair work on the 135 buildings gives practical experience to all building trades pupils. What is true of the building trades is true in other departments; all of the trade work of the institution being done by pupil labor. In order to avoid any tendency to specialization, only a limited amount of commercial work of any one kind is taken.

An attempt is made to turn out not only a mechanic, but an all-round workman, who when thrown upon his own resources can meet an emergency. For example, the carpentry pupil is given supplementary instruction in the allied trades, as bricklaying, plastering, painting, tinsmithing, and wood turning, so that if called upon to do

so, he can do all the work of repairing a house. Briefly the trade work in the different classes is as follows:

Blacksmithing.—After covering the course of practice pieces and becoming familiar with the use of the ordinary blacksmith's tools, the pupil takes up practical work, of which there is a great variety, such as ironing of wagons, making tools, general forge and repair work, and horseshoeing. Instruction is also given in tempering.

Bricklaying and plastering.—Special stress is laid on plain house construction, including foundations, chimneys, fireplaces, and window and door arches. Instruction is given in scaffolding, mixing mortar for both brickwork and plastering, lathing, use of hair, use of mortar, stain, and cement work.

Cabinetmaking.—The first year is spent in studying the principles of joinery and cabinetmaking. Then follows the actual construction of cabinets, desks, tables, bookcases, etc., and the repairing of furniture. Instruction is also given in wood turning, wood carving, uphostering, staining, and finishing of woods.

Carpentry.—When a certain stage of proficiency is reached, the pupil passes on to practical work, as building and repairing buildings of the institution. Advanced classes are given contract work. For example, in one building erected each room was turned over to two boys who were to lay the floor and trim it according to specifications, with the understanding that if any of the work was unsatisfactory or any improper material was used the job would have to be done over at their expense. That is, conditions were made as nearly as possible what they would be if the contract was given to some outside builder. The class as a whole made an estimate on the cost, after which they were allowed what was considered a satisfactory price. Each pair of pupils then made out their own bill of material, which they purchased from the mill and hauled to the building themselves. Whatever material they saved was bought back at the price they had paid for it.

This method gives the pupils practical lessons in the kinds and grades of material that can be used in such work, prices of the same, value of their time and labor, and their personal gain in economizing materials.

Machine work.—The course includes vise work, exercise on speed and engine lathes, drill press, shaper, planer, and milling machine.

Painting.—The course of instruction includes house painting, hardwood finishing, carriage and wagon painting, lettering, sign painting, and interior work, such as paper hanging, frescoing, and varnishing.

The many buildings on the grounds furnish a large variety of practical work.

Printing.—All printing required by the institute is done in this department. The work includes letter heads, leaflets, bulletins, periodicals, catalogues, and other kinds of printed matter. The aim is to give as thorough an all-round training as is possible in the time allowed to the trade.

Shoemaking.—In this course instruction and practice are given in the production and repairing of shoes, the cutting and fitting of uppers, finishing pegged, nailed, and sewed shoes.

Steamfitting and plumbing.—This course comprises instruction and practice in all the piping and connections necessary for the heating of buildings, connecting of engines and boilers, and water-supply mains, both wrought and cast iron.

Under plumbing are included sanitary drainage; laying, grading, and calking cast-iron and terra-cotta soil pipes; fitting up bathroom, kitchen and laundry, and general house plumbing.

A limited amount of steam engine and boiler practice with Corliss and slide-valve engines and return tubular boilers is included.

Tailoring.—The more advanced pupils in academic subjects are given the preference in admission to this department. The work done includes the cutting and making of uniforms, trousers, overalls, civilian suits, overcoats, and ladies' capes. Special attention is also given to cleaning, repairing, and pressing.

Tinsmithing.—Instruction is given in working out the processes entering into general tin work, as roof covering, conveying of water, manufacture and repair of tinware, and setting up stoves. Much work of a practical nature is found on the school grounds.

Upholstering.—This course consists of practice in caning chairs, making and renovating mattresses, making cushions and pillows, and general upholstery work.

Wheelwrighting.—In wheelwrighting the aim is to fit the pupil to handle the work found in the ordinary country or city shop. For this reason practice is given in all lines of the wheelwright's trade, including the construction of wagons, farm carts, wheelbarrows, trucks, and pushcarts. Repairing and painting are also done.

The workshops are supplied with complete equipment for all trades. A description of the equipment appears in Table V.

Twenty-four teachers of trade subjects were employed in 1909–10. Two of these were teachers of theory (mechanical and free-hand drawing). These men were pupils at trade schools and later were employed in trade work. The other 22 were teachers of practice trade work. Eight teachers had received some instruction beyond that of the public schools, and 17 were employed on account of their trade experience. All but 1 of the men teaching trade subjects had had from 1 to 8 years' experience in the trades.

All of the trade classes, with the exception of the printing class, are housed in the trades building, a two-story brick costing $47,767. The trade department receives its share of the increment from the $2,273.82 endowment of the institution and from the Morrill funds. Other income is from contract work and miscellaneous gifts.

An entrance fee of $10 is required of all new pupils. After the first year each pupil pays $1 per year incidental fee. The tuition fee is $100 per year. This does not include board, for which an extra charge is made. These fees apply to all departments of Hampton Institute. No extra fee is charged for trade work. In the case of deserving pupils the tuition fee may be paid wholly or in part (at the discretion of the faculty) from the scholarships given by benevolent persons or societies. It is not intended that any worthy pupil shall be kept out of Hampton because of lack of funds to pay the tuition. The tuition and other expenses of Indian pupils, up to the amount of $167 per year, are paid by the United States Government.

In addition to the regular trade work, there is given pupils in the other departments of the institute some manual training of an industrial character.

All regular day-school boys devote two or more 80-minute periods each week throughout the four years to some form of handwork. The chief purpose of this course is to make men more resourceful in meeting certain emergencies that are constantly arising in the home, on the farm, and in the schoolroom. To this end the elements of the following kinds of handwork are taught: Woodwork, harness repairing, cabinetwork, wood turning, mechanical drawing, tinsmithing, tailoring, shoe repairing, blacksmithing, bricklaying and plastering, house and sign painting, upholstering, wheelwrighting, and general repair work. From this list of subjects individual programs are arranged.

In the junior year are taught elementary woodwork, harness repairing, and cabinetwork. The woodwork is preceded by a short course in mechanical drawing to enable the pupil to make an intelligent working drawing of the things he will have to construct in wood. Instruction is given in the use and care of woodworking tools, methods of forestry, lumbering, transportation of lumber from the forest to the mill, and its preparation for commercial purposes. Problems in carpentry and house construction are given to those who intend taking the carpentry course in the trade department later, and who show a special aptitude for this work.

The work in the junior middle year may be either woodwork, wood turning, or bricklaying, whichever is best for the particular pupil. Owing to its larger field of usefulness the work in wood is continued during this year in preference to other work by those who are likely to become teachers. Many graduates are required to teach this subject who have had no trade training, and who will therefore be helped

by the additional experience. Wood turning and bricklaying are given to those who have no intention of teaching, but who will be benefited by a more general knowledge of manual work.

In the senior middle year the subjects taken are wood turning, tinsmithing, and mechanical drawing, divided into half-year terms as circumstances may require. The wood turning is to increase the pupil's command of woodworking tools in connection with machinery, to develop his appreciation of line harmony, and to show the relation of wood turning to house construction and cabinetwork. The tinsmithing is to acquaint the pupil with different metals and fluxes, to enable him to make articles for his use, but chiefly to teach him to repair leaky vessels and to do similar work about his home. The object of the mechanical drawing is to prepare the pupil to make an intelligent sketch and working drawing of any ordinary object and to make a set of plans for a simple house or outbuilding. A special course in house construction is provided for pupils, other than those in the trade classes, who are desirous of this form of work and who expect to be helped by it either in teaching or in building their own houses.

The work of the senior year is entirely elective. The pupil may specialize in a particular branch of manual training with a view to teaching it, or he may do practice teaching in the manual-training classes at the institute and in the public and evening schools of the neighborhood. The course in house construction provided for the senior middle year is also given in the senior year to those who may need such help.

CLASSES FOR GIRLS.

In the training of young women the school has two aims distinctly in mind. Every young woman is expected to engage in teaching upon graduating. Later she is expected to marry and become a home maker. During the last year of the academic course every young woman spends half the year in all-day work as a pupil-teacher in the Whittier Training School. This training not only enables her to teach effectively until her marriage, but it prepares her for a sort of community leadership that makes her home, when she has one, a sort of social settlement.

The girls are given very thorough training of an industrial nature, but not with the idea of putting them into the trades. They are discouraged from seeking employment in the cities. The aim and purpose is primarily to develop home makers, women who can go back to their homes in the rural districts and teach their people how to keep their homes clean and sanitary, how to care for their children and for their sick and aged, how to make and keep in repair their own clothing, and how to do the innumerable other things that should be

done in a well-regulated home, but of which many of the Negroes and Indians in the rural districts and on the reservations know but little.

The girls who come without funds, like the boys, are allowed a "work year," in which time they work for the institution during the day and attend academic classes in the evening. When a girl enters the work year, she is assigned to some branch of the domestic service of the institution, the laundry, kitchen, dining room, or sewing room. She remains in the department to which she is assigned throughout the year, by which time she is fairly proficient in that particular work. The following year she may give four days per week to academic work and one or two days to productive labor, for which she is paid. Girls are encouraged to take this "work year" whether they need it financially or not, because of the value of the training given.

In addition to this practical training which the girls get in connection with their remunerative employment, they have a course in the domestic arts, designed primarily to enable them to make good homes and to teach others to do so.

Two 80-minute periods per week are given to this work throughout the four years, the time being about equally divided between cooking and sewing. The girls in the cooking classes have instruction and practice in all kitchen and dining-room work, in the preparing and serving of meals, and in the study of food values. The girls of the upper classes are detailed to work in the teacher's home kitchen, where they assist in preparing and serving the teacher's meals.

The girls in the sewing classes are given instruction to enable them to make all their garments. They must also make a complete set of infant's clothing and must make their own graduation dresses. They do all of the mending of the boys' clothes, and on special "sewing evenings" set aside for the purpose they make and repair all of their own garments.

In addition to the above all of the housework of the girls' dormitories and teachers' home and all of the laundry work for the student boarding department and the teachers' home is done by the girls.

Whenever a pupil's program will permit, a half year is spent in household handicrafts, generally known as the "gumption class." They have instruction and practice in simple carpentry, glazing, chair caning, soldering tinware, repairing door and window locks, and other work which enters into the care of a home. The object of this course is to make it possible for those who will become teachers to instruct their pupils in rural schools in similar work and for all girls to do the minor repairing necessary in their homes.

Physical training is required throughout the entire time at Hampton. In the junior year hygiene is a specific study. The course has a practical bearing on matters of personal and community hygiene, emphasis being laid on such topics as exercise, ventilation, tuberculosis, con-

tagious diseases, water supply for barn, house, town, and city, the use and abuse of patent medicines, and of remedies in emergencies.

At all times the girls are under the general supervision of the woman physician. Once a month each class has a lecture on matters pertaining to personal hygiene, habits, self-culture, etc., a direct attempt being made to teach the girl her potentiality and what she will have to meet when she goes out from Hampton and to give her the knowledge that will enable her to solve successfully the problems she will meet.

As practically no apprenticeships are open to the Negro, the trade pupil of Hampton goes into the industrial world well equipped, and his work in school must take the place of the apprenticeship.

It is not the aim of Hampton to turn out factory workers, and the graduates are discouraged from going to factories, so there is no tendency to fit pupils for foremen's positions. Since the fundamental purpose of the school, however, is to develop leaders, the whole tendency of the school work is to turn out men qualified to lead.

In the early days of Hampton's activity the academic department was the goal toward which all pupils worked, and the industrial departments were looked upon as stepping stones to the academic. The attitude has now changed, and the industrial departments have become the goal toward which the pupils labor. Most of the trades have a long waiting list, and each year the academic requirements for entrance to the trades have been advanced. There is still some opposition, due chiefly to ignorance, from those who stand for the so-called "higher culture," who fear that the practical work will cultivate a materialistic viewpoint and the ideal will be lost sight of. Educators, philanthropists, and employers, both North and South, have given substantial evidence of their appreciation.

Hampton affords an opportunity to watch two classes of pupils, those who take a day-school course with manual training, and those who take the trade course, attending evening school. It is asserted that the experience of the years has gone to show that those in the trade classes develop stronger character than those who do not obtain a regular trade. The work develops patience, exactness, and a sense of responsibility. From the time the pupil enters Hampton until he leaves he is made responsible for some work of his hand. In the trade-school departments, especially in the machine shop, he must do exact work, and this leads to the acquirement of careful habits.

TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE, TUSKEGEE, ALA.

This school was established by an act of the Alabama Legislature in 1880 as the Tuskegee Normal School. Its first session was opened July 4, 1881, in a rented shanty, with 30 pupils and 1 teacher. In 1893 the institution was incorporated as the Tuskegee Normal and Industrial Institute.

The object of the school is to provide young colored men and women an opportunity to gain a sound moral, literary, and industrial training. It is expected that every Tuskegee graduate will become a factor in the moral and industrial uplift of his community.

"The method of instruction employed aims to correlate and combine the academic studies and industrial training in such a way as to emphasize the social and moral significance of skilled labor and at the same time illustrate in the shop the practical meaning of the more abstract teaching of the class room."

During the first session of the institute the present location, consisting at that time of 100 acres with three small buildings thereon, was purchased. Now the plant consists of 2,345 acres of land and 100 buildings. There also remain 20,176 acres of public land unsold from the 25,500 acres granted by act of Congress for the aid of the school. The endowment fund amounted to $1,401,440.77 on May 31, 1910.

The affairs of the institution are administered by an executive council of 18 members, consisting of the principal, treasurer, and the heads of the several school departments. There is also an advisory board made up of business and professional men from all parts of the country. It is only with the industrial phase of the school that this report is concerned.

The industrial work is housed in the Slater-Armstrong Memorial Trades Building, which measures 283 by 315 feet in its greatest dimensions.

The subjects taught are determined by the executive council, bearing in mind the characteristics of the race with which they are dealing, the trades open to the Negro, and the needs of the race to develop the best that is in them.

Apprenticeships, as a rule, are not open to the Negro youth, so pupils must be prepared to do a journeyman's work upon graduation. The school aims to fit pupils for all trades which are open to Negroes. The trades taught and the number of pupils enrolled in the different trade courses on May 26, 1910, were: Baking, 15; basket making, broom making, and upholstering, 24; blacksmithing, 39; bricklaying, lathing, plastering, and tile setting, 102; brickmaking, 4; carpentry and wood turning, 97; dressmaking, 83; electrical work, 29; foundry work, 13; harness making and carriage trimming, 26; ladies' tailoring, 31; laundering, 7; laundering and soap making, 68; machine-shop work, 87; millinery, 42; painting (house and carriage), 25; plain sewing, 129; plumbing and steam fitting, 16; printing, 24; sawmilling, 7; shoemaking, 18; stationary engineering, 15; tailoring, 53; tinsmithing, 21; wheelwrighting, 23.

The courses cover one year in electrical work, ladies' tailoring, laundering, laundering and soapmaking, and sawmilling; two years in

dressmaking, foundry work, millinery, machine-shop work, plain sewing, and stationary engineering; four years[1] in basket making, broom making, and upholstering; in the remaining trades the courses are three years in length.

A full presentation of the practice work in each of these trade courses and the equipment for the practice instruction will be found in Table V. In addition to the pupils in the trade courses enumerated above, there were on the date specified 505 girls who were being instructed in cooking.

An agricultural school, where general farming, floriculture, landscape gardening, and road building are taught, forms a part of the instruction at the institute. There is also a training school for nurses, where a three years' course is given.

Candidates for admission to Tuskegee must be not less than 14 years of age and must be able to pass the entrance examination, which involves ability to read and write and to understand addition, subtraction, multiplication, and division. They must submit two letters of recommendation from persons of their own communities and must be of good moral character. They may enter the school at any time of the year.

The trade pupils attend academic classes from 9 a. m. to 12 m. and from 1 to 4.30 p. m. on three days of each week. Alternate days are spent at their trade, on which days they work from 7.15 a. m. to 12 m. and from 1 to 5 p. m.

Applicants are admitted to the trade courses of their choice as nearly as is possible. If, however, the quota of a chosen trade is full, the applicant is assigned to some other division until a vacancy occurs. In assigning pupils to their trades the mental ability to comprehend and the physical ability to perform the required duties are carefully considered.

The academic studies pursued by pupils in the various trade courses are mathematics, English, geography, and history. Mechanical drawing forms a part of the instruction in some trades and lectures on trade topics are included in the curriculum of all trades. The time devoted to academic work varies among the different subjects and trade courses followed. The aggregate hours per week given to theory and other schoolroom work by pupils in the several trade classes in 1909–10 were as follows: Baking, 10½; basket making, broom making, and upholstering, 14; blacksmithing, 13; bricklaying, lathing, plastering, and tile setting, 17¼; brickmaking, 13½; carpentry and wood turning, 14½; dressmaking, 14; electrical work, 22½; foundry work, 17¼; harness making and carriage trimming, 13; ladies' tailoring, 14; laundering, 15¾; laundering and soap making, 14; machine-shop work, 21½; millinery, 14; plain sewing, 14;

[1] Broommaking 2, upholstering 2.

plumbing and steam fitting, 21½; printing, 13½; sawmilling, 15¾; shoemaking, 17¼; stationary engineering, 21½; tailoring, 13; tinsmithing, 17¼; wheelwriting, 17¼.

The total time devoted to both schoolroom instruction and practice work by the pupils in each trade course during 1909–10 was 45¾ hours per week. The school year embraces 36 weeks, from the second Tuesday in September to the fourth Thursday in May. A summer term covers 16 weeks, so that the school is open to pupils during the entire calendar year. The regulations governing the summer term are the same as those for the regular term.

There is an evening school of academic work for those pupils who can not afford the small charge made in the day school. Requirements for admission to the evening school are practically the same as for the day school, except that applicants must be 16 instead of 14 years of age and must be able to perform adult labor.

The necessary expenses of a pupil at Tuskegee are small. It is intended, so far as possible, that no diligent, worthy person shall leave the institute because of a lack of means. Tuition is free to all pupils. A fee of $9 is collected on entrance, and pupils are required to furnish their own textbooks, but the remaining expense, outside of board, is small. Day-school pupils are given an opportunity to work out from $1.50 to $3 per month on their board, while those in the evening school are able, in some instances, to earn an amount in excess of the cost of board. In such cases, the excess of earnings is placed to the pupil's credit to be used for his board after he enters the day school.

The teachers at Tuskegee are all colored. Of 29 teachers of trade subjects falling within the investigation who were employed in 1909–10, 15 received training at Tuskegee and 4 at Hampton, while the others came from various colleges, mostly in the North. Actual trade experience in the subject taught, ranging from 2 to 20 years was reported by 13 teachers, and previous experience in teaching the trade by 16 teachers. Only 2 of the teachers of trade theory had any practical experience. Eight had no trade experience, but a teaching experience covering from 1 to 8 years.

Pupils who complete the prescribed course of study in any trade are awarded a certificate. About 50 per cent of the pupils are reported to leave school at the end of the second year, due in large measure to their desire to enter gainful employment. Many of the buildings of the institution were built by student labor.

While this school makes a considerable commercial product, the pupils earn nothing from the sale of products, nor do they work for wages outside of school. A part of the school product is used by the institution and a part is offered for sale in the open market. In 1909–10 the value of products sold and work done amounted to $2,725. There is said to be a considerable demand for graduates

throughout the South, especially for those who are qualified to act as foremen and as heads of schools.

In the early years of the school the industrial feature was opposed, as it was at Hampton, the opposition being due to ignorance and to misunderstanding of the real purpose of the work. That opposition has, however, gradually declined.

The trade work for girls is conducted in a separate building, and is under the supervision of a director of girls' industrial training. The building is well equipped for all training in the subjects taught.

The aim of this department is to prepare the girls to earn their livelihood at the occupations taught, and also to enable them to return to their home communities and to be a factor in the general bettering of the social and sanitary conditions of the community.

Fourteen hours per week are devoted to academic work, which includes mathematics, English, history, and lectures on trade subjects. Like the boys, the girls spend three days per week, from 9 a. m. to 4.30 p. m. in academic work, and the alternate days, from 7.15 a. m. to 5 p. m. in trade work.

Plain sewing is the first exercise in the sewing course. Girls who know nothing of needlework are placed in this division. After completing the course they are promoted to dressmaking and tailoring. The sewing and tailoring classes do the sewing for the institution; many of the girls do their own sewing under the direction of the teacher. In both dressmaking and millinery the girls do order work for the teachers and others.

All of the laundry work for the institution and for persons connected with the institution is done by the laundry class.

A two-year course is offered in dressmaking, millinery, and plain sewing, a one-year course in ladies' tailoring, and a four-year course in basket making, broom making, and upholstering.

In addition to the trade work for girls they are given a thorough course in cooking and in home making. The agricultural training also is well adapted to the needs of girls, many of whom are enrolled in that course.

SNOW HILL NORMAL AND INDUSTRIAL INSTITUTE, SNOW HILL, ALA.

The Snow Hill Normal and Industrial Institute, of Snow Hill, Ala., was founded by a graduate of Tuskegee Institute, and its purpose and system are much the same as those of the latter school. It is located in the heart of an agricultural community, 2 miles from Snow Hill. The school was opened in 1894 in an old log hut, with one teacher and three pupils. It now owns 2,000 acres of land and 17 buildings of modern construction, and employs 27 officers and teachers.

Agricultural training is the main feature of the school, but it is with the trade phase only that this report is concerned. The industrial

department aims to give pupils "such training as will enable them to do their work more intelligently, thus making themselves of greater use to their community." To this end instruction is offered in a number of trades which are open to colored people in the Southern States. The enrollment in the several trade classes during the year 1909–10 was as follows: Blacksmithing and wheelwrighting, 12; brickmaking and bricklaying, 9; carpentry and saw milling, 22; laundering, 37; printing, 7; sewing, 34.

In addition to the trade work of the school, 46 pupils were receiving instruction in mattress making and chair caning and 22 were learning cooking. Housekeeping was studied by 21 pupils.

A three-year course is offered in blacksmithing and wheelwrighting, carpentry and saw milling, printing, and in sewing. In brickmaking and bricklaying and in laundering the course is two years in length. In all trade courses for males $20\frac{5}{6}$ hours per week are given to practice work and $28\frac{2}{3}$ hours to academic work and the theory of the trade. In laundering and sewing a larger proportion of the time is given to practice work. All pupils devote $16\frac{2}{3}$ hours each week to five common-school studies, which vary according to the advancement of the individual pupil, and 4 hours to theory of trades. Boys have 8 hours of instruction in mechanical drawing each week. Nine teachers of trade subjects were employed in 1909–10. Of these, four were males and five were females.

School is in regular session from the first Monday in September to the last Sunday in April. In addition to this there is a summer term of three and one-half months for such pupils as fall behind in their studies during the regular term. Instruction is given on five days of the week from 7 a. m. to 12 m. and from 1 to 5 p. m. On Saturday the hours are from 7 to 11.30 a. m.

About 80 per cent of the pupils never graduate. The reason for this is that as soon as they reach a degree of proficiency that will enable them to get employment many leave school for the purpose of earning their own living.

A statement of the shop equipment and shop practice of the industrial department will be found in Table V of the present report.

The school admits as a pupil anyone furnishing written testimonials of good character who is at least 14 years of age. There is no maximum age limit on school entrance. Pupils are charged an entrance fee of $2 and a tuition fee of 75 cents per month. Admission to the school may be had at any time of the year.

The school's affairs are administered by a board of 11 members, all of whom are teachers in the institution, who are chosen by the board of trustees. The products of the industrial department, consisting of wagons, carts, furniture, brick, etc., are sold in the open market.

BEREAN MANUAL TRAINING AND INDUSTRIAL SCHOOL, PHILADELPHIA, PA.

An evening school for colored people was established in Philadelphia, Pa., in 1899, through the efforts of a colored minister of the community, under the title of the Berean Manual Training and Industrial School. The school gets $7,500 a year from the State, the remainder of the money for its expenses being contributed by interested persons. It has no endowment.

A four years' course is given in carpentry, in upholstering and chair caning, and in tailoring; a three years' course in dressmaking; and a two years' course in millinery, and in electrical work. The number of pupils in these courses on June 9, 1910, was: Carpentry, 8; upholstering and chair caning, 3; tailoring, 7; dressmaking, 61; electrical work, 3; millinery, 14. To be admitted to the school pupils must be at least 14 years of age.

School is in session from 8 to 10 o'clock five evenings per week, each pupil attending only two sessions during the week. The arrangement of the hours was made to suit the pupils, many of whom are in domestic service or in laboring positions. The pupils in the third-year class in dressmaking meet for four hours on Thursday afternoons. These pupils also attend school on two evenings for instruction in arithmetic and millinery.

The school year, which is divided into three terms, covers 34 weeks. The tuition fee is $5 per term or $15 per year throughout each course except dressmaking, in which pupils pay $15 during each of the first two years and $20 during the third year.

So far no academic work has been introduced except arithmetic for pupils in the third year of the dressmaking course. However, the great amount of illiteracy among the pupils of the institution has been a serious drawback to the progress of the classes, and the addition of instruction in English has been decided upon.

While, like many other colored schools, this institution is hampered by lack of funds, it has sufficient equipment to give thorough training in those subjects which it claims to teach.

In April, 1910, several day classes were organized, but with the exception of a course in power sewing machine operating, the day work is academic in character rather than industrial.

The class in power sewing machine operating, known usually as the shirt-waist-making class, meets every day from 8 a. m. to 5.30 p. m., Monday to Friday, inclusive. On Saturday this session ends at 1 p. m. This class is expected to be self-supporting; that is, from work supplied from an outside employer the pupils are expected to make enough on a piece-rate basis to pay the instructor at a rate of 30 cents per week per pupil and also to receive something for themselves.

The class is conducted on a shop basis; that is, the hours correspond closely to those of a factory and a piece rate is paid all machine operators, the goods being furnished by a manufacturer who pays for the completed work.

At the time the school was visited eight pupils were enrolled in this class. As soon as pupils master the work, which they do in from one to three months' time, they leave the school, so that the enrollment is constantly changing.

Of eight teachers of trade subjects employed in 1909–10 for whom the facts were reported, six had worked at the trade for periods ranging from 3 to 29 years, and all had previous experience in teaching the trade. Seven of these teachers were in the evening school and one taught power machine operating in the day school. A self-perpetuating board of 19 members governs the affairs of the school.

WATCHMAN INDUSTRIAL SCHOOL, PROVIDENCE, R. I.

Elementary instruction in printing and dressmaking is given in the evening sessions of this school. The purpose is to familiarize pupils with trade work. The school was founded in 1908 by Rev. W. S. Holland, who has supplied the most of the funds for its maintenance. The tuition fee is $10 per year.

This school is housed in the building and makes use of the equipment used by the day school. The printing classes meet five evenings per week. Pupils in these classes devote two and one-half hours per week to theoretical work—i. e., general instruction in spelling, punctuation, proof-reading, care and use of tools and presses, and seven and one-half hours to practice work, including learning the case, distribution of the type, making up forms, and presswork.

Classes in dressmaking meet two evenings a week, Tuesday and Thursday, for two hours. One hour during each week is given to general instruction on the nature of fabrics, harmony of colors, and best methods of selecting materials, and three hours are devoted to practice work, in which the pupils learn cutting from patterns, basting, the making and fitting of shirt waists, etc. The courses in printing and dressmaking cover two years as a minimum. The school year in 1909–10 embraced 34 weeks, from October 1 to May 28.

The school does not attempt to turn out a finished workman. However, the pupils graduated have an elementary training that makes them much more valuable than the untrained person. Children under 17 years of age are not admitted.

Two teachers of trade subjects were employed in 1909–10. The teacher of printing had had 25 years experience as a compositor and the dressmaking teacher had worked an equal number of years as an independent dressmaker.

The school makes no commercial product. In the printing class some work is done for the institution, but the amount is not large.

The dressmaking pupils furnish their own materials and retain the completed articles. On May 28, 1910, there were 5 pupils in the printing class and 10 in the dressmaking class. In addition, 6 pupils were studying household science. An advisory board of 14 members named by the president of the school assists in its conduct.

ALCORN AGRICULTURAL AND MECHANICAL COLLEGE, ALCORN, MISS.

Alcorn Agricultural and Mechanical College, located at Alcorn, Miss., was organized under its present title in 1878.

The school is primarily agricultural, but provision is made for instruction in a limited number of trades. It is a public school, and is maintained chiefly by Federal and State funds. These appropriations are made for the institution as a whole, and no data regarding the expenditures for the support of the trade departments alone can be given.

The enrollment in the several trade classes in June, 1910, was as follows: Blacksmithing and wheelwrighting, 128; carpentry and cabinetmaking, 95; dressmaking, 32; painting, 35; plain sewing, 111; shoemaking, 33.

In blacksmithing and wheelwrighting and in carpentry and cabinetmaking the course covers four years. In the remaining trade courses the time is three years. The school year is 36 weeks in length, the opening and closing dates in 1910–11 being September 7 and May 24, respectively.

Pupils may enter at the beginning of any one of the three terms which make up the school year. The minimum age limit for school entrance is 15 years. There is no maximum limit. The only charge for tuition is a yearly fee of $15 for nonresidents of the State.

All trade pupils are required to do academic work, but there is no correlation between the academic and trade work. The pupil upon entering the trade class enters the academic classes at that point for which his previous training has prepared him. In all trade classes $18\frac{3}{4}$ hours per week are given to academic work in common-school subjects, and $20\frac{5}{12}$ hours to practical trade work.

School is in session from 7.40 a. m. to 12.30 p. m. and from 2 to 5 p. m. on five days of the week. In addition to this, all pupils who wish employment are paid by the institution for work done on Saturday, thus helping poor pupils to pay their way while in school. For Saturday work the compensation is rated in proportion to the work performed, 8 cents per hour being the maximum rate paid. The value of each day's work is marked as in class recitation on the scale of 100. Pupils making an average of 80 per cent for the month receive the maximum wage; for less than 80 per cent the wages are rated proportionately.

A pupil-foreman is selected from those who made the highest standing for the previous term, in this way giving the more promising pupils training for executive positions as well as for actual trade work. About 40 per cent of pupils are reported as remaining in school until the completion of their courses.

A statement of the shop practice work and the equipment for trade instruction will be found in Table V of this report.

The trade classes do most of the work needed by the institution. The class in shoemaking is the only one that puts a product on the open market. During the year 1909–10 the class in shoemaking sold $250 worth of product. A board of trustees of eight members, appointed by the governor of the State, maintains a general supervision over the school.

STATE AGRICULTURAL AND MECHANICAL COLLEGE, NORMAL, ALA.

The State Agricultural and Mechanical College of Normal, Ala., was established in 1875 as a part of the public-school system of the State. Its support is practically all derived from State and Federal sources. It is located in an agricultural region and is primarily an agricultural school. The trade training, while secondary in importance, is of a very practical nature.

Following is a statement of the trades or occupations taught and the number of pupils enrolled in each in June, 1910: Blacksmithing and wheelwrighting, 6; bricklaying, 14; carpentry, 21; laundering, 22; millinery, 4; painting, house and sign, 6; printing, 12; sewing, 60; shoemaking, 12; stationary engineering, 9; tailoring, 15.

The courses in millinery and in laundering are two years each in length; for stationary engineers, carpentry, and bricklaying it is four years, and in the other trades it is three years.

The hours of instruction are from 7.30 to 11.45 a. m. and from 1 to 4 p. m., Monday to Friday, inclusive. On Saturday the hours are from 7.30 to 11.45 a. m.

The school year includes 42 weeks, the session lasting from the 1st of September to the 1st of June. In all trade courses the pupils devote 18¾ hours to academic studies and 21¾ hours to practice work during each week. Anyone who can read and write may enter the school, and pupils are received at any time. There is no age limit on school entrance, but the average age of new pupils is about 17 years. Tuition is free to residents of Alabama. Nonresidents pay a tuition fee of $5 per annum.

A board of three members appointed by the governor of the State supervises the school's affairs. In addition, there is an advisory board made up entirely of graduates of the institution and whose members are selected by its president.

Only about 20 per cent of the pupils are said to remain until the completion of their courses. The reason assigned is that as soon as a pupil feels that he "can do the work" he leaves, regardless of the diploma. Most of the withdrawals occur after the second year.

The school does not make a product for the market. Individuals in the millinery and sewing classes are permitted to bring their own materials or that of their friends and do the work under the supervision of the teachers, but aside from this no products are taken from the institution.

HIGH POINT NORMAL AND INDUSTRIAL SCHOOL, HIGH POINT, N. C.

The New York Society of Friends established this school in 1891, the purpose being the industrial and academic training of Negro boys and girls. It is not endowed, being supported by the society which founded it.

In the industrial department the course is three years in each trade. In order to graduate from any department of the institution a pupil must have had at least two years of trade work. The following are the trades in which instruction is provided and the number of pupils enrolled in each on May 20, 1910: Basket making, 49; blacksmithing, 10; bricklaying and plastering, 18; carpentry, 7; dressmaking, 20; plain sewing, 49. There were also 42 pupils on the above date who were receiving instruction in cooking.

The academic work consists of mathematics, English, civics, history, science, literature, and drawing. Ten hours per week are given to practice work and 22½ hours to academic work, including time given to study and recreation.

School is in session from 8.30 a. m. to 12 m., and from 1 to 4 p. m. on five days of the week. The school year extends from the middle of September to the middle of May, and embraces 35 weeks.

To enter the school pupils must be at least 12 years of age and must present a certificate of good health. They are admitted at any time of the school year. There is no charge for tuition to resident pupils. Nonresidents pay a fee of $1.50 per month. A board of 24 members, chosen by the New York yearly meeting of the Society of Friends, has general oversight of the school.

The school makes only a limited amount of commercial product. Pupils get their practice principally upon work for the institution. This training is said to be sufficiently adequate to give graduates of the school preference with employers. The latter are quoted as saying that boys and girls trained here have proved the value of the training. The school does not pretend to turn out finished workmen, and graduates must have considerable practice at their trades before they can hold their own with experienced workmen.

MAYESVILLE INDUSTRIAL AND EDUCATIONAL INSTITUTE, MAYESVILLE, S. C.

This institution is the development of a small school organized in 1885. In 1896 it was incorporated as the Mayesville Industrial and Educational Institute under the laws of South Carolina.

The purpose of the school is to give the Negro youth a liberal literary as well as a thorough industrial education.

Pupils are admitted at 13 years of age, or above. The course, covering both trade and academic work, is four years in length. The academic work is the same as the usual high school course. All pupils devote 21 hours per week to academic work during the first three years of the course and 24 hours during the fourth year.

The trade work for boys includes instruction in carpentry, blacksmithing (including wheelwrighting and horseshoeing), bricklaying, stone masonry and plastering, and tailoring. The boys are given 16⅔ hours per week of instruction and practice in trade work until the fourth year, when the time is reduced to 13½ hours. If the pupils remain through the four-year course they are said to be prepared to enter the industrial field and to experience no difficulty in finding employment. However, about 65 per cent of the pupils are reported as leaving school at the end of the first year.

The girls are given instruction in plain sewing, dressmaking, and millinery. Their hours of practice work correspond to those of the boys.

The school year covers 29 weeks, from the middle of October to the middle of May. The daily sessions are from 8 a. m. to 12 m., and from 1 to 4.30 p. m., Monday to Friday, inclusive. Tuition is free to all pupils, an entrance fee of $2 being charged. Pupils are admitted at any time of the school year. A self-perpetuating board of 14 members administers the school's affairs.

CLAFLIN UNIVERSITY, ORANGEBURG, S. C.

Claflin University, of Orangeburg, S. C., makes provision for trade instruction as a part of the prescribed course of study. Each pupil of 14 years of age or over is required to elect one of the several trade courses offered by the institution. No pupil is excused from work in the industrial department except upon written request from parent or on presentation of a certificate of efficiency in one trade.

In the trades department practice work is made paramount to the academic. All pupils devote 15 hours per week to academic studies, which comprehend history, civics, physiology, arithmetic, geography, spelling, and English, and 23¾ hours per week to the study and practice of trade work.

School is in session from 8.15 a. m. to 12 m., and from 1 to 5 p. m. on five days of each week from the last of September to the 1st of

May. To the boys, four-year courses are given in carpentry, cabinet-making, printing, blacksmithing, wheelwrighting, bricklaying and plastering, tailoring, and machine woodworking. Three-year courses in carriage painting and house painting are also offered. The girls are given three years' work in plain sewing, two in dressmaking, and one in millinery.

The minimum age for school entrance is 14 years. All pupils pay an annual registration fee of $2. The tuition fee varies from $10 to $30 per annum, depending on the stage of academic advancement of the pupil. Pupils who have graduated from the several trade courses are regarded as competent to do satisfactory work in the trade for which they have been trained. Graduates of the school are found in good positions, and several are reported to have risen to executive positions. About 70 per cent of the pupils are reported as leaving school at the end of the second year of their course.

VOORHEES INDUSTRIAL SCHOOL, DENMARK, S. C.

This school, located at Denmark, S. C., was founded in 1897 by a graduate of Tuskegee Normal and Industrial Institute. On May 15, 1910, pupils were enrolled in trade classes, as follows: Blacksmithing and wheelwrighting, 15; bricklaying and plastering, 5; broom making, 3; carpentry, 22; millinery, 4; plumbing, 15; printing, 12; sawmilling, 22; sewing and dressmaking, 48; shoemaking, 2; upholstering, 6; wood turning, 22.

Wood turning, plumbing, and sawmilling are two-year courses; all others require three years to complete.

Pupils must be at least 14 years of age for school entrance. Academic work is required of every pupil. The academic course covers mathematics, grammar, history, English, science, and mechanical drawing. Twenty-five hours per week are devoted to this academic work and 22½ hours to trade work by all pupils.

The school is in session from 7 a. m. to 12 m., and from 1 to 5.30 p. m., Monday to Friday, inclusive. Evening classes in academic work are conducted for those who can not attend the day sessions. The school year covers 30 weeks. No charge is made for tuition, but an entrance fee of $1.50 is collected from each pupil.

ST. PAUL NORMAL AND INDUSTRIAL SCHOOL, LAWRENCEVILLE, VA.

Founded by an Episcopal minister in 1883 this institution has continued under church auspices. During the year 1909-10, 82 boys and 17 girls were enrolled in the various trade courses, as follows: Blacksmithing, 15; bricklaying and plastering, 17; carpentry, 13; dressmaking, 17; harnessmaking, 3; painting, 3; printing, 4; stationary engineering, 14; tailoring, 8; wheelwrighting, 5.

The dressmaking course covers two years; in the other courses the time is three years. The 17 girls also take lessons in cooking and laundering. The school is in continuous session throughout the year, except on church holidays and one week at Christmas. In practically all of the trade classes pupils devote 12 hours per week to theory of trade and academic studies and 49 hours to practice work. To enter the school a pupil must be at least 16 years of age and pass a satisfactory examination.

There is no tuition fee charged, but an entrance fee of $10 and a medical fee of $2, also an incidental fee of $2, are charged for admission to any department of the school.

Unlike the majority of these schools the St. Paul school does not require trade pupils to do academic work during the day. The only school work required in the daytime is two hours per week given to the theory of the trade studied. The hours are long. Industrial pupils begin their working day at 7.30 a. m. and work until 5 p. m., with an hour recess at noon. In addition to this, they attend school for instruction in common school branches from 7 to 9 on five evenings of each week.

The school makes no commercial product, but practically all the work needed by the institution is done by pupils of the industrial department.

CHAPTER X.

INDIAN INDUSTRIAL SCHOOLS.

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INTRODUCTION.

In the treatment of this class of schools the endeavor has been merely to acquaint the reader in a general way with what is being done toward providing vocational training for the 45,000 or more Indians of school age within the limits of the United States. No attempt at a census of schools offering industrial courses for Indians has been made.

The most recent information is that there are 21 Indian schools in the United States in which industrial instruction is given. A majority of these institutions is scattered throughout the Western States, where they may be easily accessible to pupils from the different reservations. Courses in carpentry, blacksmithing, wagon making, painting, shoemaking, and tailoring are offered in most schools. In a few schools, particularly those located on reservations, only the fundamentals of the trades are taught. At Fort Lapwai, Idaho, an industrial high school is maintained by the State and the Federal Government jointly, which receives both Indian and white pupils, each race being afforded equal opportunities as to instruction. At the Hampton (Va.) Normal and Agricultural Institute, an institution established primarily for the education of the Negro race, Indians are admitted to a limited extent. (See p. 314.) In the pages which follow a description is given of the leading features of two schools, one under Federal and the other under State control, whose aim is to train Indian boys and girls for industrial pursuits.

UNITED STATES INDIAN SCHOOL, CARLISLE, PA.

The specific purpose of the instruction given in this school is to train Indian youth of both sexes to take upon themselves the duties of citizenship and to prepare them for earning a livelihood, either among their own people or in competition with whites away from the reservation. In the several trades or vocations taught the aim is to give the pupils a thorough grounding in the fundamentals and to advance them to a stage where only the time required for adaptation to special shop conditions shall be needed in order to qualify them for work as journeymen.

The school was established in 1879 by the Federal Government for the purpose of giving the Indians training in the peaceful pursuits of their white neighbors. Use of the abandoned Army post at Carlisle, Pa., having been provided for this purpose, the school was opened on October 6, 1879. The school is intended for Indians, exclusive of the so-called Five Civilized Tribes.

The school is supported by annual appropriations of Congress, and its work is arranged so as to conform as nearly as possible to the needs of the different localities from which the pupils are received. The subjects taught are selected by the superintendent after careful investigation of the special needs of the Indian, subject to the approval of the Commissioner of Indian Affairs.

The trades taught to males, with the number of pupils in each on January 31, 1910, were as follows: Baking, 6; blacksmithing and wheelwrighting, 17; bricklaying and plastering, 9; carpentry and cabinetmaking, 39; carriage making, trimming, and upholstering, 4; harness making, 15; painting, house and sign, 19; plumbing and steamfitting, 18; printing, 42; shoemaking, 8; stationary engineering, 5; tailoring, 28; and tinsmithing, 5; total, 215. In addition there were 35 boys receiving instruction in farming, dairy work, and horticulture. In addition to the trades taught to males, instruction in sewing and dressmaking and in laundry work is provided for the girls. On May 31, 1910, there were 53 girls in the sewing and dressmaking department and 24 in the laundry. Besides these, there were 236 girls who were receiving instruction in cooking.

Attendance upon the school is entirely voluntary. In general all persons between the ages of 14 and 21 years who can prove the possession of at least one-eighth Indian blood, and who are of sound health and morals, are accepted as pupils. In exceptional cases persons below or above the age limits may be admitted. Members of the Five Civilized Tribes, as well as students from Porto Rico and the Philippines, are admitted, but only on the payment of tuition charges.

Pupils may enter the school at any time during the year. Upon entry they are examined for classification, and later they are promoted or demoted as their rate of progress may warrant or demand. Special pupils who wish to take up trade work only, and who do not desire further academic training, may be admitted for this purpose provided they have a good elementary education. Each pupil is expected to continue at his trade until it is mastered, unless it is for his best interests to make a change. An "outing system" enables pupils pursuing trade courses to obtain employment in shops and manufacturing establishments during a part of the school term where, in addition to the wages earned, they are introduced to actual conditions of industrial life. Large numbers of students annually avail themselves of the advantages of this feature.

There is no stated term limit in any of the trades or vocations taught in the school. A certificate is issued to the pupil whenever he is able to satisfy the instructor and the superintendent that he has mastered the essentials of his trade. Owing to the widely varying conditions as to the previous educational advantages of pupils entering the school, the academic work can not be arranged so as to correlate with the industrial courses. The work of the latter begins as soon as the pupil is admitted, and may be taken in conjunction with that of any of the academic grades provided for in the curriculum of study.

In all trades or vocations taught the pupils devote 15 hours per week to common-school studies and 24 hours to shop work or comparable form of practice work, making a total of 39 hours spent in the school each week.

The course of study in the academic department is as follows:

First grade.—Number work, language, physiology, geography, morals and manners, reading, writing, and spelling, general lessons.

Second grade.—Arithmetic, physiology, language, geography, morals and manners, reading, writing, and spelling, general lessons.

Third grade.—Language, arithmetic, physiology, geography, morals and manners, reading, writing, and spelling, general lessons.

Fourth grade.—Geography, literature, physiology, morals and manners, arithmetic, language, reading, writing, and spelling, general lessons.

Fifth grade.—Physiology, arithmetic, geography, morals and manners, literature, reading, writing, and spelling, general lessons.

Sixth grade.—Geography, reading, writing, and spelling, literature and history, arithmetic, physiology, morals and manners.

Freshman year.—Literature and history, arithmetic, language, penmanship, orthography, elementary science, business forms, general lessons.

Sophomore year.—Orthography, elementary science, business forms, geography, language, penmanship, arithmetic, general lessons.

Junior year.—Elementary science, business forms, penmanship, language, orthography, arithmetic, commercial geography, general lessons.

Senior year.—Geography, arithmetic, orthography, literature and history, elementary science, business forms, penmanship.

The following is a summary of the shop or practice work performed in each of the several trades:

Baking.—In the bakery, under the direction of a competent instructor, is made all the pastry and breadstuffs needed to feed the thousand or more pupils at the institution, thus giving pupils plenty of practice as well as theory in the trade of baking. The equipment is modern and sufficient for all needs of the school.

Blacksmithing and wheelwrighting.—The course of study in this department embraces all the ironwork in buggy and wagon construction, horseshoeing, tempering, tire setting, tool making, and welding. In horseshoeing practical work is given by shoeing the horses and mules used at the school and the two farms connected therewith. Tempering of different metals is taught as practical work

of this sort comes in from day to day. The shop equipment is complete and up to date.

Bricklaying and plastering.—The course in bricklaying consists of instruction in the proper use of tools; making mortar beds and boards; the choice of lime and sand; screening sand and slaking lime; the use of coloring material; building scaffolding; selecting and cleaning brick; spreading mortar; laying brick pavements and piers; building arches, chimneys, and stacks; setting door and window frames; trimming joints; the use of headers, etc.

The plastering work comprises mortar mixing; the use of hair; lathing; plastering walls and ceiling; plastering to ground and to finish and sand finish. New buildings of the school are plastered by pupils under a master mechanic.

Work in cement includes laying pavements; making excavations; framework; grouting; mixing screened stone, cement, and sand; leveling; marking; putting on top coat of cement and sand; finishing; building curb; removing frame; care of pavement until hardened; molding of artificial stone, etc.

Practical work in masonry is also done by pupils. A full assortment of hand tools is provided for each kind of work.

Carpentry and cabinetmaking.—The course of study consists of the names, use, and care of tools; dimensions; planing by hand; nailing and gluing various kinds of joints, with their practical uses.

After the pupil has acquired some skill in the use of his hands he is given practice in the use and care of machines. Cabinetmaking is taken up as soon as he is able to execute his work in a neat manner. The construction and repair of buildings, as well as the making of furniture for school use, furnishes practice work for pupils.

The equipment of this department comprises a number of machines driven by individual motors and all necessary hand tools.

Carriage making, trimming, and upholstering.—Instruction comprises the care and use of tools; planing, squaring, marking, mortising, tenoning, and framing. A detailed drawing of the body or the gear is made, after which is begun the construction of the piece to be produced. Practice is also given in filling, priming, glazing, rubbing out, putting in color and varnish, striping, ornamenting, and finishing; also in laying out cloth, filling, tufting, sewing, and covering top and bows. This shop has all necessary equipment.

Harness making.—The student is taught how to cut out and make a complete set of harness, how to select leather for particular kinds of work, how to dress and finish work, and how to care for and repair harness. The equipment consists of benches and sewing horses, with all conveniences.

Painting, house and sign.—House painting includes paint mixing, inside and outside painting, graining, natural hardwood finish, var-

nishing, polishing and enameling, sizing, and calcimining. All buildings on the grounds are painted and all calcimining is done by pupils as practice work. In sign painting instruction is given in styles and names of letters, shapes and proportions, laying out, cutting, spacing, and gilding.

Plumbing and steamfitting.—The work in this department is divided into three parts, arranged progressively. The first part embraces the names and use of tools, making nipples, cutting pipe, laying out heating systems; setting up and repairing steam gauges, pumps, traps, etc. The second part consists of more advanced work in making joints, laying sewer pipes and traps; erecting soil stacks; fitting lavatories, bathtubs and closets; placing boilers; repairing tanks, etc. In the third part of the course instruction is given in the erection of line shafting and in the installation and repair of laundry, bakery, and farm machinery.

Printing.—The printery is fitted up and conducted as nearly like a commercial plant as possible, and the work executed is made up of all kinds of job work, from a card to a catalogue. A weekly newspaper and a monthly magazine are published, and other pamphlets and publications are got out in the interest of the school from time to time. Special attention is given to presswork, it being one of the chief purposes of this department to train students for positions as feeders and pressmen. The course of instruction covers five years, and the equipment is complete in every respect.

Shoemaking.—The student is taught the various operations involved in making both men's and women's shoes. All work is done by hand, except sewing on soles, which is done by a machine run by motor. Much repair work is done by students. The department is well equipped with improved tools and machinery.

Stationary engineering.—A limited number of pupils are given practice in the care and management of four 150-horsepower boilers, equipped with mechanical stokers, which furnish heat and power to the school. Several steam engines, together with a large number of individual motors, afford training in the sort of work which the student may be called on to perform when he takes employment outside the school.

Tailoring.—The work in this department consists chiefly in making uniforms for the school, working-clothes for the boys, and civilian suits for the graduates. The course is divided into three grades—not necessarily years, but each grade must be completed before advancement is made to another.

Tinsmithing.—Practice work in tinsmithing consists of making tin and sheet-metal vessels and tin roofing. The pupil is taught the care and use of tools and machines, and how to make repairs of all kinds. The shop is equipped with all necessary tools and machines.

Sewing and dressmaking.—The work for girls in sewing and dressmaking is divided into four grades, as follows:

1. The darning class of small girls and beginners, in which is taught the use of the thimble and the needle, darning, plain sewing, and stitching on the machine.

2. The class in all kinds of repairing and mending.

3. The plain-sewing class, in which is done all the more advanced plain sewing.

4. The dressmaking class, where is taught cutting, fitting, and the making of the school uniforms and work dresses. The seniors are taught drafting and the making of useful patterns, how to tuck and shirr thin materials, fancy waists, and skirts. This department makes the graduation dresses used at the school commencement exercises.

The equipment consists of sewing machines, tables, and all necessary appliances for drafting, cutting, and fitting.

Laundry work.—The laundry work is carried on in a very practical manner. The pieces are washed and delivered to the various quarters each week, necessitating the girl who is learning this trade to do all grades of work. Each girl does a certain amount of washing and ironing, which is carefully supervised. A special detail of girls spend a part of each day for six weeks sorting and counting clothes, making starch, starching collars, sprinkling and folding clothes, etc. The equipment is that of a modern laundry.

In all departments of the school one half of the regular students are instructed in their trades and occupations between the hours of 7.30 and 11.30 a. m., six days weekly, and the other half between the hours of 1 and 5 p. m. At the end of each month the students are changed from the morning period to the afternoon period, and vice versa. The half day (three hours for five days weekly) not devoted to trade work is utilized for academic instruction.

The length of the school year is 40 weeks, from about September 1 to June 15. There is no summer term. The vacation during the school year consists of one week at Christmas.

Pupils who complete the prescribed course of study in the academic branches in addition to their industrial training are awarded a diploma, which states the trade followed by the pupil and the grade attained therein. A certificate is given pupils who have mastered the trade or occupation pursued in the school, but who have not finished the academic course. About 30 per cent of pupils leave school before the completion of their trade courses. It is compulsory that pupils remain in the school during the period for which they enroll, but many enter for limited periods of from one to three years and return to their homes at the expiration of their terms of enrollment. Of these, large numbers reenroll after vacation for an additional term in order to complete their trades.

The number of teachers employed in the industrial department in 1909–10 was about 20. Instruction in mechanical drawing was given by one teacher while another taught only practical proof reading. All teachers were appointed as a result of examinations conducted by the United States Civil Service Commission. Of the teachers of trade subjects reported, five had attended schools other than common schools and one had pursued a correspondence-school course. Actual shop experience in the trade taught was reported by 18 teachers, and previous experience in teaching the trade, either in the school or elsewhere, by 17 teachers.

Teachers of general subjects do not give instruction in the trades or occupations, but it is the custom for them to accompany their classes at stated periods to the shops or other places of employment and collaborate with the industrial instructors in the application of trade or industrial terms to the regular academic work. No difficulty has been experienced by the school in retaining capable teachers of trade work. Those who leave are usually transferred by promotion to other Government schools, but the per cent of such transfers is small.

Approximately $400,000 have been expended for buildings or parts of buildings for the school. This amount has been drawn from general appropriations of Congress for the support of the school, made at various times since 1879. The equipment for trade instruction, consisting of tools, benches, machines, etc., also provided out of appropriations of Congress, would cost about $44,500 if replaced. During 1909–10 the amount of financial support received from the Federal Government was $164,000.

Pupils who are not entitled to the benefits of the school without cost are admitted upon the payment of $167 per year, payable in monthly installments. No other fees or charges are made. Pupils are provided with board and clothing during their period of attendance and also, in the case of free pupils, with transportation from and to their reservations or other places of residence. All schoolbooks are furnished free to pupils.

The cost of materials used in trade instruction during 1909–10 was $39,167, this being paid from the general appropriation of Congress for the school. No janitor service is required for the school, as all work of this kind is done by pupils. Products of the school that are not needed for school use are sold to private individuals and to the Government for use throughout the Indian school service, and for the use of old Indians. These consist of, in addition to farm and dairy products, manufactured articles of the several industrial departments, such as harness, wagons, surreys, tinware, etc.

The receipts from the sale of manufactured products in 1909–10 were $2,072.26. The products of the other departments, such as uniform coats and trousers, shirts, dresses, underwear, curtains,

sheets, pillow cases, shoes, etc., are not sold, but issued to pupils. Pupils themselves earn nothing in the school from the sale of finished products.

Except as regards that part which is required for adaptation to special shop conditions, the school work in all trades taught is usually accepted as the equivalent of the usual period of apprenticeship. Under the "outing system" which prevails in the school, there is a considerable demand for pupils by employers, nowithstanding the stringent rules imposed on the latter as regards the proper care and treatment of pupils employed. The young men are placed in shops with contractors and in manufacturing establishments, where they work side by side with white mechanics, receiving pay in proportion to the kind of work done and the ability and skill manifested. During the summer of 1909–10 nearly 100 young men from the various trades departments were employed under these conditions, many of them receiving regular journeymen's wages. A complete record of the career of each graduate is kept, which shows the wages earned and the positions held. This record shows that graduates of the school are able to hold their own as general workmen in the shops in which they are employed. Many applications for the services of graduates and ex-pupils are received at the school.

Much appreciation of the school has been manifested by the Indians in general, as well as by prominent persons interested in educational and sociological questions who have observed the work being done at Carlisle.

Labor unions have in the past shown some opposition to the employment of boys from the school in shops alongside of their members, but this feeling is said to have died out.

The boys in the school are under partial military discipline, which develops attention to details, respect for superiors, and obedience; all being conducive to all-round manliness. The girls are under the supervision of "orderlies" appointed by the matron. The discipline is firm, but kindly. Girls leaving the grounds are accompanied by chaperons. Pupils of this school are more orderly than are those in common schools, for the reason that they are required to move with military precision. They become regular and prompt, also due to the system of unity in movement. They are easily controlled and are quick to form habits of promptness and regularity.

The training received at the school is believed to raise the moral and ethical character of pupils, by teaching them habits of self-control, reliability, neatness and promptness. The intimate relations existing between pupils and teachers, as well as the general environments, exert a refining influence. Those who have returned to their homes are considered leaders in their communities.

THOMAS INDIAN SCHOOL, CATTARAUGUS INDIAN RESERVATION, IROQUOIS, N. Y.

Established as a mission school in 1855, this institution passed under the control of the State of New York in 1875. Its purpose is to teach the fundamentals of trades to orphan and destitute Indian boys and girls from the several reservations of the State. Boys are given about half of the necessary training for trade pursuits, while girls receive a somewhat larger measure of instruction in the occupations fitted to their sex. The subjects taught are selected by the board of managers and the superintendent, the course of instruction being made to conform to the needs of the special class of pupils comprising the school's population.

On June 25, 1910, there were 10 boys who were engaged in carpentry and joinery work, including cabinetmaking, 10 who were learning house painting, and 5 who were studying steam fitting. In addition, 20 boys were doing work in farming. On the same date 25 girls were receiving instruction in sewing and 20 in laundering. Fifteen girls were being taught cooking. All girls are instructed in the three last-mentioned subjects, but make a study of one in particular, with a view to following that as a vocation.

When vacancies exist in the school, pupils may enter at any time of the year. There are no definite limits to the period which a pupil may devote to the study of a particular trade. In general, pupils remain until the completion of their studies in the scholastic department, receiving trade instruction during the last four years of the course. The academic subjects taken during each of these four years are reading, writing, geography, history, civics, drawing, mathematics, household science, and agriculture. Equal time is given to schoolroom instruction and to trade work, a part of the pupils spending the forenoon in the shops and in the afternoon being succeeded by the remainder. There is little attempt at correlating the academic with the trade instruction.

The school is open from 8.30 a. m. to 12 m. and from 1 to 4.30 p. m., with an additional hour from 7.15 to 8.15 in the evening. Five sessions a week are held, from Monday to Friday, inclusive. The length of the school year is 40 weeks, from the 1st of September to the last of June, with one week of vacation at Christmas. About 15 per cent of the pupils are reported as leaving the school before the completion of their courses. A majority of these are older pupils who have become proficient enough to earn a livelihood in their chosen vocations.

All teachers employed in the school are obtained from the State civil service register of eligibles. Of seven teachers of trade subjects in 1909–10 for whom the facts were reported, four had attended other than common schools, five had actual shop experience in the trade

taught, and all had previous experience in teaching the trade. Each teacher of academic subjects also gives some instruction in industrial work.

The board of managers of the school consists of nine members appointed by the governor of the State for a term of six years. This board has direct charge of the school's affairs and reports annually to the legislature. In 1909 the State appropriated $4,000 for the maintenance of the school and $6,000 for an additional building for trade instruction. The present shop equipment of tools and machines is valued at $1,550.

All pupils of the institution receive free tuition, board, and clothing. No charge is made for the use of textbooks or other school property. The cost of materials used in training for trade work during the session of 1909–10, approximating $800, was paid from the State appropriation for the school's support. Products of the industrial department, consisting of articles of furniture, clothing, farm and garden produce, etc., are used in supplying the needs of the institution.

While not graduated as finished workmen, pupils usually find ready employment among the industries contiguous to the Indian reservations, on farms, and in domestic service. No opposition to the school has been manifested, and much appreciation of its work has been expressed by leading citizens of the community, as well as by educators generally and other persons interested in the welfare of the Indian.

The endeavor is to keep the pupils usefully employed by arousing and stimulating a healthy interest in their work. Discipline is believed to compare favorably with that in common schools when the difference in the character of the pupils is considered. The school influence, which leads from indolence and shiftlessness to habits of industry and usefulness, together with the direct religious and moral training imparted, tend to raise the standard of character of the pupils.

CHAPTER XI.

CORRESPONDENCE SCHOOLS.

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INTRODUCTION.

Correspondence schools have developed through a recognized need of a means to carry instruction to people who realize the deficiencies in their education and are ambitious to study in order to improve their condition, but who are so situated as to work, distance, or other circumstances as to be unable to attend schools or colleges. In the case of mechanics in shops these schools take the place of the continuation or cooperative schools in so far as they provide the theoretical instruction which supplements the practical work carried on in the shop. The character of the instruction varies widely. Many apprentices and journeymen who left school for work at the age of 14 or younger, and who at the time of withdrawal had not completed the grammar grades, must be provided at first with elementary work; other applicants take up their studies at advanced stages. However, the correspondence school gives the pupils whatever work they elect, provided that they are able to master the instructions mailed them. The only requirements for enrollment are ability to read and write English.

The schools can not state definitely how long a pupil will require to cover a course; at best they can merely state that progress depends on ability and the amount of time per day or per week devoted to study. Occasionally a maximum number of years is allowed for the completion of a course, but as a rule the pupil takes his own time, which may be considerably lengthened because of his inability to grasp a subject quickly, by lack of opportunity to study regularly because of overtime work or other business reasons, or by illness or some other unforeseen or nonpreventable cause.

Somewhat recently a new feature has been added to the work of some of the correspondence schools. This is the sending forth of "traveling instructors" to assist apprentices and journeymen pupils whom they meet for an hour weekly or bimonthly in their places of employment. The pupils are expected to prepare and send regularly to the school the assigned lessons and to confer with the traveling instructor only on points which they find too difficult to master. One of the principal benefits of this system is the encouragement to persevere when the pupils become discouraged and decide to discontinue study. The fact that these pupils must work against considerable odds, due to their lack of elementary education, to their tiring

day in the shop, and to the lack of sympathy on the part of their associates for their desire to better their condition, makes the assistance of the "traveling instructor" invaluable. The extension division of Wisconsin University has employed this method extensively and most successfully.

Correspondence schools may give instruction for only one occupation or in a number of occupations. In the first class are found such schools as the International Typographical Union Course of Instruction in Printing, Chicago, Ill.; the School of Railway Signaling, Utica, N. Y.; and the American College of Dressmaking, Kansas City, Mo. In the second class are found schools similar to the following: The International Correspondence Schools, Scranton, Pa.; the American School of Correspondence, Chicago, Ill.; the extension division of Wisconsin University, Madison, Wis.; and the Union Pacific Educational Bureau of Information, Omaha, Nebr. With the exception of the last named these schools all charge tuition varying according to the school and course. The Educational Bureau of Information of the Union Pacific Railroad has been organized for the benefit of its employees who voluntarily elect to take a course and who are not charged tuition. The purpose of this school is the betterment of the service through increased efficiency and the opportunity to qualify for positions of responsibility.

In the following outlines of a number of correspondence schools it will be seen that in general their methods of instruction are similar and the points of difference are due largely to specialization.

INTERNATIONAL CORRESPONDENCE SCHOOLS, SCRANTON, PA.

This school was established in 1891. The purpose of the school as stated in its catalogue is "Teaching employed persons the science of their trades or professions; preparing misplaced and dissatisfied people for congenial or better-paying work; giving young unemployed persons the training necessary to enable them to start at good salaries in chosen vocations."

Many of the courses offered come under the present investigation as continuation or preparatory study.

The textbooks are prepared especially for home study, and instruction is given by correspondence. The time required to complete any course depends entirely on the time that the student is able or willing to give to study. The charges are the same regardless of the time a student may require to complete the course.

The success of the method of teaching by mail depends very largely on the subdivision of the student's work into many short, easily mastered lessons. These are sent to him in a fixed order in the shape of instruction and question papers, drawing plates, and whatever else

his course may require. The instruction papers are printed in pamphlet form of from 16 to 100 pages. Each paper is complete in itself and contains all the instruction required, but includes nothing that is not necessary for a complete understanding of it. The text writers assume that the student knows nothing more about the subject than has been treated in a previous paper. Only the plainest language is employed, and many facts, principles, and processes that would otherwise be hard to understand are made clear by the use of zinc etchings and half-tone illustrations.

As soon as the student is enrolled, his first and second instruction and question papers are sent to him, accompanied by directions for proceeding with the work, inquiry blanks, and a supply of envelopes. After reading the directions, he studies the first instruction paper and works out the examples for practice. If he meets with any difficulty, he fills out an inquiry blank, giving full particulars, sends it to the school, and proceeds with his studies. A full written explanation of the matter referred to the school is forwarded from the school, and he is encouraged to write for special information at any time. After mastering the contents of the first instruction paper, he takes up the accompanying question paper and writes his answers to the test questions. He then forwards these answers to the school and proceeds to study the second instruction paper.

When the sets of answers are received at the school, they are reviewed by examiners specially trained for this work. The papers are gone over, errors are checked in red ink, and explanation of any particular problem in error is written on the back of the sheet. Whenever necessary, special exercises and letters of explanation are sent to the student.

After being corrected, the papers are recorded as passed if a satisfactory mark has been attained. If his mark is not satisfactory, the student is required to review the incorrect portions until mastered. The answers are then returned, accompanied by a percentage slip, and the third lesson set. By this system the student always has one paper to study while his work on a previous paper is being corrected. If the student meets with continued difficulty in the study of any subject, a special instructor is, on request, assigned to him (without extra charge), who gives personal attention to his case until the subject is completed.

A large corps of experts, instructors, and assistants is occupied in writing and revising the I. C. S. textbooks and in examining and correcting the work of the students.

There is also a railway department. The school owns and operates seven air-brake instruction cars, a dynamometer car, and a passenger railway service testing car. There are instructors lecturing on com-

bustion of fuel and firing on nine cars that are furnished by railroad companies.

A description of a number of railroad apprenticeship schools conducted by this institution is given on page 166.

AMERICAN SCHOOL OF CORRESPONDENCE, CHICAGO, ILL.

The American School of Correspondence was chartered in 1897. Its purpose is to give ambitious men such systematic instruction as they desire to enable them to advance in their present occupations or to assume responsible positions in other lines of work. Instruction is offered in trade, technical, commercial, and preparatory courses, several of which as continuation or preparatory study are within the present investigation.

The school states its requirements for admission as (1) ambition, (2) the will to devote at least three hours a week to study, (3) and the ability to read and write English. Each student begins with the elementary instruction in his subject unless he can show satisfactory credentials for any part of the work already covered.

Textbooks which have been prepared especially by experts on the respective subjects are furnished with the instruction. Some of these textbooks on engineering subjects have been adopted by such universities as Harvard and Lehigh for use in their technical departments.

Pupils advance only as they complete each lesson. Every assistance is given when difficulties present themselves, and pupils are encouraged to ask for information whenever they feel unable to go on. All papers are marked with certain grades which, if high enough throughout the course, entitle without a final examination to a diploma or certificate of proficiency. The average pupil, however, is required to take the final examination to secure his diploma. The amount of time spent on a course depends on a pupil's ability and application. The school allows a maximum time of five years in order to cover such unforeseen interruptions as illness, overtime, or other adequate reasons for temporary delay in the completion of a course. At the end of the five years, however, the school severs its connection with the pupil and is under no obligation to then refund any of the money paid for a complete course.

Tuition fees include cost of materials such as inquiry blanks, envelopes, textbooks, and postage to the pupil. These fees are payable in monthly installments.

No extra charge is made for a diploma. Pupils who are in good standing but who are temporarily unable to meet their tuition payments are retained on the roll until they are able to resume regular payment.

UNIVERSITY OF WISCONSIN (EXTENSION DIVISION), MADISON, WIS.

In order to afford instruction to persons unable to attend schools or colleges the University of Wisconsin has organized an extension division through which instruction is furnished by correspondence. In the vocational studies in mechanical engineering an additional feature has been provided for residents of the State in the sending of instructors to shops where continuation classes for journeymen and apprentices have been formed.

The method of introducing this form of instruction into the factory consists in the visit of a university representative to the employer to whom the plan of the correspondence school with additional instruction by means of a traveling teacher is carefully explained. If the employer approves of the plan interviews are held with the employees to whom the proposition of the school is made. The teacher may be authorized by the firm to collect the tuition fees from prospective pupils in the form of orders on the firm to deduct the amount in small installments from their wages. A classroom is placed at the disposal of the teacher and his pupils whom he meets either once each week or once in two weeks.

The employees receive their lessons from the correspondence school and mail their lesson papers and examinations. During the one hour spent with the traveling teacher lessons are worked out, difficulties explained, and discouraged pupils encouraged to persevere. Classes are held in one establishment after another in a locality throughout the working day, starting with the opening of the first establishment at 7 o'clock. In some shops two or more classes are held where there is a sufficient number of pupils to divide them into sections, based on either different lines of work or on the stage of advancement.

Courses are offered along many lines. A course may embrace several subjects, for example, in the course for power plants the subjects treated are mathematics, 40 assignments; heat, 16; boilers, 16; steam engines, 20; gas engines, 12; gas producers, 8; and electrical machinery, 8.

The pupils are required to fill out an application form and sign an agreement to perform faithfully their part of the contract. All correspondence pupils may apply their work toward a university degree, but this must be stated on the original application blank.

INTERNATIONAL TYPOGRAPHICAL UNION COURSE OF INSTRUCTION IN PRINTING, CHICAGO, ILL.

This course of instruction in printing was founded by the International Typographical Union, which in 1907 appointed a commission to formulate some method of providing a technical education for journeymen and apprentices in the trade.

The commission reported that in the average shop the opportunities for thoroughly learning the trade of printing did not exist.

Specialization kept some printers indefinitely on one kind of work and provided but a narrow field of instruction for the apprentice. This circumstance had resulted in a perceptible decrease in skill among printers, who were practically given no opportunity to acquire the mastery of their trade. A second result of this lack of a general training was the necessity of calling on outsiders for some of the work which it was asserted rightfully belonged to the printers. These outsiders are the professional designers, who are trained in art schools, where they have learned the principles of lettering, design, and color harmony, and have been given opportunity to exercise originality.

With all these considerations in view the typographical union realized that the printers needed technical education, and as a central school was not possible, the idea of the correspondence school was adopted as the only practical means of effecting the desired change. The typographical union did not propose "to make printers but to give apprentices, journeymen, and even master printers an education supplementary to that of the printing office."

The course covers 37 lessons, which the student printer completes according to his leisure and his ability. All students pay a tuition fee of $23 in advance, or $25 if tuition is paid in installments.

The subjects are as follows:

Lettering.—Including Roman capitals in pencil, Roman lower-case in pencil, italic in pencil, inking in Roman capitals, inking in Roman lower-case, inking for italic, Gothic alphabets, making cover-page design.

Design.—Balancing measures, proportion, shape harmony, tone harmony, preliminary sketches or arrangements of lines and masses.

Color harmony.

Composition.—Including letterheads, billheads, business cards, envelope-corner cards, tickets, menus, programs, cover pages, title-pages, advertisements, layout of booklets and books.

Papermaking.

Plate making of various kinds.

Imposition.—Including 4 and 8 page forms, 12 and 16 page forms, 24 and 32 page forms, and forms for folding machines.

The instruction aims so to qualify journeymen and apprentices that they can do any form of printing that comes into their shop. The only requirement for enrollment is that applicants must be compositors, whether journeymen or apprentices. During 1909–10 the school had 1,600 pupils enrolled.

UNION PACIFIC EDUCATIONAL BUREAU OF INFORMATION, OMAHA, NEBR.

The Union Pacific Educational Bureau of Information was established in July, 1909. This correspondence school has three distinct objects: 1, To assist employees to assume greater responsibilities; 2, to increase the knowledge and efficiency of employees; 3, to prepare prospective employees for the service.

The educational bureau was the outcome of a realization that some definite steps must be taken to raise the standard of efficiency in all departments of the road and to fit men for the higher positions. The officials recognized not alone the need for some educational opportunities for the rank and file, but also the lack of such opportunities in evening schools or in other schools in which subjects of value to the railroad employee are not taught.

The bureau is under the charge of five directors, one of whom is the vice president and general manager, while the remainder are assistant general managers of the company. There is also an advisory board of seven members composed of one member from each department of the service, and the chairman who is the chief of the bureau. The advisory board is appointed by the vice president and general manager.

The director of the bureau is empowered to call upon experts in the employ of the company for information for the pupils so that the teaching staff includes practically all the expert employees in the Union Pacific Railroad Co.

Since the opening of the school 1,335 pupils have been enrolled. Of this number, 972, or 72.8 per cent were reported "in good standing and studying." In addition to this number 18 pupils in good standing were enrolled as prospective employees.

The courses of study are planned to cover the individual needs of the pupil—that is, they supply instruction for the work which appears to the pupil necessary as a means of improving his present work and preparing him for advancement. Applicants are required to state their previous education and experience; whether they are subscribers to any technical magazine; whether enrolled with any correspondence school; in what line of work they wish to advance; and to what position (in reason) they are ambitious to attain.

As preliminary work all pupils are required to study and report on the following topics: History of the Union Pacific; geography of the Union Pacific; geography of the State in which employee is located, and (probably) the geography of other States in which the Union Pacific has business interests. In addition to the taking up of any one subject, such as track work, mechanical engineering, etc., employees are invited to send to the bureau any request for information in reference to individual problems in their work. These questions will be referred to such members of the advisory board as are best qualified to answer them. This course of calling upon men in touch with certain lines of work has been followed in order to prevent any possible conflict with department rules or instructions.

Four teachers are employed, one of whom is a Japanese assigned to the direction of the work for Japanese section foremen. All the instructors have had college education, while three, including the

Japanese, hold degrees. All have had practical experience in some form of railroad work.

There is no tuition fee and all instruction papers are furnished free of charge. Certain textbooks or sections of textbooks are loaned until a subject is completed. Pupils who elect work in which drawing is required must furnish their own materials and instruments.

In addition to the correspondence instruction, pupils who fail to grasp the lessons assigned are further assisted by the personal instruction of some one sent to them by the bureau.

At the conclusion of the course a letter in which are stated the amount of work completed and the grade attained is given to pupils who request it.

The educational bureau of the Union Pacific has been regarded with favor by both employers and employees. Although the school has been in operation but a short time, the associations of employers and employees of railroads look upon the work as distinctly beneficial to the pupils and indirectly of practical value to the company.

SCHOOL OF RAILWAY SIGNALING, UTICA, N. Y.

The general and increasing development of railroad systems has demanded a comprehensive system of signaling in order to facilitate travel, to insure high-speed trains right of way, and at all times to provide adequate precautions against possible disaster by collisions. The signal tender of some few years ago had comparatively simple duties which, as a railroad employee, he learned through actual experience as he progressed from one position to another. At the present time the demand for expert signal engineers is greater than the supply, because the necessary qualifications have assumed a broader and more scientific nature which the average railroad employee can not secure in his everyday experience. Special preparation is admitted to be necessary, but the opportunities for securing this preparation have been most inadequate and generally inaccessible. In response to this need correspondence schools have been conceded to be the logical means which could be made available to any railroad employee, wherever located, provided he is sufficiently ambitious and capable of taking up the work.

Previous to the establishment of the School of Railway Signaling, an effort had been made by the New York Central & Hudson River Railroad to educate its signal forces through a system of evening schools on the Harlem and Mohawk divisions. Although the opportunity was limited, there was sufficient success noted to consider the establishment of some general method of instruction that would reach railroad employees irrespective of the lines on which they were situated. As a result a correspondence school for railway signaling was

established at Utica, N. Y. This school outlined a comprehensive course on signal engineering and has reported satisfactory results. These results include not alone the general benefit to employees through promotions, but also the increased efficiency of service and the greater number of available signalmen competent to assume and discharge their duties in an intelligent and responsible manner.

The school has an advisory board of practical railroad signal engineers secured from 15 different railroads. It has received the commendation of prominent railroad and signal manufacturing companies.

Pupils are provided with a file number and with a book on general instruction which explains the methods of instruction. If any pupil states that he can not understand any work sent him he is provided with a special instructor to assist him until he is able to go on alone. There is no extra charge for this added instruction. The school also invites signal employees to write for information concerning difficulties in their own work.

Two courses in signaling are offered: (1) Railway signaling and (2) a signal drawing course.

The railway signaling course begins with elementary arithmetic and includes the following subjects: Algebra, elements of mechanics, heat and light, chemistry, materials, tools, magnetism and electricity, concrete, signal towers, tram operation, track work, wires and cables, line construction, direct-current relays, direct-current track circuits, highway-crossing signals, mechanical interlocking, locking, direct-current signal appliances, direct-current power-operated signals, direct-current block signaling, electrical power supply, electropneumatic interlocking, pneumatic interlocking, alternating-current machinery, alternating-current block signaling, signal rules.

If any pupil wishes to omit any of the course on the ground that he has already covered the work he is required to pass a special examination to show that he is ready to take up the course at the stage desired.

Tuition fees are as follows: Railway signal course, $75 cash, or from $85 to $104 if paid in monthly installments; signal drawing course, $21 cash, or $24 if paid in monthly installments. It is stated that the complete course can be covered in 18 months if 8 hours' study are given each week, but no limit is set, as the pupil is expected to regulate the time of his course to suit himself.

The School of Railway Signaling has the approval of the Railway Signal Association, to whom a report of the school was made by a committee appointed by this body to investigate correspondence schools in which railway signaling is taught.

AMERICAN COLLEGE OF DRESSMAKING, KANSAS CITY, MO.

The American College of Dressmaking, Kansas City, Mo., offers to teach this trade through a course of 20 illustrated lessons. The time required for the completed course is entirely at the discretion of the pupils. The applicant on paying her tuition signs an agreement in which is stated the following: "It is understood that this is a life scholarship, and I am to have instruction until I have fully mastered the complete course in dressmaking, and that any questions that I may ask relative to dressmaking at any time in the future are to have careful and prompt attention." On this application blank there are also certain questions which must be answered by the prospective pupil in regard to her knowledge of sewing and dressmaking, and previous experience with any system of cutting and fitting dresses.

Tuition if paid in cash is $20; if in installments is $25—$5 as a first payment, and $2 per month for 10 months. In addition to the lessons a textbook, The American Dressmaker, and a diploma are given without extra charge to graduates.

CHAPTER XII.

YOUNG MEN'S CHRISTIAN ASSOCIATION SCHOOLS.

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Educational work, to a greater or less extent, is conducted in about 400 different locals of the Young Men's Christian Association. It includes many forms of educational privileges—such as lectures, talks, and demonstrations attended in the year 1909–10 by 330,000 employed men and boys; clubs for discussion, research, and investigation with 19,000 members; in addition to classes for instruction in 120 subjects taught by 2,443 teachers and in which there are enrolled over 53,600 employed men and boys as students. The expense of such work, aside from light, heat and rent, last year was $740,000, largely paid for by the membership and tuition fees of the students.

These educational centers range in size from only a few students to nearly 2,500, and 70 of them have special educational supervision ranging from one trained man to four such persons giving their entire time to discovering and helping to meet the educational needs of men and boys with special reference to broadening their intelligence and increasing the efficiency of their life work.

There are 190 different occupations represented by men in the class work alone; the age of students ranges from 14 to 60 years, the average being 23 years. About 9,700 are under 18 and 43,900 are 18 and over.

The different class work is grouped into (*a*) Commercial—as business arithmetic, bookkeeping, business correspondence, stenography, and 20 or more kindred subjects; (*b*) industrial and science—including all forms of mechanical, architectural, and free-hand drawing and design, as applied or adapted to needs of men in trades and vocations based on drawing; science subjects, as physics, electricity, chemistry, and their divisions of applied science to meet various kinds of mechanicians, and operators of various machines; (*c*) machine and building trade subjects, including those in the wood, metal, and other trades; (*d*) language, academic subjects, and semiprofessional subjects; including 40 or more courses.

This work in each community is largely colored by local conditions. In many places the emphasis is commercial, in others it is general. There are about 180 associations giving more or less special attention to industrial, science, technical, and trade subjects.

While the educational work of the Young Men's Christian Association was begun in the evening to help meet the needs of men and boys, it is found that many persons have much leisure in the daytime; hence with the same desire to help meet a real need the association is now conducting some of its work in the daytime as well as in the evening, but with no thought or desire to compete with, but rather to supplement, the work of other agencies both public and private. A number of corporations find they can most helpfully use the association, by cooperation, in the conduct of their apprentice schools.

To help stimulate and develop a standard in the character and efficiency of class work, the international committee of the association offers annual examinations.

On succeeding pages a table is given showing the number of men and boys receiving instruction in the year 1909–10 in or along the lines of industrial education. In addition the table shows the total number of persons receiving instruction in all courses, nonindustrial as well as industrial, in the schools that give industrial education. The table is as nearly complete as can be obtained from the records of the international committee.

The lectures, a total of 1,100 of which were given in all of the associations of the United States, include such subjects as the Panama Canal, the Development of the Merchant Marine, Abraham Lincoln, etc. The practical and science talks, of which 4,900 were given, attended by 260,000 employed men and boys, include such topics as Electrified Steam Roads, Industrial Chemistry, Electricity in Surgery, Chemistry of Leather, Essentials of a Successful Employee, Personal Efficiency, etc. These topics are treated by local authorities, with or without demonstration or laboratory material, and attended by groups of 25 to 300 members.

There were 19,000 men and boys in over 80 different kinds of "educational clubs." An "educational club" in the association interpretation is a group of 5 to 10 or more men or boys for the purpose of study, research, investigation, debate, and reading along some particular line. There are many science, industrial, trade, and technical groups, as well as literary. Under a leader and with a definite organization they often conduct a series of practical talks by prominent men on their particular club subject, as Chemistry in the chemistry club, Electricity in the electrical club, Air Brakes in the air brake club, etc.

The teachers here reported are those handling the industrial, technical, science, trade, and engineering subjects. They are experienced men in the trade, science, or industry which they teach, employing their time and energy daily in those lines, but teaching these subjects two or more evenings per week. Their salaries for such services range from $2 to $5, $7, or more per evening, depending

upon the subject. A few of the teachers are employed exclusively by the Young Men's Christian Association.

The students in industrial, science, technical, building, and trade subjects are employed men and boys. In the majority of cases they take but one subject, as mechanical drawing or electricity, and confine their attention to that subject two or more evenings per week. Yet, in about 35 per cent of the cases one man will be found taking two or more subjects, as mechanical drawing, electricity, and shop mathematics. In the columns of the table relating to these subjects, therefore, the figures indicate enrollment rather than the number of different men.

In a few places day classes have been organized, as in Seattle, Detroit, Cleveland, and elsewhere. It now looks as if much more would be done in this direction. A few apprentice schools—either day or night, either on or out of company time—are now conducted under association auspices. There is one school in the Young Men's Christian Association at Wilmerding, Pa., for the Westinghouse Air Brake Co; one in Philadelphia for sheet metal workers employed by the Lupton Co.; one in building trades in Chicago; and a group of schools for railroad apprentices of the Lackawanna Railroad system at points on its lines.

The last column is an inclusive one. It shows the number of different men and boys who attended classes in all departments of association work. In addition to the science, industrial, and technical work, it includes the students in other subjects conducted by the association, as commercial, language, semiprofessional, agricultural, academic, college preparatory, etc.

The first automobile school in America was instituted by the Young Men's Christian Association in Boston in 1900. There are now 37 such schools with over 3,000 pupils, many of whom are owners of machines. The first apple-packing school in America, so far as known, was organized in the Young Men's Christian Association in North Yakima, Wash., in 1907. There are now several such classes in associations in the greater apple-raising sections of the country. A three weeks' agricultural school for 240 farmers was held by the Mount Pleasant (Iowa) Young Men's Christian Association in 1907, and has been repeated annually since. This is given with the cooperation of the State agricultural college. Several associations have done likewise, but on a smaller scale. A great many lectures and talks have recently been given on agricultural subjects; garden and agricultural clubs are in operation among 3,000 boys, and numerous poultry classes and schools have been organized recently. The poultry school of Portland, Oreg., with nearly 100 boys and young men, has been conducted for two years in cooperation with the State agricultural college.

NUMBER OF MEN AND BOYS RECEIVING INSTRUCTION IN INDUSTRIAL SUBJECTS,

State and locality.	Number of lectures and practical or science talks.	Number of men and boys in educational clubs.	Number of paid teachers in industrial, technical, and trade subjects.	Number of students (employed men and boys) in industrial, technical, and science subjects.			
				Evening classes.			
				Drawing and design: Mechanical, architectural, or free hand.		Science subjects: Physics, electricity, or chemistry.	
				Men.	Boys.	Men.	Boys.
Alabama:							
Birmingham	3	.....	3	7	.....	.....	.....
Mobile	12	75	7	5	.....	.....	.....
Selma	.....	.....	2	.....	.....	12	.....
Arizona:							
Bisbee	.....	35	2	.....	.....	12	.....
Douglas	3	3	3	19	.....	.....	.....
Arkansas:							
Little Rock	.....	14	2	8	.....	.....	.....
California:							
Berkley	6	.....	2	8	.....	.....	.....
Los Angeles	42	208	16	79	20	88	13
San Francisco	9	50	5	37	.....	.....	.....
Colorado:							
Denver	70	.....	16	52	.....	86	.....
Connecticut:							
Ansonia	2	.....	2	40	.....	.....	.....
Bridgeport	22	20	11	42	60	10	6
Hartford	22	65	11	54	12	18	5
Meriden	.....	.....	3	29	4	.....	.....
New Britain	4	.....	3	44	.....	.....	.....
New Haven	1	137	6	28	15	12	58
Torrington	.....	.....	1	20	.....	.....	.....
Winsted	.....	.....	2	7	.....	.....	.....
Delaware:							
Wilmington	16	67	6	46	18	.....	.....
District of Columbia:							
Washington	47	96	10	77	.....	65	.....
Georgia:							
Savannah	3	30	2	19	.....	.....	.....
Illinois:							
Bloomington	3	60	5	44	.....	.....	.....
Chicago (central)	66	179	20	129	.....	135	.....
Moline	.....	35	1	22	.....	.....	.....
Peoria	12	18	3	9	.....	.....	.....
Springfield	24	80	1	.....	.....	.....	.....
Indiana:							
Indianapolis	20	26	20	74	20	35	14
Lafayette	4	.....	2	5	.....	12	.....
Marion	3	.....	3	11	14	.....	.....
Peru (railroad)	23	.....	1	10	.....	.....	.....
South Bend	20	50	4	34	11	.....	.....
Terre Haute	2	.....	4	44	.....	.....	.....
Iowa:							
Buxton (Negro)	10	61	1	.....	.....	.....	.....
Kansas:							
Hoisington (railroad)	10	.....	1	.....	.....	.....	.....
Leavenworth	.....	.....	2	.....	.....	.....	.....
Topeka	.....	.....	2	6	.....	.....	.....
Topeka (Negro)	.....	7	.....	.....	.....	.....	.....
Topeka (railroad)	24	140	2	10	.....	9	.....
Kentucky:							
Louisville	.....	.....	5	41	.....	11	.....
Louisiana:							
New Orleans (Negro)	6	.....	1	.....	.....	.....	.....
Maryland:							
Baltimore (central)	26	27	7	7	12	8	1
Baltimore (west branch)	2	85	.....	35	.....	.....	.....
Massachusetts:							
Boston	10	160	33	201	.....	192	.....
Brockton	43	60	4	18	.....	10	.....
Cambridge	40	43	4	13	3	.....	12
Fitchburg	3	10	2	11	.....	.....	.....
Gloucester	.....	.....	2	7	.....	.....	.....
Holyoke	6	.....	3	18	.....	7	.....
Lawrence	1	.....	3	14	.....	15	.....

ETC., IN THE YOUNG MEN'S CHRISTIAN ASSOCIATION SCHOOLS, 1909-10.

Number of students (employed men and boys) in industrial, technical, and science subjects.								Total number of individual students in class work, including industrial, technical, trade, commercial, language, and semi-professional subjects.
Evening classes.						Day classes: Mechanicians, technical preparation, or apprentice schools.		
Mathematics: Arithmetic, algebra, geometry, or shop mathematics.		Operating engineers: Electrical, steam, gasoline, or automobile.		Machine and building trade subjects: Woodwork, metal work, plumbing, sheet metal, and other trades.				
Men.	Boys.	Men.	Boys.	Men.	Boys.	Men.	Boys.	
16	32							68
3	65							109
12								47
6								48
11	14							75
2	8							33
16								51
130	107	214	17	42	35	38	31	1,256
45	49			10				264
77		167		62		15		703
22								136
18	5			7	18	22	23	213
16	3	25		30	1			304
								33
11								234
9				12	105			434
								66
7								19
43	22	2						369
197								621
15								123
10								122
381	47	92		103		278		1,491
								74
7	5			18				55
		18						55
59	125	60				17		677
4				3				48
3	10	6	2					102
								40
29							38	246
18	27			8				147
12	11							52
15								30
20		16						47
13	18							58
22								35
								29
19	8							174
14	27							41
110	148			15	2			425
								68
189	31	798		24		130		2,159
4				14				225
17	2	7						545
				14				109
		17						52
		9						170
				15				294

NUMBER OF MEN AND BOYS RECEIVING INSTRUCTION IN INDUSTRIAL SUBJECTS,

State and locality.	Number of lectures and practical or science talks.	Number of men and boys in educational clubs.	Number of paid teachers in industrial, technical, and trade subjects.	Number of students (employed men and boys) in industrial, technical, and science subjects.			
				Evening classes.			
				Drawing and design: Mechanical, architectural, or free hand.		Science subjects: Physics, electricity, or chemistry.	
				Men.	Boys.	Men.	Boys.
Massachusetts—Concluded.							
Lynn	8	41	7	34	.....	74	.....
New Bedford	5	20	2	.....	.....	.....	.....
Northampton	11	71	2	.....	.....	.....	.....
Pittsfield	.....	.....	4	11	.....	5	.....
Quincy	.....	32	4	21	2	.....	.....
Salem	.....	.....	8	22	6	29	.....
Somerville	2	.....	2	8	.....	10	.....
Southbridge	5	25	1	14	.....	.....	.....
Springfield	9	29	3	36	.....	.....	.....
Taunton	24	26	1	.....	.....	10	.....
Westfield	12	48	1	.....	.....	10	.....
Worcester	25	.....	7	29	5	28	.....
Michigan:							
Detroit	.....	.....	18	223	.....	110	.....
Grand Rapids	8	10	7	74	14	14	.....
Ishpeming	15	40	3	.....	.....	12	.....
Jackson	37	65	7	46	.....	5	.....
Lansing	7	.....	4	20	4	.....	.....
Minnesota:							
Cloquet	1	35	2	9	.....	.....	.....
Duluth	11	26	4	27	7	6	.....
Minneapolis	35	116	9	76	.....	25	.....
St. Paul	8	110	5	45	.....	16	.....
Missouri:							
Kansas City	5	.....	7	50	6	22	.....
Kansas City (railroad)	8	.....	1	8	.....	1	.....
St. Joseph	9	.....	2	3	.....	.....	.....
St. Louis	5	50	8	57	10	18	24
St. Louis (railroad)	67	99	5	12	.....	.....	.....
Nebraska:							
Omaha	37	75	7	38	6	13	32
New Jersey:							
Elizabeth	8	23	2	26	.....	.....	.....
Hoboken (railroad)	11	68	2	.....	.....	.....	.....
Newark	23	54	10	40	2	12	30
Paterson	12	90	5	12	4	.....	.....
Trenton	8	47	3	.....	.....	.....	.....
New York:							
Albany	5	36	1	.....	.....	.....	.....
Binghamton	.....	15	2	14	.....	.....	.....
Brooklyn (Central)	5	105	9	27	9	.....	.....
Brooklyn (Bedford branch)	85	55	6	30	.....	.....	.....
Brooklyn (Eastern branch)	21	80	3	8	.....	10	2
Buffalo	46	76	6	28	5	42	.....
Elmira	7	70	3	7	.....	.....	.....
New York (East Side branch)	19	68	2	10	1	.....	.....
New York (Harlem branch)	16	61	7	42	.....	.....	.....
New York (23d Street branch)	113	243	15	62	.....	65	.....
New York (Union branch)	15	62	5	15	10	6	.....
New York (West Side branch)	59	147	20	.....	.....	.....	.....
Norwich (railroad)	3	.....	1	.....	.....	.....	.....
Oneonta (railroad)	7	30	2	.....	.....	.....	.....
Rochester	13	46	2	8	.....	8	.....
Syracuse	.....	.....	4	19	.....	6	.....
Tarrytown	16	36	4	14	.....	.....	.....
Troy	12	109	9	5	7	6	2
Watertown	4	5	2	.....	.....	.....	.....
North Carolina:							
Asheville (Negro)	16	.....	1	.....	.....	.....	.....
Charlotte	5	25	2	5	.....	.....	.....
North Dakota:							
Fargo	37	8	2	17	.....	7	.....
Grand Forks	27	35	3	.....	.....	.....	.....

ETC., IN THE YOUNG MEN'S CHRISTIAN ASSOCIATIONS SCHOOLS, 1909-10—Cont'd.

Number of students (employed men and boys) in industrial, technical, and science subjects.								Total number of individual students in class work, including industrial, technical, trade, commercial, language, and semi-professional subjects.
Evening classes.						Day classes: Mechanicians, technical preparation, or apprentice schools.		
Mathematics: Arithmetic, algebra, geometry, or shop mathematics.		Operating engineers: Electrical, steam, gasoline, or automobile.		Machine and building trade subjects: Woodwork, metal work, plumbing, sheet metal, and other trades.				
Men.	Boys.	Men.	Boys.	Men.	Boys.	Men.	Boys.	
34		6		4				334
	27	31						280
		12		22				34
6				9				49
							62	119
42	5	69		9				223
								108
								26
7				8				148
								60
								30
7		107		3				290
113	67	182		18		161		1,469
5				8				307
24								60
62		9		5				206
30		29						140
4								51
31		10					25	260
65		101						548
49		50						380
26	53	12						250
								16
48	8							135
44	48	9		5			15	363
39		40		39			3	329
30	28			15				388
	13							41
						40	38	78
51	11	48						550
28	20			6		6		300
6	62							216
		10						59
8								46
76	17	16	1	21				715
24		245						616
9	2							166
4		25	4					259
		45						122
13	4							198
33	10	33		31				559
71		22		54		43		1,304
8				43				118
36	28	754	5			411		2,472
		21						21
		75						85
4		6						36
11		14		6				70
9	1	47						97
16	28	8		7	1			222
		24						24
16	14							30
4								68
								107
		19		9				104

NUMBER OF MEN AND BOYS RECEIVING INSTRUCTION IN INDUSTRIAL SUBJECTS,

State and locality.	Number of lectures and practical or science talks.	Number of men and boys in educational clubs.	Number of paid teachers in industrial, technical, and trade subjects.	Number of students (employed men and boys) in industrial, technical, and science subjects.			
				Evening classes.			
				Drawing and design: Mechanical, architectural, or free hand.		Science subjects: Physics, electricity, or chemistry.	
				Men.	Boys.	Men.	Boys.
Ohio:							
Akron	4	135	1	9	.....	.....	.....
Bowling Green	19	.....	1	24	.....	.....	.....
Canton	5	49	5	24	11	.....	.....
Cincinnati	18	48	14	37	.....	32	.....
Cleveland	10	62	15	123	.....	58	.....
Columbus	5	.....	13	47	.....	24	.....
Dayton	36	97	15	168	.....	36	.....
Hamilton	7	16	16	80	13	9	.....
Lima	6	.....	3	9	.....	.....	.....
Lorain	1	30	3	25	10	.....	.....
Marion	6	.....	2	22	.....	.....	.....
Newark	6	32	1	15	.....	.....	.....
Springfield	6	65	5	38	6	20	5
Toledo	20	112	2	13	.....	.....	.....
Youngstown	.....	55	7	58	18	6	.....
Oregon:							
Portland	304	30	21	102	21	75	12
Salem	.....	48	2	6	.....	.....	.....
Pennsylvania:							
Allentown	4	65	1	12	.....	.....	.....
Altoona (railroad)	15	.....	2	46	.....	.....	.....
Bellwood (railroad)	5	75	.....	.....	.....	.....	.....
Berwick	7	.....	3	50	.....	10	.....
Butler	.....	35	2	30	.....	.....	.....
Chester	25	75	3	16	2	.....	.....
Connellsville	.....	.....	1	.....	.....	.....	.....
Easton	7	.....	3	22	.....	.....	.....
Erie	8	50	4	48	.....	.....	.....
Germantown	6	.....	3	28	.....	.....	.....
Johnstown	10	10	2	7	3	.....	.....
Juniata (railroad)	43	30	2	7	2	6	.....
Monongahela	3	.....	2	12	3	.....	.....
New Castle	6	.....	3	32	.....	.....	.....
Norristown	.....	.....	2	14	.....	12	.....
Philadelphia (Central)	58	106	15	98	14	15	.....
Philadelphia (Kensington branch)	2	20	16	51	2	7	7
Philadelphia (West branch)	.....	.....	2	7	.....	.....	.....
Philadelphia (railroad)	7	105	5	15	.....	.....	.....
Pittsburg (Central branch)	.....	.....	6	45	.....	40	.....
Pittston	26	89	3	4	13	.....	.....
Pottstown	.....	20	1	24	.....	.....	.....
Reading	17	.....	4	14	.....	3	12
Reading (railroad)	8	.....	1	.....	.....	.....	.....
Scranton	54	97	4	18	.....	.....	.....
Scranton (railroad)	35	150	6	17	.....	.....	.....
Steelton	5	.....	2	6	.....	.....	.....
Wilkes Barre	1	20	3	18	.....	.....	.....
Wilmerding	4	35	8	20	8	6	.....
York	3	21	3	35	10	.....	.....
Rhode Island:							
Pawtucket	4	.....	3	9	.....	.....	.....
Providence	4	.....	3	.....	.....	.....	.....
South Carolina:							
Columbia (industrial)	7	22	2	.....	.....	.....	.....
Greenville	4	44	2	.....	.....	.....	.....
Tennessee:							
Chattanooga	13	12	2	11	.....	.....	.....
Chattanooga (Negro branch)	10	.....	1	.....	.....	.....	.....
Memphis	.....	45	3	16	.....	.....	.....
Texas:							
Childress (railroad)	.....	25	1	6	.....	.....	.....
Dallas	40	50	2	4	.....	.....	.....
El Paso	10	28	3	18	.....	.....	.....
Houston	6	20	3	16	.....	.....	.....
San Antonio (railroad)	2	.....	2	30	2	.....	.....

ETC., IN THE YOUNG MEN'S CHRISTIAN ASSOCIATION SCHOOLS, 1909-10—Cont'd.

Number of students (employed men and boys) in industrial, technical, and science subjects.								Total number of individual students in class work, including industrial, technical, trade, commercial, language, and semi-professional subjects.
Evening classes.						Day classes: Mechanicians, technical preparation, or apprentice schools.		
Mathematics: Arithmetic, algebra, geometry, or shop mathematics.		Operating engineers: Electrical, steam, gasoline, or automobile.		Machine and building trade subjects: Woodwork, metal work, plumbing, sheet metal, and other trades.				
Men.	Boys.	Men.	Boys.	Men.	Boys.	Men.	Boys.	
.....	.....	.....	.....	.....	.....	.....	.....	90
.....	.....	.....	.....	.....	.....	.....	.....	24
6	18	.....	.....	.....	30	.....	.....	308
73	99	163	.....	12	.....	25	26	872
72	27	39	.....	9	.....	54	.....	812
68	25	85	.....	22	.....	.....	.....	403
78	30	45	.....	48	28	.....	.....	662
47	21	38	.....	.....	.....	.....	.....	492
.....	.....	19	.....	7	.....	.....	.....	53
5	5	.....	.....	.....	.....	.....	.....	131
13	.....	.....	.....	.....	.....	.....	.....	44
.....	.....	.....	.....	.....	.....	.....	.....	51
24	13	.....	.....	.....	.....	.....	.....	169
12	.....	.....	.....	.....	.....	.....	.....	90
32	16	.....	.....	16	15	.....	.....	256
134	228	83	.....	136	11	.....	.....	1,004
2	2	.....	.....	.....	.....	.....	.....	20
.....	.....	.....	.....	.....	.....	.....	.....	24
.....	.....	.....	.....	.....	.....	.....	.....	46
.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	10	.....	.....	.....	.....	.....	.....	80
.....	.....	.....	.....	.....	.....	.....	.....	231
.....	19	.....	.....	.....	.....	.....	.....	52
.....	.....	32	.....	.....	.....	.....	.....	43
18	8	.....	.....	.....	.....	.....	.....	76
8	.....	10	.....	.....	.....	.....	.....	109
23	.....	.....	.....	.....	.....	.....	.....	143
10	7	.....	.....	.....	.....	.....	.....	76
2	4	7	.....	.....	.....	.....	.....	42
16	7	.....	.....	.....	.....	.....	.....	49
2	4	.....	.....	14	.....	.....	.....	106
.....	.....	.....	.....	.....	.....	.....	.....	60
196	51	78	.....	74	.....	.....	.....	1,175
107	11	7	1	10	1	16	16	337
38	.....	.....	.....	.....	.....	.....	.....	61
29	.....	20	.....	.....	10	.....	.....	215
85	.....	.....	.....	40	.....	.....	.....	501
21	37	.....	.....	.....	.....	.....	.....	91
.....	.....	.....	.....	.....	.....	.....	.....	40
12	2	3	.....	21	.....	.....	.....	119
.....	.....	.....	.....	.....	.....	24	.....	24
106	33	.....	.....	4	.....	.....	.....	333
60	16	20	.....	.....	.....	60	60	266
5	.....	.....	.....	.....	.....	.....	.....	119
.....	22	16	.....	.....	.....	.....	.....	154
32	7	6	.....	5	.....	34	34	278
4	10	.....	.....	.....	.....	.....	.....	54
9	.....	12	.....	4	.....	.....	.....	77
18	.....	.....	.....	29	.....	.....	.....	184
12	5	.....	.....	8	.....	.....	.....	28
17	38	.....	.....	.....	.....	.....	.....	110
.....	34	.....	.....	.....	.....	.....	.....	66
14	16	.....	.....	.....	.....	.....	.....	30
11	.....	1	.....	.....	.....	.....	.....	179
4	.....	.....	.....	.....	.....	.....	.....	18
2	4	.....	.....	.....	.....	.....	.....	52
7	.....	.....	.....	.....	.....	.....	.....	65
.....	18	.....	10	.....	.....	10	.....	128
.....	.....	.....	.....	.....	.....	.....	.....	32

NUMBER OF MEN AND BOYS RECEIVING INSTRUCTION IN INDUSTRIAL SUBJECTS,

State and locality.	Number of lectures and practical or science talks.	Number of men and boys in educational clubs.	Number of paid teachers in industrial, technical, and trade subjects.	Number of students (employed men and boys) in industrial, technical, and science subjects.			
				Evening classes.			
				Drawing and design: Mechanical, architectural, or free hand.		Science subjects: Physics, electricity, or chemistry.	
				Men.	Boys.	Men.	Boys.
Utah:							
Salt Lake City	22	.....	12	35	.....	.....	.....
Virginia:							
Clifton Forge (railroad)	10	.....	.....	18	.....	.....	.....
Norfolk (Negro)	7	.....	2	.....	.....	.....	.....
Richmond	5	.....	3	2	.....	.....	.....
Richmond (railroad)	.....	.....	3	17	.....	.....	.....
Washington:							
Bellingham	8	90	2	5	.....	.....	.....
Everett	1	50	3	19	.....	3	8
North Yakima	7	37	2	10	.....	.....	.....
Seattle	38	20	24	105	.....	62	.....
Spokane	12	125	15	31	9	15	6
Tacoma	4	.....	9	48	.....	15	.....
Wisconsin:							
Beloit	10	.....	2	10	.....	.....	.....
La Crosse	3	11	3	11	.....	.....	.....
Lake Geneva	8	.....	1	.....	.....	.....	.....
Milwaukee	9	30	7	35	2	5	.....
Racine	10	37	3	4	14	.....	.....

ETC., IN THE YOUNG MEN'S CHRISTIAN ASSOCIATION SCHOOLS, 1909-10—Concl'd.

Number of students (employed men and boys) in industrial, technical, and science subjects.								Total number of individual students in class work, including industrial, technical, trade, commercial, language, and semi-professional subjects.
Evening classes.						Day classes: Mechanicians, technical preparation, or apprentice schools.		
Mathematics: Arithmetic, algebra, geometry, or shop mathematics.		Operating engineers: Electrical, steam, gasoline, or automobile.		Machine and building trade subjects: Woodwork, metal work, plumbing, sheet metal, and other trades.				
Men.	Boys.	Men.	Boys.	Men.	Boys.	Men.	Boys.	
25	88	17	2	.....	.....	.....	.....	489
.....	.....	.....	.....	.....	.....	.....	.....	18
30	29	.....	.....	.....	.....	.....	.....	59
8	110	.....	.....	8	.....	.....	.....	187
14	.....	10	.....	.....	.....	.....	.....	90
6	6	.....	.....	.....	.....	.....	.....	78
2	12	.....	.....	.....	.....	.....	.....	106
.....	.....	.....	.....	20	.....	.....	.....	80
181	26	29	.....	67	.....	220	.....	959
53	24	163	30	40	4	20	10	488
37	13	1	.....	10	1	.....	.....	266
4	.....	.....	.....	.....	.....	.....	.....	28
15	5	.....	.....	.....	.....	.....	.....	51
.....	.....	2	8	.....	.....	.....	.....	.....
29	14	16	16	18	.....	.....	.....	411
.....	13	.....	.....	.....	.....	.....	.....	61

CHAPTER XIII.

STATE COMMISSIONS ON INDUSTRIAL EDUCATION.

CHAPTER XIII.

STATE COMMISSIONS ON INDUSTRIAL EDUCATION.

INTRODUCTION.

A striking evidence of the growing popular interest in industrial education is the number of commissions appointed in recent years for the study of the subject with a view to preparing the way for the introduction of systems of industrial training. In a number of States commissions have been created by legislative enactment, charged with the duty of conducting investigations and recommending proper measures for obtaining the desired results. Important legislation has often resulted from the work of these bodies. Municipalities have, in some instances, appointed commissions for the purpose of procuring information relative to the establishment of industrial schools adapted to local conditions. Thus, in Massachusetts, municipal commissions have conducted inquiries looking to the establishment of schools for shoe workers in Brockton and Lynn, for textile workers in Lawrence, and for machinists in Worcester. In California the teachers of the State have taken the initiative in organizing a commission to formulate plans for a thorough-going scheme of industrial education at State expense. A tentative bill embodying the ideas of the commission has been drafted and submitted for the criticisms and suggestions of teachers.

A commission appointed for special examination of the Rhode Island College of Agriculture and Mechanic Arts reported to the general assembly of that State, in 1909, that—

> To keep our position as a State, as against the enlightened competition of other States and nations, we must provide increased opportunities for industrial education throughout our whole school system from the common school on through the high school to and including the technical college; for, paradoxical as it may seem, the higher school is the basis and condition of the lower. * * * To add industrial courses to its public schools would complete a system of public industrial education.

The National Association of Manufacturers and the American Federation of Labor, representing, respectively, the interests of the employer and the employee, have each shown their concern for the cause of industrial education by the appointment of special committees for the study of the subject. The reports of these committees, presented after investigation and research, form a valuable addition to the literature on industrial training.

In several instances commissions from foreign countries have visited the United States for the purpose of studying methods of industrial education in use here. The Mosely Educational Commission in 1903 devoted particular attention to schools offering preparation for the trades, and its report contains much valuable information on that subject. In the following year commissioners representing the German Government spent some time in this country in a study of American education, with special reference to industrial development. The results of this commission's work were published by the House of Deputies of the Prussian Parliament. In 1910 the Canadian Government appointed a commission to visit the United States and other countries and report on the systems of technical education which have been established in those lands. The report of this commission was issued early in 1911.

CONNECTICUT.

Connecticut was the first State to create a commission for the investigation of industrial education. A special act of the general assembly, approved June 3, 1903, contained the following provisions:

SECTION 1. That the governor be and is hereby directed to appoint a commission consisting of three persons, whose duty it shall be to investigate practical means and methods of industrial and technical education.

SEC. 2. Said commission shall, on or before February first, nineteen hundred and six, report to the general assembly at its session to be held in nineteen hundred and five, and shall make such recommendations for legislation as it may deem wise.

SEC. 3. No member of said commission shall receive any compensation for services as such member, but the commission may expend a sum not exceeding five hundred dollars for incidental and necessary expenses incurred in the discharge of his duties, and said sum shall be paid by the treasurer upon the order of the comptroller, with whom the commission shall file proper receipts and vouchers.

The commission appointed under the terms of this act presented a final report to the general assembly of 1907 recommending the enactment of a law covering the following points:

(1) Whenever a town shall appropriate a sum of money for the establishment or maintenance of a trade school, the State shall contribute an equal sum for that school; provided that the course of study proposed for the school and its proposed equipment shall be approved by the State board of education, and provided that the total sum appropriated by the State shall not exceed ——— dollars for establishment in any one year, and that the total sum appropriated for maintenance shall not exceed ——— dollars in any one year.

(2) Such schools shall give instruction in such distinct trades as may be provided for by the local school boards with the approbation of the State board of education.

(3) Such schools shall have sessions both by day and in the evening, and the instruction given shall be free to all citizens of Connecticut and to their children; it being provided that no pupil under 16 years of age shall be admitted who has not completed the studies of the eighth grade in the public schools or some equivalent course of study.

(4) All details in the management of such trade schools shall be controlled by the school boards of the towns in which the schools are located, subject to the general authority and supervision of the State board of education.

Following the report of this commission a bill entitled "An act concerning the establishment of free public schools for instruction in the

principles and practices of trades" was enacted and became a law as chapter 250 of the public acts of 1907. This act was later repealed by chapter 85 of the public acts of 1909, providing for the establishment by the State board of education in each of the two towns best adapted for the purpose a free public day and evening school for instruction in the trades. Under this law trade schools operated under State control have been opened in the cities of Bridgeport and New Britain. The text of the law appears on page 501.

MASSACHUSETTS.

Under authority of a resolution of the Massachusetts Legislature, a commission on industrial and technical education was appointed by the governor of the State on June 7, 1905. The resolve creating this commission follows:

Resolved, That the governor, with the advice and consent of the council, shall, within thirty days after the passage of this resolve, appoint a suitable commission of nine persons, citizens of the Commonwealth, representing the manufacturing, agricultural, educational, and labor interests, to serve for such compensation as the governor and council shall approve, to be known as the commission on industrial and technical education. Said commission may employ experts and all necessary clerical and other assistance, and may incur such reasonable expenses, including traveling expenses, as may be authorized by the governor and council. Before incurring any expense the commission shall from time to time estimate its probable amount, and submit the estimate to the governor and council for their approval, and no expense shall be incurred by the commission beyond the amount so estimated and approved. The commission shall report to the general court on or before the second Wednesday of January in the year nineteen hundred and six, with such recommendations for legislation as it may deem expedient. The powers of the commission shall terminate on the said second Wednesday in January. The commission shall investigate the needs for education in the different grades of skill and responsibility in the various industries of the Commonwealth. They shall investigate how far the needs are met by existing institutions, and shall consider what new forms of educational effort may be advisable, and shall make such investigations as may be practicable through printed reports and the testimony of experts as to similar educational work done by other States, by the United States Government and by foreign governments. There may be expended from the treasury of the Commonwealth a sum not exceeding fifteen thousand dollars to carry out the purposes of this resolve: *Provided, however*, That not more than five hundred dollars shall be paid in full for services rendered as compensation to any member of the commission.

(Approved May 24, 1905.)

The time between the appointment of the commission and the date set by the resolve for the submission of the commission's report being too short, the legislature extended the time until the second Wednesday in April. The report submitted contained a comprehensive presentation of the problems of industrial education, with the recommendation that a second commission be appointed for the purpose of extending the investigation of methods of industrial training and of local needs, and advising and aiding in the introduction of industrial education by means of a system of independent schools. A draft of a bill embodying its recommendations was submitted by the commission which, after some modifications, was passed by the legislature. The text of this law is reproduced on page 504 of the present volume.

The new commission was appointed August 31, 1906, and began its labors immediately. As its instructions were to proceed toward the actual establishment of industrial schools, the commission directed its efforts toward initiating at different centers throughout the State movements toward that result. Public meetings and informal conferences were held in a number of cities, in which the plans and purposes of the proposed schools were discussed by men representing all the various interests of the community.

The commission submitted its first annual report in March, 1907. This report showed that considerable progress had been made toward the establishment in several cities of the industrial schools contemplated by the law.

The second annual report, presented to the legislature in January, 1908, went more fully into the details connected with the performance of the duties imposed by the act creating the commission. The report showed that evening schools for industrial workers had been established by the commission in five cities, while requests for a number of others were under consideration. Upward of 1,000 pupils were in attendance upon these schools. In addition to the results of extensive inquiries into local conditions, the commission published reports of special investigations of industrial and agricultural schools in the United States and Europe.

In reviewing its work of the year the commission reported that "during the past year the interest in industrial education steadily increased among all classes and in all directions. Both employers and employed are meeting on the common ground of mutual interests. Educators are more thoroughly awakening to the fact that the industrial education movement is to be one of the next great advances in systematic education. Both individuals and associations are expressing their deep interest in the work. Other States are agitating the question of following the example of Massachusetts in establishing a system of State industrial schools."

An inquiry into the textile schools at Lowell, New Bedford, and Fall River was made in conformity with a resolution of the legislature approved April 24, 1907. The report on these schools was published as a separate document by the commission. A report on the advisability of establishing a higher technical school or industrial college was also made in compliance with the requirement contained in section 6 of the act creating the commission. In addition, a series of bulletins on industrial education topics was issued.

In 1908 further legislation affecting the commission was enacted, the main features of which were—

1. The extension of the term of the commission from three years to five years.

2. The addition of a sixth member to the commission, who was to be a woman.

3. Further delegation to the commission of necessary powers in the conduct and maintenance of independent industrial schools.

4. Moneys appropriated for the maintenance of independent industrial schools, whether appropriated by the State or by municipalities, to be expended under the direction or with the approval of the commission.

5. Permission extended to any city or town to establish independent industrial schools in charge of a board of trustees, and empowering such a board with authority to provide and maintain such schools.

6. Such schools to be approved by the commission as to location, courses and methods of instruction, in order to receive State aid, as provided for in chapter 505 of the acts of 1906.

7. Authority given the commission to permit any resident of Massachusetts to attend an authorized independent industrial school in any other city or town than that of his residence, provided that his own town does not maintain such a school in whole or in part.

8. Authorizing the commission to fix a tuition fee to be paid by the home town in case of pupils attending school elsewhere under the circumstances named above, the State to repay to the town one-half the tuition fee so paid.

In the third annual report of the commission, submitted in January, 1909, it was shown that, as a result of the commission's efforts, day industrial schools had been established in 2 cities of the State and evening industrial schools in 11 cities. Progress was reported toward the establishment of similar schools in several other cities.

By act of the legislature, approved May 28, 1909, the commission on industrial education was abolished, as was the existing State board of education, and the powers and duties of each body were conferred on a new board of education created in conformity with the terms of the act.

The laws of Massachusetts relating to industrial education appear in Laws Relating to Industrial Education, Chapter XVI.

MARYLAND.

In Maryland a commission on industrial education was created by act of the general assembly, approved April 6, 1908. Section 1 of the act reads as follows:

Be it enacted by the General Assembly of Maryland, That the governor be, and he is hereby, authorized and requested to appoint a commission, consisting of not more than five persons, citizens of this State, to make inquiry and report to the legislature at its next session, by bill or otherwise, respecting the subject of industrial education, including an examination of the extent to which it is already carried on in Maryland and elsewhere, the best means of promoting and maintaining it in its several grades, whether by State or local action alone, or by both combined; how far it is possible or desirable to incorporate it into the existing system of public instruction; the best method of training teachers for such schools or departments, and what changes, if any, are required in the existing system of schools to enable them to provide such

training, or to meet more fully the needs of the system of public instruction as now organized in this State, with such other inquiries as the commission may itself institute or be requested by the governor to undertake. The members of the commission shall serve without compensation, except for necessary expenses and clerk hire actually incurred and approved by the governor, not to exceed the sum of three hundred dollars ($300).

Pursuant to the terms of this act the governor of the State named the members of the commission on May 2, 1908. In beginning its work the commission addressed an inquiry embodying the essential points to be covered by the investigation to a large number of persons interested in industrial education, both within the State and elsewhere. This letter elicited much information of value from school officials, editors, manufacturers, members of labor organizations, and others.

At the conclusion of its work in 1910 the commission transmitted a report to the legislature which contained, among other things, the following conclusions:

1. The control of industrial education should be in the hands of the State board of education and county boards, strengthened, if need be, by the addition of an advisory committee of citizens.

2. There must be a close cooperation with the home for work in mechanic arts, agriculture, and cooking in the rural schools. It would be unwise to extend to the rural schools the same industrial work which is practical and desirable in the city schools.

3. Industrial training should begin after the ordinary school work is fairly completed, and as soon as the muscles are strong enough to handle the lighter tools of industry safely. Under ordinary conditions the vocational schools should be open to children who are 13 or 14 years of age.

4. There should be industrial or vocational schools for these boys and girls, giving a better elementary school provision for the vocational needs of those likely to enter industrial pursuits.

5. There should be continuation (evening) schools for boys and girls already at work during the day in stores, offices, or factories.

The commission submitted no specific recommendations to the general assembly, and up to the present time no legislation has resulted from its labors.

NEW JERSEY.

The members of the New Jersey Commission on Industrial Education were named by the governor of the State on May 26, 1908. The joint resolution of the senate and general assembly under authority of which the commission was appointed required (1) a thorough investigation of the needs of the industries in respect to industrial or technical training; (2) a statement of the extent to which these needs were being met by existing institutions; and (3) as a result of a searching examination of conditions in the State and elsewhere,

some definite suggestions for the promotion of industrial education in such manner as might best serve the interests of the Commonwealth and its citizenship.

Realizing the importance of going directly to those engaged in the industries for information, the first work of the commission was to address to employers and workers everywhere in the State inquiries designed to bring out both the needs and practical suggestions for the improvement of conditions. Interviews with representatives of numerous firms located in all parts of the State were also held. The results of these investigations are thus summarized by the commission in its report to the legislature of 1909:

(1) As the direct outcome of modern industrial conditions—factory organization, the introduction of machinery, and "piecework"—the apprenticeship system has been virtually abandoned as a means of instructing the young in the various trades. (2) There is a lack of skilled and efficient workmen, and this will be largely increased unless a better means of vocational training is found. (3) Although the compulsory attendance period in the public schools has been extended gradually in New Jersey (as elsewhere in the United States), the schools have not been able to offer vocational training. Fully 95 per cent of the pupils leave school between the ages of 14 and 17, and without having formed any idea as to what trade or vocation they should follow; in consequence, they drift into occupations, rather than select those which might be most nearly suited to their aptitudes, and their progress is generally arrested at an early age, because of the restricted character of their experience and the failure to receive supplementary instruction. (4) The trades have become so specialized that there is but little chance for a learner to go beyond the narrow limits of the work to which he is assigned, unless he has supplementary training. (5) The workers, mechanics, or craftsmen in the several trades are deeply sensible of their lack of opportunities for vocational training during the early years, and grown men among them would gladly take advantage of industrial schools if these institutions were established. (6) Although business conditions are such that the employers, in most instances, have neither the time nor the inclination to conduct vocational schools within the factories, they would gladly welcome any suitable means of providing the workers with the instruction which the latter require. (7) There is an urgent demand for facilities for industrial education to supplement the training of the shops.

The establishment of evening "industrial improvement" schools for the benefit of persons employed by day in the industries was advocated by the commission. Such schools were to be operated under local boards chosen largely because of connection with the industries. With regard to trade schools, i. e., schools for specific industrial training in which shop work predominates, the commission reported that "the consensus of opinion shows a well-defined opposition to their introduction on the grounds (1) that they are too expensive a form of education for the present; and (2) even if trade

schools were provided, at great expense for equipment and maintenance, it would be difficult to reach any large number of individuals through them." The investigation further disclosed that only a small percentage of the manufacturers of New Jersey favored the introduction of part-time day industrial schools, their opposition to this form of instruction being based on the fear that it would tend to disorganize the factories and shops.

In concluding its report, the commission recommended the establishment of a permanent State commission on industrial education, with local boards of trustees, independent of the existing boards of education and appointed by the executive heads of the various municipalities, for the management and control of industrial schools. The draft of a bill providing for a State system of schools under the authority named above was submitted for the consideration of the legislature. Up to January 1, 1911, no action on this proposed bill had been taken by the legislature. By joint resolution No. 7, Acts of 1909, the commission on industrial education was continued for a period of one year, but with the provision that no expense was to be incurred for which the State should be responsible.

MAINE.

The Maine Legislature in 1909 passed a resolution authorizing the State superintendent of public schools to make "a special investigation of the needs of the State in relation to a system of vocational or industrial education, together with an investigation into the methods adopted by other States and countries for meeting similar needs." A committee of six members was invited to cooperate in making the investigation and the report. The members of this committee served without compensation except for actual expenses.

The committee held meetings in various sections of the State and made visits to typical industrial establishments, the effort being made to secure expressions of judgment and advice from all classes of citizens. The report of the committee, submitted in 1910, recites that "the purpose is to give to members of the legislature and to citizens of the State a general survey of industrial education plans as they have thus far been formulated and to present therewith illustrative instances of schools that have been actually established, together with recommendations for the introduction and extension of similar plans in Maine schools." According to the latest available information no legislation has resulted from the work of the committee.

MICHIGAN.

By an act approved June 2, 1909, the Legislature of Michigan empowered the governor of the State to appoint a commission of not

less than five, nor more than seven members, "to be known as the Michigan Commission on Industrial and Agricultural Education." It was specified in the act that the commission members should serve without pay, and should maintain organization until July 1, 1911, on which date their terms of office should expire by limitation unless renewed by subsequent act of the legislature.

The duties imposed on the commission were: (1) To make a careful study of elementary industrial and agricultural education in the State of Michigan, whether under public-school or other auspices; (2) to make a study of the conditions of labor as they affect children between the ages of 14 and 18 years; and (3) to present a report showing these conditions, with recommendations for such a plan of elementary industrial and agricultural training in connection with the public schools of the State as should in their judgment best meet the conditions known to exist. The act required this report to be rendered in triplicate to the governor, the State superintendent of public instruction, and the State commissioner of labor on or before January 1, 1911.

The conclusions and recommendations of the commission were published in December, 1910. These may be summarized as follows:

1. The enactment of a township district law for the entire State, with the provision for at least one high school in each township.

2. The enactment of a law providing that a high school within the meaning of the statute shall consist of four years of work beyond the eighth grade.

3. The introduction into all high schools of the State of courses in agriculture, manual training, and home economics.

4. The general school laws to be so amended that any village or city having a population of 5,000 or more may establish trade departments in connection with the public-school system, and also may provide for continuation schools.

5. The enactment of a law providing for the certification of all teachers of agricultural and industrial subjects.

6. State supervision of all agricultural and industrial courses in the public schools.

7. The enactment of a law granting a limited amount of State aid to trade and continuation schools and to schools which introduce high-school courses in agriculture and home economics.

The following plan for the apportionment of State aid among the different schools was suggested by the commission:

(*a*) The law granting State aid should provide that the total amount of State aid under the law should not exceed, for the first year, $30,000, for the second year, $50,000, nor in any subsequent year $100,000.

(*b*) The apportionment of State aid between courses in agriculture and home economics on the one hand and industrial courses on the other hand should be equal.

(*c*) Schools applying for State aid must be duly certified to the auditor general by the superintendent of public instruction, the order and priority of certification to be determined by statute.

(*d*) Any high school in the State in any township or city of less than 20,000 in population may be certified for State aid for courses in agriculture and home economics to the following amounts, viz, $500 for the first teacher employed and $250 for each additional teacher employed, provided that no school district shall receive an allowance for these courses of more than $1,000 in all.

(*e*) Any city or village having a population of 5,000 or more shall be entitled to State aid for establishment of one or more of these schools, viz, (1) an elementary industrial school, (2) a trade school for boys 16 years or more of age, (3) a trade school for girls 16 years or more of age. Said city may be duly certified to receive through its regular board of education State aid to the amount of $500 for the first instructor and $250 for each additional instructor employed, up to a limit of four instructors in all for these schools or departments.

(*f*) Cities with a population of 20,000 or more may in the same way be certified for continuation schools of trades up to a limit of $1,000 for three teachers employed in said school.

(*g*) Any school drawing State aid under this law should, for the purposes of this law, be under the supervision of the State department of education, and for these purposes an additional deputy superintendent should be provided.

WISCONSIN.

A commission to formulate and report upon plans for the extension of industrial and agricultural training in Wisconsin was provided for in a joint resolution passed by the legislature of that State in 1909. This commission, composed of five members prominent in educational affairs, delegated to one of its number the task of drafting the report on industrial education. In the collection of data for the report this member visited the larger cities of the Eastern States and also spent some months in European countries.

The report of the commission was submitted to the legislature in January, 1911. It contained a comprehensive study of systems of industrial education in use both in this country and abroad, with suggestions as to their application to Wisconsin's needs. In advocating a State system of continuation schools for persons employed in industry the commission expressed the belief that "the industrial educational need of this State is not going to be supplied by the establishment of trade schools here and there in cities which can

afford them; but that a complete system adapted to the whole State, meeting the needs of people in the smallest villages as well as the largest cities, must be installed, or else the problem will not be solved." The commission further stated that "We have not as yet organized our system of trade schools or continuation schools, therefore we must do something to fill the gap, and it will be necessary, your committee believes, to establish evening schools for a while in the State, but only under protest, with the idea of eventually abolishing them for children, as the Germans have done."

The following recommendations were made:

1. That a temporary State advisory board for industrial education be appointed by the governor and that an assistant and other officers, whose duty it shall be to supervise and encourage industrial education, shall be added to the State superintendent's office; said assistant to be appointed by the State superintendent with the approval of the board of industrial education.
2. That there be established in every community, where industrial education is undertaken, local boards of the same general nature as the temporary State advisory board, which board shall have similar control in their localities over industrial education and evening schools.
3. That as soon as school facilities can be provided for children between 14 and 16 years of age already in industry, they be compelled to go to school a specified time each week; that this time shall be expended as far as possible in industrial training; and that the hours of labor for such children shall not exceed eight hours per day for six days of each week, which time shall include the time spent by each student in vocational schools.
4. That after careful investigation by the boards established for this purpose, continuation schools, trade schools, and evening schools shall be gradually established in the State, and that State aid shall be given for these purposes, under strict limitations as to methods and in such a manner that all training given in such schools can be combined into a harmonious and economical system.
5. That the apprentice laws of the State be changed so as to expand them and bring them up to date, in order that the apprenticeship system may be put in close and harmonious relation with the educational system.
6. That the appropriation for the extension division of the university be increased in order that this division may form a flexible element in the gradual development of industrial and commercial education of the State.

Practically all these recommendations were given effect by laws enacted in 1911, as may be seen by reference to Chapter XVI, where the text is given in full.

CHAPTER XIV.

ATTITUDE AND ACTIVITIES OF ORGANIZATIONS.

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ATTITUDE AND ACTIVITIES OF ORGANIZATIONS.

INTRODUCTION.

The widespread interest in industrial education is evidenced by the serious consideration and study given to it by various national organizations standing for many different interests. Among the bodies that have given consideration to the subject are the following: The American Federation of Labor, the National Association of Manufacturers, the National Education Association, the National Society for the Promotion of Industrial Education, the National Society for the Promotion of Engineering Education, the National League for Industrial Education, the Southern Industrial Education Association, the General Federation of Women's Clubs, the American Foundrymen's Association, the National Metal Trades Association, the National Association of Builders, the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, American Home Economics Association, the International Typographical Union, the Young Men's Christian Association, and the Young Women's Christian Association.

From the above list it is seen that industrial education has been the subject of thought and discussion by manufacturers, labor leaders, educators, scientific societies, economists, and social workers.

After a study of the attitude of the various associations of employers toward this subject it was found that a perfectly fair exposition of the employers' position could be presented from the point of view of the National Association of Manufacturers. The attitude of organized labor appears to emanate and radiate from the position assumed by the American Federation of Labor. This organization has made an extended study of the problem and issued a report which states definitely its position and advocacy of industrial education. At least two societies have been organized for the express purpose of studying and advancing the movement for industrial education—the National Society for the Promotion of Industrial Education and the National League for Industrial Education.

The attitude and activities of the four representative bodies above named are presented in this chapter.

AMERICAN FEDERATION OF LABOR.

The American Federation of Labor first appointed a committee on education at its twenty-third annual convention in 1903. This committee, however, considered only the work in manual training and technical education which was to be done by the unions themselves, and concluded that "the subject of manual training and technical education to be given by trade unions is of such a general character that this convention could not very well recommend any plan or policy that would apply equally to all unions, on account of the diversity of conditions and difference in skill required." A committee was appointed in 1904 and one again in 1905, but neither ever reported.

The committee on education of the twenty-sixth convention, 1906, again recommended that the committees already appointed conduct investigations into the subject of apprenticeship, the graduates of the trade schools, manual training, and schools of technology. The recommendation was adopted without discussion. These various resolutions serve to show that the organization was becoming interested in the subject, as it had always been in other phases of education, but the trade-school proposition, with other phases of industrial education, was first brought squarely before the American Federation of Labor at the Norfolk Convention, November, 1907. The secretary of the National Society for the Promotion of Industrial Education addressed the convention on the second day of its session, when a resolution was introduced stating the policy of the federation in the following words :

Whereas an organization has been formed, known as a National Society for the Promotion of Industrial Education, having for its object the raising of the standard of education along industrial lines; and

Whereas some misapprehension exists in many quarters as to the attitude of organized labor upon this subject: Be it, therefore

Resolved, That this, the Twenty-Seventh Annual Convention of the American Federation of Labor, having in mind the experience of many of our national unions with the so-called trade school, which attempted to teach a short cut to trade and which on some occasions was used as a weapon against the trade union movement, do not favor any movement having this ulterior object in view; and be it further

Resolved, That we do indorse any policy, or any society or association, having for its object the raising the standard of industrial education and the teaching of the higher technique of our various industries.

The resolution was referred to the committee on education. It reported that it "decided to record itself in favor of the best opportunities for the most complete industrial and technical education obtainable for prospective applicants for admission into the skilled

crafts of this country, particularly as regards the full possibilities of such crafts, to the end that such applicants be fitted not only for all usual requirements, but also for the highest supervisory duties, responsibilities, and rewards; and your committee recommends that the executive council give this subject its early and deep consideration, examining established and proposed industrial school systems, so that it may be in a position to inform the American Federation of Labor what in the council's opinion would be the wisest course for organized labor to pursue in connection therewith." The report of the committee was adopted.

The executive council proceeded as instructed, securing its information chiefly by correspondence, and in its report to the twenty-eighth annual convention, 1908, reported very briefly on schools recently established, and recommended that all correspondence and material on the subject be turned over to a committee for report and further recommendation.

The committee on education made a report on the portion of the report of the executive council just noted and clearly summed up the situation as viewed by it, concluding with recommendation for a special committee to consider the subject, as follows:

We note with satisfaction the splendid progress accomplished by the executive council along the lines of industrial education, carrying out the instruction of the Norfolk convention. Much data and material have been brought to hand and referred to your committee. But your committee feels that in no sense with the limited time allotted them can they make a complete report on the value of the mass of material referred to them on this subject, and we can best submit our recommendations in the following resolution:

"Whereas industrial education is necessary and inevitable for the progress of an industrial people; and

"Whereas there are two groups with opposite methods, and seeking antagonistic ends, now advocating industrial education in the United States; and

"Whereas one of these groups is largely composed of the nonunion employers of the country who advance in industrial education as a special privilege under conditions that educate the student or apprentice to nonunion sympathies and prepare him as a skilled worker for scab labor and strike-breaking purposes, thus using the children of the workers against the interests of their organized fathers and brothers in the various crafts; and

"Whereas this group also favors the training of the student or apprentice for skill in only one industrial process, thus making the graduate a skilled worker in only a very limited sense and rendering him entirely helpless if lack of employment comes in his single subdivision of a craft; and

"Whereas the other group is composed of great educators, enlightened representatives of organized labor, and persons engaged in genuine social service, who advocate industrial education as a common right, to be open to all children on equal terms, to be provided by general taxation and kept under the control of the whole people,

with a method or system of education that will make the apprentice or graduate a skilled craftsman in all the branches of his trade; and

"Whereas organized labor has the largest personal and the highest public interest in the subject of industrial education, and should enlist its ablest and best men in behalf of the best system, under conditions that will promote the interests of the workers and the general welfare: Now, therefore, be it

"*Resolved*, That the president, in conjunction with the executive council of the American Federation of Labor, be, and is hereby, authorized to appoint a special committee of at least 15, to be composed of a majority of trade union members of this convention, who will serve without compensation and incur no expenses other than necessary and legitimate expenditure within the judgment of the president and executive council, to investigate the methods and means of industrial education in this country and abroad, and to report its findings, conclusions, and recommendations to the next annual meeting of the American Federation of Labor."

The recommendation of the committee was concurred in and the special committee appointed.

The president in his report to the Toronto convention in 1909 clearly stated the position of the federation. He referred to the attempt of the National Association of Manufacturers to give the impression that organized labor is opposed to all industrial education. He asserted that American labor is in favor of true public industrial education, but stated its opposition to narrowly specialized training under control of private interests.

The executive council reported the appointment of the special committee of 15, authorized by the previous convention. This special committee reported to the convention through its chairman that it had held meetings in New York City, Washington, D. C., and Toronto, Canada. It stated its task, in accordance with the terms of the resolution under which it was appointed, to be:

First.—A thorough investigation of the needs of industrial education;

Second.—A statement of the extent to which needs are met by existing institutions; and;

Third.—As a result of such investigations, some definite suggestions for the promotion of industrial education in such manner as might best serve the interests of the whole people.

It voiced the demand for industrial education and noted a return in certain quarters to the apprenticeship system.

In order to bring out practical suggestions toward the solution of the problem, the committee addressed themselves to the following questions:

1. Should trade, vocational, technical, and industrial schools be established as a part of the public-school system?
2. Should private industrial education institutions be tolerated?

3. Under what conditions and terms should industrial schools, either public or private, be countenanced and supported?

4. Under what conditions should semiprivate or semipublic industrial schools, namely, the so-called cooperative industrial schools, be approved or disapproved?

5. Should they be free, supported by the city, county, or State in which they are located?

6. Should they be under the control or partial control of the National Government?

7. And should their instructors or teachers be practical men from the ranks of trade occupations, or should they be men who know nothing of the trade itself except its theoretical side?

8. What should be taught under the head of "industrial education"?—the cultural side, the professional side, the mechanical side, the business side, or all combined?

9. To what extent, if any, should labor headquarters, labor temples, and labor halls be used to favor industrial education?

The committee expressed itself thoroughly opposed to what has come to be known as the "Fitchburg plan." [1] The grounds for this opposition can best be expressed in its own words:

The committee feels that there is justification in condemning any system of public instruction privately controlled or any scheme of private selection of pupils, and calls attention to the introduction of a plan which is being put into operation in several localities and fostered by manufacturers' associations.

It is a limited plan for industrial education, carried on between the high school, which engages a teacher for the purpose; one satisfactory to the manufacturers, and a group of the latter who indenture such boys as they desire to have. The idea is, of course, to give a thorough trade training. But—

(*a*) The manufacturer is not obliged to take any boy, or to keep any boy. On the other hand, the high school is obliged to educate all duly qualified boys, to give them all that the city provides.

Therefore, those who study in the cooperative course do so on sufferance.

(*b*) The people have no hand in this plan. No matter how much a father may desire such training for the boy, the city is helpless to do anything, as under this plan the veto power over the boy's right to public industrial education is in the hands of the manufacturer.

(*c*) The public must be neutral as to trade unionism. Surely it dares not be hostile. But what is there to restrain one or all the cooperating plants from assuming any attitude, however hostile? They have the right to teach and to foster antiunionism with school-apprenticed boys under them.

(*d*) A boy who should talk over or agitate for union principles can be instantly deprived of his educational future under this plan; and if his father should be a known union champion only the good nature of the manufacturer can prevent reprisal in the form of dropping the boy from this course.

(*e*) The teacher can not help siding with the manufacturer; he can not protest, should he so wish, if they import scabs, strike break-

[1] For description, see pp. 187–190.

ers, or any sworn foes of unions. It is not for the school to say who shall be the fellow workmen of these young student apprentices. If he be a man of principles, he could not take the boys out of such a shop, for they are under bond.

(*f*) Finally, with a teacher too soft on the side of the manufacturers we shall see, for the first time in a public-school system, a spirit new in evil power—a class of schoolboys trained under a thoroughly un-American system of private selection of pupils, based on no public or competitive method, unless the manufacturers so permit; a system wholly removed from the salutary supervision of the people; a system which needs no check in prejudicing the favorites of this system against the large excluded class of their school fellows, and later, against their fellow workmen themselves.

Any scheme of education which depends for its carrying out on a private group, subject to no public control, leaves unsolved the fundamental democratic problem of giving the boys of the country an equal opportunity, and the citizens the power to criticize and reform their educational machinery.

The committee also reiterated the opposition of organized labor to any schemes of industrial training, public or private, which do not give thorough training in craftsmanship, but only the superficial training which serves to furnish strike breakers.

The trend toward the introduction of schemes of industrial education and apprenticeships at public, as well as private expense, which pretends to teach trades in periods ranging from four months to four years, and turn out graduates in times of industrial peace who are able to earn only 50 per cent of the established wage in a given trade, and in times of industrial dispute are exploited in the interests of unfair employers, is worthy only of condemnation.

It briefly reviewed the history of the appropriations for the land-grant colleges, and asserted that such schools fail to benefit the large mass of citizens of the States.

It then stated the position of organized labor:

Organized labor's position regarding the injustice of narrow and prescribed training in selected trades, by both private and public instruction, and the flooding of the labor market with half-trained mechanics for the purposes of exploitation, is perfectly tenable, and the well-founded belief in the viciousness of such practices, and consequent condemnation, is well-nigh unassailable.

Organized labor's record for years in regard to better sanitary conditions in factories and workshops, and its continued efforts toward safeguarding women and minors, have been the subject of wide discussion and much helpful legislation.

Its advocacy of free schools, free textbooks, and the raising of compulsory school age have been religiously adhered to, and closely allied to these subjects is that of industrial education, and any serious discussion of the proper kind of vocational training promotes discussion of the former.

There is a strong reaction coming in general methods of education, and that growing feeling, which is gaining rapidly in strength, that the

human element must be recognized, and can not be so disregarded as to make the future workers mere automatic machines.

Experience has shown that manual-training school-teachers without actual trade experience do not and can not successfully solve this great problem, and that progress will necessarily be slow, as new teachers must be provided, a new set of textbooks will have to be written, and the subject taught in a sympathetic and systematic manner.

In the last analysis, it is of greater moment to those engaged in industry whether this question should be discussed freely and fairly, than it is to mere theorists, who advocate industrial education without having any definite plan or purpose (other than a selfish one), in their advocacy of the same, and it is believed that a unification rather than a multiplication of effort is needed in order to help solve this immense problem.

It emphasized its judgment of the importance of the whole problem in the following conclusions:

It is believed that the future welfare of America largely depends on the industrial training of our workers and in protecting them.

The inquiries of the committee seem to indicate that if the American workman is to maintain the high standard of efficiency, the boys and girls of the country must have an opportunity to acquire educated hands and brains, such as may enable them to earn a living in a self-selected vocation, and acquire an intelligent understanding of the duties of good citizenship.

Reference was then made to the present unsatisfactory school situation, where the great majority never complete the grades, because of lack of interest on the part of the pupil, and dissatisfaction on the part of the parent because the schools "do not offer instruction of a more practical character." Emphasis was put on the need of a healthy public sentiment which should hold the trades to be honorable vocations, and eradicate the false ideal of the superiority of clerical occupations.

The committee crystallized its views in the following recommendations:

The importance of this kind of school, for those who have already entered the trades, has been a matter for serious consideration by the committee.

The demand for such instruction is measured by the necessity for training in particular trades and industries, and the chief aim of such instruction should be to present those principles of arts and sciences which bear upon the trades and industries, either directly or indirectly.

The economic need and value of technical training is not to be disregarded, and cognizance should be taken of the fact that throughout the civilized world evening and part-time day technical schools enroll 20 pupils to every one who attends the other types of vocational schools.

And the committee submits for consideration and discussion, to the convention, the proposition that there be established, at public expense, technical schools for the purpose of giving supplemental education to those who have entered the trades as apprentices.

We favor the establishment of schools in connection with the public-school system, at which pupils between the ages of 14 and 16 may be taught the principles of the trades, not necessarily in separate buildings, but in separate schools adapted to this particular education, and by competent and trained teachers.

The course of instruction in such a school should be English, mathematics, physics, chemistry, elementary mechanics, and drawing. The shop instruction for particular trades, and for each trade represented, the drawing, mathematics, mechanics, physical and biological science applicable to the trade, the history of that trade, and a sound system of economics, including and emphasizing the philosophy of collective bargaining. This will serve to prepare the pupil for more advanced subjects, and in addition to disclose his capacity for a specific vocation.

In order to keep such schools in close touch with the trades, there should be local advisory boards, including representatives of the industries, employers, and organized labor.

The committee recommends that any technical education of the workers in trade and industry being a public necessity, it should not be a private but a public function, conducted by the public and the expense involved at public cost.

The committee further recommended the continuance of its life to the convention of 1910; that the United States Department of Commerce and Labor be requested to investigate the subject here and abroad; that the committee cooperate with the Department of Commerce and Labor; and that affiliated organizations of the American Federation of Labor furnish all information possible on the subject.

The report was referred to the committee on education, which concurred in its recommendations, including the continuation of the special committee to the 1910 convention, and further recommended that sufficient copies of the report be printed for distribution to affiliated organizations. The report of the committee was adopted.

At the thirtieth annual convention held in 1911 the committee, authorized by the Denver convention, made no report, but a special committee on industrial education was appointed to review its work. The special committee made the following recommendations which were unanimously adopted by the convention:

Your committee recommends the continued advocacy of labor's bill for vocational education—known as the Dolliver bill—which, as you will recall, provides for educational cooperation between the State and Federal Governments and for State and Federal control and supervision of public industrial education.

It recommends, also, that the special committee appointed by authority of the Denver convention be continued, and that that committee "be urged and authorized to prosecute their investigation, and to lend their every assistance to the accomplishment of the extension and completion of comprehensive industrial education in every field of activity."

NATIONAL ASSOCIATION OF MANUFACTURERS.

The National Association of Manufacturers first officially recognized the question of industrial education in its convention held in 1904, when a committee on industrial education was appointed, with instructions to report to the convention to be held in 1905. Since that time this committee has constituted one of the regular committees of the organization, and has reported annually.

Its reports have served to define the position of the association, which necessarily is concerned in industrial education as a means of national industrial advancement, since its members could not escape a realization of the dearth of skilled mechanics. If the reports of the committee on industrial education may be said to express the attitude of the association, its earliest advocacy of industrial education seems to have been brought about by this realization, together with its hostility to the rules of the trade-unions limiting the number of apprentices, and to the general policy of unionism. This was not only frankly stated in the earlier reports, but was emphasized further by the definite opposition of the committee to the admission into any proposed trade schools, of those already apprenticed, until all applicants not serving apprenticeships had been accommodated. Furthermore, it has consistently maintained that a trade school can turn out a finished workman, without the necessity for a term of apprenticeship. Its attitude on the apprenticeship question has now, however, been materially modified by its advocacy of the cooperative system as noted elsewhere.

At first the association refrained from any specific recommendations as to the methods by which trade schools might be established, except to suggest such schools as proper objects of philanthropy. By 1907, however, it had indirectly assumed the position of favoring schools established and financed by the State, by its approbation of the Wisconsin law governing the establishment of industrial schools, and by instructing the committee to prepare a model bill for presentation to the legislatures of the several States to be presented to the next convention. A year later it acknowledged that philanthropy as a means of meeting the need was a failure and approved the Davis bill then before Congress, provided a change in the wording be made so that it should read manual trades instead of manual arts.

The association, through its committee, can not be said during the years 1905 to 1909 to have placed itself on record as favoring any distinct type of school. At the meeting held in 1908 a supplementary report on the cooperative system of trade training was read. It dealt chiefly with the system then newly inaugurated at the University of Cincinnati in the engineering courses, and not with cooperative schemes as applied to secondary schools. No action was taken on the report at this time, but this system, in its application to secondary

trade training, was to become a part of the practical scheme later advocated by the association. At the convention held in 1909 the supplementary report on this subject referred to the application of the cooperative scheme to secondary training at Fitchburg, Mass., Cincinnati, Ohio, and elsewhere, but again there was no official action on it. At the fifteenth annual convention held in 1910, however, the committee on industrial education took a definite stand. It admitted the need for industrial education, which, indeed, it had admitted practically from the beginning, and went into considerable detail concerning methods of trade training and objections to industrial education. Since it is not only the most recent, but the most complete report of the committee on this subject, and being adopted by the association, it may be taken as an expression of the present attitude of the organization:

To the board of directors and members, National Association of Manufacturers:

Your committee on industrial education begs to submit herewith the following report:

The National Association of Manufacturers, during several years past, has done much to bring the importance of industrial education to the front.

Great progress has been made throughout the country in approaching general agreement on the following points:

1. That the interests of manufacturing industry require a new education for boys who are to work with tools and machines.

2. That this industrial education must consist of skill and schooling and that these two parts are of equal importance—that they must be organically combined—and that each will coordinate and supplement the other.

3. That real skill and suitable schooling can not usually be given in the ordinary public school by the average schoolmaster.

4. That the average manufacturing shop or factory is not likely to organize private trade school departments in their works that will give the best results in both skill and schooling.

5. That real trade schools are feasible and practicable where a higher, practical, efficient shop skill can be secured than has ever been known under the ordinary apprenticeships, and that this is possible even when one-half of the apprentice's time is devoted to schooling adapted to the life of the pupil.

6. That such half-time trade schools can be so organized and conducted that a superior high skill and a broader shop experience can be secured than the average manufacturing shop can give in its specialized modern factory, because there the object is to make money and not to make skilled, intelligent, trained workmen.

7. That such a real trade school must have well-equipped, productive shops, where pupils are taught the best methods of rapid, high-grade production by skilled working mechanics.

8. That such trade schools need not produce anything but useful, high-grade products, with a very small percentage of spoiled work or damage to tools and equipment—a smaller percentage of loss than occurs in the average shop.

9. That where such a trade school can be established, with modern buildings and equipment and a moderate working capital, well managed, it will not only be an efficient educational institution, covering the high-school period, but it will be productive and largely self-supporting.

10. That such a real trade school can be maintained with a course corresponding to the high-school course, persistently aiming to turn out working mechanics with superior mechanical skill and wide shop experience plus good mental training. In this way a class of skilled American mechanics will be produced meriting higher wages than the average mechanic, and the greatest good will come to wholesome organized labor and to individuals through individual merit.

It will be seen by these statements that the association has now adopted as one of its distinct policies the advocacy of a trade school in which the time of the pupil is spent half in shop practice in a school shop and half in theoretical and cultural instruction. It reiterates its belief that such a school can turn out a practical workman without further apprenticeship, and advocates the commercial sale of the school product.

It then takes up certain objections urged against trade schools.

It is believed after 30 years of study and experience with industrial education that the greatest obstacles to progress have been:

(*a*) A misunderstanding on the part of organized labor as to just what should be aimed for in industrial education and as to what a real trade school ought to and can accomplish.

(*b*) A false claim by educators and others (who do not know) has been made that a superior skilled workman could not be produced in a trade school.

(*c*) That a trade school could not be productive on account of the inexperience of the pupils, and must not be commercial on account of the probable objection on the part of competitors who are producing similar products:

(*d*) Consequently, the notion that pupils in a trade school must be fed on the milk of exercises through "instruction versus construction." This weakness has thus far held manual training back and down for years past, and this fallacy must be overcome before manual training can be vitalized and expanded into its full usefulness as a primary element in industrial education.

(*e*) Another objection made to the success of the trade school by some educators has been that the best boy talent can not be secured for the industrial school, but that such boys will be influenced by the inducement usually presented by the teacher (and frequently by the parents) to "take a broad course" and fit for college if they wish to make the most of themselves in the world. This argument is met by the following reply, viz:

First. We never can tell what will prove to be the best boy talent. While we appreciate the high value to be placed upon good parentage, there is often such great disadvantage following from indulgence and luxurious ease that the boy talent from the harder walks of life proves to be the best stuff for efficiency in the industries and the most desirable for citizenship.

Second. We are just as much gratified to take a boy farther down the scale of advantage and raise his efficiency a certain number of degrees as to do the same thing for any other boy believed to start farther up the scale. It is the amount of progress we make through industrial education that counts, and not so much where we start.

(*f*) Another objection offered from the same source is, that however desirable it may be to develop industrial efficiency in the boy by a skilled trade, the boy, his parents, and the public are all bound to secure cultural education so far as possible. The reply to this is:

The advocates of industrial education through trade schools and otherwise do not ignore or depreciate the value of mental discipline and all the refinements of life that come under the name of culture.

Mental discipline and wholesome culture—these stand high on our program, and fill one-half of the half-time plan. But we believe that for a very large group of boys more and better culture can be secured through the industrial school than the average high school and college has hitherto given the average boy.

In the proposed trade school one-half of the time is devoted to mental culture under conditions and circumstances that are likely to secure the very best educational results.

Instead of the attacks on organized labor of previous reports, it now is found speaking in these words:

To return for a moment to these obstacles: Your committee believes that some of the objections to industrial education, so called, have been reasonable, and that if industrial and trade education is put upon a proper and sound and high basis, all intelligent thought, including that of rightly organized labor, will approve, simply because such industrial education will advance every interest involved in the life of the workingman and even in a better life of the organization itself.

We intend to take boys at 14 years of age and give them four years of training corresponding to the high-school period—half skilled work and half suitable schooling.

We propose to take any boy who wants to be a superior, skilled workman and give him this thorough training in skill and schooling.

We propose to make the boy a skilled workman, superior to his father in efficiency and shop experience, and we propose also to give him, during the time he is learning a trade, more and better schooling than his father was able to get, and consequently the boy can go directly from the trade school to a good wage-earning position in any shop simply upon his own merit.

Upon these conditions, which work to exalt the condition of labor and to elevate the work and raise wages, can anyone object to industrial education by trade schools? If there is such objection, it should be ignored, and, if necessary, resisted by every believer in American freedom and universal education.

It emphasized the necessity of what it designated as practical foundation and the "shop spirit."

Nothing is so essential in a trade school as a prevailing shop spirit. Mechanical skill and shop experience must be fundamental. The

shop spirit must underlie all and be the basis of all, even regardless at first of mental discipline and all that goes under the name of education and culture. We must see to it that all emanates and radiates from the shop.

A trade school can not be too practical. The more practical, productive, and commercial, the more possible is mechanical efficiency as well as mental discipline and general culture.

The committee then proceeded to the consideration of other practical phases of the problem.

The time has arrived when all discussion regarding the importance of industrial education should give place to the establishment of schools and other methods of securing such industrial training. The question is not "Shall we have industrial education in America?" but "What kind shall it be?" There has come to be general agreement now that industrial education for the mechanic means trade education.

First.—What kind of trade schools should we establish to the end that we may meet the more and more exacting demands for higher mechanical skill and industrial mental discipline? And shall the trade school be productive or consist of worthless exercises on material to be thrown away when completed? This problem has already been considered to some extent in the foregoing remarks.

But this is not our only problem in trade education. Some of the others are as follows:

Second.—What shall we do to vitalize and enrich the training of apprentices in shops of all kinds as they now exist throughout the country?

Third.—Besides the half-time regular course for pupils, already considered above, what supplementary training shall the trade school provide for those apprentices and workmen who are already in the shops and factories?

(*a*) Evening schools may be established both for schooling in all common branches and for special skill and shop practice in various branches of mechanical trades.

(*b*) Half-day schooling each week may be provided for apprentices and men from the various shops where the proprietor is willing to allow wages to continue while the apprentice devotes the half day per week in school.

(*c*) Part-time schools may be provided where a double set of apprentices are employed, making a half-time system; or a one-third-time system where three sets of apprentices are employed, so that each apprentice can have one-half or one-third of his time devoted to schooling.

In all these extension schools, whether one-half per week or part-time plan with two or more sets of apprentices, the wages earned would admit of supplying industrial education to many who could not afford to take the regular trade-school course without earning wages meanwhile. All who are able to take the full course would, however, command higher wages at the end of the course.

It will be seen that this constitutes a definite approval of the cooperative system as a part of the public-school system.

It proceeded even further, and recommended schools for girls, with the twofold aim of training for home duties and for industrial life, and it went into much detail on this subject, especially in regard to training for home duties.

Your committee therefore conceives that the desirable consideration in regard to girls is the promotion of independent industrial schools so planned that the duplex needs may be secured, and that special effort should be made to advance the science and the skill in cooking and housekeeping.

First.—By the establishment of day industrial schools for girls whose main need is to prepare for industrial wage-earning pursuits. During this preparation, however, for a trade considerable domestic training is a necessary part of the course.

Second.—Courses for girls who wish to take as a vocation complete and thorough training in any or all branches of domestic science, housekeeping, and management of the home in all its branches.

Third.—And possibly part-time schools for girls who are already engaged in wage-earning pursuits in the less skilled occupations.

Fourth.—Evening classes for women who are employed in the trades who wish to advance themselves, and also for trade workers who wish to prepare for teaching in industrial schools.

Fifth.—Evening classes for women and girls who wish to become better housekeepers.

All the departments above mentioned can naturally be organized along the same lines as the boys' school—i. e., about the same relation of skilled work and of schooling, and, therefore, about the same sort of rooms for each, except the department for "complete home training." This department should be independent of all other vocational departments, and be very complete, thorough, and hence attractive. The number of pupils in the department might be smaller than the other trade classes—say not over 30 pupils for the first class—because this is to demonstrate the most important and most promising field in industrial education.

In making the foregoing statements your committee has given consideration to the fact that several attempts made to establish schools for women and girls on somewhat similar lines, through private initiative, have been declared failures by some writers. We should, however, spare no effort to maintain the integrity of the home through the development of a right public sentiment and through a properly developed system of industrial education for the girls who are to be the wives and mothers of the coming generation.

A supplementary report on the progress of the cooperative plan, with special reference to the Cincinnati Continuation School, the Fitchburg plan, and the University of Pittsburg, was made. Both reports were adopted and ordered printed and distributed to every school superintendent and high-school principal in the United States.

Thus the present position of the manufacturers' association on the subject of industrial education is clearly shown by the report quoted. It has assumed a position of advocacy of several types of trade schools at public expense.

First.—Regular trade schools for boys, where all instruction, shop as well as academic, takes place in the school; such schools to produce finished workmen and to make a commercial product.

Second.—Part-time schools for those boys already apprenticed on the cooperative plan.

Third.—Evening schools for boys and men.

Fourth.—Schools for girls and women of the same general form indicated for boys, but with much emphasis upon instruction in home economics.

NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.

[An abridgment of a statement furnished by the secretary of the society.]

The purpose of this organization is, as its name implies, the promotion and advancement of industrial education. The society was organized in November, 1906, in a general meeting at Cooper Union, New York City, at which some 250 persons representing important educational institutions, manufacturing concerns, and labor organizations of the entire eastern half of the country were present.

The organization of the society at present takes the form of a national society with State branches already organized in 10 States and State committees in 16 States. The requirements for a branch are a membership of 50, and each branch has a constitution and official staff of its own. Membership in the State branch includes membership in the national organization, and vice versa. The desirability of having local organizations of this character is of paramount importance in the matter of organizing public opinion, of studying specific commercial and educational situations, and of distributing propaganda and bringing influence to bear upon legislative bodies for the passage of appropriate laws.

There are certain general economic conditions which point to the fact that more specific attention to industrial education is desirable on the part of the American people. If the United States is to maintain the high position as a commercial nation which abundant natural resources, high inventive ingenuity, and conspicuous ability in business organizations have given it, this Nation must turn its attention to the education of its workmen up to the production of superior goods bearing the mark of intelligence and careful training.

In regard to method, the present is a time for experimentation and not a time for dogmatization, while every sincere attempt to get results is worthy of equally serious consideration. The national society does not foster any special kind of school nor lean to any particular form of industrial education. It rather stands as an investigating and correlating agency which hopes to disseminate a knowledge of various methods of instruction and forms of organization by rational criticism and comparison.

A most striking feature of the field of industrial education is the fact that there are many varied and, at times, conflicting interests to be consulted. On the one hand organized labor has a very decided interest in this subject. Nothing can be nearer to the workman than the means which are afforded him for preparing himself to be an efficient economic unit. On the other hand, the manufacturer has a point of view which has been considered on many occasions as something contrary to that of the labor interests. There is a third class of persons interested in this subject, namely, the professional educators, who are a little "caked in custom" and at times not so practical as could be desired. Recognizing these various interests to be taken into account and the necessity for harmonious cooperation, the founders of the National Society for the Promotion of Industrial Education at the outset endeavored to secure representation for all. The society started with no self-interested propaganda to foster, with no "axes to grind." It worked then and is working now on the assumption that in almost every controversy in which men are lined up in opposing camps there is a great deal of room for common agreement which is often largely obscured by partisanship and false issues. Also that there is a great deal of partial truth in the predilections of each party to the difference. The national society aims to be the common meeting ground of many interests, some in harmony, some in conflict. Its officers and board of managers contain prominent manufacturers and prominent labor men, private philanthropists, welfare engineers, and practical school administrators. Men of each and all of these types have been prominent in the counsels of the society from its inception and have taken part in its annual meetings, speaking from the same platforms and addressing the same audiences. Its policy has been open-minded and impartial to the end that any good thing in the field of industrial education might be given a hearing and that any pernicious thing might be aired and properly criticized. The service that the organization can thus perform in securing a fair and unbiased discussion of mooted questions is the aim that has been most highly cherished and most consistently followed.

The influence of the society has been felt mainly through the deliberations of its members and others at its conventions held annually, through the regular bulletins published by the society, and through the distribution of other publications relating to industrial education.

NATIONAL LEAGUE FOR INDUSTRIAL EDUCATION.

An organization somewhat similar in purpose but which restricts its activities to a narrower field is the National League for Industrial Education. This body was established in 1909 for the specific pur-

pose of promoting the enactment by Congress of provision for national cooperation with the various States in matters relating to vocational education. The officers of the league are a president, vice president, secretary and treasurer. Committees to cooperate with the national organization have been formed in a number of States. The league's policy has been widely indorsed and its advocacy of vocational training has done much to focus public attention on the subject. It seeks to advance the cause of vocational education throughout the country by assisting to obtain the wisest use of the national, State, and local funds that may be provided for this purpose. Representatives of the league appeared before the Committee on Agriculture and Forestry of the United States Senate during the sessions of the Sixty-first Congress in advocacy of a measure then pending, popularly known as the Davis-Dolliver bill, which provided for national cooperation with the States in encouraging instruction in agriculture, the trades and industries, and home economics in secondary schools, and in preparing teachers for those vocational subjects in State normal schools.

CHAPTER XV.

VOCATIONAL GUIDANCE.

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INTRODUCTION.

Vocational guidance as a branch of the public educational system is a recent development, but one which has roused strong and widespread interest. The national conference on vocational guidance, held in Boston on November 15 and 16, 1910, was a good evidence of the extent of this interest. It was attended by delegates from 35 cities, and was notable for the enthusiasm displayed by the participants.

Vocational guidance does not mean selecting a pursuit for a child nor finding a place for him. It means rather leading him and his parents to consider the matter themselves, to study the child's tastes and possibilities, to decide for what he is best fitted, and to take definite steps toward securing for him the necessary preparation or training.

Such work naturally develops along several lines. It is necessary to work directly upon parents and children to rouse their interest and keep the children from drifting aimlessly into the first occupation they find upon leaving school. Then, that they may have a basis for choice, it is necessary to present in accessible and easily comprehended form information concerning the industrial openings of a given city, the opportunities each presents, and the demands it makes. Further information is necessary as to how and where the proper training for entering these may be secured. Personal consultations with children and young people to aid them in making a choice are essential, and usually an effort is made to follow the child after the decision has been reached and the work begun, to see that he is really fitted for his position, to encourage him to get further training, and to aid in every way in making his employment a real vocation in which and through which he lives, instead of a mere job by which he gets his living. Securing work may be and, in fact, usually is carried on in connection with vocational guidance, but it is in itself only a limited part of the field covered. The scope of the work is partially indicated by the insistence at the conference already referred to upon the fact that "one large aim in vocational guidance is to develop the methods and material by which the public schools may help fit their individual graduates for the work they are likely to do, and in this effort to use

all the spiritual, economic, educational, and other agencies which may cooperate to bring about the most complete information and the best suggestions."

Movements to promote vocational guidance have been undertaken in New York, Boston, Chicago, Cleveland, Philadelphia, Pittsburg, St. Louis, and several other cities. In some cities, as New York, this work developed directly from the effort to place pupils who were ready to leave or obliged to leave the public schools. In others, as Boston, the features of guidance and counsel have from the first been prominent. The work in these two cities will be described at some length, as the newness of the subject and the present great interest in it seem to justify considerable detail.

VOCATIONAL GUIDANCE IN NEW YORK CITY.

As already stated, in New York this work began in an attempt to place pupils, from which effort other features of vocational guidance have developed. The High School Teachers' Association, through its students' aid committee, has taken the lead, its work in this direction being the outgrowth of the efforts of one teacher to help his students in choosing and securing work suited to their abilities and offering some prospects for the future. By 1908 in each day and evening high school there was a teacher or a committee of teachers to help students not only in deciding what vocation to choose, but in learning how to enter it. This work was purely voluntary on the part of the teachers and was carried on in addition to their regular duties. At this time the students' aid committee stated its objects as follows:

In order that local committees and the teachers of the several schools may be better prepared to help pupils who leave school to fit themselves to their environment, the general committee has planned to collect and make available information regarding—

(1) The necessary and prescribed qualifications for entering the skilled trades and learned professions in this city.

(2) The opportunities which are furnished to the young people of this city for acquiring these necessary qualifications, the time usually required, and the expense to the individual of qualifying himself.

(3) The restrictions which are placed by labor unions and professional bodies upon candidates who desire to enter the several skilled trades or professions.

(4) The average remuneration and the relative permanency of employment which a properly qualified person of either sex may expect in each of the skilled trades, the learned professions, and the commercial pursuits in which young people are usually employed.

In order to furnish this information in convenient form, the committee undertook the preparation of a series of vocation leaflets, of which a dozen or more have appeared, with such titles as "Choosing

a Career," of which there are two issues, one for boys and one for girls; "Openings for Boys in Machine Shops," and "The Vocational Adjustment of the Children of the Public Schools." These pamphlets are definite and practical. The two on choosing a career contain, in addition to concise information respecting the various pursuits, lists of books, reports, and magazine articles dealing with the different occupations, and lists of institutions giving special training to boys, to girls, or to both sexes, their location, requirements for entrance, etc.

These pamphlets are utilized throughout the high school course in directing the students' attention to the importance of choosing a vocation and preparing for it. From the beginning of the course every effort is made to rouse the students' interest in this matter. In four of the high schools the pupils are definitely required to prepare regular plans for their future careers, including a study of their own capacities. In others, while not so definitely required, this is strongly urged. One of the plans outlined for such work is as follows:

SUGGESTIONS.

1. Let the student select an occupation, find some acquaintance engaged in that work, secure an interview, and write out the results of the interview as if for a newspaper. It will add to the interest if several members of the class have the same topic.
2. Let the student select an occupation for himself and plan for himself a career.
3. Let suitable questions for the debating society be so framed that pupils will discuss the opportunities in one line of work as against the opportunities in another; the requirements for success in one line, as against the requirements in another; the rewards of a profession as against the possible returns from a trade or a business.
4. Let the pupils select a line of work in which they are interested and write a review of one of the books of reference dealing with that occupation.
5. Let the student select some particular line in which he may be interested, and write an answer to some newspaper advertisement for help in that line.

A PLAN FOR A CAREER.

In writing a plan for a career a student should set forth:

I. (*a*) His preferences; (*b*) the expressed wishes of his parents and friends in regard to his future.

II. (*a*) His own reasons for his choice; (*b*) reasons in favor of or against his choice which were gleaned from books and magazine articles; (*c*) arguments in favor of or against his choice which were advanced by parents and friends who were consulted.

III. His personal characteristics by the aid of which he hopes to win success in his chosen vocation.

IV. The legal requirements for admission to the practice of the chosen trade or profession.

V. The schools to be attended to meet these requirements and the estimated time and expense involved in preparation.

VI. The possible rewards as stated in the authorities which were consulted.[1]

A strong effort is made to counteract the restlessness and impatience for immediate gains which frequently prompt young people to quit school and enter some "no-thoroughfare" occupation, even when necessity does not compel such a move. Lectures, personal conferences, and other devices are used for this purpose. As one means to this end, tables have been prepared for distribution throughout the elementary schools showing the money value of a high-school and of a college education, as compared with an elementary education. The average earnings of the unskilled laborer are compared with those of the skilled workman and of the professional and business man. Similar comparisons are made for girls. A calculation is made in each case of the sum which, invested in an annuity, would produce this annual difference in earnings, and due emphasis is placed on the fact that this sum represents the cash value of the additional education and training the skilled worker has secured.

The practical manner in which this material is presented is shown by the following quotation from Choosing a Career [2] for girls:

A young woman who leaves school without any special training can not earn much more than the cost of living for the first few years. In estimating the cost of a special education the student must consider the time required, her living expenses during that time, the cost of tuition, and the necessary incidental expenses. A study of the catalogues of the special schools will enable the student to estimate the cost of a special education.

A few examples are given herewith to indicate how students may estimate the value of an education.

I. The average annual earnings of women over 16 years of age in the shirt factories of New York is $327; the average earnings of over 300 stenographers employed in the several departments of the city governments of which the pay rolls were examined was $954. These women secured their appointments because of their special training. Their income from their work is over $600 a year more than is the income of the factory women referred to. At the age of 25, a woman can also secure such an annual income for life by a cash payment of $12,000 to a life insurance company. This means that a thorough training in English, stenography and typewriting is worth as much in this market as the annual income of $12,000.

II. The average annual earnings of 401 nurses in the city service is $760. The average annual earnings of over 12,000 women making women's clothing, according to the Census Bureau, is $398.

The four years spent by a girl in high school and the two years in a nurses' training school enables her to earn $362 a year more than the sewing women earn. The sewing woman could increase her annual

[1] From Report of the Committee on School Incentives of the Brooklyn Teachers' Association, by E. W. Weaver, Arthur L. James, and A. Broderick Cohen, Boys' High School.

[2] Choosing a Career, a circular of information for girls, published by the Students' Aid Committee of the High School Teachers' Association, of New York City, 1909.

income by $362, if she would buy an annuity in a life insurance company which would bring her $362 a year. This annuity would cost her over $7,000 in cash. The special training of the nurse girl must be worth this $7,000.

A considerable work is done in placing students who are ready or obliged to leave school, although both teachers and committee look upon this as a somewhat subsidiary branch of the work. It is, they say, "but a comparatively small number who need help of this kind. For the larger number it is not so much that they need help in securing employment as that they need advice in wisely selecting their work and oversight in working out their vocational aims." The purpose is to keep in close touch with the students who are placed, as well as with those who are advised, through the period of adjustment to their work, to counsel and help in case of difficulty, to keep the student informed of opportunities for increasing his efficiency or adding to his educational or vocational equipment, and to incite him to avail himself of such opportunities.

One of the most striking features of the work is the way in which, in the execution of this purpose, the actual business, trade, and professional life of New York is utilized as a training school. Ever since the work began employers applying for workers have been investigated and the results of the investigation carefully recorded. Consequently the counselors have at their command an extensive knowledge of employers, the kind of help they wish, and the opportunities they offer. The students sent to take positions have been so well chosen and so carefully followed up that it is said that the employer who has once tried one always comes back for more, and as a result the counselors have no difficulty in securing a suitable position for any pupil they wish to place. If the pupil can remain in school for the proper preliminary training, he can be put at once into a position where he can advance steadily in his chosen career. But if a student is obliged to begin work with inadequate preparation or no preparation for the vocation which after due consultation he has decided upon, the counselor may arrange to secure for him three or four successive positions, each of which will furnish a part of the training needed for the desired career. Each is held until its contribution toward the necessary training has been mastered, and as by that time the employee is an older, more experienced, and more valuable worker than when he entered, the employer has no ground of complaint if he gives up this position to take something better, i. e., something which will supply another part of the well-rounded training he needs. Meanwhile the counselor sees that by attendance at evening schools the academic part of his training is secured. Thus a boy who is forced to leave school at 14 or 16 may, through this process of guidance, find himself at maturity with a fair English education, an adequate knowledge of the theory of his chosen vocation, and

a more complete and practical knowledge of its actual processes than he would have been likely to obtain in even the best industrial or technical schools. Meanwhile he has been self-supporting from the first, a considerable part of his trade, business, or scientific training has been a contribution to the industries or arts or professions of the city instead of a burden upon the taxpayer, and he has had a very practical demonstration of the art of finding and profiting by existing opportunities in a situation which at first thought seems to offer none. Those in charge of the vocation work feel that the utilization of the city's resources could be carried much further than is now done. The following quotation, condensed from a report of the chairman of the students' aid committee, summarizes the way in which it is hoped to make schools and employers cooperate:

The employers of this rapidly growing city need all the young people who go out from the schools. In working out a plan to enable deserving young people to make immediate connection with suitable, profitable, and promising employments, the schools will be able to save for education the maximum amount of the child's time, to minimize to the students the possibilities of misfits, and to reduce to the employers the loss of time which results from the employment of incompetents for probationary periods. By knowing into what employments their students are to go, the schools will be able to supplement the general education of the young with instruction in the proper performance of the specific tasks to which they may be assigned, and to direct them to the places where they will find those evening courses which are most likely to prepare them for success in their assigned work. The general adoption of such a plan would bring about the organization of educational forces, the training shops of factories, the offices of commercial houses of the city into a vocational university of the highest type without materially increasing the present outlay for education.

As has been mentioned, this work has been carried on by many volunteer workers and by voluntary contributions from interested persons. By 1910 it was felt that it had sufficiently proved its usefulness to justify asking public support, and in its report for that year the students' aid committee urged the formation of a central vocational bureau to take general charge and oversight. This has not yet been established, but an appropriation of $250 was granted each high school for expenses connected with the work. The plan outlined by the committee is here given in full, as showing what it is felt should be the scope of such a bureau:

A CENTRAL VOCATIONAL BUREAU.

I. MANAGEMENT.

A. By an executive committee composed of representatives of associations of employers, labor unions, educational, social, and church workers, or of contributors.

B. By the school authorities under the direction of the superintendent of schools.

II. FUNCTIONS.

A. To offer advice and direction to young people of exceptional abilities who can not receive the necessary assistance from the vocational teachers of their respective schools.

B. To serve as a means of communication between employers and the employment agencies or vocation teachers of the several schools and colleges from which students go out to work.

C. To collect information in regard to the opportunities for workers of ordinary ability and others of exceptional training; information concerning the personal and educational qualifications required for admission into different lines of work, and concerning the tests of efficiency which are set for promotion into the different grades of the same lines of work; and information regarding legal enactments and labor-union restrictions, this information to be gathered from:

1. Associations of employers.
2. Individual employers.
3. Statistical publications and Government reports.
4. Social workers.
5. Vocational records of workers of known capacities.

D. To make available through special publications, lectures, pamphlets, and conferences, for the use of students who are to choose a vocation and also for parents and social workers, general information in regard to the opportunities which are offered in the city, and to supply committees on courses of study or on syllabi of instruction with material which will enable them to increase the vocational content of the teaching material in the several subjects of study; and to supply the employment agencies of the several schools with specific and confidential information in regard to the terms and conditions of work with particular employers.

E. To keep a registry of students of the evening, trade, and continuation schools who are prepared because of the completion of the prescribed courses of study for employment in higher forms of service than those in which they are engaged.

F. To assist students of high capacity to complete advanced courses of study:

1. By means of scholarships.
2. Through part-time employment.
3. Through vacation employment.

The work of vocational guidance has been much more developed in the high schools than elsewhere, but it is not confined to them. In Brooklyn a number of grade teachers are counseling and following up in precisely the same manner the pupils who must leave before even entering a high school. This work is so entirely individual, however, that it is difficult to say how extensive it is.

In 1910 one of the district superintendents, on the lower east side of New York, employed a young woman who devotes all her time to finding positions suitable for untrained boys and girls who must leave school at 14. When a child who has fulfilled the school requirements says that he must go to work, he is sent to this agent who, by personal interviews with him and consultation with his teacher, tries to learn

his tastes, ambitions, and capacity, and to secure for him a place adapted to his abilities and needs. The agent also visits employers, inspects the conditions under which children would have to work, learns the opportunities for advancement, considers the influence of the foreman or employer with whom a child would come in contact, etc. Unless the result of her investigations is satisfactory children are not sent.

Children after being placed are expected to keep in touch with the agent by means of evening conferences. If the work proves unsatisfactory, efforts are made to remove the difficulties, or, if necessary, to secure another position for the child.

Within the present year another line of work has been taken up. In February, 1911, a joint committee of the Junior League and of the Public Education Association of New York City was formed to consider the subject of vocational guidance. The understanding was that a preliminary survey should be undertaken to find out—

What is the meaning of the term "vocational guidance," what is its true significance as measured in terms of its origin, what its methods and its results are, and lastly, in case the movement appeared to grow out of a real need, to formulate a plan for vocational guidance for the elementary schools of New York City.

The execution of these purposes naturally involves several different lines of research, of which the most interesting is that into existing industrial conditions among workers from 14 to 16 years old. Whether vocational guidance is needed in the elementary schools, and, if so, what kind should be provided, naturally depends very much upon the conditions encountered by the children who go out from these schools into the industrial world. Since all young workers can not be studied in the time assigned, the investigation is limited to those under 16 as being the most immature and helpless, and also as being the group whose members, according to popular opinion, fail most frequently as workers.

But the conditions they must face vary widely from one district to another of New York, and the limitations of time made it impossible to study the whole city. Also the number of children leaving the elementary schools each year to begin work is far too great to be handled by such a body. Consequently, after some preliminary survey, the committee has tentatively recommended an investigation which should extend over one year and should be confined to the territory covered by two schools, one for boys and one for girls. Within these two districts an intensive study should be made of the children going to work during the year covered, and concurrently of all who have gone to work during the three preceding years. The primary aim of this part of the investigation would be to determine whether children have to go to work on account of economic pressure, and whether, when they do,

they are able to relieve this economic pressure by the kind of work they can do. In connection with these two points, however, a large body of facts would be secured about other motives for going to work, how far the work entered upon might be related to any previous training the child has had, the attitude of the child, its family, and its employer toward its employment, the conditions under which the work is carried on, wages received and disposition made of them, hours of labor and steadiness of work, opportunities for advancement, methods of finding work, changes from one employment to another and reasons therefor, etc. In fact, the investigation contemplates the acquisition of a mass of illuminative data covering the whole subject of why the children in the given district go to work, their industrial experiences, and the effect of their employment upon themselves, their families, and the industries entered.

In connection with this work the committee hopes to carry on a study of the social forces in the two selected school districts. The purpose of this part of the investigation, it is stated, is to bring to light—

Facts in regard to living conditions, congestion of population, child labor, factory laws, etc., which it is necessary for the school to know both for the sake of the children and for its own sake. Vocational guidance should not only help the school to prepare the children for the world; it should also help the school to prepare the world for the children.

As additional lines of activity the committee recommends the study of vocational guidance in other cities and active cooperation with other social agencies such as trade schools, trade-investigation committees, child-labor committees, etc., dealing with children from 14 to 16 years old.

It will be seen that the committee has laid out a tolerably comprehensive field of work, of which, according to its own statement, the most important feature is the intensive study of the boys and girls who are going and have gone to work from the selected schools within the given age limits. On the basis of the information obtained through this inquiry it is felt that practical conclusions can be reached as to the kind of guidance and training needed by the children in school both at this age and before they reach it. As yet the investigation has not reached a point at which conclusions can be drawn as to its probable results.

THE BOSTON PLAN.

The leading organization in Boston for vocational guidance is the Vocation Bureau, but either affiliated or working in the closest harmony with it are four other organizations—the committee on vocational direction of the Boston School Board, the Boston Home and

School Association, the Girls Trade Education League, and the Women's Municipal League.

Of these the committee on vocational direction was formed expressly that in cooperation with the Vocation Bureau it might begin the work of guidance within the schools, before the pupils leave even the grammar grades. The other three are independent organizations which carry on specific work along the lines of vocational guidance as only one among varied activities.

The Vocation Bureau was the pioneer in the field and forms a kind of inspirational center for the later comers. During the last year the three independent organizations sent representatives, by invitation, to sit with the executive board of the Vocation Bureau, that the plans, both of the bureau and the other bodies, might be discussed and carried out cooperatively and that all might be kept informed of the progress of each. It is likely that during the coming year a plan of even closer cooperation will be worked out. It is also likely that two at least, and possibly all, of the other bodies will remove their offices for vocation service so as to make a continuous suite of offices in connection with the Vocation Bureau. Owing to this close cooperation of all interested there has been very little, if any, duplication of effort and the field has been covered with unusual thoroughness.

THE VOCATION BUREAU.

The Vocation Bureau is an extension of the work of the late Prof. Frank Parsons, who, as educational director of the Civic Service House, organized in 1907 a bureau for the purpose of advising young men in their choice of a vocation. The present bureau, organized June 19, 1909, represents a cooperative effort on the part of public-spirited men and women in the fields of labor, education, commerce, manufactures, and social work, to organize and put into operation a comprehensive plan of vocational advice and assistance for the children and young people of Boston. Its work is carried on by a director and an executive board of thirteen members; there is no fee nor charge of any kind for its services.

The organizers of the bureau believe that proper guidance at the critical period of adolescence will enable beginners to find themselves early and to make good in the work they are doing, and will, moreover, stimulate them to fit themselves for advancement. In return for this increased interest in their pursuit, manufacturers and business men are asked to cooperate in securing for their young employees the largest opportunities for progress in the work assigned them.

The bureau does not prescribe vocations, nor is it conducted as an employment office. Its chief service is in bringing together the best occupational information and in devising the best methods of applying such information in assisting the child and its parents to make an intelligent choice of a career. At the invitation of the Boston School

Board the bureau is cooperating with the schools in outlining methods of helping pupils choose their life work and prepare for it. It is also conducting a training school for teachers and school officials who have been appointed as vocational counselors by the school department.

The activities of the Vocation Bureau fall into four general groups:[1]

1. The maintenance of an office, centrally located, for the collection and study of information concerning the various occupations of the community. When secured, this information is classified and made public in such a way as to help young people, teachers, and parents to understand what the occupations hold out, their advantages and disadvantages, and the conditions for efficiency and success in each.

2. To make clear the need of training and educational equipment for the desirable occupations, and by advice and cooperation to prolong the school period of young people, whether by day, evening, or part-time courses, and also to secure other educational opportunities when needed.

3. To organize personal vocational counseling both for those in school and for those already at work, in order to enable them to plan intelligently for their educational and vocational progress.

4. To furnish opportunities for consultation to people of all ages, who have personal problems concerning the trades, the professions, and academic or industrial pursuits.

To show the extent of the bureau's work and the methods it pursues, these groups of activities will be taken up in order.

The first centers about the acquisition and use of the material on which counsel is based, to secure which the bureau has undertaken the investigation of occupations open to boys and young men. Professions, trades, and different kinds of business are included. There is no bias in the bureau's plan in favor of industrial over non-industrial pursuits, all vocations being given equal attention in the collection and presentation of facts relating thereto, but the trades and manual occupations come in for a considerable share of study.

To make these researches the bureau employs two expert investigators, who are expected to learn what an occupation is, its conditions and openings, what it demands of a boy, what it offers in pay and advancement, what opportunities are open for securing the specific training it requires, and what the general conditions of employment are as regards health and effect upon the life of the individual. This investigation is conducted by making personal visits to firms, shops, or factories, and by consultation with employers, superintendents, foremen, employees, and labor men, and also by the use of books dealing with occupations and of trade periodicals.[2] The

[1] A presentation of the activities of the bureau will be found in Appendix I, p. 487.

[2] A presentation of the purposes, scope, and methods of the bureau's investigations will be found in Appendixes II and V, pp. 489 and 494.

information secured is transcribed on white cards when the occupation presents normal conditions and a fair future, on yellow cards when it offers no future, and on red cards when it presents physical dangers. The scope of the investigation is shown by the following sample blank, filled out for a shoe factory. For obvious reasons, the identifying facts have been omitted.

THE VOCATION BUREAU, BOSTON.

VOCATIONS FOR BOSTON BOYS.

Nature of occupation? *Shoe manufacture.*
Date of inquiry? *July 1, 1910.*
Name of firm? ——— ———.
Address? ——— ———.
Superintendent or employment manager? ——— ———.
Total number of employees? {Male, *2,730.* Female, *2,280.*
Number of boys, *1,200;* Girls, *1,000.*
Has there been a shifting in relative numbers of each? *No; there is fixed work for each.*

PAY.

Wages of various groups, and ages? *Errand boys, counters, carriers, 14 years old, $3.50; assemblers, assistants, pattern boys, 16 years, $3.50 to $6; lasters, 20 years, $6 to $7; other work, 20 years or more, $8 to $12, for young men in early employment.*
Wages at beginning? *$3.50 to $6.*
Seasonal? *By year.*
Hours per day? *7.30 a. m. to 5.30 p. m.; to 12 m. on Saturday in summer; one hour nooning.*
Rate of increase? *This is very irregular, averaging $1 per week each year.*
a. On what dependent? *Not at all on age, but on ability and position filled, or on increase in skill in a certain process.*
b. Time or piece payment—any premiums or bonus? *66 per cent piece payment. Yes, on certain lines for quality and quantity of work, neatness of departments, etc.*

BOYS.

How are boys secured? *By application to firm, by advertising, and by employees. It is impossible to find enough.*
Their ages? *Fourteen years and up.*
Previous jobs? *Nearly all boys come into this industry from school. A few come from other shoe factories, or from retail shoe stores.*
Previous schooling? *Grammar school, or a certificate of literacy or attendance at night school must be presented.*
Are any continuing this training? *Yes.* Where? *In public evening schools, Y. M. C. A. classes, and Continuation School in Boston.*

THE INDUSTRY.

a. Physical conditions? *Most sanitary, with modern improvements and safeguards, with hospital department and trained nurses.*
b. What variety of skill required? *Some mechanical skill. The ordinary boy of good sense can easily learn all processes.*
c. Description of processes (photos if possible)? *Errand boys, counters, carriers, assemblers, assistants, pattern boys, lasters, trimmers, and work dyeing, welting, and ironing shoes. Also in office, salesman, foreman, manager, or superintendent.*
d. What special dangers?
Machinery. *The chief danger arises from carelessness.*
Dust. *Modern dust removers are used.*
Moisture. *Not to excess.*
Hard labor. *Steady labor rather than hard.*
Strain. *Not excessive.*
Monotony. *Considerable on automatic machines.*

Competitive conditions of industry? *New England is a great center of the shoe industry. There is extreme competition but with a world market.*
Future of industry? *The future of a staple product in universal demand.*
What chance for grammar school boy? *He would begin at the bottom, as errand boy.*
High-school graduate? *In office, or in wholesale department, to become salesman or manager.*
Vocational school graduate? *Trade school, giving factory equipment, would be best.*
What opportunity for the worker to show what he can do in other departments? *The superintendent and foreman study the boy and place him where it seems best for him and for the firm.*

TESTS.

What kind of boy is desired? *Honest, bright, healthy, strong. Boys living at home are preferred.*
What questions asked of applicant? *As to home, education, experience, and why leaving any former position.*
What tests applied? *For office work, writing and figuring.*
What records kept? (Collect all printed questionnaires and records.) *Name, address, age, nationality, married or single, living at home or boarding, pay, date of entering, and of leaving.*
Union or nonunion? *Open shop.*
Comment of employer? *Education is better for the boys and for us.*
Will he take boys sent by Vocation Bureau? *Yes.*
Will he attend Vocation Bureau conferences if asked? *Gladly.*
Comment of foreman? *Employment bureaus have failed us. We look everywhere for boys, but find few such as we want. The average boy can apply himself here so as to be well placed in life.*
Comment of boys? *We have a bowling alley, reading room, and library, park, and much to make service here pleasant. It is something like school still. We mean to stay. Piecework will give us good pay by the time we are 20 years old.*
Health board comments? *Inhaling naphtha from cements and dust from leather-working machines, and overcrowding and overheating workrooms are to be guarded against in this occupation. The danger of each injurious process may be prevented by proper care.*

CENSUS BUREAU REPORT ON THIS OCCUPATION, MASSACHUSETTS, 1908.

Number of establishments.	Capital invested.	Value of stock.	Wages paid.	Average earnings.	Males employed.	Females.	Value of product.
413	*$35,260,028*	*$104,171,604*	*$38,959,428*	*$562.59*	*46,063*	*23,187*	*$169,957,116*

Bibliography? *The Shoe Manufacturing Industry in New England. I. K. Bailey (New England States, v. 1, 1897), and Massachusetts Labor Bulletin, No. 14, May, 1910.*
School fitting for this occupation? *The Boston Continuation School.*

——— ———, *Investigator.*

Over 100 occupations have been thus investigated and the results carefully filed for use as a basis for vocational counsel. In addition, in occupations which seem adapted to such treatment, the facts gathered are worked up into a bulletin for the use of those interested either in choosing a vocation for themselves or helping others to make a choice. The bulletins are not meant to furnish strictly scientific or technical treatment of the occupations, but it is intended that the information they give shall be thoroughly reliable. To this end each bulletin is carefully scrutinized by the persons furnishing the information on the investigation cards, by an economist, a labor union official, and others.

The purpose of issuing the bulletins is to supply information to the vocational counselors in the Boston public schools, to parents and advisers of youth, and to boys and young men concerned over the choice of a vocation, but it is not intended that they should take the place of personal consultation and cooperation.

Already seven bulletins have been published, as follows: "The Machinist," "Banking," "The Baker," "Confectionery Manufacture," "The Architect," "The Landscape Architect," and "The Grocer." "Bookkeeping and Accounting" and one on "Department Stores" are now in the course of preparation. Beginning with "Department Stores," it is the intention to make the bulletins much fuller, more analytical, and more nearly complete than it was found possible to make the earlier issues.

Three of these bulletins, relating to "The Machinist," "The Baker," and "The Architect" are reproduced in full, by permission, as illustrations of the work of the bureau.

THE MACHINIST.[1]

The Trade: Its Divisions, Dangers, Conditions, and Future.

The trade of the machinist consists in the manufacture, installing, and repair of machinery; or, "A machinist is a constructor of machines and engines, or one versed in the principles of machines; in the general sense, one who invents or constructs mechanical devices of any kind."

The two grand divisions of the occupation are general machine work and tool making. The manufacturing branch of the industry, which is almost entirely shopwork, has the following specialized lines or divisions: The all-round machinist, only a very small per cent of those engaged in the occupation; the lathe hand; the planer hand; the milling-machine hand; the drill-press hand; the erecting and assembling shop hand; the tool, jig, and die hand, a division itself highly specialized; the automatic machine operator, who is hardly a machinist; and the outside erecting and assembling hand, who must have good judgment and often expert knowledge of the machine to be erected. Another division in the industry in some cases quite separate, in others not, is that of the machine repairer who ranks with the erector and assembler. The pattern maker is a woodworker.

Most machinists engage in several of the divisions of the industry or pass readily from one to another. Employees of the Government generally remain fixed in one.

The four divisions of people connected with the occupation, receiving wages or salary, are the apprentice boy, the journeyman, the foreman, and the superintendent.

The chief danger of the occupation is from dust in cutting and grinding metals, especially in brass working. There is danger from machinery, with hard labor and strain in handling heavy materials or working on heavy products. There is considerable monotony, also, in working on automatic machines. On the other hand, some shops manufacture such a variety of products, one shop visited manufacturing 3,800 different kinds of tools, that the workman's interest is steadily maintained.

There is keen competition in the general lines of the industry. Many machine shops manufacture special machines, tools, or articles, some of which are under patent control and are thereby less affected by competition. The field of the machinist has been enlarged in recent years by the growth of the automobile industry.

The high specialization of processes at the present time and constant improvements in the machinery used in the modern shops affect the number of employees, making it comparatively less in the individual shop in most cases year by year, while the entire industry enlarges.

There is an ever-widening field for the expert machinist, and the future of the industry will be good in all lines because of the constantly increasing demands of the industrial world.

Pay, Positions, and Opportunities.

Pay at the beginning ranges from $3 to $8 a week, according to age, conditions of apprenticeship, or shop entered, being more generally, outside of the apprenticeship system, from $4 to $6 a week. The average yearly increase for boys is small, being usually $1 a week each year.

Boys do errands, act as messengers or as assistants to machinists, do drilling, milling, lathe work, planing, shaping, and run light machines. A young man, after a period of learning such processes, earns from $12 to $15 a week in most shops. In the general trade the wages paid are as follows: In lathe and planer work, erecting and assembling, and operating automatic machines, from $1.50 to $2.50 a day; in milling

[1] Bulletin No. 1. The Machinist. Vocations for Boston Boys. Issued by the Vocation Bureau of Boston. Copyright, 1911, by the Vocation Bureau, Boston, Mass.

and drill-press work, $1.25 to $2 a day; in tool, jig, and die making, from $2.50 to $4.50 a day; in outdoor erecting and assembling, from $2.50 to $4.50, with traveling or personal expenses added in some cases; in the repair shop, $2.50 to $4; the journeyman who has finished his apprenticeship or period of learning earns $2.50 or $2.75 a day; a foreman earns from $21 to $25 a week. The salary of a superintendent depends mainly on the man, ranging from some hundreds of dollars a year in the small shop to many thousand in the great corporation. The average machinist in Boston earns about $16 a week, in the State about $600 a year, and the average workman in the trade in the United States about $400 a year, taking into consideration the conditions of unemployment usually existing. Anyone earning less than $2 is sometimes ranked as a helper; one getting over $2.50, an expert.

In repair shops very few boys are employed, trained machinists being regularly drawn from other branches of the industry.

Firms which conduct an apprenticeship system do not generally desire boys on any other basis, and give to the few taken outside of the system only unimportant duties, as errand and messenger service, which afford little chance to learn and advance in the occupation.

Outside of the trade of the machinist, boys who have had some business training do office work in machine shops, as bookkeepers, accountants, and stock-ledger keepers, at about the same pay as such service brings in other industries.

Outside of any single easy process, it takes at least three years to make a boy worth much to an employer in a machine shop. Advancement is slow to the age of 20 or 21.

Apprenticeship in the Trade.

The modern apprenticeship system in the various trades in this country had its beginning in the years from 1860 to 1872, and from the latest statistics available 43 States have laws relating to the employment of apprentices. Thirty-eight States provide that in addition to the trade the apprentice shall be taught the common English branches of education in some public or other school or through such means as the employer may provide.

The older and larger machine shops in Boston and vicinity have some full or partial apprenticeship system, and the general conditions connected with it are as follows:

1. There is an indenture or agreement of apprenticeship.
2. The age preferred for entering is 16 or 17, and the age limits are 15 and 18.
3. The usual length of time required is four years, with a probationary period of two months.
4. The pay is generally 8 cents an hour the first year, 10 cents the second year, 12½ cents the third year, and 15 cents the fourth year.
5. There is a bonus of $100 payable at the end of the period of apprenticeship. Against this bonus each apprentice may be charged for tools, technical books, drafting equipment, etc.
6. Time used in study counts as actual service in the shop.
7. Wages are paid weekly, for 54 hours in the winter and 55 in summer.

In the apprenticeship system of one large corporation, for machinists, work is given during the first six months on the bolt and milling machines and on small tools; on general bench work for the second six months, as shaping and filing; for the third six months boys work under the direction of various machinists, on drills, planers, grinders, lathes, and boring mills; the fourth six months they are given more difficult work, on slotters, planers, and shapers. At the beginning of the third year the apprentice is placed at whatever tool he has shown himself to be most efficient with and is given work which will develop his special ability. After the first six months school work is required of the apprentice, unless he shows that he is already proficient therein. During the period of probation apprentices are required to serve as messengers, in office duties, or in any miscellaneous service.

The system of another large corporation is here given in full, by permission:

APPRENTICE COURSES FOR MACHINISTS, DIE AND TOOL MAKERS, AND PATTERN MAKERS.

These courses are open to boys of at least 15 years of age who have had a grammar-school education or its equivalent and who are physically strong enough to undertake the prescribed work.

The courses last four years (including the trial period).

Apprentices are paid a compensation of—

Eight cents for each hour of actual service for the first half year.

Ten cents for each hour of actual service for the second half year.

Twelve cents for each hour of actual service for the second year.

Fourteen cents for each hour of actual service for the third year.

Sixteen and one-half cents for each hour of actual service for the fourth year.

The regular working hours are 55 per week, so that the weekly wages, even at the beginning, are sufficient for self-support.

The completion of the full term of apprenticeship entitles the graduated apprentice to a "certificate of apprenticeship" and a cash bonus of $100.

The classroom instruction is based on a grammar-school education and includes arithmetic, algebra, geometry and plane trigonometry, physics as it concerns simple machines, power transmission, strength of materials, machine design, magnetism and electricity, mechanical drawing, and jig and fixture design. For pattern-maker apprentices an extended course in mechanical drawing is substituted for jig and fixture design and for part of the physics instruction.

While a small percentage of machinists have served an apprenticeship, this system helps make the all-round machinist and a fair proportion of the most skillful workmen in the various branches of the trade.

In the first corporation mentioned about 5 per cent of all employees at the present time are serving in some part of the apprenticeship system.

Union shops allow one apprentice for the shop and one for each five machinists.

The Boy: Qualities and Training Required.

In this occupation a boy is rarely taken under 15 years of age. From 16 to 18 is the age very generally preferred. Only the larger firms have a regular apprenticeship system, since young men after learning the trade pass so readily from one shop to another or from one branch of the trade to another.

Boys should have a grammar-school education. In the occupation are found many high-school and technical-school graduates, these quite generally becoming foremen or superintendents. It is an advantage for young men in machine shops to continue their studies in mathematics and drawing in evening schools or classes.

A boy should have natural mechanical skill or adaptability to tool and hand work. He should be strong, energetic, and of good physique.

Three important factors in advancement in this trade are: First, mastery of the work in hand; second, the ability, the health, and the energy to get the related studies bearing on the trade, such as shop mathematics, shop English, shop drawing, and shop science and practice; third, the development of the qualities of leadership.

Comments of People in the Trade.

It is a detriment to a boy to specialize. The constant repetition of a process dulls ambition and narrows interest and power. We will not hire the indifferent, street-corner boy. Some parts of the year it is very difficult to find any suitable ones. We want the best out of the schools, and offer them a good future.

The chief trouble with boys in this industry is their inclination to go from shop to shop, while yet practically learners only.

The repair shop is a place for expert workmen only—masters of the machines which they have to repair.

Boys naturally want to earn more than is possible in learning a trade, and it is not always easy to maintain an apprenticeship system in this country. The present high

industrial organization calls for short cuts and time-saving methods. The machinist, however, should serve several years to become an expert workman.

The chances of a boy to learn are better in a small shop, where he can have the constant personal attention of an employer or foreman.

Machinists are quite generally satisfied with their vocation, coming into it after some deliberation and frequently through some system of apprenticeship.

The past in this occupation has been good, and the future has a fair outlook. There is a lack still of skilled machinists.

COMMENTS FROM THE MASSACHUSETTS BOARD OF HEALTH REPORT, DANGEROUS OCCUPATIONS, 1907.

Manufacture of machinery, machine parts, and metal supplies.

In the manufacture of machinery and metal supplies there are several operations which involve exposure to dust, fumes, vapors, or extreme heat. These include making castings, cleaning and smoothing, grinding and polishing, and scaling.

While the nature of some of the processes is such as to warrant classification of this industry with the dangerous trades, the conditions under which the work is done are very largely responsible for the injurious effects on the health of the employees, and these conditions are to a considerable extent avoidable or at least susceptible of improvement.

FROM MASSACHUSETTS CENSUS REPORTS.

A.—Statistics of manufacture, 1908: Foundry and machine-shop products.

	The State.	Boston.
Number of establishments	519	106
Capital devoted to production	$60,525,711.00	$11,152,410.00
Value of stock and materials used	$20,791,813.00	$2,976,147.00
Amount of wages paid during the year	$18,699,125.00	$2,200,481.00
Average yearly earnings	$601.03	$681.47
Value of product	$56,208,811.00	$7,171,175.00
Males employed	30,661	3,190
Females employed	451	39
Both sexes	31,112	3,229
Smallest number	25,874	2,576
Greatest number	37,863	4,045

B.—Selected occupations, 1905: Age periods for machinists in employment.

	Aggregate.			Machinists.			Machinists' helpers.
	Males.	Females.	Total.	Males.	Females.	Total.	
Under 16 years	110	.....	110	32	.....	32	78
16 to 24 years, inclusive	6,835	2	6,837	4,986	2	4,988	1,849
25 to 44 years, inclusive	15,810	1	15,811	15,278	1	15,279	532
45 to 64 years, inclusive	6,069	.....	6,069	5,882	.....	5,882	187
65 years and over, and unknown	782	.....	782	767	.....	767	15
Aggregate number	29,609	3	29,609	26,945	3	26,948	2,661

C.—Manufactures, 1905: Machines and machinery.

Number of establishments		709
Private firms	479	
Corporations	222	
Industrial combinations	8	
Partners and stockholders		7,512
Amount of capital invested		$75,797,145

Value of stock used		$22,273,370
Value of goods made		$59,621,469
Persons employed:		
Average number		33,182
Men 16 years and over	32,395	
Women 16 years and over	539	
Children under 16 years	248	
Smallest number		27,736
Greatest number		38,984
Excess of greatest over smallest		11,248
Total amount paid in wages		$19,271,846
Average yearly earnings		$580.79
Number of salaried persons		2,836
Total amount paid in salaries		$3,814,114
Average salaries		$1,344.89
Average proportion of business done (per cent)		61.96
Average number of days in operation		290.82

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SCHOOLS GIVING COURSES FITTING FOR THIS OCCUPATION.

Franklin Union, Boston.
The Association Institute, Y. M. C. A., Boston.
The Somerville Industrial School for Boys.
Massachusetts Institute of Technology.
The Lowell Institute School for Industrial Foremen.
The Graduate School of Applied Science, Harvard University.
Evening Industrial Schools of the Boston Public School System.

THE BAKER.[1]

The Industry: Conditions, Dangers, and Future.

This article deals mainly with the industry as found in the large modern baking establishments, using machinery and employing many people. While the facts and conditions presented are quite generally true in the industry, in the smaller and older bakeshops connected with the retail trade unsanitary conditions often prevail.

Most of the plants of the large bakeries are new and have modern equipment because of recent growth in the industry.

The chief objection to working in a bakery is the requirement of night employment, all the large bakeries, except those manufacturing biscuit, running night and day with shifts of help. For this reason boys often leave the occupation before they have given it a fair trial. The hardest processes in the large establishments are generally given over to Polish labor.

Most large bakeries take measures for the general welfare of their employees, and one conducts classes in business with addresses at regular periods by business men. Another maintains a cooperative system of insurance for its employees against accident or death. There is some danger in the occupation from machinery and considerable from flour dust in the older establishments.

There is active competition in the industry in the quality of goods on the one hand, and in cheapening the materials for certain products on the other. The selling prices of baker's goods are practically fixed by custom.

Consumption of baker's goods has greatly increased in recent times, the firms investigated claiming a growth of from 40 to 60 per cent in the last 10 years.

Pay, Positions, Opportunities.

The work of a boy in a bakeshop is general, as that of an apprentice. He is put by a foreman where he may be needed as chore boy or helper. In union shops one helper or apprentice is allowed to every seven men employed. He pares apples, cleans pans, and places them for the mixture, or removes goods from ovens or from pans. After two or three years of this kind of service he usually becomes what is called the third hand, or general baker. The third hand does boys' work, if boys are lacking in an establishment. He puts materials together and makes preparations for mixtures. Later he may become second hand or subforeman. The second hand, as a rule, makes all mixtures, and his work is important in the industry. Next comes the first hand, or foreman, who attends the ovens and has general charge of his room or department.

A boy may enter the apple room in a bakery at $3.50 a week. Usually, however, boys who are capable of doing a fair amount of work enter at $1 a day, and their pay increases to about $9 a week, according to their ability and quickness, until they reach the position of third hand, who receives upon an average $15 a week. The second hand earns about $16 a week, and the first hand, or foreman, from $18 to $25 a week. Polish laborers enter usually at $6 and advance to $11 or $12. They do the heavier work, such as loading trucks, taking bread from the ovens, loading and unloading wagons. Head floor men, who are not bakers, look after orders and teams. Their pay is generally $14, and that of their assistants $11 or $12.

The baker may be a confectioner or employ a confectioner to do fancy or ornamental work in cake and pastry, for sale or for window display. This is an important position in many bakeries and commands pay varying from $18 to $30 a week.

As a general rule in small bakeries boys have to work extra hours on Saturday and on Sunday mornings. Besides the duties already enumerated they may do office work,

[1] Bulletin No. 3. The Baker. Vocations for Boston Boys. Issued by the Vocation Bureau of Boston. Copyright, 1911, by the Vocation Bureau, Boston, Mass.

or serve as salesmen on wagons. Such salesmen usually receive $12 a week and 2 per cent of sales up to $150 a week, above that amount receiving 5 per cent of sales. Traveling salesmen of the large companies receive $25 or $30 a week, according to their ability.

The Boy: Qualities, and Training Required.

A boy should be at least 16 years of age, of good habits, health, and strength. A grammar-school education to the seventh grade at least is necessary, and there are opportunities for the boy who knows something of chemistry, bookkeeping, and business methods. The boy who wishes to do ornamental work in baking should take private lessons in decorating before or after entering a bakeshop.

The boy of industrious habits who knows how to conduct himself and to meet the public would be gladly engaged, and boys who have worked one or two years in a grocery store or on an express wagon are in demand.

Comments of People in the Industry.

This occupation does not require any special skill or apprenticeship training, so boys who are old enough can easily enter it. Many young men who are unmarried and living at home work in bakeries.

Men of all-around ability are in great demand in this industry, and the worker on the manufacturing side should know everything concerning a loaf of bread, as wheat, flour, and the processes of manufacture.

Formerly relatively more men were employed in baking; now machinery and a cheaper grade of labor in some departments have changed the occupation, and night work prevents the employment of young boys.

The industry offers a good future for men capable of management, and fairly steady employment for young men who must work for moderate wages.

MASSACHUSETTS BOARD OF HEALTH REPORT.

Sanitary condition of factories, workshops, and other establishments where persons are employed, 1907.

BAKERIES.

Chapter 75 of the Revised Laws (secs. 28 to 34) requires that all buildings occupied as bakeries shall be properly drained and plumbed; shall be provided with proper wash rooms and water-closets, having ventilation apart from the bake room or rooms; and shall have, if required by the local board of health, an impermeable floor of cement or of tiles laid in cement, and an additional floor of wood properly saturated with linseed oil. It further requires that the walls and ceiling of a bake room shall be plastered or wainscoted, and, if required by the local board of health, shall be whitewashed once in three months; and that the furniture and utensils shall be so arranged that they and the floor may at all times be kept clean and in sanitary condition. It requires also that the manufactured products shall be kept in perfectly dry and airy rooms, so arranged that the floors, shelves, and all other facilities for storing the same can be easily and perfectly cleaned. It prohibits having a water-closet, earth closet, privy, or ash pit within or communicating directly with the bake room of any bakery; and provides that sleeping places for employees shall be separate from the rooms in which flour or meal and food products are manufactured or stored.

Bakeries and confectionery and catering establishments, to the number of 547, were visited in 25 cities and 3 towns. A study of the conditions observed led to the division of these establishments into four distinct classes, as follows:

Class A.—Worthy of special commendation.

Class B.—Satisfactory.

Class C.—Not especially bad.

Class D.—Distinctly bad.

The following table, which was published in the monthly bulletin of the board for August, 1906, shows the number of establishments examined in each place and their classification:

Number visited	547
A	11
B	44
C	222
D	270

Because of some doubt on the part of local inspectors as to what is meant by "distinctly bad" conditions, and because the standard upon which the above classification is based is more exacting than that called for by existing laws, a division of Class D is made, merely to separate the bakeries which were found to be clearly not in accordance with the intent and meaning of the statutes from those concerning which reasonable doubt may arise.

In the new classification basement bake rooms are considered alike with those otherwise located, and not so much stress is laid on certain points, e. g., light and ventilation; hence many of the rooms first placed in Class D fall into Class C. In addition, a list of all basement bakeries is given.

Number visited	547
A	11
B	44
C	326
D [1]	166
Basements	132

The object of the investigation was, however, not to determine the number of "passable" bakeries, but to ascertain the conditions under which baking and similar kinds of work are carried on, both with regard to the employees and the consumers.

Cellar air that is vitiated by respiration, by illuminating gas, kerosene, and the gas from coke or coal, is not fit for the employees to breathe; neither is a cellar a suitable place for handling flour, dough, jellies, cream, milk, etc., which go to make up food products, particularly on windy days in summer, when the sidewalk windows permit ready entrance of street dust into the chocolate and cream fillings or the lemon and apple pie fillings, as not infrequently has been observed.

INSTANCES OF BAKERIES WITH COMMENDABLE CONDITIONS.

Boston.

A. A small "home" bakery. The bake room is large, well lighted and ventilated, and is on the first floor. The water-closet is entirely separate. The whole place is exceedingly clean and neat.

B. A small bakery, employing 3 men. The bake room is new, and finely arranged as regards cleanliness and ease of cleaning. The light and ventilation are excellent. The water-closet is in an entirely separate part of the building.

C. A large bakery, employing 280 hands, who work in two shifts. The whole place is kept very neat and clean, and the rooms are light and well ventilated. The toilet rooms are separated from the rest of the bakery, and are ample. Great care is taken to have every part of the building in a cleanly condition.

D. A large bakery, well lighted and ventilated, and neat and clean throughout. A stone alley in the rear of the oven is provided for the removal of ashes, thus doing away with ash dust in the bake room. The toilet arrangements and metal clothes lockers are in the basement, away from the bake rooms, and are well ventilated.

[1] Refers here to establishments with conditions not in accordance with the statutes.

FROM CENSUS REPORTS.

A.—Massachusetts for 1908, statistics of manufacture: Bread and other bakery products.

	The State.	Boston.
Number of establishments	258	140
Capital	$2,945,321	$1,435,642
Value of stock used	$7,270,105	$3,272,195
Value of product	$12,703,922	$5,593,705
Wages paid	$1,952,169	$905,911
Average yearly earnings	$571.14	$587.49
Males employed	2,606	1,236
Females	812	306
Both sexes	3,418	1,542
Smallest number	3,110	1,372
Greatest number	3,787	1,707

B.—Massachusetts, selected occupations, 1905: Age periods for bakers.

	Males.	Females.	Total.
Under 16 years	34	9	43
16 to 24 years, inclusive	1,126	73	1,199
25 to 44 years, inclusive	2,529	87	2,666
45 to 64 years, inclusive	773	57	830
65 years and over, and unknown	86	10	96
Aggregate number	4,598	236	4,834

C.—United States Census of Manufactures, 1905: Bread and other bakery products.

	1900	1905
Number of establishments	14,836	18,227
Capital	$80,901,926	$122,363,327
Cost of materials	$95,051,952	$155,999,318
Value of the product	$175,368,682	$269,609,051
Salaries paid	$6,063,269	$6,272,855
Wages paid	$27,864,024	$43,179,822
Salaried officials, clerks, etc	9,167	8,358
Average number of wage earners	60,192	81,284
Men 16 years and over	47,861	64,580
Women 16 years and over	10,441	14,844
Children under 16 years	1,890	1,860

NOTE.—Census reports in general have not included small establishments in which manufacturing was incidental to mercantile or other business, or establishments in which the value of the products for the year amounted to less than $500.

TRADE PERIODICALS.

The Bakers' Journal, Chicago.
The Bakers' Review, New York.

THE ARCHITECT.[1]

The Profession: Its Nature, Conditions, and Future.

Architecture is the art of building, or the art of designing appropriate construction. It deals with the design and working drawings for buildings, and the superintendence of their execution. There are two sides to the profession, the artistic and the practical, which are quite inseparable in preparation and in practice, and both demand a general knowledge of construction. The successful architect is one who has decided capacity either for designing buildings and accessories or for getting work done expeditiously, properly, and with economy.

The chief work of the architect is indoors, planning and designing, with some outside work when superintending construction. The physical conditions found in this occupation are of the best. A possible danger is injury to the eyesight. The hours required are short compared to those of most occupations, usually from nine to five, though there is always opportunity for occasional work outside of one's regular employment. Students in architecture at the Institute of Technology and at Harvard can generally find summer employment, either without pay or at a low rate.

While the hours are short, the work of the draftsman is very exacting, and the responsibilities of the practicing architect very great. He has not only to supervise construction, but also to direct the expenditure, often, of large sums of money in the interests of a client who trusts in his professional and business abilities and standards. He may have, also, to harmonize the conflicting interests of the various people concerned in the construction of a building.

Closely allied to architecture are the various branches of engineering: Structural engineering, connected with the use of iron in construction, either by itself or with concrete; civil engineering, as connected with surveying; domestic engineering, which covers matters concerned in heating, ventilating, electric light and power, and plumbing. The tendency to specialization is increasing in these lines, and there is a growing demand for the architectural engineer, and for the mechanical engineer. Such are found in all large offices. In addition to the engineering there is the work connected with the grading, planting, and decoration of grounds, and this again touches on horticulture, agriculture, and forestry. This is the special work of the landscape gardener or landscape architect. All of these occupations require draftsmen, and all require special training and experience. With all of these branches of architecture the architect is so closely connected as to make it desirable, if not necessary, that he should have some fundamental knowledge of all. On this account the profession of architecture is becoming more and more complex, and offices tend to become larger and more thoroughly organized and specialized, so that the complex problems involved in almost any modern building, with its accessories and surroundings, may receive proper study.

There is, therefore, in the whole field of architecture a very wide range, with very great opportunities for young men of varying talents and abilities. It is a profession of the highest standing, and has the future of an important occupation.

Pay, Positions, and Opportunities.

Wages are paid to the learner, but varying from $3 a week to $6, according to age, fitness, and ability. The rate of increase is generally $1, $1.50, and $2 a week yearly until one reaches permanent employment as draftsman or designer. These earn on an average from $800 to $1,500 a year, though exceptional men earn more, up to $2,000 or $3,000. Men holding high positions in a firm, though not members of it, often have a share in the profits.

[1] Bulletin No. 5. The Architect. Vocations for Boston Boys. Issued by the Vocation Bureau of Boston. Copyright, 1911, by the Vocation Bureau, Boston, Mass.

The majority entering the profession remain draftsmen permanently, at pay varying from $20 to $35 a week. Graduates from advanced college courses may earn $40 a week or more in permanent employment as draftsmen, after spending two or three years in an office. The draftsman is sometimes called the architect's assistant. Boston offices employ from 2 or 3 to 25 or more draftsmen in each.

The earnings of the practicing architect, who is not working on a salary, are variable, ranging from $1,000 to $5,000 or $10,000 a year. A small number of American architects with a national reputation earn greater sums, but comparatively few in the profession receive more than moderate incomes. Architectural receipts depend upon the conditions of the building business, and this in turn upon the state of general business. Again, the class of contracts rather than their number is to be taken into consideration. An architect sometimes devotes a year or even more to the designing of a single building, of which he usually superintends the erection. The minimum fee, named as professional and binding by the American Institute of Architects, for plans, specifications, and superintendence, is 6 per cent of the total cost of the building, and on buildings costing less than $10,000 a higher rate is usually charged. The fee for the architect's services on small buildings is seldom less than $100, and the architect of a city block, hotel, or public building may receive from $3,000 to $25,000 or more.

Many of the best architects find it of great advantage to work under partnership arrangements, as firms. The firm gets a wider range of clients when it can offer expert service in each of the various lines of the profession.

Besides draftsmen architects require expert stenographers and bookkeepers, and one of these is often an office manager, attending to the administration of the office routine. Such a position does not require professional education or training, but business knowledge and executive ability. In a large office of from 20 to 100 men this position is a responsible and well paid one.

Pursuits allied to architecture, and in a sense supplementary to it, are the designing and manufacture of furniture, rugs, interiors, and stained glass, mural painting, and landscape architecture. In recent years the architect has found a new and important field in town and city planning. Members of the profession are usually included in building commissions, as in the Boston Schoolhouse Commission.

The outside superintendent is often merely a capable draftsman with thorough knowledge of construction in all trades, and ability to handle men. Such a man need have no especial training in design, although experience will have given him some judgment in such matters. The clerk of the works, or superintendent of construction, is paid by the owner, but is under the control of the architect. Such men receive from $1,500 to $2,500 a year.

Architecture is a profession that centers in cities and towns, and the unprecedented growth of large cities in this country has given the American architect a constantly enlarging field of activity and service.

The Boy: Qualities, and Training Required.

A boy 14 years old may find a place in office work in this profession with some opportunity for learning. Usually, however, a boy must be at least 16 years of age, and he is not likely to become exclusively a draftsman until he is 20. One must have imagination, structural sense, skill in designing and drafting, a mechanical or artistic cast of mind, and judgment. Good health and habits and good eyesight are essential. Some architects prefer city boys on account of their acquaintance with streets and buildings.

There are two natural divisions in this profession, demanding two kinds of men. First is the artist. He is a designer, and works indoors on plans for construction. He must have creative ability, artistic feeling, and power to sketch. He must constantly study art and architecture. He may, however, have but a minimum of mathematical knowledge.

The second is the construction man indoors and out, the superintendent of outdoor work. He must acquire a comprehensive working knowledge of construction, of the writing of specifications, and of superintending work. He may have a minimum of artistic feeling and ability, but he must have a maximum of mathematical and technical knowledge and of administrative ability.

As a rule architects are trained in a professional school, after having obtained a college degree, and this study is supplemented by travel and study abroad; but many boys become good draftsmen, and some few good architects, with no other school education than that of the high school, and no other professional education but that acquired in an office, and through the various evening classes and university extension work.

In all cases high school training is required, yet this may only make one a draftsman; for advancement beyond this position technical education is necessary, except in cases of especial ability. Designers and practicing architects are nearly all graduates of technical schools or colleges, such as the Massachusetts Institute of Technology or the Graduate School of Applied Science at Harvard. Many young men in architects' offices, especially those who have not had a college training, study in evening classes in the Y. M. C. A. Institute or in the Architectural Club. It is a profession demanding constant study and concentration of thought and endeavor.

There are many scholarships in the colleges and in connection with architectural societies for draftsmen of marked ability. These afford opportunities for education with tuition fees paid, or one or two years of foreign travel and study with all expenses paid.

A liberal education is of the greatest value. Architects owe many of their ideas to foreign examples, and the more one is educated the more he will profit by travel and study. Nevertheless in this country the capacity to organize and direct an office is essential for him who would have charge of large work. A knowledge of French is an advantage, as many books on architecture are written in that language; yet one needs above all a thorough knowledge of the English language. Draftsmen will need a working knowledge of ordinary construction or else of historic ornament, and skilled work alone will often not suffice. A student of architecture should keep in touch with new books and magazines, and study the kinds and uses of material. This knowledge is especially important now when so many new kinds of material are coming into use. Terra cotta in architectural work has an increasing interest. Concrete, also, is a material whose structural and ornamental possibilities are only beginning to be understood. With this multiplying of kinds of material, the student can not afford to neglect the subject. The conditions of practice in which the client often disregards time make it necessary for the student to learn to work quickly, yet he must take care that his work appear finished rather than crude, and that it show character rather than copying.

There is but little change in the personnel of a firm from year to year, and the profession is a life occupation for those going into it.

Comments of People in the Profession.

Professional education is by far the best; one can not well educate one's self for an occupation having such high requirements.

The complexity of modern life as echoed in modern buildings is so great that the work of the conscientious architect is arduous and wearing in the extreme, and its best appreciation comes largely from other architects and artists.

The architect has an unusual opportunity to be helpful in civic advance. He is recognized by the public as a professional man as well as an artist, and consequently has a hearing which as an artist alone he would lack. Though he can not afford to do much real work without fees, still by his attitude he can in a very marked way direct public taste toward the principles of good design in city planning and in civic art. The architect can direct men's eyes so that they too can "dream dreams" of things which may be brought to pass.

Suggestions from an Architect to a Boy who wishes to enter the Profession.

A boy must have creative ability to become an architect, but the boy who loves sketching or modeling, or work with tools, may have the making of one. The capacity to think for one's self, to plan work ahead and get it done on schedule time, to be prompt, explicit, and thorough—these are qualifications of prime importance in architectural work. It is sometimes said that the client more readily appreciates good business methods than good design; yet competition among the best designers is always keen.

The architect must be an administrator as well as an artist. This is a recent outgrowth, but under present conditions the student must look forward to becoming a partner in or part of a large concern. For this he receives no training in school, so if your bent is for designing, and not for handling men, try to put through some actual work while studying. You will learn much from your relations with a client and from the trades that go into the work. If it be only an ell to a house or an outbuilding, so long as the responsibility rests on you, do it. Have interests outside of architecture. Design such things as interior decoration, draperies, and light fixtures, or other accessories.

There is no recipe for getting clients. The best way to get clients is to deserve them.

It is not hard for a bright boy to get into an architect's office as messenger or office boy, with a chance to make tracings. This is the beginning of the average draftsmanship and its relation to actual work will be learned in the office, and by going out into the work itself. Part time in an architect's office and part time in a technical school will help a boy to a thorough education in the profession; but unless his heart is in his work from the first, he had better seek another occupation.

FROM CENSUS REPORTS.

A.—Massachusetts, 1905: Selected occupations, age periods for architects, designers, draftsmen, etc.

	Male.	Female.	Total.
Under 16 years			
16 to 24 years, inclusive	690	9	699
25 to 44 years, inclusive	1,619	33	1,652
45 to 64 years, inclusive	476	3	479
65 years and over, and unknown	74	1	75
Aggregate number	2,859	46	2,905

B.—United States, 1900: Occupations, total persons 10 years of age and over, architects, designers, draftsmen, etc.

	Male.	Female.	Total.
Of native parentage	14,890	524	15,414
Of foreign parentage	13,628	518	14,146
Aggregate number	28,518	1,042	29,560

The second group of activities centering around the need of securing a sufficient training and educational equipment for the young workers is carried on in part by personal conferences with parents, teachers, advisers, and the students themselves, and in part by correspondence, lectures, and public presentation of the facts whenever an opportunity can be found. This purpose underlies and permeates

practically the whole work of the bureau, and every line of action undertaken either directly or indirectly forwards this end.

The third group of activities, the organization of personal vocational counseling, has two aspects: The direct organization of vocational bureaus, or committees, or other groups who will undertake such work, and the training, advising, or otherwise helping those who are already acting as vocational counselors or wish to fit themselves to do so. The first involves a large amount of correspondence, and numerous interviews, conferences, etc. One interesting development along this line is the formation of groups of employers to act as individual advisers to bureau applicants in regard to the special trade or occupation they are conducting.

The second line of activity, training those who wish to fit themselves to give vocational guidance, has led to the establishment of a course for counselors, conducted by the director of the bureau. The counselors, 117 in number, have been appointed by the school department from the teachers in the Boston school system. In addition, teachers from surrounding towns and cities have attended the course. This class meets twice a month, and, besides the course of lectures given by the director, there have been addresses upon various occupations by superintendents of factories, stores, and other establishments.

A still more recent development along this same line is a course given for the first time at the 1911 session of the Harvard Summer School. This was established primarily for teachers, and was arranged under the advice of the new department of university extension to meet an apparent demand for persons competent to judge of the fitness of any given individual for a particular vocation. To show the nature and scope of the training offered, the official announcement of the course is here given in full:

SUMMER SCHOOL OF ARTS AND SCIENCES.

[June 29–August 10, 1911.]

Education.

Vocational guidance.—The duties and equipment of teachers as vocational counselors; the theory and practice of vocational guidance—Lectures, reading, and conferences. Ten lectures, beginning Friday, July 7, and continuing on Mondays, Wednesdays, and Fridays at 4 p. m., for three weeks.

In view of the present demand for competent advice to young people concerning vocations appropriate to their opportunities and capacity, and because of the increased responsibility thus put upon school teachers and others, this course has been provided. The lectures will aim to show the purpose of the new movement, and to guide the students to an understanding of sound principles in giving

vocational counsel and to the best sources of the knowledge necessary for effective work.

Besides the lectures there will be conferences for informal discussion; regular reading will be expected of all who take the course; and an examination will be held.

Outline of lectures.

1. Elements in the choice of a vocation.
2. The necessity of vocational guidance, as recognized in various countries.
3. Vocational guidance in the school system.
   a. The public schools.
   b. Guidance and private philanthropy.
4. The duties and equipment of the vocational counselor.
5. How to study the vocations.
6. Vocational guidance and the problem of employment.
7. The foundations of vocational efficiency—educational, economic, and personal.
8. The employer's point of view in vocational guidance.
9. Social gains through vocational guidance.
10. Summary of the course, and cautions.

The fourth line of activity, the direct giving of advice in consultation, is naturally carried on informally. The purpose is to be of service to all who have a vocational problem or difficulty. This presupposes a wide and varied knowledge of all forms of occupation, and that this may be available when needed every effort is made to secure the active cooperation of employers, organized labor, teachers, public officials, social workers, vocational counselors, and such other people in the community as can render the service this work of vocational guidance requires.

It will be seen that the work of the Vocation Bureau is exceedingly varied and comprehensive, but it does not come into direct contact with the future worker until he is himself beginning to think about his future employment, which, too often, is not until he is upon the point of leaving school. Two other agencies strive to turn the thought of both pupils and parents to the necessity of making a choice before the immediate need arises for doing so and to prepare the child to make intelligent use of the aid the Vocation Bureau stands ready to give. The first of these is the committee on vocational direction.

COMMITTEE ON VOCATIONAL DIRECTION OF THE BOSTON SCHOOL BOARD.

In June, 1909, the school committee requested the cooperation of the Vocation Bureau, and provided through appointment by the superintendent of schools, a committee on vocational direction com-

posed of six members of the teaching force. This committee, working in cooperation with the Vocation Bureau, has developed and made effective a general interest in vocational guidance in the Boston schools. Mass meetings were first held to interest the teachers, a vocational counselor or a committee of counselors was appointed for each school, and a series of lectures and addresses arranged for the purpose of interesting parents as well as children.

Perhaps the most important of these measures was the appointment of the vocation counselors, as this placed in each school a responsible official or committee, thoroughly interested in the subject and already familiar with the children, ready to advise and help at the time both parents and children most need advice and are most aware of their need. These counselors are teachers already engaged in the schools, who undertake the vocational work in addition to their ordinary duties.

A very practical service has been rendered by the vocational counselors in helping to select the grammar school graduates who shall be admitted to some of the more popular specialized high schools, where the applicants for admission outnumber the capacity of the schools. Through meetings with the principals and visits to the schools the vocational advisers of the grammar schools familiarized themselves with the special work done in each high school and the kind of boy or girl to whom it was best adapted. Their work as teachers in the grammar schools had already given them a personal knowledge of the graduates, to which they added consultation with the parents and a careful estimate of the child's ability. They were therefore exceptionally well qualified to judge what pupils out of the overnumerous list should be permitted to enter the schools in question, and the matter was left to their decision. This plan was used in 1910 to decide admissions both to the High School of Commerce and the High School of Practical Arts, the latter a school for girls only.

In addition to the lectures already referred to, the committee devised a vocational record card on which all the graduates of the elementary schools were to be registered. These cards were to be sent forward in the fall to the high schools the pupils had entered and were to be revised twice during the high-school course. "The value of the card record," explained the committee, "is not so much in the registering of certain data as in the results of the process of getting these. The effect upon the mental attitude of pupil, teacher, and parent is excellent and makes an admirable beginning in the plan of vocational direction."[1]

[1] Report of Committee on Vocational Direction, 1909–10.

The following is a copy of the vocational card thus used:

ELEMENTARY SCHOOL VOCATIONAL RECORD CARD.

Name.....; school and class.....
Date birth.....
Parent's name.....
Residence.....
Parents' plans for pupil.....
Pupil excels in or likes what subjects?.....
Pupil fails in or dislikes what subjects?.....
Physique.....; Pupil's plan? (a trade, a profession, business).....
Attend school, or work next year?.....
What school?.....
Intend to graduate from that school?.....
After high school, what?.....
[College—Tech.—Normal—Evg. High—Trade Sch. or Spec. Sch.]

HIGH SCHOOL VOCATIONAL RECORD CARD.

First year (Oct. 1).

Name.....From.....School.....
Entered.....
Object in attending high school?.....
Does....intend to graduate? What school after high? { Normal..... / Technical..... / College.....
Preparing for business, trade, or profession?.....
Greatest aptitude.....

Third year (Oct. 1).

Have you changed plans since first year?.....
If so, what are they?.....

A special effort is made to turn the attention of the older pupils to the subject of vocational choice. In the High School of Commerce, for instance, courses of lectures are given concerning conditions in Boston as shown by careful investigations. The whole atmosphere of the school is permeated with the idea of choosing wisely some particular business. The purpose of the school is not to fit the boy for a commercial career, but to find that particular career to which he seems best adapted.

In order to assist in the process of placing each boy, a system of summer apprenticeships has been established and a vocational adviser has charge of the work of finding employment for boys during the summer in the business houses of the city. The business men, through the Boston Chamber of Commerce, have cooperated heartily in the plan. They agree to give the boys the best possible chance to obtain a knowledge of the business, and to demonstrate their fitness or unfitness for it. In particular they agree not to retain a boy in their employ after school opens in September, even though he has shown special aptitude for the work assigned him. By this plan the business men gain a practical understanding of the aims of the school,

and the boys obtain some insight into the relation of their school tasks to commercial life.

In the Trade School for Girls a position with the title of "vocational assistant" has been created. The regulations of the school committee provide that one such vocational assistant shall be appointed for each one hundred girls in the school.

The vocational assistant is charged with the duty of investigating conditions in the trades taught by the school in order that it may adapt its courses to the exact needs of these particular businesses, and also in order to provide accurate and up-to-date information for the use of parents and pupils. The vocational assistant is further charged with the duty of securing positions for graduates of the school, and of keeping track of the girls placed with reference to their success in their chosen occupation. When a girl finds that she is in a position which offers no chance for advancement, the vocational assistant is usually on hand to encourage and assist, to advise her return to the school, or to procure other employment wherein there is greater prospect of obtaining a living wage.

THE BOSTON HOME AND SCHOOL ASSOCIATION.

This association differs from the committee on vocational direction in being a private instead of an official body, and in taking up the subject of vocational guidance as only one of its activities. The purpose of the association is to secure the closest possible cooperation between parents and teachers in all that concerns the children's welfare. For the coming year its plan is to obtain information as to the educational and vocational ambitions of parents for their children and to discover how far these ambitions are based on knowledge and on possible opportunities to realize them. The following list of questions will be sent out to the parents of children in various schools:

Questionnaire for parents of high school pupils.

1. Are you going to send your boy (or girl) to college?
2. If so, what college, and why?
3. Have you in view any occupation for which you wish to train your boy (or girl)?
4. What occupation do you think your boy (or girl) is most adapted to? Has your boy (or girl) received any training in preparation for this occupation?

Questionnaire for parents of children in the eighth grade.

1. Are you intending to send your boy (or girl) to high school?
2. If so, what high school, and why?
3. Have you in view any occupation for which you wish to train your boy (or girl)?
4. What occupation do you think your boy (or girl) is most adapted to? Has your boy (or girl) received any training in preparation for this occupation?

With the above information in hand the association will determine the kind of lectures and conferences to organize for the various parents' associations.

To aid in this purpose a lecture bureau has been formed, which has prepared a list of competent speakers who are specially interested in the problem of vocational guidance.

THE GIRLS TRADE EDUCATION LEAGUE OF BOSTON.

The Girls Trade Education League, like the Home and School Association, by no means confines its activities to vocational guidance, but nevertheless an important part of its work is along such lines. It is making a careful study of the opportunities open to girls between the ages of 14 and 18 who leave school to become wage earners and of the difficulties in their way. A considerable number of girls on leaving school take the first work they can find regardless of the advantages or defects of that particular occupation, their own fitness for it, or its possibilities for the future. Often neither they nor their friends have any knowledge or experience which would enable them to form an opinion on these points. Consequently unless there is some outside agency to help and guide, the haphazard fashion in which they make their entrance into industrial life is inevitable, but its results are none the less unfortunate. Finding themselves in occupations for which they have no special fitness, and which offer no chances for advancement, they become discouraged and dissatisfied, or come to look upon their work as hopeless drudgery, to be gone through with as mechanically as may be. From every point of view it is desirable to aid these girls to choose occupations which instead of retarding their development will tend to increase their general efficiency.

As a first step in this process, the league aims to procure and make generally accessible full information about industrial openings for girls. To gain this it investigates all occupations in which young girls are employed, paying special attention to the conditions under which the girls must work, the wages at which they must begin, the possibilities of advancement, the character of the work, whether seasonal or steady, etc. On the other side they investigate quite as carefully what qualities of mind and body a girl needs for success in a given occupation, what general education and preliminary training is required; where these may be obtained, how soon, if her work is satisfactory, she may expect advancement, and what is the best she can attain if she keeps on steadily in her chosen vocation. As this information is gathered, the league strives to make it available by means of lectures, printed statements, classes, and other methods.

In addition to this work of securing and disseminating information, the league conducts a vocation office for the purpose of aiding girls who must take up some employment after leaving school. The purpose is not so much to find work for a girl as to help her decide for what particular work she is best fitted and to advise and aid her in securing this work. Like other agencies for vocational guidance, the league endeavors to keep the girls from leaving school early or without a good general training, but when this training has been secured, or when the leaving is inevitable, it tries to do away with the period of undirected experimentation and to place the girl at once where she can stay and develop with her work. It is not always possible to place a girl at once in the right position, so the league endeavors to keep in touch for a year or more with each girl it counsels, in order to aid during the shifting process—if shifting proves necessary—and to make sure that she is finally placed in an employment to which she is adapted and which affords a living wage.

By these two lines of activity—first, by a study of industries, discovering and making known what opportunities are open to girls, and next, by following the girls as they leave school and thus learning the difficulties in the way of their securing the right kind of work—it is hoped to gain a knowledge of the situation which will suggest what more can be done by the schools, by outside agencies, or by further legislation, to lessen the present number of maladjustments and to improve the present unsatisfactory condition of girl wage earners.

The league has published 10 bulletins as follows: "Telephone Operating," "Bookbinding," "Stenography and Typewriting," "Nursery Maid," "Dressmaking," "Millinery," "Straw Hat Making," "Manicuring and Hair Dressing," "Nursing," and "Salesmanship."

This series of bulletins has the same basis of study as those for boys and is presented in the same simple manner. Those relating to dressmaking, millinery, and bookbinding are reproduced in full, by permission, in the following pages:

DRESSMAKING.[1]

Nature of the Work.

While the term "dressmaking" covers in a broad sense the making of all sorts of dresses, certain kinds of dressmaking are excluded when one speaks of learning the dressmaking trade. The majority of the workers in factories where ready-made dresses are produced can hardly be called dressmakers, as very few of them understand the making of a complete dress, but only know how to perform some special part.

In the generally accepted sense of the word, a dressmaker is one who understands the cutting, fitting, and making of dresses sufficiently well to practice it as a trade, and not one who merely knows how to make her own dresses. Dressmakers work at their trade, however, in very different ways, some going out by the day to make dresses; others working in their own homes, either alone or with a small number of helpers; and still others running independent establishments which employ large groups of workers.

Training Required and How Secured.

A girl can begin to learn the dressmaking trade at 14 years of age if she wishes, and the opportunities for training divide themselves into several classes in accordance with her aim.

1. If she expects to master the trade and become an independent dressmaker going out by the day, she ought to spend from three to four years in preparation. A girl could hardly hope to make a success of daywork until she was 18 or 20 years of age, as she would be thrown upon her own resources and should therefore have a complete knowledge of her trade. Such training might be secured in three different ways:

(*a*) By taking a three or four year trade course in sewing and dressmaking at a technical institution.[2] While requirements for entrance to technical schools differ, the minimum is usually 16 years of age and previous high-school training.

(*b*) By serving an apprenticeship in a shop where one could be taught every branch of the trade and have sufficient practice to master each part. To accomplish much in this way a girl should be fairly mature, should have had considerable previous experience in general sewing, and should spend at least a year in a shop before attempting to do independent daywork.

(*c*) By taking short courses in special dressmaking schools or classes where drafting and fitting is taught, while at the same time gaining general practice in the making of dresses by working in a dressmaking shop for several years. Brief courses in drafting and fitting must be supplemented by a large amount of practice in order to be of any value.

2. If a girl desires to enter the trade as a beginner, with a view either to working at the trade or to becoming a skilled dressmaker at some indefinite future time, several different possibilities are open to her:

(*a*) She can take a course at the trade school, where about two-thirds of her day will be given to trade practice and the remainder of the time given to other studies which are closely related to her trade, and which will help to make her a better worker. For entrance to this school a girl need not be a graduate of grammar school, but must be 14 years of age, and while it is desirable for her to remain two years, she can take a shorter course if this seems best for her.

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[1] Bulletin No. 5. Dressmaking. Vocations for Boston Girls. Issued by the Vocation Office for Girls. Copyright, 1911, by the Girls Trade Education League, Boston, Mass.

[2] Such institutions are usually private and the expense for tuition is fairly high. Pratt Institute, Brooklyn, N. Y., and Drexel Institute, Philadelphia, Pa., are examples of this kind.

(*b*) She can go to the Practical Arts High School where the course extends over four years, and where a smaller number of hours a week is devoted to dressmaking and the remainder of the time to other studies. Graduation from grammar school is required for entrance.

(*c*) It is possible also for a girl who has a good deal of natural ability in sewing to start with a dressmaker at the age of 14 or 15 at a small wage and gradually learn the trade in this way. The opportunities for this are not great, however, as dressmaking establishments are demanding trained helpers and are apt to give a young and inexperienced girl little to do besides running errands. The prospects for the average girl in thus working up her trade are not as bright as though she had taken previous training.

The Girl: Qualifications Required.

To be a dressmaker a girl should have good eyesight, a good sense of color, and an ability to use her hands readily. She should be able to apply herself steadily and be fairly quick in her movements. Neatness of person is also essential for success, and a girl who dislikes sewing either by hand or machine, or who can not endure close confinement, should not consider entering the dressmaking trade.

Positions and Pay.

Girls who have sufficient training to go out by the day can command from $1.50 to $3.50 or more per day, dependent upon their experience and the quality of work which they can do. The more usual wage for those who are beginning to work up the trade is $1.50 to $2, and this generally includes luncheon and dinner.

In dressmaking shops positions and pay are somewhat variable. In most of the shops which are large enough, however, the work is subdivided so that girls specialize more or less on some part of the dress. Aside from the head person (who usually does all the planning and cutting) there are:

1. Waist drapers—who fashion the waist in accordance with the chosen style. These are paid from $12 to $25 per week, and sometimes in the larger and more select places expert waist drapers get as much as $35 and $40 a week.

2. Waist finishers—who take the waist after it is modeled and complete it. These receive from $6 to $10 a week, and are gradually working up to the position of draper.

3. Sleeve makers—who fashion and make the sleeves. The head sleeve girl usually gets from $12 to $15 and her helpers get from $6 to $8.

4. Embroiderers and collar makers—who are able to put in fancy stitches according to the prevailing styles. These also receive from $6 to $12.

5. Skirt makers and finishers—who attend to skirts only and who receive from $6 to $12 and $15 a week. The head skirt girl usually gets $12 or $15 and sometimes more.

If a shop is large enough there is also an errand girl, who delivers orders and performs other minor duties; a shopper, who goes to the stores for trimmings and materials to match samples; and often also, a girl who assists at the fittings, attends to the order of the room, and performs other minor duties. These girls are paid from $2.50 to $5 a week.

Opportunities for Employment and Advancement.

The demand for girls in dressmaking establishments is very great, and those who have had training can always secure positions. There is, too, every opportunity for advancement, as a girl who has ability can look forward to mastering the trade step by step until she is manager of her own establishment, earning anywhere from $1,000 to $5,000 or more a year. As a rule advancement is more easily secured if a girl receives a general training, such as that given at a trade school, before she enters a shop. In this way she understands how to work on different parts of the dress, so that even though her work is confined to waists, sleeves, or skirts at first, she can more readily advance from one position to another, and so gradually gain experience which enables her to master the entire trade.

It is usually better for a young girl who has had only a trade-school training or less to go into a small shop at first, where the work is not too specialized and subdivided,

as here she has greater variety given her and so advances much more rapidly, even though she may not earn quite as much at first.

Conditions of the Work.

Conditions in dressmaking shops vary greatly. In the large shops which are subject to factory inspection, the laws regarding working hours are fairly well adhered to. The hours are usually from 8 a. m. to 6 p. m., with one-half hour for luncheon, and the work is continuous for the entire six days of the week. In the dressmaking departments of the large stores these are somewhat less, often not more than eight or eight and one-half hours per day. In small shops, often conducted in the homes of the employers, the hours are apt to be irregular and, as these places are not well inspected, the laws are frequently broken through ignorance, and girls are required to work overtime.

The seasons are no less variable than the hours. In general it may be said that dressmaking is fairly steady for about nine months of the year, there being approximately two dull months in summer and one in winter. In the dressmaking departments of the large stores, the seasons are apt to be pretty steady, while in small shops the busy seasons last from 9 to 10 months.

Suggestions for a Girl Choosing the Vocation of Dressmaking.

1. A girl should like to sew and have a real aptitude for it, as these qualities are necessary for success.

2. General school training is greatly to a girl's advantage, as a knowledge of English, of business accounting, and of design will be especially useful in building up a good custom and becoming a successful dressmaker.

3. If only a short time can be devoted to training, a year or two spent at the trade school will prepare a girl to take a good position in a shop with fair wages and a chance for promotion.

4. If a longer time can be given to training for dressmaking, a four-year course taken at the Practical Arts High School will prepare a girl for entrance to the trade and give her much general useful knowledge besides, especially in the line of cooking and household art.

5. If a girl who desires to learn dressmaking must begin to earn money as soon as she has completed her compulsory schooling, it would be advisable for her to enter a small dressmaking shop or get a chance to sew with a dressmaker who works at home. In a small shop she is more likely to have different kinds of work thrust upon her and so gradually learn her trade. Progress, however, is apt to be much more difficult and slow for a girl who has not had previous training, and her success is much more a matter of chance.

BOARD OF HEALTH REPORT.

No report has been given by the State or city board of health on conditions of work in dressmaking.

FROM SPECIAL REPORTS OF THE UNITED STATES CENSUS.

Statistics of women at work, 1900.

At the Twelfth Census 338,144 women 16 years of age and over in continental United States were reported as dressmakers. They formed 97.5 per cent of the total number of persons—men, women, and children—engaged in that occupation.

Of the other occupations which furnished employment to at least 5,000 women, two—that of servant and waitress and that of agricultural laborer—contained a larger number than the occupation of dressmaker; but in none was the percentage of the total formed by women higher.

In addition to dressmakers, 138,724 women 16 years of age and over were classified as seamstresses and they formed 91.9 per cent of the total number of persons included in that occupation; but the figures are misleading, as the census returns included

workers of various types, from women working in sweatshops to those going out to do sewing by the day.

As would be expected, dressmaking is most important for working women of French parentage * * *. Among most of the other European nationalities, also, the percentage of female breadwinners who were dressmakers is considerably higher than the corresponding percentage for the native white of native parentage. The marked endency of the women of these nationalities to enter the occupation may probably be attributed to the fact that dressmaking has for years been considered an important part of the public-school training of girls in many countries on the Continent of Europe.

FROM THE MASSACHUSETTS CENSUS: SELECTED OCCUPATIONS, 1905.

A.—Age periods for dressmakers.

	The State.			Boston.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 16 years	.....	38	38	.....	16	16
16 to 24 years, inclusive	11	2,875	2,886	10	1,142	1,152
25 to 44 years, inclusive	23	10,283	10,306	20	3,284	3,304
45 to 64 years, inclusive	4	4,565	4,569	3	1,144	1,147
65 years and over, and unknown	.....	489	489	.....	125	125
Aggregate number	38	18,250	18,288	33	5,711	5,744

B.—Age periods for seamstresses.

	The State.			Boston.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 16 years	9	47	56	2	37	39
16 to 24 years, inclusive	36	1,344	1,380	70	1,106	1,176
25 to 44 years, inclusive	43	2,214	2,257	74	1,116	1,190
45 to 64 years, inclusive	11	1,293	1,304	4	483	487
65 years and over, and unknown	5	296	301	1	81	82
Aggregate number	104	5,194	5,298	151	2,823	2,974

In the above tables the figures given for seamstresses in the State are for seamstresses classified separately from necktie and neckwear makers, shirtwaist, skirt, and wrapper makers, and underwear makers. Seamstresses in Boston, however, are placed in one class, and it is impossible to tell if any or how many of these are workers in factories on ready-made clothing and how many are seamstresses doing work at home or going out by the day.

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The needle trades. Butler, Elizabeth B. (Women and the trades. N. Y., Charities Publication Committee, 1909, vi, vii, pp. 101–140.)[1] [2] 3563.307.4

A study of women in seasonal trades, with special reference to dressmaking, millinery, and machine operating. (In preparation by the research department of the Women's Educational and Industrial Union, to be published in the fall of 1911.)

[1] Copies in Reference Library, Vocation Office.

[2] Boston Public Library number.

MILLINERY.[1]

Nature of the Work.

While the term "millinery" is sometimes used in a broad sense to cover the manufacture of all kinds of hats, it is not generally so understood. In considering the millinery trade certain lines of work are therefore excluded. These are, first, the pressed hats made in straw or felt and sold untrimmed, and, second, the so-called ready-to-wear trimmed hats. The making and trimming of these hats are trades by themselves and the work is usually confined to large factories where much of it is done by machinery.

The millinery trade is more commonly spoken of in connection with custom millinery and means rather the mastering of all the steps which go into the designing, making, and trimming of hats to suit the tastes of individual customers. This work is carried on in special millinery shops and in millinery departments of large stores.

Processes.

Millinery requires a fundamental knowledge of sewing and measurement, and the different processes in learning the trade are these: A beginner is first taught to make bands or bandeaux, which are sewed into the inside of the crown in order to make the hat fit the head, and to make and sew in the linings. Next she is taught to make frames of both wire and buckram and to cover them with whatever material the hat is to be made—velvet, silk, chiffon, lace, or straw, as the case may be. Up to this point the millinery worker is known as a maker, which means that she is able to prepare the hat ready for the trimming. This might seem comparatively simple if frames were always the same shape and always covered in the same way, but since they are made in almost every possible shape and size the skill required in hat making is considerable. In some seasons the velvet or silk must be fitted on perfectly smooth, requiring the most careful planning and handling in order that there shall be no wrinkles and that every seam shall come in the right place. In other seasons hats are draped, and the maker must understand how to plan her material and put it on in graceful folds. Again, in other seasons, facings and crowns are shirred or plaited, and so the art of the maker is one which requires great skill in a variety of ways. The next process in millinery is that of trimming—sewing on the flowers, feathers, or other ornaments. Above the trimmer is the designer, who creates original models in accordance with suggestions gained from Paris in regard to shape, materials, color combinations, and trimmings.

Positions and Pay.

In general, it may be said that there are three distinct kinds of work in the millinery trade for which girls may prepare:

1. The position of maker, in which the steps of progress are—

(*a*) An apprenticeship, acquired either by training in a trade school or by giving from six months to a year in a millinery shop without pay and from which a girl advances to—

(*b*) An assistant maker or helper, in which she starts with from $3 to $4 and is raised to $5 or $6 within a year or two, if she is an average worker.

(*c*) A maker, in which a girl earns from $8 to $12 and is responsible for seeing that the hats are prepared ready for the trimmer.

2. The position of trimmer, which usually requires previous training in making but which demands more originality and artistic ability. Trimmers get from $15 to $25 a week, and sometimes higher.

3. The position of designer, which is separated from that of trimming in the larger establishments only, and which pays from $25 to $40 or more a week.

[1] Bulletin No. 6. Millinery. Vocations for Boston Girls. Issued by the Vocation Office for Girls. Copyright, 1911, by the Girls Trade Education League, Boston, Mass.

While the millinery trade offers excellent opportunities for girls who have ability, there are certain difficulties which ought to be clearly understood by every girl before she decides to enter the trade.

Conditions of the Work.

1. The seasons are short, and although in some establishments they are longer than in others, because the millinery workers may be assigned to other duties when the millinery trade is dull, yet in general the millinery seasons are not longer than 14 weeks in the spring and again in the fall, making not more than 28 weeks of employment during the year for a large percentage of those employed in the trade. These short seasons are particularly difficult for beginners, who are rarely earning more than $8 a week at the end of two years and who are apt to be the first to be laid off when trade becomes slack.

As a girl advances in the trade to earn $12 or $15 a week the short seasons are not so difficult for her, as her average weekly earnings may amount to from $6.50 to $8, or as much as she would be earning in many other occupations where the work was less interesting and where she was employed every week in the year.

The clever worker can usually find employment for at least a part of her dull seasons at another occupation, and if this is of the right sort it tends to make her all the more efficient as a milliner. During the Christmas season girls can frequently secure work in the stores and this experience is of great value to the would-be milliner. In the summer girls can often find positions at country or seaside hotels or in families to care for children, so that one who has a talent for millinery can usually find some way to manage the difficulty of short seasons.

If a girl is not obliged to earn her entire living during the first few years while she is mastering her trade she can always utilize her dull seasons for her own home and family sewing, and frequently too, she can get some millinery trade, such as remodeling and the like, for her friends and neighbors, and in this way supplement her earnings. Or if she can give her dull seasons for definite training along some line, either one which will fit in with her millinery as another possible occupation, such as seamstress work, or one which will increase her efficiency as a milliner, such as design or salesmanship, she can look forward to much better prospects for adequate self-support after she has been at work for a few years.

2. The hours are long—often as long as the law permits during the busy seasons, and the work is unusually strenuous. In many of the smaller establishments evening work is required once or twice a week, but this is rarely true in the larger shops. The longest seasons and the shortest hours per day are generally found in the department stores where girls can be more readily transferred to other store work when millinery is at all slack. While the majority of beginners are laid off as soon as the season becomes slack, a girl who can turn her hand to other things and who can make herself generally useful is the one to be retained longest.

The opportunities for advancement in millinery are great, as trimmers and expert makers are always in demand and there is the widest range of possibility for girls to reach the highest position in the business. If a girl has ambition and ability and the patience to work hard and faithfully, she may look forward to having her own millinery establishment, either large or small, or she may reach the position of designer and buyer for some large establishment, where she is sent abroad once or twice a year to select foreign models and materials. In either of these positions her income may reach a very substantial figure. In the largest of these, women are making anywhere from $5,000 to $10,000 a year—while in many moderate sized establishments women are clearing from $1,500 to $2,000. Millinery is an excellent trade for girls who have the talent and who can afford to look forward to several years of only partial self-support while they are receiving their training. For those who must be self-supporting as soon as they begin to work, the difficulties ought to be squarely faced in order to avoid disappointments and discouragements later. When a girl goes to college

Opportunities for Advancement.

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or normal school to prepare for teaching she knows that she must spend from two to four years of time and considerable money before she will be ready to practice her vocation. So in millinery a girl should know in advance that she must spend two or three years of time before she is adequately prepared to earn a complete living. In the latter case, however, she is earning her training, while at the same time contributing something toward her self-support.

In Boston there are several ways that millinery training may be secured:

Training Required and How Secured.

1. By taking a course at the Trade School for Girls. This is open to girls of 14 years of age and over, and extends over two years. Girls who complete this course are placed in millinery establishments as makers.

2. By serving an apprenticeship in a millinery shop. While this is still possible for an older girl who shows considerable promise, most of the so-called apprenticeships are little more than errand girl positions. Where a shop is small and an employer conscientious, a girl may have a good opportunity to learn the trade. An apprentice is generally required to give two seasons without pay, after which she may start with a small wage.

3. By attending private millinery schools and classes. These are not as a rule advisable for young girls but are adapted to older girls and women who have had a good deal of previous knowledge of sewing and handling materials. All such charge a tuition fee. Millinery classes connected with settlements or clubs are not often complete enough to do more than teach millinery for home use.

The Girl: Qualifications Required.

The desire to be a milliner may help somewhat in determining fitness to enter the trade, but there are more certain ways to test one's probable success or failure in millinery. The first tests might be those of taste. A would-be milliner should like to sew—to handle materials, to combine colors and the like. The next tests might be physical. A girl should have good eyesight, good endurance, and, above all, dry hands and an ability to use her fingers quickly. If one has clumsy, moist hands she is almost certain to be a failure. Other tests might be those of personality. One should be neat and careful in dress and should always care to make an attractive appearance. An interest in people is also to one's advantage, as in working up to be a trimmer, designer, buyer, or millinery saleswoman, one must be able to handle customers skillfully.

As in almost everything, the longer a girl can remain in school for general training, the better chance she has for success. If a girl is obliged to begin her millinery apprenticeship at 14 she should continue her studies in English, arithmetic, and design at evening school.

To the young girl who has completed her general school training these suggestions are made:

Suggestions for Entering the Trade.

1. Be sure you have the taste and the physical and personal characteristics needed.

2. Learn to sew well and quickly, both by hand and machine.

3. If you can do so, take a course at the Trade School for Girls, where you will be taught the principles of millinery and where you will also receive training in design, English, and arithmetic, and in the care of your health, and where you will get a good knowledge of industrial conditions, which will help you to succeed in your trade.

4. If you can not go to the trade school, enter a small millinery shop, where you will be given a variety of work to do, from shopping and delivering hats to assisting with the making. Each new responsibility will increase your opportunity to learn the business. In a small place you will have more varied duties, but in all probability you will have a better chance to learn the trade, as in a large shop your time is often all spent in doing errands and sewing in linings and bands.

5. In general, watch for every chance to try some part of the work which you have not done before. Observe the more skillful workers and practice at home and in your spare minutes. Study hats in shop windows and try to sketch them, and do everything to make yourself as useful and as skillful as possible.

BOARD OF HEALTH REPORT.

No report has been given by the State or city board of health on conditions of work in the occupation of millinery.

FROM THE MASSACHUSETTS CENSUS.

Selected occupations, 1905: Age periods for milliners.

	The State.			Boston.		
	Males.	Females.	Total.	Males.	Females.	Total.
Under 16 years	.....	34	34	.....	12	12
16 to 24 years, inclusive	4	2,028	2,032	1	569	570
25 to 44 years, inclusive	26	2,688	2,714	16	820	836
45 to 64 years, inclusive	18	520	538	5	123	128
65 years and over, and unknown	.....	43	43	.....	10	10
Aggregate number	48	5,313	5,361	22	1,534	1,556

FROM SPECIAL REPORTS OF THE UNITED STATES CENSUS.

Statistics of women at work, 1900.

At the census of 1900 there were 82,936 women reported as milliners in continental United States, and the occupation was fourteenth in rank among the pursuits in which women are engaged as breadwinners. Millinery is preeminently a woman's occupation, 94.4 per cent of all the milliners being women. Only two occupations had a larger proportion of women—that of dressmaker, with 97.5 per cent, and that of housekeeper and stewardess, with 94.7 per cent. These three occupations and that of seamstress, with 91.9 per cent, were the only ones in which women constituted over nine-tenths of all persons employed.

In addition to the women engaged as milliners, 3,184 girls from 10 to 15 years of age were so employed. Thus the total number of female milliners was 86,120, or 98 per cent of all the milliners.

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Drysdale, William. Helps for ambitious girls. N. Y., Crowell & Co., 1900, xxxvii, xxxviii, pp. 441–453.[1] [2] 5589.180

Richardson, Anna Steese. The girl who earns her own living. N. Y., Dodge, 1909, viii, pp. 100–112.[1] [2] 5588.210

A study of women in seasonal trades, with special reference to dressmaking, millinery, and machine operating. (In preparation by the research department of the Women's Educational and Industrial Union, to be published in the fall of 1911.)

[1] Copies in Reference Library, Vocation Office.

[2] Boston Public Library number.

BOOKBINDING.[1]

Nature of the Work.

Bookbinding, as the name implies, means binding the pages of a book securely together and into its cover. This includes all the processes necessary in the making of a book after the paper has been made and the printing done. The work of the different binderies varies according to the character of their product. Some of them make such books as literary and historical works, novels, and school and college textbooks. Others rebind old school and library books, some make blank books, pamphlets, and catalogues, and still others make notebooks and diaries or do loose-leaf work and manifold sheeting. In binderies of the first-named class girls perform many of the first processes which the books must undergo on their way to completion. These are:

Processes.

1. *Folding.*—The printing has been done on large sheets which have then been sent to the bindery. Here they are folded over and over until in length and breadth they are the size of one page; when they reach this form they are called "signatures." One of these signatures is the unit of a book and each book is made up of a number of these units, being either a large or small book, according to the size of the page and the number of units used. By looking closely at the top of a book and following the edge of the leaves to the back one can discover the separate signatures. In the larger binderies a great part of the folding is done by machines with automatic feeders. In addition to these there is sometimes a small number of machines which are fed by girls, whose duty is to take the sheets one by one from a large pile and feed them into the machines as rapidly as they can be taken up and folded. In the smaller binderies, girls do most of the folding by hand with the aid of an ivory folding stick, which is quite like a long paper cutter. Some hand folding is also done in the binderies where folding machines are used. This is necessary in case of special folds, of errors which sometime occur in machine folding, and in case the necessary folds are too small for the machines.

2. *Pasting.*—In the making of every book a certain amount of pasting has to be done, such as inserting illustrations, plates, and maps, and putting in the flyleaves. Until recently this was all done by hand, but machines have been invented which in some binderies are now used to do a considerable part of the pasting.

3. *Gathering.*—As a large number of copies of a book are made at one time, there are many duplicates of each signature when the folding is done. These duplicates are collected into separate piles, and the piles arranged in order of the page numbers. One signature is then taken in order from the top of each pile to form the individual book. The process of collecting these signatures is called "gathering." In some of the larger binderies gathering is done by machines, but where these are not used girls perform the work by walking from pile to pile and collecting by hand the signatures which make up each separate book.

4. *Collating.*—After every such collection of signatures is made a girl examines it to see that no error has occurred in the order of pages and that no signature is missing. This is called collating.

5. *Sewing.*—When the signatures have been gathered and collated they must be sewed together. In the larger binderies the sewing of the signatures is done by machines operated by girls, but in a few smaller binderies the sewing is still done by hand; in either case the work calls for skill and demands fairly high wages.

The remaining processes are "forwarding" and "finishing" which are performed almost entirely by men, although girls assist in certain parts. Forwarding includes "trimming" the edges of the leaves; "rounding" or curving the back of the book, previous to putting it into its cover; "backing" or jointing it along each side of this

[1] Bulletin No. 2. Bookbinding. Vocations for Boston Girls. Issued by the Vocation Office for Girls. Copyright, 1911, by the Girls Trade Education League, Boston, Mass.

rounded back to allow for the bending of the cover; "lining up" or reenforcing the back with cloth and paper, and in some books putting on the cloth head bands at the top and bottom of the back. The forwarding also includes the making of covers. Finishing means placing the design and title on the cover. Sometimes these are stamped on by a machine and sometimes "tooled" on by hand.

The more usual kinds of work which girls do in these final processes are two:

1. Laying gold leaf on the cover of the book preparatory to stamping the title and design.

2. Inspecting the books after every process has been completed to detect any pages which may be marred or soiled; for these must be replaced by perfect ones before the book goes out from the bindery.

In binderies where old books are rebound, girls are employed to take books to pieces by freeing them from their former bindings and from all stitches until they are reduced to loose signatures again. Where blank books are made and other similar work is done girls feed sheets into ruling and perforating machines and insert leaves in blank-book covers; in both blank-book and pamphlet work they do wire stitching on power sewing machines; they paste on the covers of pamphlets; and in the manifold sheeting they number sheet after sheet by the use of a power machine.

Training Required and How Secured.

No special training for bookbinding is required except what one receives in connection with the industry itself. In the busy seasons learners are taken on for some of the simpler processes such as hand folding and inserting. If they prove themselves capable of these they have later, either in the bindery where they gained their first experience or elsewhere, opportunity to learn other processes which are more interesting and which afford a better wage.

The Girl: Qualifications Required.

The majority of girls are at least 16 years of age when they gain entrance to the work of bookbinding. Little stress is laid upon educational qualifications; "a bright, smart girl, neat and able to apply herself to her work" is the type usually called for. Accuracy, speed, and skill with the hands, however, are requisites of success.

It is important that a girl who enters a bindery should be strong and healthy, especially for the work of hand folding or gathering, as the one calls for rigorous exercise of the muscles of shoulders and back and the other demands constant walking. Folding and gathering by hand are being rapidly decreased, although not entirely supplanted, by machinery.

Positions and Pay. Opportunities for Advancement.

The work which girls do in binderies is almost wholly piecework; that is, a girl is paid a certain amount for a definite number of units of work which she turns off. Her wage, therefore, depends a great deal upon the steadiness with which work is given her and upon her speed.

The occupations which are found in nearly all binderies are given in the following table, with approximate average weekly wages for each through a working year:

Kinds of work.	Wages.		
	Beginning.	Usual.	Maximum.
Hand folding	$3.00–$4.00	$7.00	$8.00– $9.00
Machine folding	4.00	$7.00– 8.00	10.00
Gathering and collating	6.00	8.00– 9.00	12.00
Sewing	6.00	8.00– 9.00	12.00
Pasting	5.00	8.50	10.00
Laying gold leaf	6.00	8.00	8.50
Inspectors	4.00	7.50– 8.00	8.00– 9.00

If a girl shows herself capable in one kind of work—the folding, for example—she may be transferred to another which requires more skill and affords better wages. By being placed temporarily on one kind of work she may, therefore, have an opportunity to advance. For example, when the sewing is done by machine, signatures are sewed together not into single books but into a long row of many like books, which are afterwards separated by hand. When business is particularly brisk and the machine operators have not the time to do this, the task is given to extra girls. While thus occupied an observant girl has an opportunity to learn the details of operating the sewing machine; if later there is an opening at the machines she is in line for the work and a better wage.

Conditions of the Work.

Hours in the binderies are usually from 8 until 5.30 daily, with one hour for lunch and Saturday afternoon free. Where piecework is done, the hours vary according to seasons; for example, in the dull season the hours are shortened in some departments.

Busy, slack, and dull seasons vary with the different binderies. Those which handle schoolbooks are busiest during the weeks of summer vacation; those putting out commercial matter find their busiest time from the middle of September to March; while with publishers of fiction the busy season is in the months preceding Christmas. During slack seasons in some binderies there is not business enough to keep all of the regular workers steadily employed, but the different times when such seasons occur at the various binderies often make it possible for the worker to find employment in her trade elsewhere.

The introduction of machinery for folding, gathering, and sewing has displaced and is still displacing workers; and even if they are fortunate enough to be transferred to other work instead of being laid off permanently, their wages are often lowered, temporarily at least. On the other hand, these same machines are doing away with some of the most tedious work which girls have had to perform.

Suggestions for a Girl Choosing the Vocation of Bookbinding.

1. A girl who seeks work in bookbinding for the first time will usually find a more ready opening in the smaller binderies, and if she secures entrance in one of these the experience which she gains there will be of assistance later should she desire a position with a larger concern.

2. Sometimes when one kind of work is slack she may be asked to try her hand at another, regardless of wage, and she will make no mistake in doing this, for experience with different processes will stand her in good stead when in the future, perhaps, she makes application at some other bindery, or when one kind of work becomes slack in her own. In other words, she may count on steadier employment if she knows more than one process. On the other hand, since she will usually work by the piece, the more skilled she becomes in one line of work the higher will be her immediate wage.

3. Her advancement will depend upon attention to and interest in her work, her willingness to learn more than one process if the opportunity comes, and the skill which, through experience, she is able to acquire in any or all processes.

MASSACHUSETTS BOARD OF HEALTH REPORT.

The work of the State inspectors of health, November, 1908, to November, 1909.

Printing and binding establishments:[1] "One modern printing establishment was exceptionally well lighted and ventilated. Only one bench, where 10 girls were employed, used artificial light. The work of the girls consisted in assembling folios.

[1] Of the district including the cities of Cambridge, Everett, Malden, Medford, Melrose, and Somerville, and the towns of North Reading, Reading, Stoneham, and Wakefield.

In this establishment was a room for outside wraps of employees, a lunch room, a lounging room, and an emergency outfit. Another large establishment was very well lighted and adequately ventilated. Several small printing establishments installed additional ventilating flues and fans at the suggestion of the State inspector of health."

FROM CENSUS REPORTS.

A.—Massachusetts statistics of manufacture, 1908: Bookbinding and blank-book making.

	The State.	Boston.
Number of establishments	39	18
Females employed	1,992	390
Males employed	1,162	309

B.—Massachusetts, selected occupations, 1905: Age periods for bookbinders in employment.

	Males.	Females.	Total.
Under 16 years	17	47	64
16 to 24 years, inclusive	541	1,101	1,642
25 to 44 years, inclusive	734	732	1,466
45 to 64 years, inclusive	259	106	365
65 years and over, and unknown	38	4	42
Aggregate number	1,589	1,990	3,579

C.—United States census of manufactures, 1905: Bookbinding and blank-book making.

	1900	1905
Number of establishments	954	908
Women 16 years and over	7,872	8,379
Men 16 years and over	7,592	8,784
Children under 16 years	507	550

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Bookbinding and account-book work. (Trades for London girls. Longmans, Green & Co. London and N. Y., 1909, pp. 67–70.)[1]

Gold laying on. (In the same, p. 65.)

[1] Copies in Reference Library, Vocation Office.

THE WOMEN'S MUNICIPAL LEAGUE OF BOSTON.

The active work of the league along the lines of vocational guidance began early in 1909 when its department of education appointed a committee on vocational opportunities. The aim of this committee was to study the opportunities presented for vocational training in and around Boston, especially those offered by educational and philanthropic institutions, and to make the results of this study easily accessible to children, parents, teachers, and all interested in giving vocational counsel. The following outline presents its initial plans and methods of work.

PLAN OF WORK.

1. To prepare a map showing the distribution of supplementary educational agencies and resources.
2. To prepare a directory of these educational agencies, for individual and community uses, and to issue this material in chart form periodically.
3. To prepare a report upon the character and scope of the work of these institutions.
4. As a result of this study to offer constructive suggestions so that there will be less overlapping and less waste of energy and money, and more effective cooperation.

METHOD.

1. To catalogue and classify as completely as possible the educational agencies of Boston.
2. To collect reports from these institutions and make digests of them.
3. To send out special list of questions to get needed information not given in reports.
4. To visit the most important institutions.
5. To confer with individuals and representatives of organizations who are interested in the work of these agencies.
6. To form an advisory committee made up of such persons.
7. To find out what has been done along this line of investigation either in Boston or elsewhere.

The preparation of the charts referred to under the second item of the plan is the most conspicuous of the committee's activities and is the only one which will be dealt with in detail. As a first step in their preparation, it was necessary to subdivide the types of education offered and the following outline was prepared:

Chart 1. Elementary industrial schools.
Chart 2. Advanced industrial training.
Chart 3. Commercial training in public and philanthropic schools.
Chart 4. Organized opportunities for the physically handicapped.
Chart 5. Vocational training in settlements, memorials, and guilds.
Chart 6. Vocational training in professional schools.
Chart 7. Education in schools of fine arts.
Chart 8. Apprenticeship schools.

Four of these charts have already appeared, and two more will soon be issued. The work of investigation for the first chart was done by a paid investigator, but for the three following it was done mainly by students from Harvard, Radcliffe, Simmons, and Wellesley colleges, and the School of Social Workers. Although the work thus done by students was credited as part of the college course, it was planned by the committee and carried on under its immediate direction.

This method proved so effective, both as a training in civic work for the student, and as a means of obtaining needed information for the committee, that a very full outline of the plan of work is given. Briefly described, a list of institutions giving information of the type under consideration was prepared, names of such institutions being obtained from directories, telephone books, school reports, neighborhood workers, and every source available. Reports of these institutions were secured, and the investigating students were expected to study these carefully.

A list of questions was made out covering the information it was desired to gain concerning each school. Much thought was given to the preparation of this list. Experts in various types of education were consulted, and the interests of various organizations were considered, in order that the information when gathered might be of interest to many cooperating organizations.[1]

Weekly lecture periods or conferences were held with the students, and after the plans and methods of work had been sufficiently explained each student was assigned to investigate three schools, of which the principals had been warned that a visit was impending.[2] Each school was visited twice, first to secure answers to the formal list of questions and again to clear up any points which might seem doubtful when the report of the first visit was written up. After the second visit the final report was placed on record and afterwards used for chart construction. When in proof, copies were sent to the directors of the schools concerned for criticisms and necessary additions. Throughout the investigation the work of the students was held under close supervision and carefully checked.[3]

In addition to the direct investigation by college students, the committee has made use of conferences of those specially qualified to pass on the material gathered, and has employed experts to report upon doubtful schools. This has been done for two reasons: (1) The investigation of any student must be somewhat superficial because of lack of technical knowledge and training; (2) the investigations by conferences and experts bring out many technical and expert opinions that are valuable both in listing schools and in a choice of

[1] This list is given in Appendix III, p. 491.

[2] For letters written to principals, see Forms 1, 2, and 3, Appendix IV, pp. 492 and 493.

[3] For full outline, see Appendix V, p. 494.

material. The conferences have included educational experts of every kind, business men who employ graduates of the schools in question, and graduates of the schools or others closely connected with their work. The investigation by experts has been used only when there was reason to mistrust a school, in which case a technical expert would be sent to inspect and report. No school which is believed to be unreliable has been charted.

The charts have been distributed widely in Boston and its vicinity. They are of convenient shape for hanging up in schools, factories, settlements, and similar places, and are intended to serve the double purpose of showing those who wish special training where it may be obtained, and of suggesting to those who have never considered the subject the desirability of seeking such training. To aid these ends, the committee proposes to follow up the charts, learn what effect they have actually had, and ask for suggestions as to how this effect may be increased.[1]

The types of schools already investigated by the committee are four.[2]

Chart 1 includes schools which give elementary industrial training. The pupils admitted to the majority of these are young, ranging from 10 to 18 years of age. The instruction offers to the child a favorable entrance to the industries. In some of the schools the instruction is of as much value for general education and home making as for industrial life. In all these schools the industrial instruction comprises much of the work, in some all of it. A tabular presentation of the chart follows.

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[1] For letters used in the distribution and "follow-up" of the charts, see Forms 4, 5, and 6, Appendix IV, pp. 493 and 494.

[2] If a school was found unreliable the research was discontinued. This does not mean, however, that all schools worthy of listing have been charted. There are undoubtedly many schools of excellent character which have not been given a place on the chart, because they have not come to the notice of the committee.

CHART NO. 1.—PRINCIPAL OPPORTUNITIES FOR

[Compiled by the educational department of

Free schools.	Ages of students (years).	Industries taught.	Supplementary work.
Mechanic Arts High School (public, for boys).[1]	13 and over.....	Free-hand and mechanical drawing; carpentry; wood carving and wood turning; pattern making; forging; the use of hand and machine tools; machine-shop work.	English; history; government; French or German (elective); mathematics; science.
High School of Practical Arts (public, for girls).[1]	.....do.....	Household science—cooking and housewifery; dressmaking; sewing; millinery.	English; history; science; mathematics; French or German (elective).
Trade School for Girls (public).[1]	14 to 18.....	Dressmaking; millinery; clothing machine operating; straw machine operating.	Spelling; business forms; business English; study of textiles; history of industrial conditions; color study and designs.
Evening Industrial School (public, for boys).[1]	15 and over.....	Machine drawing; architectural drawing; machine-shop practice.	Simple shop mathematics incident to practice in marine construction; tool and gig making; boiler engineering; building estimating.
Evening Industrial School (Warren Avenue branch; public, for boys and girls).[1]	.....do.....	Free-hand drawing; industrial design.	.....
Evening Industrial School (East Boston branch; public, for boys).[1]	.....do.....	Machine drawing; architectural drawing; ship drafting; sheet-metal pattern drafting.	Interior decorating for painters.
Evening Industrial School (Roxbury branch; public, for boys and girls).[1]	.....do.....	Free-hand drawing; architectural drawing; machine drawing; industrial design.	Descriptive geometry in second and third years.
North Bennett Street Industrial School (boys and girls from the public schools).[1]	10 to 16.....	Boys—Woodwork, printing, clay modeling. Girls—General housekeeping, sewing, textiles, design, cooking, laundry work.	.....
Training School for Household Service (Young Women's Christian Association).[1]	16 and over.....	Cooking; general housework; chamber work; parlor work; laundry work.	Reading; writing; elementary home nursing; plain sewing; mending.
Hebrew Industrial School (girls).	8 to 14; day school.	Cooking; kitchen and dining-room work; hand sewing; machine sewing; dressmaking; millinery.	Talks on correlated subjects and on health and hygiene.
Dorchester Industrial School (for girls).	11 to 16.....	General domestic service..	Attendance at Boston public grammar schools.
Daly Industrial School (girls).[1]	12 to 18.....	Embroidery; shirt-waist making; laundry work.	Instruction 10 months in grammar school branches.

[1] Diploma or certificate.

INDUSTRIAL EDUCATION IN BOSTON.

the Women's Municipal League, April, 1910.]

Special features.	Requirements for admission.	Division of time.	Season.
First 3 years, required work; fourth year, work elective; pupils may elect first-year courses in higher technical schools.	Graduation from Boston grammar schools, or an equivalent education satisfactory to the board of superintendents.	Trade instruction, two-fifths; drawing, one-fifth; supplementary work, two-fifths.	10 months; September to July.
First-year work required; second, third, and fourth years, industrial (elective); choral singing; physical training; costume designing; household decoration.	do	Industrial instruction, two-sixths; drawing and art, one-sixth; supplementary work, three-sixths.	Do.
Personal hygiene and gymnastics; cooking; business talks by director or guests.	Ability to comprehend and profit by the instruction given.	Trade instruction, eight-ninths; all supplementary work, one-ninth.	12 months.
Advanced machine drafting and designing; architectural design in sketching and rendering; the making of perspectives from plans and elevations.	Applicants of 15 admitted without examination; preference given to pupils already in the trade.	Trade instruction, five-fifths.	66 working nights; October to April.
Training for photo-engraver, advertisement designer, millinery, and costume.	do	do	Do.
Advanced study in machine drafting and tool design; ship and yacht design and delineation; architectural design in sketching and rendering, and the making of perspectives from plans and elevations.	do	do	Do.
Training for photo-engraver, advertisement designer, millinery, and costume.	do	do	Do.
	Special pupils selected as follows: Boys—Eliot School, Grades V to VIII, and two ungraded classes; girls—Hancock School, Grades VI and VII.	do	10 months; September to July.
	Residence of 6 months and agreement to work as domestics for at least 1 year after leaving school.	Industrial instruction, two-fifths; supplementary work, one-fifth; recreation, two-fifths.	12 months.
Summer work in domestic science; summer out-of-door work; summer out-of-door kindergarten—pupils over 15 eligible for evening classes.	Good health and good eyesight; attendance at public school.	Trade instruction, four-fifths; all supplementary work, one-fifth.	Winter session, 8 months, 4 to 6 p. m.; summer session, 3 months.
Elementary home dressmaking, home cooking, and laundry work; at the age of 17 pupils are placed in positions through application to matron; board and tuition free.	Residence in home on application to the admission committee.	General domestic training, one-fourth; public-school work, one-half; recreation, one-fourth.	12 months.
Home dressmaking; home cooking; general housework; music; typewriting; board and tuition free.	Residence in home on indorsement by parish priest.	Industrial training, three-fourths; supplementary work, one-fourth.	12 months (industrial).

Chart No. 2 includes schools that offer advanced industrial training. Upon it are listed some that are of unusually high grade, almost professional in type, while others are more elementary, offering instruction in but one vocation. The subjects taught include vocations for men and for women. The requirements for admission are varied, some requiring elementary school education, some demanding other academic preparation, while others merely ask that the pupil be able to profit by the instruction given. The age of the applicant for admission ranges from 14 years upward. Tuition varies with the courses.

In some schools pupils are paid for attendance. The season during which the school is in session varies with the type of instruction and the type of student. The day schools usually have a longer session than the evening schools, but the latter are adapted more closely to the needs of the working pupil. A tabular presentation of the chart follows.

CHART NO. 2.—PRINCIPAL OPPORTUNITIES FOR

[Compiled by the educational department of

ADVANCED INDUS-

Industrial education offers the student a favorable entrance into the industries. To get the

A.—Schools for men.

Name.	Subjects taught.	Special features.
Lowell Institute School for Industrial Foremen (Massachusetts Institute of Technology).	Training in industrial science to fit men already in the trades for advancement in mechanical and electrical pursuits.	Instruction by members of the Massachusetts Institute of Technology teaching staff.
Franklin Union	(*a*) Machine construction, industrial chemistry, electricity, steam engines and boilers, structures, architectural working drawings; (*b*) sheet-metal drafting, mechanical drawing, estimating for architects and builders, heating and ventilating, gas engines; (*c*) training for firemen, concrete construction, watch repairing.	Complete laboratory equipment of latest commercial apparatus.
The Polytechnic School (of the Association Institute, inc. under Boston Y. M. C. A.).	Engineering — Mechanical, structural, steam, railroad.	
Hawley School of Engineering.	Operating electrical machinery; training steam engineers; firing.	Complete working steam and electric plant; of assistance to students in passing State examinations; of value as supplementary work to men already in the trade.
Evening Trade School (of the Massachusetts Charitable Mechanic Association).	Carpentry; masonry; plumbing; pattern drafting; sheet-metal work; electricity.	A shop for each trade
Evening School of Electricity (of the Association Institute, inc. under Boston Y. M. C. A.).	General electricity (theory and practice)—Laboratory exercises, mathematics, physics, mechanical drawing.	
North End Union	Plumbing; printing	
Waltham Horological School.	Watch repairing; engraving; work of an optician.	
Piano Tuning Department (factory of Chickering & Sons).	Piano tuning, voicing, regulating, and repairing; piano polishing.	Three-year training under factory conditions; diploma.
Shoe and Leather School (public).	Methods of manufacture and merchandising of leather and leather products.	Instruction given by practical leather dealers.

VOCATIONAL EDUCATION IN BOSTON.

the Women's Municipal League, April, 1911.]

TRIAL TRAINING.

best results, such education must be supplemented by actual experience under shop conditions.

A.—Schools for men.

Requirements for admission.	Tuition.	Season and length of course.	Placing of students.
18 years of age or over; must pass an examination on arithmetic (including metric system); elementary algebra; plane geometry; mechanical drawing.	Free.....	7.30 to 9.30, 3 or 4 evenings per week; 2-year course.	.....
14 years of age or over; 18 years preferred; preference given to men already in the trade.	From $6 to $10 per season.	Monday, Wednesday, and Thursday evenings (70 lessons); Saturday afternoons (24 lessons); group a, 2-year course; group b, 1-year course; group c, 3-months course.	.....
Ability to profit by the instruction given.	Varies with course.....	Day and evening courses 30 weeks in the year; structural engineering, 4-year course; mechanical engineering, 3-year course; steam engineering, course long enough to fit for State examinations.	.....
17 years of age or over; grammar-school education.	Electric day course, $60; electric evening course, $40; combined steam and electric course, $110; first-class engineer course, $60; second-class engineer course, $45; third and fourth class engineer courses, $35; extra first-class fireman course, $30; first-class fireman course, $25; second-class fireman course, $20.	The school is open for study Monday to Friday, 9 a. m. to 5 p. m. and 7 to 9.30 p. m., except during August; length of time required depends on ability, course, and amount of time given; varies from 5 months to 1 year.	No charge is made for the placing of graduates.
17 years of age or over; grammar-school education; references to certify good moral character.	First year, $12; second year, $10; third year, $8.	From 7 to 9.30 p. m., Mondays, Wednesdays, and Fridays, from October to April; 3-year course.	.....
Ability to profit by the instruction given.	Fifteen-weeks course, $25; three-year course—first year $35, second and third year each $50.	15-weeks course—2½ hours, 3 evenings per week; 3-year course.	.....
Plumbing course—17 years of age or over, must be in the trade; Printing course—16 years of age or over, apprenticeship indenture required.	Plumbing—Fifty lessons, $10.	Plumbing—2 evenings shop work, 1 evening lecture, course 1 to 3 years; printing—8 hours daily, 50-weeks course.	.....
Ability to profit by the instruction given.	$200.....	8 a. m. to 5 p. m. throughout the year, except short midsummer vacation; 1-year course.	Opportunity through business connections of the school for placing graduates.
16 years of age or over; a musical ear and mechanical ability; probationary period of 3 months.	Pupils are paid—Nothing during probationary period; from $3 to $8 per week as progress is made.	7.30 a. m. to 12 m.; 1 p. m. to 4.30 p. m., all working days throughout the year; 3-year course.	.....
Most pupils are high-school graduates and range from 17 to 25 years of age; must be employed in the trade; must have permission of employer to attend without loss of wage.	Free	.....	.....

CHART NO. 2.—PRINCIPAL OPPORTUNITIES FOR ADVANCED INDUSTRIAL

B.—Schools for men and women.

Name.	Subjects taught.	Special features.
The Automobile School (of the Association Institute, inc. under Boston Y. M. C. A.).	Automobile care, repair, and driving.	A complete shop.
New England Linotype School.	Operation and mechanism of the linotype machine.	The instruction is by actual experience on running machines.
Boston School of Telegraphy.	Telegraphy—Commercial, railroad, brokerage, wireless.	
Boston Telegraph Institute.	Telegraphy (Morse and continental)—Commercial, railroad, brokerage, wireless.	
Faust School of Pianoforte and Organ Tuning.	Piano, reed, and pipe organ tuning, repairing, and regulating; player piano—regulating and repairing.	Instruction is by actual experience in the practice rooms of the school and in the factory of Chickering & Sons; certificates for special courses; diploma for full two-year course.
Eliot School.	Mechanical drawing; architectural drawing.	Individual instruction.

C.—Schools for women.

Miss Farmer's School of Cookery.	Cookery—Advanced, invalid, institutional, infant and child, waitresses' and housemaids' course, dietetics, marketing.	
The McDowell Dressmaking and Millinery School.	Garment cutting; dressmaking; French and American millinery.	Individual instruction.
The Trade School Shops (Women's Educational and Industrial Union).	Hand sewing (children's clothing); millinery; dressmaking.	These shops give training under actual business conditions.
Training of Women as Attendants (Vincent Memorial Hospital.	Care of convalescents, feeble or elderly persons, subacute and chronic cases.	
Training School for Nursery Maids (Hospital of Massachusetts Infant Asylum).	Care of infants; nursery work.	Food-room work, including the making of modified milk, whey, barley water, beef juice, etc.

VOCATIONAL EDUCATION IN BOSTON—Continued.

TRAINING—continued.

B.—Schools for men and women.

Requirements for admission.	Tuition.	Season and length of course.	Placing of students.
Ability to read and write.	Lecture course, $12; shop and laboratory course, $13; road course (100-mile run), $18; total, $43.	Day classes all the year; evening classes Oct. 1 to July 1; 6 weeks are necessary for the three courses.	Some attempt is made to find positions, but the best guarantee is the thorough course.
18 years of age or over; 3 years' experience in the printing trade.	Day course, $60; evening course, per week, $5.	Day course, 8 hours 6 days per week for 8 weeks; evening course, 6 to 10 p. m. 3 evenings per week for 12 weeks.	Effort is made to place graduates, but positions are not guaranteed; there is a shortage of employees in this trade throughout the country.
15 years of age or over; grammar-school education.	Varies with time and course.	Day and evening sessions; course 6 months or longer; pupils may enter at any time.	Effort is made to place graduates, but positions are not guaranteed (graduates mostly employed by railroads).
16 years of age; preferably 18 years or over; grammar-school education.	Complete course, $100 or $125; pupils may also attend and pay by the month.	Day and evening sessions throughout the year; pupils may enter at first of any month.	Employment department for benefit of graduates.
18 years of age or over; musical and mechanical ability.	Piano tuning, $150; pipe organ, $75; reed organ, $25; player piano, $50; full 2-year course, $250.	Day and evening classes throughout the school year of 10 months; complete course in the school year is possible.	Effort is made to place graduate students.
.....	$1 to $5, to cover cost of materials.	Day classes from Oct. 1 to June 1; evening classes from Oct. 1 to Apr. 1.	.....

C.—Schools for women.

18 years of age or over...	Invalid cookery, $50 or $65; waitresses' course, $12; advanced cookery, $14, $16, $18; housekeepers' course, $30.	Morning, afternoon, and evening classes.	.....
16 years of age or over; some knowledge of sewing.	Course in cutting, $20; course in dressmaking (per month), $10; course in millinery, $25.	9 a. m. to 12 m., except Saturday, in drafting room; course 2 weeks to 3 months; 9 a. m. to 4 p. m. in sewing room, course indefinite length; 9 a.m. to 4 p.m. in millinery room, course 8 weeks; evening classes, Monday, Wednesday, and Friday, 7 to 9 p. m.; pupils admitted at any time.	Effort is made to place pupils.
Must have working girl's certificate; previous training equivalent to one year at the Boston Public Trade School for Girls.	Pupils are paid $4 to $6 per week.	8.30 a. m. to 5.30 p. m.; 6 months to 1-year course.	Positions are found for graduates.
Between 20 and 40 years of age; grammar-school education; references of high character.	$25.....	7.30 a. m. to 8 p. m.; classes will begin at intervals of 6 weeks; 12-weeks' course.	A certificate of this association permits the holder to register as attendant at the directory of nurses.
Between 17 and 25 years of age; grammar-school education; good health; certificate of character and ability.	Pupils are paid $6 per month after the first month and supplied with two uniforms; (lodging, board, and laundry free).	Training in nurseries 7 a. m. to 7 p. m.; 6 months in the hospital; 2 months in private family; 2 hours free every week day; 4 hours free every Sunday; 1 afternoon free every week.	Positions assured graduates without registration fee.

CHART NO. 2.—PRRINCIPAL OPPORTUNITIES FOR ADVANCED INDUSTRIAL

C.—Schools for women—Concluded.

Name.	Subjects taught.	Special features.
Training School for Nursery Maids (Infants' Hospital).	Care of infants; nursery work.....	Food-room work, including preparation of infants' food, modified milk, whey, barley water, beef juice, etc.
Paul Revere Pottery (Girls' Bowl Shop).	Pottery—Glazing, outlining, painting.	Complete pottery equipment.....

VOCATIONAL EDUCATION IN BOSTON—Concluded.

TRAINING—concluded.

C.—Schools for women—Concluded.

Requirements for admission.	Tuition.	Season and length of course.	Placing of students.
Between 18 and 25 years; grammar-school education; good health; certificate of character and ability.	Pupils are paid $5 a month; two uniforms are supplied by the training school (lodging, board, and laundry free).	Training in the nurseries 7 a. m. to 7 p. m.; 4 months in the nurseries; 2 months in a private family; time off duty—1 hour each day, 1 afternoon each week, 4 hours each Sunday.	Positions assured graduates without registration fee.
15 years of age or over; must be member of "Library Club House."	Pupils are paid.....	Any time of day and year.	.....

Chart No. 3 includes public and philanthropic schools which offer commercial training. On this chart are listed the high schools of the city and a few philanthropic schools. No attempt has been made to list such schools conducted by private enterprise. The chart reveals places where commercial training may be secured, something of the equipment of the schools, requirements for admission, tuition, season and length of course, and the effort made by the school to place its graduates. A tabular presentation of the chart follows.

CHART NO. 3.—PRINCIPAL OPPORTUNITIES FOR

[Compiled by the educational department of

COMMERCIAL TRAINING IN PUBLIC

Commercial education offers the student a favorable entrance into business. To get the best

A.—Schools for boys.

Name.	Commercial subjects taught.	Special features.
High School of Commerce (public).[1]	English (with special reference to business forms); bookkeeping and accounting; business knowledge and practice; local industries; stenography and typewriting; commercial law; commercial geography; commercial arithmetic; economics; history of commerce and industry.	(1) Apprenticeship work; (2) business men's advisory committee; (3) series of lectures by business men on business, economic, and civic subjects; (4) special courses by laymen; (5) visits to business houses.
English High School (public).[1]	English (with special reference to business forms); bookkeeping; stenography; typewriting; commercial law; commercial geography; commercial arithmetic; economics; history of commerce and industry.	An excellent general equipment for commercial purposes; special attention given to commercial geography, for which a large collection of specimens is provided; excellent courses offered in shorthand and in typewriting.
School of Cooperative Business (of the association institute, Boston Y. M. C. A.).[1]	English; bookkeeping; penmanship; stenography; typewriting; commercial law; commercial geography; commercial arithmetic; economics; salesmanship; advertising; office routine.	The student works at the school and at cooperating business houses on alternate weeks; during the summer he is employed for full time by the cooperating firm (except for two weeks' vacation); wages exceed tuition and leave a substantial balance.

B.—Schools for boys and girls.

Brighton High School (public).[1]	English (with special reference to business forms; bookkeeping; stenography; typewriting; commercial law; commercial geography; commercial arithmetic; economics; history of commerce and industry.	Special attention is given to pupils preparing for commercial work; good equipment for commercial purposes.
Charlestown High School (public).[1]	.....do.....	.....do.....
Dorchester High School (public).[1]	.....do.....	Special attention is given to pupils preparing for commercial work; the new annex to be equipped and used exclusively for commercial purposes.
East Boston High School (public).[1]	.....do.....	Special attention is given to pupils preparing for commercial work; good equipment for commercial purposes.
South Boston High School (public).[1]	.....do.....	.....do.....
West Roxbury High School (public).[1]	.....do.....	.....do.....
Dry Goods Continuation School (public).[1]	Textiles—Production, manufacture, distribution; salesmanship.	Talks and lectures by experts; frequent visits to mills.
Preparatory Salesmanship Continuation School (public).[1]	English; penmanship; arithmetic; salesmanship; textiles (raw materials and merchandise).	Practical talks on the conditions of success in salesmanship; hygiene.

[1] Certificate or diploma.

VOCATIONAL EDUCATION IN BOSTON.

the Women's Municipal League, April, 1911.]

AND PHILANTHROPIC SCHOOLS.

results such education must be supplemented by actual experience under business conditions.

A.—Schools for boys.

Requirements for admission.	Tuition.	Season and length of course.	Placing of students.
Graduation from a Boston elementary school or from other public or private schools whose standards are satisfactory to the board of superintendents; also by examination.	Free to residents of Boston.	6 hours daily for 5 days a week, September to June; regular course 4 years; special post-graduate course 1 year.	Effort is made to place graduates through the vocational counselor.
.....do.....	.....do.....	5½ hours daily for 5 days a week, September to June; 4 years' course.	Students are placed by organized methods.
An elementary school education or its equivalent; a high-school education is preferred.	$75 per year, payable monthly; pupils are paid while working for cooperating firms.	9 a. m. to 2.15 p. m., school hours; regular hours of business house during alternate weeks; September to June (June to September with business house); 3 years' course.	Students are in positions throughout the course; it is expected that they will remain permanently with these firms.

B.—Schools for boys and girls.

Graduation from a Boston elementary school or from other public or private schools whose standards are satisfactory to the board of superintendents; also by examination.	Free to residents of Boston.	5½ hours for 5 days a week, September to June; 4 years' course.	Successful effort is made to secure positions for pupils of high standing.
.....do.....	.....do.....	.....do.....	Do.
.....do.....	.....do.....	5½ hours for 5 days a week, September to June; regular course, 4 years; intensive course, 1 year.	An employment service is maintained, and successful effort is made to secure positions for pupils of high standing.
.....do.....	.....do.....	5½ hours for 5 days a week, September to June; 4 years' course.	Graduates of high standing are placed.
.....do.....	.....do.....	.....do.....	Successful effort is made to secure positions for pupils of high standing.
.....do.....	.....do.....	.....do.....	Do.
Employment in the dry-goods business; permission of employer to attend during working hours without loss of pay.	Free; pupils are paid full wages while attending the school.	3.30 to 5.30 p. m., Monday and Friday; October to February or February to May.	Students already have positions, but interest is taken in their advancement.
Between 14 and 18 years of age and employment in a retail store; permission of the employer to attend during working hours without loss of pay.	.....do.....	8.30 to 11 a. m., or 3 to 5.30 p. m.; 2 days a week, October to May; 30 weeks' course.	Do.

CHART NO. 3.—PRINCIPAL OPPORTUNITIES FOR COMMERCIAL TRAINING IN PUBLIC

C.—Schools for girls.

Name.	Commercial subjects taught.	Special features.
Girls' High School (public).[1]	English (with special reference to business forms); bookkeeping; stenography; typewriting; commercial law; commercial geography; commercial arithmetic; economics; history of commerce and industry.	Civil-service course; training is given in the use of the various office appliances, such as the mimeograph, copying press, billing and adding machines; intensified clerical course planned, beginning 1911–12.
Roxbury High School (public).[1]	.....do.....	An intensified clerical course with bimonthly promotions of such pupils as can pass rigid tests. Before finishing the course it is purposed that pupils should undertake practical work for business firms to demonstrate the students' capacity.
Union School of Salesmanship (Women's Educational and Industrial Union).	(1) Salesmanship; (2) textiles; (3) business arithmetic; (4) color and design; (5) English (including spelling, penmanship, and expression).	(1) Demonstration sales, with critical analyses; (2) lectures twice a week by store men and others interested in salesmanship; (3) discussions of store experiences; (4) constant use of store materials; (5) hygiene.
Commercial School (Boston Young Women's Christian Association).[1]	English; stenography; typewriting; accounts (elementary); business; correspondence; spelling.	Court testimony; all forms of legal documents.

D.—Evening schools for boys and girls.

Central Evening High School (public, for boys).[1]	English composition; bookkeeping; penmanship; stenography; typewriting; commercial law; commercial geography; commercial arithmetic.	Civil-service course.....
Central Evening High School (public, for girls).[1]	.....do.....	.....do.....
Charlestown Evening Commercial High School (public).[1]	.....do.....	.....do.....
Dorchester Evening Commercial High School (public).[1]	.....do.....	.....do.....
East Boston Evening Commercial High School (public).[1]	.....do.....	.....do.....
Roxbury Evening Commercial High School (public).[1]	.....do.....	.....do.....
South Boston Evening Commercial High School (public).[1]	.....do.....	.....do.....

[1] Certificate or diploma.

VOCATIONAL EDUCATION IN BOSTON—Concluded.

AND PHILANTHROPIC SCHOOLS—concluded.

C.—Schools for girls.

Requirements for admission.	Tuition.	Season and length of course.	Placing of students.
Graduation from a Boston elementary school or from other public or private schools whose standards are satisfactory to the board of superintendents; also by examination.	Free to residents of Boston.	5½ hours daily for 5 days a week, September to June; 4 years' course.	Effort is made to place students, and it is planned to put this work into permanent and systematic form.
....do....	....do....	....do....	Successful effort is made to secure positions for pupils of high standing.
Applicants (*a*) must be from cooperating stores; (*b*) must have good fundamental education; (*c*) must have approval of the director of the school and of the employer.	Free; pupils are paid full wages while attending school.	8.30 to 11.30 a. m., school; 2.30 to 5.30 p. m., store; 3 courses a year, 3 months each, beginning September, January, and April.	Permanent positions and a minimum wage of $6 a week are guaranteed to graduates.
A high-school education or its equivalent; satisfactory reference as to character; preference is given to Christian races.	Day course, $7 per month; evening course, $6 per term of 25 lessons.	9 a. m. to 2 p. m. 5 days a week; 7 to 8.30 p. m. Monday and Thursday, September to June; 6 months average length of course.	The association generally places students, but does not guarantee positions.

D.—Evening schools for boys and girls.

Graduation from a Boston elementary day school or from a Boston elementary evening school or from schools of equal or higher grade; also by examination.	Free to residents of Boston.	7.30 to 9.30 p. m. on not less than 3 nor more than 5 evenings in the week; 22 weeks' session, October to April; 4 years' course.	.....
....do....	....do....	....do....	.....
....do....	....do....	7.30 to 9.30 p. m., 3 evenings in the week; 22 weeks' session, October to April; 4 years' course.	.....
....do....	....do....	....do....	.....
....do....	....do....	....do....	.....
....do....	....do....	....do....	.....
....do....	....do....	....do....	.....

Chart No. 4 includes organized opportunities for the physically handicapped. Its purpose is to show to parents and teachers, to employers of labor and to the general public that handicapped persons need not be regarded as helpless, ignorant, and dependent. The chart is intended to show where training may be secured that will take away the handicaps from children and give them chances to be happy and useful citizens. It suggests to employers of labor that efficiency can be found among the physically handicapped. Schools and workshops for the blind, the crippled, and the deaf have been listed. The purpose of each school and the industrial opportunities are emphasized by being printed in red. It is intended that this chart shall be distributed over New England. A tabular presentation of the chart follows.

CHART NO. 4.—ORGANIZED OPPORTUNITIES

[Compiled by the Educational Department of

TO EMPLOYERS OF LABOR: Handicapped persons need not be regarded as helpless, ignorant, and depend the physical handicaps. Will you cooperate with the directors of these institutions in securing suitable your interest these persons can be given opportunity to become self-supporting and prove their acquired

TO PARENTS AND TEACHERS: Below are listed some of the schools that take away the handicaps from

TO THE GENERAL PUBLIC: The cause of blindness in a great number of cases is due to opthalmia neona opthalmia neonatorum is in part as follows: Acts of 1905, chapter 251. "Should one or both eyes of an the physician, nurse, or other attendant * * * to report (this fact) in writing within six hours there $200.) The board of health shall then take action in order that blindness may be prevented.

TO THE GENERAL PUBLIC: Suggestive opportunities for the young child as well as for the adult are His growth is more normal and his opportunities for a useful life are increased. Strenuous efforts should possible age. Most handicapped adults have not had the advantage of early care and education for the for the handicapped is the best asset for the individual and for the State.

For training the handicapped to efficiency we rely upon two main elements: The state of mind which to take toward them. To be handicapped is a serious thing and requires to offset its consequences hope ment both material and personal. Only by providing such surroundings can we make the handicapped

A.—Opportunities for the blind.

Name.	Purpose.	Industrial features.	Subjects taught and special features.
Boston Nursery for Blind Babies (private home and hospital for boys and girls).	To provide a home and hospital care for infants wholly or partially blind; to supply by training the education that the physically normal child acquires by imitation.	.....	.....
The Kindergarten for the Blind (the lower school of the Perkins Institution—semipublic day and boarding school for children of kindergarten and primary school age).	The care, training and education of blind children of kindergarten and primary school age.	.....	In the kindergarten—Games, gifts, occupations, and songs; sloyd in both hard and soft materials, dancing, gymnastic exercises, and outdoor sports; the kindergarten is the preparatory department of the Perkins Institution for the Blind, to which the pupils are promoted on the recommendation of the teachers: special instruction for the deaf-blind.
Perkins Institution and Massachusetts School for the Blind (semipublic day and boarding school for boys and girls).	Education of blind children and youth, to fit them for life, that they may become wholly or or in part self-supporting and take their places in the community as respected and self-respecting citizens.	Business course—Salesmanship (store managed by pupils), bookkeeping, typewriting; piano tuning; chair seating of all kinds; mattress making and renovating; netting; basketry; pianoforte; normal department for advanced pupils who teach seeing children free.	Elementary and High School branches; Writing—American Braille, pencil, typewriting; Reading—American Braille and Boston line; library, museum, gymnasium, and athletic field; instrumental and vocal music; school chorus; physical training and dancing; sloyd; diploma given for completion of academic course; special certificates and diplomas are accepted by certain higher institutions.
State Home Teaching for the Adult Blind (under the supervision of the Perkins Institution).	To instruct blind adults at their own homes; to reveal new resources to blind pupils; to awaken them to new activities by the example, special aptitude, and personal service of their blind teachers; to make the pupils believe in themselves, and also to make their households believe in them.	Reading embossed print as fundamental to knitting, crocheting, chair caning, poultry raising, becoming proprietors of small commercial enterprises, all sorts of suggestions for occupation.	The instruction is given by blind teachers; not only the pupils of these teachers, but the blind throughout the United States and Canada have the use of the large circulating library of the Perkins Institution.

FOR THE PHYSICALLY HANDICAPPED.

the Women's Municipal League, April, 1911.]

ent. This chart is intended to suggest to all employers of labor the organized efforts made to remove employment for graduates whom they can conscientiously recommend for responsible positions? Through efficiency.
children and give them chances to be happy and useful citizens.
torum, resulting from lack of proper care of the eyes at time of birth. The Massachusetts law relating to infant become inflamed, * * * at any time within two weeks after its birth, it shall be the duty of after to the board of health of the city or town in which the parents reside. * * * (Maximum fine,

mentioned in this chart. The earlier the child's handicap is removed the more self-reliant he becomes. be made by parents and guardians to secure care and training for the handicapped child at the earliest removal of their disability. Therefore schools and shops must be maintained for them. Early training

can be created through giving them physical vitality and the attitude which the general public can be made and courage of a high order. We must, therefore, surround such persons with an inspirational environbe and do their best.

A.—Opportunities for the blind.

Requirements for admission.	Expense.	Season and session.	Placements.
Any blind or partially blind child under 5 years of age.	Admission may be free; when able to pay, the expense is adjusted to financial condition of parents or guardian; expense is borne by private contributions and by annual subscriptions; State pays per capita for State minor wards.	The home and the hospital are open all the year.	Application for admission to the Kindergarten for the Blind at Jamaica Plain must be made to the Perkins Institution by the parents or guardian.
Blind children at least five years of age who are mentally normal; no restriction as to sex or color.	Free to children of Massachusetts; other States or individuals pay $300 per pupil per annum.	Constant care and supervision in the house, classroom, and playground; September to June, inclusive, with the usual school vacations; children can not remain during the long summer vacation; course about four years.	
Too little sight to read ordinary print and sufficient intelligence to profit by instruction offered; 13 to 19 years of age; no restriction as to sex or color and no previous training is required.	Endowed and receives State grant; free to Massachusetts children; other applicants are charged $300 per annum.	September to June, inclusive, with the usual vacations; length of course is indefinite.	Every effort is made to place pupils in positions which they are capable of filling.
Any blind person living in Massachusetts who desires the hope and inspiration of example.	Expense is borne by the State.	Depends upon the amount of State appropriation and upon the number of pupils desiring instruction.	

CHART NO. 4.—ORGANIZED OPPORTUNITIES

A—Opportunities for the blind—Concluded.

Name.	Purpose.	Industrial features.	Subjects taught and special features.
Perkins Institution (workshop department for nonresident adult blind).	To afford a limited number of blind adults a living through work which they might not otherwise be able to command.	Mattress, pillow making, and renovating; chair seating of every description.	Special attention is given to the commercializing of products; the number of persons employed is dependent upon ability to keep them busy by piecework the year round; the Howe Memorial Club of graduates of the Perkins Institution grants small loans to worthy members to start them in their life work.
Massachusetts Commission for the Blind (workshops for men and women).	(1) To establish, equip, and maintain workshops for the employment of blind persons; (2) to establish schools for industrial training; (3) to devise means for the sale and distribution of home and shop products of the blind; (4) to act as a bureau of information and industrial aid; (5) to prepare and maintain a register of the blind in Massachusetts.	Cambridge (for men)—Rug weaving, mop making, broom making, chair seating; Cambridge (for women—Art fabric weaving, cane-seating; Pittsfield—Mattress making, chair seating, broom making; Lowell, Worcester, and Fall River — Mattress making, chair seating; Shop schools and industrial classes — Instruction in chair seating and mattress making is given with a view to home or shop employment; training is given in rug, mop, and broom making, and in art fabric weaving as vacancies occur and as the business expands.	Special attention is given to the commercializing of shop, school, and home products; the products of home industries of blind women are sold through the salesroom of the Perkins Institution and of the commission at 383 Boylston Street, Boston; manufactured products (mops, rugs, and brooms) are disposed of in regular commercial channels, through the commission's distributing agent; shops, especially for renovating trades (chairs, mattresses) are dependent on patronage of community; the commission may, at its discretion, make loans of tools, materials, or other equipment necessary for the chosen trade or business, either to be returned or to be paid for on easy terms.

B.—Opportunities for the crippled.

The Industrial School for Crippled and Deformed Children (private day school for boys and girls).	To promote the education and special training of the crippled and of the deformed.	Trade classes and shops for persons over 15 years of age — Typesetting, printing, basketry, cane seating, needlework, making of wooden articles.	Primary and grammar grade branches; manual training leading to the trade class and shop work; conveyed to and from school when necessary; noon meal is given.
The New England Peabody Home for Crippled Children (private home and school for boys and girls).	To provide a home for the care and education of hopelessly crippled children; to make children who would otherwise be dependent self-confident and wholly or partially self-supporting.	Sewing; cooking; housework; basketry; cane seating; typewriting; woodworking.	Primary and grammar grade branches; sloyd; open-air treatment for tubercular patients.

FOR THE PHYSICALLY HANDICAPPED—Continued.

A.—Opportunities for the blind—Concluded.

Requirements for admission.	Expense.	Season and session.	Placements.
20 to 70 years of age; blind adults of good character during years of efficiency.	The business is self-sustaining under guarantee of the Perkins Institution; piecework wages paid.	The workshop department and the salesroom are open the year round.	Permanent, subject to efficiency and good behavior.
Able-bodied blind persons, residents of Massachusetts, needing industrial training and employment; the commission requires of its apprentices—*first*, that they shall take up apprenticeship with the distinct hope and determination of making practical and effective use of the trade after its mastery; *second*, that they shall give their best energy to the mastering of the chosen trade; *third*, that they shall persevere until the trade has been learned, and shall in no case withdraw without due cause, and after consultation with the proper authorities. On the other hand, the commission reserves the right to dismiss any apprentice for sufficient reason; *fourth*, that they shall conform to reasonable and customary regulations while under instruction, both in and out of class rooms and hours.	Instruction is given without charge to citizens of Massachusetts who are qualified for the work and approved by the commission; it is expected that living or traveling expenses during apprenticeship will be borne by the apprentices or their friends, as far as possible; in cases where it is impossible for them to do so, however, the commission may, by special vote in each case, make industrial aid appropriations to be applied thereto; workmen are paid piecework wages.	Shops in operation throughout the year, but limits of capital make some industries subject to seasonal shutdown or short time according to fluctuations of trade.	The commission is able in some cases, if the apprentices desire it, to give them employment in its own workshops; in other cases in which it feels confidence and has opportunity to do so, it will make efforts to secure similar work with other employers, or to assist in establishing the apprentices in carrying on their trades as home industries.

B.—Opportunities for the crippled.

5 years of age and over; crippled or deformed and mentally normal; pupils must agree to the care and treatment prescribed by their own physician or by the physician in attendance at the school.	Tuition and training free; the school is supported by a small endowment fund and by yearly contributions.	9 a. m to 4 p. m.—October to June for primary and grammar grades, with the usual vacations; 9 a. m. to 5 p. m.—Printing shop open the entire year; time required to finish the course depends upon the physical condition of the pupil.	The school does not guarantee positions, but gives assistance when possible.
Crippled or deformed children, mentally normal, living in New England; children entered for not less than two years and must be under 12 years of age.	The expense for care, treatment, and education is adjusted to the financial condition of the parents.	Morning and afternoon sessions for 11 months in the year; pupils may enter at any time.	Assistance is given in placing pupils when possible.

CHART NO. 4.—ORGANIZED OPPORTUNITIES

B.—Opportunities for the crippled—Concluded.

Name.	Purpose.	Industrial features.	Subjects taught and special features.
Massachusetts Hospital School (public for boys and girls).	To remove physical disabilities as far as possible and build up the health of temporarily or permanently crippled and deformed children; to give practical elementary education, manual training, and vocational work suited to each case, with a view to making the children self-supporting, or at least useful members of the homes to which they return, thereby preventing indifferent helplessness and ignorance.	(*a*) For boys—Practical farm and garden work, elementary plumbing, steam fitting, firing, care of boilers and engines, electric wiring, carpentry and practical woodworking, painting, cobbling, manufacturing splints and surgical apparatus; (*b*) For girls—Rug making, hand and machine sewing, hand and machine laundering, practical housekeeping, telephone operating, library work; the above are taught under the immediate supervision of practical instructors and workmen employed at the institution.	Elementary school branches; music; sloyd leading to practical woodworking and carpentry; basketry; bookbinding.

C.—Opportunities for the deaf.

Sarah Fuller Home[1] (for little deaf children—private home school for boys and girls).	To give a home, with care and instruction, to such little deaf children as are too young to enter the Horace Mann Public School for the Deaf, and also for those whose parents or guardians can not give at home the preliminary instruction which the loss of hearing renders necessary.	.....	English is taught by means of speech and lip reading; elementary reading, writing, and number work; kindergarten occupations—sewing, weaving, paper folding, paper cutting, clay modeling.
Horace Mann School for the Deaf (public for boys and girls).	The education and training of children too deaf to attend the ordinary public school.	For boys—Woodworking; for girls—Sewing, cooking.	English is taught through speech and speech reading as a foundation for elementary school branches; paper folding; cardboard construction; free-hand drawing; sloyd leading to woodworking; the transportation of pupils to and from school is paid.
Trade School for the Deaf (private day classes for boys and girls).	Teaching of useful industries to deaf children.	For boys—Metal work; for girls—Dressmaking, millinery, embroidery, designing.	Speech and lip reading is taught the first year in connection with each trade.
New England Industrial School for Deaf Mutes (private boarding school for boys and girls).	The education and training of deaf children or children too deaf to attend the public schools advantageously.	For boys—Manual training, leading to woodworking, basketry, chair seating; for girls—Sewing.	English is taught by means of speech and lip reading in elementary school branches; light housework.
Boston School for the Deaf (public boarding school for boys and girls).	To train the minds, hands, and bodies, and develop the character of deaf boys and girls.	For boys—Manual training leading to cabinet work; for girls—Training in light housework and table work, sewing, cooking, embroidery; for boys and girls—Free-hand, model, and object drawing.	English is taught by means of speech and lip reading in elementary school branches.

[1] The Sarah Fuller Home School is limited to receive and care for but 10 children at a time, with the hope that other small home schools of the same kind may be established throughout the State.

FOR THE PHYSICALLY HANDICAPPED—Continued.

B.—Opportunities for the crippled—Concluded.

Requirements for admission.	Expense.	Season and session.	Placements.
Crippled or deformed children of the Commonwealth between the ages of 5 and 15 years who are mentally competent to attend the public schools; both sexes and all races are admitted; no previous training is required.	$4 a week—When parents are unable to meet this expense, the place of legal settlement is responsible for payment; $5 or more per week for private patients, according to the amount of care required.	The hospital is open and the school is in session all the year.	Children are dismissed when physically able to enter the public schools, or are assisted to assume positions in the community as soon as they are able to become partially or wholly self-supporting.

C.—Opportunities for the deaf.

Any deaf child between 2 and 5 years of age, mentally normal.	The State allows $250 per annum for each child unable to pay; the charge for paying pupils is $350 per annum.	9 to 11.15 a. m.; 2 to 3 p. m.; September to June; child remains in school until six years of age.	Application for admission to the Horace Mann or other schools for the deaf must be made by the parents or guardian.
Any deaf child over 5 years of age.	Free to residents of Massachusetts; expense is borne for 10 years, or in exceptional cases for a longer period, partially by the city of Boston and partially by the State.	9 a. m. to 12 m.; 1.30 to 3 p. m.; 5 days in the week; September to June.	Boston Educational Association for Deaf Children assists pupils in finding positions.
Any deaf child over 14 years of age.	Admission free; supported by private subscription; work done by the pupils is sold to pay for their tuition; 5 per cent on salable articles paid to pupils.	2.30 to 4 p. m., 5 days in the week; 9 a. m. to 12 m., 1 to 3 p. m., Saturday; September to June; 9 a. m. to 12 m., 6 days in the week, during July; 2-year course.	
Any deaf child over 6 years of age.	Admission free to residents of New England; expense is borne by endowment fund, State grant, private subscriptions.	8.30 a. m. to 12 m.; 1 to 2.30 p. m.; 5 days in the week; September to June.	
Any deaf child over 5 years of age.	Admission free; expense is borne by the State for 10 years, or in exceptional cases for a longer period.	9 to 11.30 a. m.; 1.15 to 3.30 p. m.; September to June.	Assistance given to place pupils in suitable positions.

CHART NO. 4.—ORGANIZED OPPORTUNITIES

C.—Opportunities for the deaf—Concluded.

Name.	Purpose.	Industrial features.	Subjects taught and special features.
Clarke School for the Deaf (semi-public boarding school for boys and girls).	The education and training of children too deaf to attend public schools advantageously.	For boys — Cabinetmaking, typewriting, wood carving, instrumental drawing; for girls—Sewing, cooking, weaving, wood carving.	English is taught through speech and lip reading as a foundation for elementary school branches and special high school subjects; sloyd; basketry; training in light housework; gymnasium work; normal class for teachers of the deaf under the oral method.
American School for the Deaf[1] (semipublic boarding school for boys and girls).	The education and training of children too deaf to be instructed in the public schools.	For boys—Cabinetmaking; for girls—Dressmaking, sewing, cooking.	English is taught by oral and manual methods as a basis for elementary school branches and for special high school subjects; sloyd; free-hand drawing; training in light housework.

[1] We mention the American School for the Deaf at Hartford because the Massachusetts Legislature providing for the free instruction of the deaf includes admission to this school as well as to those of the Commonwealth.

FOR THE PHYSICALLY HANDICAPPED—Concluded.

C.—Opportunities for the deaf—Concluded.

Requirements for admission.	Expense.	Season and session.	Placements.
Any deaf child over 5 years of age. There is no fixed limit to the length of time for which a pupil may be retained.	Admission free to residents of Massachusetts; expense is borne by the State for 10 years, or in exceptional cases for a longer period; the charge for paying pupils is $400 per annum.	9 to 11.45 a. m.; 1.30 to 3.45 p. m.; 5 days in the week; September to June.	Assistance given to place pupils.
Any deaf child over 6 years of age.	Expense is borne by the State for 10 years, or in exceptional cases for a longer period.	Mondays to Fridays—7 to 8.45 a. m., industrial work; 4.15 to 5.45 p. m., industrial work; 9 a. m. to 12 m., school work; 2 to 4 p. m., school work. Saturdays—7 to 11 a. m., industrial work; no school work; September to June.	Do.

SUMMARY.

It is evident that although vocational guidance is still a very new subject it is receiving much attention in Boston. The committee on vocational direction, working through the vocational counselors appointed in every school, and the Home and School Association, working through groups of parents, are acting directly upon the children and their guardians, trying to rouse an interest in the child's future which will lead to an intelligent choice of an occupation and an effort to prepare for that occupation before school days are over. The Vocation Bureau for boys and young men and the Girls Trade Education League for girls and young women are investigating trades and supplying the information as to their requirements and opportunities which the counselors need that they may advise and the children that they may choose wisely. The Women's Municipal League approaches the subject from another standpoint, securing and disseminating the knowledge of where and how, after the choice has been made, training for the chosen vocation may be secured. The vocation counselors, the Vocation Bureau, and the Girls Trade Education League are all carrying on active work in inciting the children to secure the necessary training, in following them up after they become wage earners, and in aiding them through the difficult period of adjustment. All work in the closest cooperation, with the result that duplication and neglect alike seem to have been avoided.

In addition to the work outlined above, there have been some new developments during the summer and autumn of 1911. The Massachusetts Legislature has directed the State Board of Education to investigate and report on the "need and practicability of part-time schooling, vocational, and otherwise, for working children, and also the establishment of an apprentice system." The plans which are being formulated for this investigation contemplate an inquiry not only into the school needs of young workers, but also into the nature of the employments open to them with special reference to their educational possibilities. It is evident that the results of this investigation will have a very direct bearing upon the whole subject of vocational guidance.

As an enlargement of its work of training, the Vocation Bureau has under consideration the establishment of one or more departments of graduate study, in which those wishing to become vocational counselors may receive a thorough preparation for their work. The plans have not been fully matured, but negotiations with leading universities for the establishment of such a department are under way.

The Boston School Board is considering the establishment of a department of vocational guidance in the public-school system with a paid worker in charge, subordinate to the superintendent of schools. This will mean the presence in the schools of an expert in vocational guidance, free to devote his whole time to the subject.

APPENDIX I.—THE SCOPE OF THE ACTIVITIES OF THE BOSTON VOCATION BUREAU.

CORRESPONDENCE.

1. Mail from all parts of the country, asking for information and for help to organize similar work—school boards, deans of colleges, training schools, employers, and parents.
2. Letters from boys and young men seeking guidance into vocations.
3. Letters from people in employment asking for advice.
4. Letters from people interested in special cases.
5. Correspondence in connection with the investigation of occupations.
6. Correspondence in connection with course on vocational guidance at Harvard Summer School.
7. Correspondence with school superintendents in connection with training course for vocational counselors.

CONFERENCES.

1. Daily conferences with people interested in the work of the bureau, with the authorities of schools and colleges, and organizations seeking to do such public service.
2. Conferences with those seeking educational and vocational courses in schools and colleges.
3. Consultation with teachers, parents, business men, and social workers upon vocational problems.
4. Conferences of teachers with vocational lectures.
5. Conference with principals and counselors at schools throughout the city on vocational problems and for consultation with the graduating classes.

DEVELOPING AND EXTENDING WORK.

1. Following up the vocational meetings held in conjunction with the chamber of commerce.
2. Cooperating with authorities in establishing similar bureaus.
3. Newspaper and magazine articles.
4. Follow up of clippings and news on significant work elsewhere of interest to the bureau.
5. Organizing district vocational guidance committees with school counselors as chairmen, and stated meetings in this office with the director.
6. Organizing groups of employers to act as individual advisers to bureau applicants with reference to their specialty.
7. Lectures to parents' associations.
8. Speaker's bureau.

COMMITTEE MEETINGS.

1. Regular meetings of the executive board of the Vocation Bureau are held in the offices every month.
2. Special meetings of the board are called whenever the interests and activities of the bureau require it.

COURSE FOR COUNSELORS.

1. Meetings two Wednesday afternoons a month dealing with various vocations.
2. Regular conferences with subdivided groups of teachers in the Vocation Bureau office.
3. Appointments with groups of counselors in selected school districts.
4. Discussion of vocational problems with the counselors.
5. Interchange of experience.
6. Eventual collection of records and data by counselors and analysis of same by the bureau.
7. Opportunity on the day following lectures for teachers who wish more detailed information to meet the vocational lecturers.
8. Morning visits by the director to schools for consultation with principals and counselors, with brief addresses to graduating classes.

THE HARVARD SUMMER COURSE.

1. Vocational guidance.—The duties and equipment of teachers as vocational counselors; the theory and practice of vocational guidance—Lectures, reading and conferences. Ten lectures, beginning July 7, and continuing on Mondays, Wednesdays, and Fridays at 4 p. m. for three weeks.
2. Fee, $5 for students registered in another summer course; $10 for those who take this course alone. An auditor's ticket will admit to this course, but as a regular member only, not as a mere auditor.
3. The course will be limited to 50 members. Students will be admitted in order of application to the dean, provided they have previously consulted the instructor.

SCHOOL VOCATION COMMITTEE.

1. Regular meetings on Monday afternoons.
2. Preparation of plans for school guidance.
3. School vocational policies passed on by committee.
4. Cooperating with bureau to maintain the course for counselors, promoting vocational lectures, and securing vocational data about children in school, those about to leave school, and those who have left school.

INVESTIGATION OF OCCUPATIONS.

1. An investigation of the leading occupations open to boys in the city of Boston, showing conditions, requirements, pay, and opportunities in each.
2. The card system of investigation used touches each occupation at 50 points of interest, including health board and census reports, bibliography, and schools giving preparation for the vocation.
3. These cards are written out and prepared in duplicate. They are kept on file in the bureau and from them vocational bulletins are made.
4. This investigation is conducted by making personal visits to firms, shops, or factories; and by consultation with employers, superintendents, and labor men.

VOCATIONAL ADVISING.

1. People who have no fixed plan in life come to the bureau daily for consultation and advice.
2. Young men now employed in various places in the city come for conference upon progress in their vocation or upon changes to other pursuits.
3. Parents and friends come regularly to consult the bureau in the interests of boys and young men known to them.
4. Employers consult with the bureau.

PUBLICATIONS.

1. Leaflet on the bureau and its purposes.
2. Bibliography of books and periodicals in English and German dealing with vocational direction.
3. Speeches and lectures on subjects dealing with vocational direction.
4. The Vocational Guidance of Youth, in press, Houghton, Mifflin & Co.
5. Vocational bulletins.
6. The vocational bulletins are for the use of the Boston school counselors, boys and their parents, and ultimately the general public. All vocations in which a considerable number of boys is employed will be investigated at length and presented in bulletin form.

LIBRARY.

1. A collection of books relating to the general work of the bureau.
2. All the books on vocational problems from the library of the late Prof. Parsons.
3. State and municipal health and census reports.
4. Periodicals dealing with vocational subjects, and school and college catalogues.
5. A special deposit from the Boston Public Library of books listed in the bibliography of the bulletins.
6. Vocational Reference Library—collection of pamphlets, letters, clippings, etc., from other countries.

TRADE PAPERS.

Free subscription has been obtained to many of the leading trade papers of the industries of the country, for help in studying the occupations and for reference use in the bureau.

Some of these are: The American Carpenter and Builder, the American Wool and Cotton Reporter, the Apothecary, the Box Maker, the Clay Worker, the Implement and Vehicle Journal, the Implement Age, the Iron Age, the Journal of Education, Modern Methods, the National Builder, the Sample Case, System, the Wood Worker, labor papers, educational periodicals.

VOCATIONAL REFERENCE FILE.

1. A ready reference file (similar to index system) grouped according to general vocation, giving the opportunities (private and public) for fitting for vocational subjects, giving principally a brief and concise description of the course of study, the institutions where this can be best obtained, the time, the requirements of age, sex, examination, the cost (or tuition), and other notes which have distinct bearing on the course.
2. Also corresponding with this "ready reference file" (for immediate purposes mainly) to have filed on shelves the latest catalogues, pamphlets, circulars, and other printed matter for all vocational training in Boston and outside. Later arranging to be kept posted on the latest changes in courses (for revision of file and reference library) and having knowledge of courses and schools that are undesirable.

APPENDIX II.—THE PLAN OF THE INVESTIGATION OF OCCUPATIONS.

PURPOSES.

1. To gather a body of detailed and accurate information as to the various occupations open to boys and young men in Boston and vicinity in skilled and unskilled, professional, and other pursuits.
2. To place this material in the hands of Boston teachers and vocational counselors.
3. To use this information in advising the hundreds of boys and young men who come to the bureau for aid.
4. To have it available at the bureau for general public use.
5. To make it the basis of a series of vocational bulletins.

METHODS.

1. By a card system of investigation, touching the occupation at 50 points of vital interest.
2. By studying all available, carefully selected, firms in the same industry.
3. By going through factories, workshops, stores, and places where boys are employed, to study conditions of employment at first hand.
4. By personal interviews of the investigator with employers, superintendents, foremen, and employees in an occupation.
5. By interviewing officials of labor unions, clubs, or associations representative of an occupation.
6. By verifying all material upon an occupation by repeated visits, and by going to other firms or individuals in the same occupation.
7. By a wide use of books and periodical literature.

THE FIRM.

1. Name of firm and address.
2. Superintendent or employment manager.
3. Total number of employees, male and female.
4. Numbers of girls and boys.
5. Shifting in relative numbers of boys and girls, if any.
6. Union, nonunion, or open shop.
7. Will the employer take boys sent by the Vocation Bureau?
8. Will he attend conferences held by the bureau, if invited?
9. Every effort is made to establish cordial cooperation.

THE OCCUPATION.

1. The nature of the occupation or industry.
2. The processes of manufacture or divisions of work involved in it.
3. The variety of skill required for entering the occupation.
4. Opportunities for changes from one department to another.
5. Employment offered seasonal or steady through the year.
6. Physical conditions of the occupation.
7. Special dangers, as machinery, dust, moisture, heat or cold, hard labor, strain, monotony.
8. Competitive conditions and future of the industry.
9. White cards used to show pursuits with normal conditions and future; colored cards for "dead-end" or dangerous pursuits.

PAY.

1. Pay at the beginning, as wages or salary, and hours of employment.
2. Pay of certain ages and various groups.
3. Time or piece payment, premium or bonus.
4. The rate of increase.
5. Upon what does increase in pay depend?
6. Minimum, average, and maximum pay of those in the occupation.

POSITIONS AND ADVANCEMENTS.

1. Positions open to boys, as employees in factory, workshop, or salesroom.
2. Opportunities for advancement, as—
   a. In office.
   b. Foreman or superintendent.
   c. Buyer.
   d. Traveling salesman.
   e. Manager.
   f. Partnership or proprietor.

OTHER INFORMATION.

1. Comment and report upon the occupation by the State board of health.
2. Statistics of the Census Bureau upon the occupation in Boston, in the State, and in the United States.
3. Bibliography for this industry, as the latest books or periodical articles dealing with it.
4. A list of schools giving vocational training for this occupation.

TRADE PAPERS.

Free subscription has been obtained to many of the leading trade papers of the industries of the country for help in studying the occupations and for reference use in the bureau.

Some of these are: The American Carpenter and Builder, The American Wool and Cotton Reporter, The Apothecary, The Box Maker, The Clay Worker, The Implement and Vehicle Journal, The Implement Age, The Iron Age, The Journal of Education, Modern Methods, The National Builder, The Sample Case, System, The Wood Worker, labor periodicals, educational periodicals.

VOCATIONAL BULLETINS.

1. From the material on the vocational cards, from books and papers upon occupations, and from other information are prepared vocational bulletins, giving as leading points: (*a*) The occupation, its nature, conditions, and future; (*b*) pay, positions, and opportunities; (*c*) the boy, qualities and training; (*d*) comments of people in the occupation; (*e*) health reports; (*f*) census statistics; (*g*) bibliography; (*h*) schools.
2. For verification and suggestion these bulletins are submitted to men who have given information in an investigation and to other persons in the same occupation, in typewritten and in proof form.
3. These bulletins give simple and direct working information upon the various occupations open to boys and young men in Greater Boston.
4. They are for the use of the bureau, of teachers, parents, boys, and others interested in the welfare of youth.

THE BOY.

1. How boys are usually secured in an industry.
2. What previous positions they have held elsewhere.
3. What questions asked, tests applied, or records kept.
4. The age of entering the occupation.
5. Educational requirements.
6. The advantages of various kinds of educational equipment.
7. Physical and personal requirements.
8. Continuation of training for advancement in the occupation.

COMMENTS OF PEOPLE.

1. Comments of people in the industry as to its nature, future, and what it offers as an occupation for boys: (*a*) Of the employer or superintendent; (*b*) of the foreman or floor superintendent; (*c*) of boys now employed in the occupation; (*d*) of people formerly engaged in the occupation or who may have intimate or expert knowledge concerning it.

LABOR PERIODICALS.

1. The American Federationist.
2. Machinists' Monthly Journal.
3. Pattern Makers' Journal.
4. The Typographical Journal.
5. The International Molders' Journal.
6. Weekly Bulletin of the Clothing Trades (formerly The Garment Worker).

APPENDIX III.—SCHEDULE OF QUESTIONS FOR INVESTIGATION OF INSTITUTIONS, USED BY EDUCATIONAL DEPARTMENT OF WOMEN'S MUNICIPAL LEAGUE OF BOSTON.

Institution:
- Name?
- Age of school?
- Incorporated (where)?
- Denominational and settlement affiliations?

Location?
Telephone number?
Officers?
Purpose?
Requirements for admission:
- Academic?
- Age?
- Sex?
- Previous training?
- Other requirements (colored or foreign)?

Tuition:
- By year, term, subject?
- Charge for materials?

Curriculum:
- Content of course of study?
- Individual subjects?

Time required for graduation?
Season of giving the course?
- Length of course?
- Hours per week?

When may pupils enter?
Session:
- Morning?
- Afternoon?
- Evening?
- Combination of any two?

Probationary period?
Outside preparation for class?

Credit by examinations?
Written, oral, industrial?
Subject certificate or diploma granted?
Diploma accepted by higher institutions?
Sources of information?
Equipment, buildings, machinery, tools, material (wood, cloth, etc.), power (electrical), books, charts, etc.?
Finances:
Endowed?
Annual expense?
Is the product commercialized?
Number of students—graduates per year—teachers:
On full time?
On part time?
Paid, or volunteer?
Methods of advertisement for students:
Catalogues?
Circulars?
Distribution of literature
Field agents?
Employment service?
Follow-up methods?
Placements—positions guaranteed or assistance given to place graduates through agencies or employers?
Vocational library?
Is there State inspection?
Is there supervision?
Educational or otherwise?
Use of buildings for outside lectures, etc.?
Assistance in finding boarding places?
Remarks by students?

APPENDIX IV.—LETTER FORMS.

Form No. 1.

The subcommittee on vocational opportunities of the Women's Municipal League is planning a study of opportunities for vocational education in Boston. It will be of real assistance to us in our work if you will kindly send to the above address two copies of your latest report.

May we also trouble you to answer the following questions—

1. Have you any other available literature bearing upon the work of your institution? If so, how may we obtain it?

2. Can you give us the name and address of any person especially interested in your work who is willing to cooperate with this committee by giving it further information?

Thanking you in advance for this favor, I am,

Sincerely, yours, _____ _____,

Chairman Subcommittee on Vocational Opportunities in Boston.

Form No. 2.

The subcommittee on vocational opportunities of the Women's Municipal League is preparing for publication a series of charts describing and classifying as clearly as possible the principal opportunities for vocational training in Boston.

It will be of real assistance to us in our work if you will send to the above address two copies of your latest report.

We shall be very grateful also if you will kindly furnish added information to the college student representing our committee who will call upon you later.

With warm appreciation of your assistance in the past and thanking you for this further cooperation, we remain,

Sincerely, yours, _____ _____,

Chairman Subcommittee on Vocational Opportunities in Boston.

FORM NO. 3.

The subcommittee on vocational opportunities in Boston is preparing Chart No. 2—Advanced Industrial Training—for immediate publication.

A study of the inclosed Chart No. 1—Principal Opportunities for Industrial Education in Boston—published April, 1909, will acquaint you with the scope of the work undertaken and a reference to the starred notes at the bottom will give you the order in which it is proposed to issue the series of charts.

The inclosed copy of Chart No. 1 shows the form in which the information from your school will be arranged for Chart No. 2.

The league's research student has tabulated the information gathered from the printed report and from a visit to the school.

We request that you examine this tabulation, make what corrections are necessary, and return it at your earliest convenience.

Our reason for making this request is that we wish to give to each institution to be listed the opportunity of (1) correctly stating the material to be printed and of (2) arranging this material in the order of its educational importance.

The charts are to be hung in the public schools, in factories, and in other places where this descriptive account of the vocational opportunities of Boston will be serviceable to students, teachers, parents, employers, and persons most interested in the vocational guidance of young people.

With warm appreciation of your assistance in the past and thanking you for this further cooperation, we remain,

Sincerely, yours,

_____ _____,

Chairman Subcommittee on Vocational Opportunities in Boston.

FORM NO. 4.

LETTER WITH CHART DISTRIBUTION.

This chart is sent to you by the subcommittee on vocational opportunities of the Women's Municipal League with the approval of the superintendent of the city schools.

The league asks that you aid in spreading this information concerning Boston's vocational opportunities by hanging the chart in some conspicuous place where the teachers and pupils may study it.

Please keep as definite record as possible of the use which is made of it, so that at a later date some estimate can be made of its value.

The league would be gratified also if there is an opportunity for its examination by the parents' association and vocational counselor meeting in your school building.

Cordially, yours,

_____ _____,

Chairman Subcommittee on Vocational Opportunities in Boston.

FORM NO. 5.

FOLLOW-UP—FACTORIES.

The subcommittee on vocational opportunities of the Women's Municipal League, through the courtesy of (name proper factory authorities), sent you last May Chart No. 1—Principal Opportunities for Industrial Education in Boston—requesting that it be hung where your employees might study it.

The committee is now desirous of gathering further information concerning the usefulness of the chart and will be greatly obliged if you will kindly aid us by answering the following questions:

1. Was the chart so hung?
2. Do you know of cases where the information on the chart was of value to your employees?
3. Can you add any information or suggestion in regard to the chart?

With warm appreciation of your kindness in answering these questions, I am,

Sincerely, yours,

_____ _____,

Chairman Subcommittee on Vocational Opportunities in Boston.

FORM NO. 6.

FOLLOW-UP—PUBLIC SCHOOLS.

The subcommittee on vocational opportunities of the Women's Municipal League, with the approval of the city superintendent of schools, sent you last May a copy of Chart No. 1—Principal Opportunities for Industrial Education in Boston.

We requested that the chart be hung where the teachers and older classes might study it and where the parents' association and vocational counselor of the school might examine it.

The league is now desirous of gathering further information about the usefulness of the chart and would be greatly obliged if you would kindly aid us by answering the following questions:

1. Was the chart so hung?
2. Was it called to the attention of—
   (*a*) The teachers in your school?
   (*b*) The parents' association?
   (*c*) The vocational counselor advising in your school?
3. Do you know of cases where the information on the chart was of value to pupils?
4. Will you add any information or suggestion in regard to the chart?

With warm appreciation of your kindness in answering these questions, I am,

Sincerely, yours,

_____, _____,

Chairman Subcommittee on Vocational Opportunities in Boston.

APPENDIX V.—SCHEDULE FOR THE INVESTIGATION OF PUBLIC AND PRIVATE VOCATIONAL SCHOOL OPPORTUNITIES MADE BY COLLEGE STUDENTS IN COOPERATION WITH THE WOMEN'S MUNICIPAL LEAGUE.

SCHEDULE I.—PRELIMINARY WORK.

To be done by the league's committee and by a graduate student, arranged as follows:

In preparation for the first meeting with the college students.

1. Prepare a list of schools of the types to be studied, consulting city directory, telephone directory, schoolbook publishers' list, individuals and organizations represented on the reference list of educational experts which the league committee has compiled for consultation.

Schools listed by city and State authorities.

(*a*) Public schools.
(*b*) Private schools.

These lists should be complete as to name, address, telephone number, and principal or director's name.

2. Send circular letters to the principals and directors of schools, explaining the purpose and method of the committee in making the study, requesting copies of all reports, catalogues, and other printed matter concerning the school, and mentioning the visit of a student to interview the principal.

3. Prepare for each student—
   (*a*) List of questions to be asked the principals of the schools.
   (*b*) Schedule which explains the sequence of the student's work.
   (*c*) Card for name and address of the investigating student and the schools assigned her.

Detail preparation for the second meeting.

1. Presentation of practical results of the previous charts. This résumé to be compiled from letters from parents' associations, factories and schools in which the charts were placed, and from visits to the schools listed.

2. Discussion of opinions of various educational and vocational authorities as to the value of the charts and the points that the student should be especially keen to observe, and with representatives of the Vocation Bureau, parents' association, school committee, public school principals, directors of private schools of high standing, graduates of the schools, employers of graduates, employment agencies, and authorities on the type of schools being studied.

Detail preparation for the third meeting.

1. A speaker to present some phase of vocational guidance in a 30-minute talk.
2. Chart construction from a study of printed reports, making new headings, if necessary, to fit the type of school and to bring out important information.
3. Harmonizing this information and discussing points that appear questionable.

Detail preparation for the fourth meeting.

Correct the first reports from the first schools, especially pointing out where they do not furnish the data needed to supplement the printed reports.

Detail preparation for the fifth meeting.

1. Correct first reports on second schools.
2. A speaker to present some phase of vocational guidance.
3. Before the middle of the next week correct reports on the third schools.

Detail preparation for the sixth meeting.

1. Examine final report on first school.
2. A speaker to present some phase of vocational guidance.
3. Examine before the middle of next week final reports on the second and third schools.

Purpose: Some students will grasp the principle of the reports quickly and will not need to rewrite their reports on the second and third schools, in which case their first reports will be final and may be handed back to them at the sixth meeting.

Detail preparation for the seventh meeting.

1. Preparation of circular letter to be sent to the principals or directors of the schools studied, stating the aim of the investigation and asking whether the information brought in by the students (a summarized copy is inclosed) is correct and properly classified, and, if not, requesting that errors be rectified. Inclose previous chart to show the meanings and the method of classification.
2. A speaker to present some phase of vocational guidance.

SCHEDULE II.—MEETINGS.

Meetings of the students with the representatives of the league committee as lecture periods of one hour.

Meetings will be held at the college and at the office of the committee, where the students may get in touch with the organization and the routine side of the inquiry.

At several of the meetings experts (men and women) will speak for half an hour on the value of the charts. These speakers are representatives from Women's Municipal League; Vocation Bureau; public schools of the type studied, and private schools of the type studied.

First meeting.

Explain—

1. Women's Municipal League: History, nature, membership, ideals, and work.
2. Method of cooperation between the education department of the league which is issuing the charts and the college.
3. Charts:

(*a*) General—(1) Need for the charts; (2) aim; (3) use.

(*b*) Specific—(1) General make up; (2) headings of the columns.

4. Schedules.—Study list of questions which each student is to ask the principal, explaining carefully the specific information to be gathered.
5. As preparatory work. Show circular letter which has been sent to the principals and directors. Impress upon the students the necessity of making an appointment with the principal or director of each school before visiting it.
6. Answer questions of students on any of the foregoing points.
7. Give each student list of schools she is to investigate and copy of all printed matter concerning them.

Second meeting.

1. Answer the questions of the student concerning the charts and the printed matter
2. Tell of the results of charts previously issued. This information will help the student to answer the principals' queries as to the value of the investigation.
3. Cite opinions of authorities as to the value of the charts.
4. Mention the difficulties which the students may encounter in the way of false or unwilling information and emphasize the points they must be particularly on the alert to note.

Third meeting.

1. Answer students' questions.
2. Receive first reports on first schools.
3. Speaker (Women's Municipal League or Vocation Bureau).

Fourth meeting.

1. Answer students' questions.
2. Hand back corrected first report on first school.
3. Discuss the corrections and additions which are to be embodied in the final report.
4. Receive first report on second school.

Fifth meeting.

1. Answer students' questions.
2. Receive first report on third school.
3. Receive final report on first school.
4. Return first report on second school and discuss necessary corrections.
5. Speaker.
6. During midweek return corrected first report on third school to graduate student.

Sixth meeting.

1. Receive final reports on the second and third schools.
2. Return final report on first school.
3. Give to each student three long slips of paper marked with the headings and representing a transverse section of the chart. Each of these slips is to be filled out with the information concerning one school arranged according to chart headings.
4. Explain by illustrations from previous charts. These slips are sent to the principals for correction.
5. Speaker.
6. During midweek return final reports on the second and third schools.

Seventh meeting.

1. Receive slips.
2. Show circular letter to be sent with the slips to the principals and directors of schools for correction.
3. Give final explanation on chart construction.
4. Speaker.

SCHEDULE III.—STUDENTS' WORK.

Work of the undergraduate students who substitute research work with the league committee for thesis work in courses in government or education.

Average of three schools for each student (one public, two private, where possible). This would be equal to the work of one half year thesis or of two short theses (as in Education 2a).

First week (after the first meeting).

Study the charts and other printed matter fully. Study the printed reports of the schools with reference to the list of questions which are to be asked the principals and directors and to chart readings.

Note questions of points not clear and be ready to ask for explanations at the next meeting.

Make an appointment for the next week to visit the first school and to interview the principal or director.

Second week (after the second meeting).

Visit first school. While making the visit do not take notes or refer to the printed list of questions. Seek by tactful conversation, rather than by direct questions, to gain the needful information.
Write report on the first school.
Make an appointment to visit the second school.

Third week (after the third meeting).

Visit second school.
Write report on second school.
Make an appointment to visit the third school.

Fourth week (after the fourth meeting).

Visit third school.
Write report on third school.
Rewrite report on first school.

Fifth week (after the fifth meeting).

Rewrite report on second school.
Rewrite report on third school.

Sixth week (after the sixth meeting).

Transfer chart material from the final reports on the three schools to the three slips, rranging it under chart headings.

CHAPTER XVI.

LAWS RELATING TO INDUSTRIAL EDUCATION.

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CONNECTICUT.

ACTS OF 1909.

CHAPTER 85.—*Establishment of trade schools.*

SECTION 1. The State board of education is hereby authorized and directed to establish in each of the two towns in the State which may seem to said board best adapted for the purpose, a free public day and evening school, for instruction in the arts and practices of trades, and said board may make regulations covering the admittance of scholars, but no person shall be admitted to schools established under provisions of this act under fourteen years of age: *Provided, however*, That, during vacations, said board may admit children under fourteen years of age.

SEC. 2. The State board of education shall expend the funds provided for the support of trade schools, appoint and remove their teachers, make rules for their management, and shall file semiannually with the comptroller, to be audited by him, a statement of expenses on account of such schools, and shall annually make to the governor a report of the condition of such schools and the doings of said board in connection therewith. Said board may enter into arrangements with manufacturing and mechanical establishments in which pupils of such trade schools may have opportunity to obtain half-time practice, and may also enter into and make arrangements with schools already established for instruction in trades approved by said board under the provisions of this act.

SEC. 3. When such schools are established under the provisions of this act, the State board of education may construct buildings, or hire, temporarily, rooms in which such schools shall be housed, and said board shall be authorized to expend not more than fifty thousand dollars, annually, for the purpose of erecting buildings and maintaining such schools.

SEC. 4. Any town in which a trade school is established under the provisions of this act may contribute any sum properly voted therefor to the enlargement of such school, and for the improvement of its efficiency.

Approved June 23, 1909.

KANSAS.

GENERAL STATUTES.

Industrial training schools.

SECTION 7839 (as amended by chapter 245, Acts of 1909). The board of education in each city of the first class and second class, and the annual school meeting of any school district, may, in addition to the other levies, levy a tax not to exceed one-eighth mill upon the dollar of assessed valuation in cities of the first and second class, and not to exceed one-fourth mill on the dollar of the assessed valuation in all other cities and school districts, for the equipment and maintenance of industrial-training schools or industrial-training departments of the public schools. The sum raised by such levies shall be expended for the purpose named in this act and no other.

SEC. 7840. Said board of education and district board, upon such levy being made, may provide for a separate school or a separate department in some existing school, and may employ such teachers as they think are competent to give instruction in industrial training, as required by their course of study; and it shall be the duty of such board to provide, from the funds received under the provisions of this act, the necessary books, appliances and room for such instruction, and it shall be the duty of such board to prescribe a course of study to meet the special needs of the district or city, which course of study must be approved by the State board of education.

SEC. 7841. The State board of education shall establish a standard for teachers of industrial training, and shall grant special certificates to those who are fully qualified to give instruction therein; and they shall prescribe the course of study in industrial training to be used in the State.

SEC. 7842. On the 1st day of July in each year, the clerk of each school board or district maintaining a school or department for industrial training as aforesaid, and desiring State aid, shall make a report, duly certified, to the State superintendent of public instruction, in such form as may be required, setting forth the facts relating to the cost of maintaining such school or department for industrial training, the character of the work done, the number and names of the teachers employed in such work, and the length of time such school or department was maintained during the preceding year. Upon receipt of such report the State superintendent, when satisfied therefrom and from such other investigation as he may deem advisable, that such school or department for industrial training has been established and maintained for a period of six months in the year immediately preceding, and has been taught by a special teacher or teachers having the qualifications mentioned in sections 3 and 4 [7841 and 7842] of this act, shall make a certificate to that effect, showing also the amount of money expended by such school district in the twelve months immediately preceding the 1st day of July of each year in maintaining such school or department for industrial training, and submit such certificates to the State auditor.

SEC. 7843. Upon receiving such certificate mentioned in section 4 [7842] of this act, the State auditor shall draw his warrant upon the State treasurer, payable to the treasurer of the school district or board of education maintaining said school or department, for a sum of money equal to that contributed by such school district for such purpose, but not exceeding the sum of two hundred fifty dollars: *And, provided*, That the total sum of money contributed by the State as aforesaid for such purpose shall not exceed the sum of ten thousand dollars in any one year.

SEC. 7844. For carrying out the provisions of this act, the sum of twenty thousand dollars, or so much as may be necessary, is hereby appropriated out of the State treasury out of any money not otherwise appropriated.

MAINE.

RESOLVES OF 1909.

CHAPTER 136.—*Investigation of industrial education.*

Resolved, That the sum of one thousand dollars be and hereby is appropriated for the year nineteen hundred nine and a like sum for the year nineteen hundred and ten to be expended under the direction of the State superintendent of public schools for the purpose of making a special investigation of the needs of the State in relation to a system of vocational or industrial education, together with an investigation into the methods adopted by other States and countries for meeting similar needs. Said superintendent in his regular report shall incorporate a report of the work done under this resolve, with such recommendation as he may make.

Approved March 12, 1909.

MARYLAND.

ACTS OF 1908.

CHAPTER 367.—*Commission on industrial education.*

(Page 298.)

SECTION 1. The governor is hereby authorized and requested to appoint a commission consisting of not more than five persons, citizens of this State, to make inquiry and report to the legislature at its next session, by bill or otherwise, respecting the subject of industrial education, including an examination of the extent to which it is already carried on in Maryland and elsewhere, the best means of promoting and maintaining it in its several grades, whether by State or local action alone, or by both combined; how far it is possible or desirable to incorporate it into the existing system of public instruction; the best method of training teachers for such schools or departments, and what changes, if any, are required in the existing system of schools to enable them to provide such training, or to meet more fully the needs of the system of public instruction as now organized in this State, with such other inquiries as the commission may itself institute or be requested by the governor to undertake; the members of the com-

mission shall serve without compensation, except for necessary expenses and clerk hire actually incurred and approved by the governor, not to exceed the sum of three hundred dollars ($300).

Approved April 6, 1908.

MASSACHUSETTS.

REVISED LAWS.

CHAPTER 42.—*Industrial schools.*

SECTION 10. A town may establish and maintain one or more industrial schools, and the school committee shall employ the teachers, prescribe the arts, trades and occupations to be taught therein, and have the general control and management thereof; but it shall not expend for any such school an amount exceeding the appropriation specifically made therefor, nor compel a pupil to study any trade, art or occupation without the consent of his parent or guardian. Attendance upon such school shall not take the place of the attendance upon public schools required by law.

CHAPTER 125.—*Textile schools.*

SECTION 20. If the mayor of a city files a certificate with the commissioner of corporations that in said city there are in operation four hundred and fifty thousand or more spindles, not less than seven nor more than twenty persons, citizens of this Commonwealth, may associate themselves by an agreement in writing for the purpose of establishing and maintaining a textile school in such city for instruction in the theory and practical art of textile and kindred branches of industry, with authority to take, by gift or purchase, and hold real and personal property to the amount of three hundred thousand dollars. * * * Said corporation shall be known as the trustees of the textile school of the city in which it is located and may fill all vacancies in its membership, except as otherwise provided in section twenty-two. Only one such corporation shall be established under the provisions of this section in any one city.

SEC. 21. A city in which such corporation is established may appropriate and pay to it not more than twenty-five thousand dollars, and, upon such payment, the mayor and superintendent of schools of such city shall ex officiis be members of said corporation.

SEC. 22. If the city appropriates and pays money to such corporation or if the trustees or members thereof pay money into its treasury for the establishment and maintenance of such schools, the Commonwealth shall appropriate and pay to said corporation an amount equal to the total amount so appropriated and paid, not exceeding twenty-five thousand dollars, and, upon such appropriation and payment by the Commonwealth, the governor shall, with the advice and consent of the council, appoint two trustees of the corporation for two and four years respectively, and at the end of each of said terms a trustee for four years, and such trustees and their successors by like appointment shall be members of said corporation. The governor, with the advice and consent of the council, shall fill all vacancies in the membership created by this section.

ACTS OF 1904.

CHAPTER 248.—*Textile schools—Reports.*

SECTION 1. The trustees of every textile school receiving financial aid from the Commonwealth shall, on or before the 30th day of January in each year, make to the general court a report containing a concise statement as to the buildings, equipment and resources of the school, the courses and methods of instruction, the number of teachers and students during the previous calendar year, and the number of students, if any, who graduated therefrom. The report shall also contain a statement, verified by the oath of the treasurer of the school, and in such form as the auditor of accounts of the Commonwealth shall prescribe, showing separately the amounts received during the previous calendar year from tuition fees, from the Commonwealth, from any city or town, and from all other sources, and also showing the expenditures of the school during the same period, under the heads of maintenance, construction and new equipment, and also the financial condition of the school at the close of said year.

Approved April 22, 1904.

ACTS OF 1906.

CHAPTER 505.—*Commission on industrial education.*

SECTION 1. The governor, by and with the consent of the council, shall appoint a commission of five persons, to be known as the commission on industrial education, to serve for the term of three years, and to receive such compensation as the governor and council shall approve. The said commission on its organization shall appoint a secretary to be its executive officer, who shall not be a member of the commission, and who shall receive such salary as shall be approved by the governor and council, and the commission may employ supervisors, experts in industrial and technical education, and such clerical and other service as may be found necessary. The necessary expenses of the commission, including clerk hire, traveling expenses, stationery and all other incidental expenses, shall be paid out of the treasury of the Commonwealth, as may be provided by law, but shall not exceed the sum of eight thousand dollars for the remainder of the present fiscal year.

SEC. 2. The commission on industrial education shall be charged with the duty of extending the investigation of methods of industrial training and of local needs, and it shall advise and aid in the introduction of industrial education in the independent schools, as hereinafter provided; and it shall provide for lectures on the importance of industrial education and kindred subjects, and visit and report upon all special schools in which such education is carried on. It may initiate and superintend the establishment and maintenance of industrial schools for boys and girls in various centers of the Commonwealth, with the cooperation and consent of the municipality involved or the municipalities constituent of any district to be formed by the union of towns and cities as hereinafter provided. The commission shall have all necessary powers in the conduct and maintenance of industrial schools, and money appropriated by the State and municipality for their maintenance shall be expended under its direction.

SEC. 3. All cities and towns may provide independent industrial schools for instruction in the principles of agriculture and the domestic and mechanic arts, but attendance upon such schools of children under fourteen years of age shall not take the place of attendance upon public schools as required by law. In addition to these industrial schools, cities and towns may provide for evening courses for persons already employed in trades, and they may also provide, in the industrial schools and evening schools herein authorized, for the instruction in part-time classes of children between the ages of fourteen and eighteen years who may be employed during the remainder of the day, to the end that instruction in the principles and the practice of the arts may go on together: *Provided*, That the independent schools authorized in this section shall be approved as to location, courses and methods of instruction by the commission on industrial education.

SEC. 4. Two or more cities or towns may unite as a district for the maintenance of the industrial schools provided for in the preceding section, but no such district shall be created without the approval of the commission on industrial education.

SEC. 5 (as amended by chapter 540, Acts of 1909). Upon certification by the board of education to the auditor of the Commonwealth that a city, town or district, either by moneys raised by local taxation or by moneys donated or contributed, has maintained an independent industrial school, the Commonwealth, in order to aid in the maintenance of such schools, shall pay annually from the treasury to such cities, towns or districts a sum equal to one-half the sum raised by local taxation for this purpose: *Provided*, That no payment to any city or town shall be made except by special appropriation by the legislature.

SEC. 6. The commission on industrial education shall make a report annually to the legislature relative to the condition and progress of industrial education during the year, stating what industrial schools have been established and the appropriations necessary for their maintenance, in accordance with the preceding section, and making such recommendations as the commission on industrial education may deem advisable; and especially shall the commission consider and report at an early day upon the advisability of establishing one or more technical schools or industrial colleges, providing for a three or four years' course for extended training in the working principles of the larger industries of the Commonwealth.

SEC. 7. The trustees of the Massachusetts Agricultural College are hereby authorized to establish a normal department for the purpose of giving instruction in the elements of agriculture to persons desiring to teach such elements in the public schools, as provided in sections three and four: *Provided*, That the cost of such department shall not exceed the sum of five thousand dollars in any one year, and that at least fifteen candidates present themselves for such instruction.

Approved June 21, 1906.

ACTS OF 1908.

CHAPTER 572.—*Commission on industrial education.*

SECTION 1. The term of the commission on industrial education established by chapter five hundred and five of the acts of the year nineteen hundred and six is hereby extended from three years to five years.

SEC. 2. The governor, by and with the consent of the council, shall appoint a woman as an additional member of the commission.

SEC. 3. The commission shall have all necessary powers in the conduct and maintenance of independent industrial schools, and money appropriated by the Commonwealth or by municipalities for their maintenance shall be expended under its direction or with its approval. Any city or town may also establish independent industrial schools in charge of a board of trustees which shall have authority to provide and maintain such schools. Such schools, if approved by the commission on industrial education as to location, courses and methods of instruction, shall receive reimbursement as provided in section four of said chapter five hundred and five.

SEC. 4. Any resident of Massachusetts may, with the approval of the commission on industrial education, attend an independent industrial school, as provided for in this act, located in any city or town other than that in which he resides: *Provided*, There is no such school supported in whole or in part by the city or town in which he resides, upon payment by the city or town of his residence of such tuition fee as may be fixed by said commission; and the Commonwealth shall repay to any city or town one-half of all such payments. If any city or town neglects or refuses to pay for such tuition, it shall be liable therefor, in an action of contract, to the legally constituted authorities of the school which the pupil attended under the approval of said commission.

Approved June 2, 1908.

ACTS OF 1909.

CHAPTER 457.—*Consolidation of the board of education and the industrial commission.*

SECTION 1. The board of education shall consist of nine persons three of whom shall annually in April be appointed by the governor, with the advice and consent of the council, for terms of three years, except as hereinafter provided. The members of the board shall serve without compensation. * * * Four of the present members of the board of education, and one of the members of the commission on industrial education shall be appointed members of the board of education provided for by this act.

SEC. 2. The board of education shall exercise all the powers and be subject to all the duties now conferred or imposed by law upon the present board of education, or upon the commission on industrial education by chapter five hundred and five of the acts of the year nineteen hundred and six and by chapter five hundred and seventy-two of the acts of the year nineteen hundred and eight, and acts in amendment thereof and in addition thereto, except as may otherwise be provided herein.

SEC. 3. The board shall appoint a commissioner of education, whose term of office shall be five years, and may fix his salary at such sum as the governor and council shall approve. Said commissioner may at any time be removed from office by a vote of six members of the board. He shall exercise all the powers and be subject to all the duties now conferred or imposed by law on the secretary of the board of education. He shall be the executive officer of the board, shall have supervision of all educational work supported in whole or in part by the Commonwealth, and shall report thereon to the board. He shall be allowed for traveling expenses a sum not exceeding fifteen hundred dollars per annum. The board shall also appoint two deputy commissioners, at equal salaries, one of whom shall be especially qualified to deal with industrial education. The powers, duties, salaries and terms of office of said deputy commissioners shall be such as may be established from time to time by the board, but the board may, by a vote of six members thereof, remove from office at any time either of said deputy commissioners. The total expense for salaries incurred under this section, together with the salaries of such other assistants or agents, and the cost of such clerical and messenger service as may be necessary, shall not exceed forty thousand dollars annually, and the allowance for traveling expenses shall not exceed five thousand dollars annually, exclusive of the necessary traveling espenses of members of the board incurred in the performance of the duties of their office.

* * * * * * *

SEC. 5. The terms of office of the present members of the board of education and of the commission on industrial education shall expire July first, nineteen hundred and nine, and said commission shall then cease to exist.

Approved May 28, 1909.

MICHIGAN.

ACTS OF 1909.

No. 228.—*Commission on industrial education.*

SECTION 1. The governor of the State of Michigan, by and with the consent of the senate, is hereby empowered to appoint a commission of not less than five, nor more than seven members, to be known as the Michigan Commission on Industrial and Agricultural Education.

SEC. 2. This commission, immediately after appointment, shall organize by choosing from its own membership a chairman and secretary.

SEC. 3. It shall be the duty of this commission to make a careful study of the conditions of elementary, industrial and agricultural education in the State of Michigan, whether under public school or other auspices, including the study of conditions of labor as they affect children between the ages of fourteen and eighteen, and it shall further be the duty of this commission to present a report showing these conditions, with recommendations for such a plan of elementary, industrial and agricultural training in connection with the public schools of the State as shall, in their judgment, best meet the conditions shown to exist; this report to be rendered in triplicate to the governor, the State superintendent of public instruction and the State commissioner of labor on or before January one, nineteen hundred eleven.

SEC. 4. The members of this commission shall serve without pay, and the commission shall maintain its organization until July one, nineteen hundred eleven, when said commission shall expire by limitation, unless renewed by subsequent act of the legislature.

Approved June 2, 1909.

NEW JERSEY.

GENERAL STATUTES.

Industrial education.

(Page 3069.)

SECTION 296 (as amended by ch. 20, Acts of 1906). Whenever any board of education, school committee or other like body of any city, town or township in this State shall certify, or shall have certified, to the governor that a sum of money not less than three thousand dollars has been contributed by voluntary subscriptions of citizens, or otherwise as hereinafter authorized, for the establishment in any such city, town or township, of a school or schools for industrial education, it shall be the duty of the said governor to cause to be drawn by warrant of the comptroller by himself out of any moneys in the State treasury not otherwise appropriated, an amount equal to that contributed by the particular locality as aforesaid for the said subject, and when any such school or schools shall have been established in any locality as aforesaid, there shall be annually contributed by the State, in manner aforesaid for the maintenance and support thereof a sum of money equal to that contributed each year in said locality for such purpose: *Provided, however,* That the moneys contributed by the State as aforesaid to any locality shall not exceed in any one year the sum of seven thousand dollars.

SEC. 297. All moneys raised and contributed as aforesaid shall be applied under the direction of a board of trustees, organized as hereinafter provided, to the establishment and support of schools for the training and education of pupils in industrial pursuits (including agriculture), so as to enable them to perfect themselves in the several branches of industry which require technical instruction.

SEC. 298. Any city, town or township shall have power to appropriate and raise by tax, for the support of any such school therein, such sum of money as they may deem expedient and just.

SEC. 299 (as amended by act approved Mar. 22, 1895). There shall be a board of trustees of each of such schools, which shall consist of the governor and the mayor or other chief executive officer of the city, town or township in which such school is located, as ex officio members, and eight other persons to be chosen and appointed by the governor [for terms of four years. Acts of 1896, ch. 48.] * * *; the said board of trustees shall have control of the buildings and grounds owned and used by such schools, the application of the funds for the support thereof, the regulation of the tuition fees, the appointment and removal of teachers, the power to prescribe the

studies and exercises of the school, and rules for its management, to grant certificates of graduation, to appoint some suitable person treasurer of the board, and to frame and modify at pleasure such by-laws as they may deem necessary for their own government; they shall report annually to the State and local boards of education their own doings and the progress and condition of the schools.

SEC. 300. The said trustees shall receive no compensation for their services, but the expenses necessarily incurred by them in the discharge of their duties shall be paid upon the approval of the governor.

ACTS OF 1903.

SECOND SPECIAL SESSION.

CHAPTER 1.—*Industrial education.*

SECTION 205. Whenever in any school district there shall have been raised by special tax or by subscription or both a sum not less than two hundred and fifty dollars for the establishment in such district of a school or schools for industrial education or manual training, or for the purpose of adding industrial education or manual training to the course of study then pursued in the school or schools of such district, there shall be paid for such purpose to the custodian of the school moneys of said district, on the order of the State superintendent of public instruction, an amount equal to that raised therein as aforesaid, which amount shall be paid by the State treasurer on the warrant of the State comptroller. Whenever such school or schools shall have been established in any district, or said industrial education or manual training shall have been added to the course of study in the school or schools of any district, there shall be paid to such district in like manner for the maintenance and support thereof a sum equal to that raised each year in the district for such purpose: *Provided*, That the course of study in industrial education or manual training established under the provisions of this section shall be approved by the State board of education: *And provided further*, That the moneys appropriated by the State as aforesaid to any school district shall not exceed in any one year the sum of five thousand dollars. The custodian of the school moneys of the school district shall be the legal custodian of any and all funds subscribed, appropriated or raised for the purpose of carrying out the course of study contemplated by this section, and he shall keep a separate and distinct account thereof, and shall disburse said moneys on orders signed by the president and district clerk or secretary of the board of education.

SEC. 206. In case the sum necessary as aforesaid to obtain the State appropriation or any part thereof shall have been raised by private subscription, the board of education of any school district in which there shall have been established a separate school for industrial education or manual training under the provisions of this article, may select from among the donors of such sum not more than six persons to assist said board in the management of said school.

SEC. 207. The board of education of any school district receiving an appropriation from the State for the purpose mentioned in this article shall annually, on or before the first day of August, make a special report to the State superintendent of public instruction in the manner and form prescribed by him.

Approved October 19, 1903.

ACTS OF 1907.

CHAPTER 222.—*Industrial education in cities of the second class.*

SECTION 1. It shall and may be lawful for the board of trustees of the school for industrial education in any city of the second class of this State, upon first obtaining the consent of the common council or other governing body of such city, to build upon land already owned by it, or to purchase land and build thereon a building or buildings, structure or structures, for the uses and purposes of a school for industrial education within its corporate limits: *Provided*, That the cost and expense of the land purchased, and the building or buildings, structure or structures to be erected, shall not in the aggregate exceed the sum of fifty thousand dollars.

SEC. 2. To defray the cost and expense of such land and buildings, structure or structures to be erected under and in pursuance of the first section of this act, it shall be lawful for the common council or other governing body of any city of the second class in this State, to issue bonds in the corporate name of said city for the aggregate amount required by said board of trustees, in sums of not more than one thousand dollars, and not less than one hundred dollars each, to be signed by the mayor and counter-

signed by the clerk and sealed with the corporate seal of said city, and to have written or printed thereon the words "School for industrial education construction bonds," said bonds to be disposed of at not less than their par value and shall be payable at the expiration of not more than twenty years after their date of issue, and to draw interest at a rate not exceeding four per centum per annum, payable semiannually, and may be registered or coupon bonds, or may be registered and coupon bonds combined, at the option of said city, and there shall be raised by taxes each year the interest on the whole amount of the bonds so issued, together with at least five per centum per annum for the purpose of a sinking fund, to be paid to the commissioners of the sinking fund of said city for the purpose of meeting the said bonds as they become due; and the money raised by the issuing of said bonds shall be credited on the books of the city treasurer to the said trustees of the school for industrial education, and paid out and disbursed by the city treasurer, from time to time, on the written order or orders of said trustees, signed by their president and secretary, and countersigned by the city comptroller, in payment of the purchase price of any land purchased by said trustees, and the cost of erection of any building or buildings, structure or structures thereon for the use of a school for industrial education within the corporate limits of such city.

Approved May 27, 1907.

ACTS OF 1908.

JOINT RESOLUTION No. 11.—*Commission on industrial education.*

SECTION 1. The governor is hereby authorized to appoint a commission of five persons, citizens of New Jersey, to inquire into and report to the next legislature upon the subject of promoting industrial and technical education; the commissioners to be appointed by virtue of this act shall serve without compensation, but shall be repaid their expenses actually incurred in and about the performance of their duties, and may employ a secretary and all necessary and clerical and other assistance: *Provided, however*, The total expense of said commission shall not exceed three thousand dollars.

SEC. 2. The commission shall investigate the needs for education in the different grades of skill and responsibility in the various industries of the Commonwealth. They shall investigate how far the needs are met by existing institutions and what new forms of educational effort shall be advisable, and shall make such investigations as may be practicable through printed reports as to similar educational work done by other States, by the United States Government and by foreign governments.

Approved April 14, 1908.

ACTS OF 1909.

CHAPTER 78.—*Support where certain equipment is furnished.*

SECTION 1. Whenever in any city of this State the board of trustees of schools for industrial education shall acquire by deed, gift, grant, devise or otherwise, the sum of one hundred thousand dollars, to be expended for the purchase of land and erection and equipment of a building or buildings to be used for the purposes for which said board is constituted, and whenever any such board of trustees of schools for industrial education in said city shall certify, or shall have certified, to the governor that a sum of money not less than three thousand dollars has been contributed by voluntary subscriptions of citizens, or otherwise, as hereinafter authorized, for the establishment in said city of a school or schools for industrial education, it shall be the duty of the said governor to cause to be drawn by warrant of the comptroller, approved by himself, out of any moneys in the State treasury not otherwise appropriated, an amount equal to that contributed by the said city as aforesaid for the said object, and when any such school or schools shall have been established in any city as aforesaid, there shall be annually contributed by the State, in manner aforesaid, for the maintenance and support thereof, a sum of money equal to that contributed each year in said city for such purpose: *Provided, however*, That the moneys contributed by the State as aforesaid shall not exceed in any one year the sum of ten thousand dollars.

JOINT RESOLUTION No. 7.—*Commission on industrial education.*

SECTION 1. The commission appointed under joint resolution No. 11, approved April fourteenth, one thousand nine hundred and eight, be and the same is hereby continued for another year, with all the powers and duties conferred by said resolution: *Provided, however*, That the said commission shall not be authorized to incur any expense for which the State shall be responsible.

Approved April 19, 1909.

NEW YORK.

CONSOLIDATED LAWS.

CHAPTER 16, ARTICLE 22.—*Industrial education.*

SECTION 600. The board of education of any city, and in a city not having a board of education the officer having the management and supervision of the public-school system, may establish, acquire, conduct and maintain as a part of the public-school system of such city the following:

1. General industrial schools open to pupils who have completed the elementary school course or who have attained the age of fourteen years, and—

2. Trade schools open to pupils who have attained the age of sixteen years and have completed either the elementary school course or a course in the above-named industrial school or who have met such other requirements as the local school authorities may have prescribed.

3. Schools of agriculture, mechanic arts and home making, open to pupils who have completed the elementary school course or who have attained the age of fourteen, or who have met such other requirements as the local school authorities may have prescribed.

SEC. 601. The board of education of any union free school district shall also establish, acquire and maintain such schools for like purposes whenever such schools shall be authorized by a district meeting.

SEC. 602. 1. The board of education in a city and the officer having the management and supervision of the public-school system in a city not having a board of education shall appoint an advisory board of five members representing the local trades, industries, and occupations. In the first instance two of such members shall be appointed for a term of one year, and three of such members shall be appointed for a term of two years. Thereafter as the terms of such members shall expire, the vacancies caused thereby shall be filled for a full term of two years. Any other vacancy occurring on such board shall be filled by the appointing power named in this section for the remainder of the unexpired term.

2. It shall be the duty of such advisory board to counsel with and advise the board of education or the officer having the management and supervision of the public-school system in the city not having a board of education in relation to the powers and duties invested in such board or officer by section six hundred and three of this chapter.

SEC. 603. The board of education in a city and the officer having the management and supervision of the public-school system in a city not having a board of education and the board of education in a union free school district which authorizes the establishment of a general industrial school, a trade school, or a school of agriculture, mechanic arts and home making is vested with the same power and authority over the management, supervision and control of such school and the teachers or instructors employed therein as such board or officer now has over the schools and teachers under their charge. Such boards of education or such officer shall also have full power and authority—

1. To employ competent teachers or instructors.

2. To provide proper courses of study.

3. To purchase or acquire sites and grounds and to purchase, acquire, lease or construct and to repair suitable shops or buildings and to properly equip the same.

4. To purchase necessary machinery, tools, apparatus and supplies.

SEC. 604. 1. The commissioner of education in the annual apportionment of the State school moneys shall apportion therefrom to each city and union free school district the sum of five hundred dollars for each independently organized general industrial school, trade school, or a school of agriculture, mechanic arts and home making, maintained therein for thirty-eight weeks during the school year and employing one teacher whose work is devoted exclusively to such school, and having an enrollment of at least twenty-five pupils and maintaining a course of study approved by him.

2. The commissioner of education shall also make an additional apportionment to each city and union free school district of two hundred dollars for each additional teacher employed exclusively in such schools for thirty-eight weeks during the school year.

3. The commissioner of education may in his discretion, apportion to a district or city maintaining such schools or employing such teachers for a shorter time than thirty-eight weeks an amount pro rata to the time such schools are maintained or such teachers are employed. This section shall not be construed to entitle manual training high schools or other secondary schools maintaining manual training departments, to an apportionment of funds herein provided for.

SEC. 605. All moneys apportioned by the commissioner of education for general industrial or trade schools shall be used exclusively for the support and maintenance of such schools in the city or district to which such moneys are apportioned.

SEC. 606. 1. The board of education of each city or the officer having the management and supervision of the public school system in a city not having a board of education shall file with the common council of such city, within thirty days after the commencement of the fiscal year of such city, a written itemized estimate of the expenditures necessary for the maintenance of its general industrial schools, trade schools, or schools of agriculture, mechanic arts and home making, and the estimated amount which the city will receive from the State school moneys applicable to the support of such schools. The common council shall give a public hearing to such persons as wish to be heard in reference thereto. The common council shall adopt such estimate and, after deducting therefrom the amount of State moneys applicable to the support of such schools, shall include the balance in the annual tax budget of such city. Such amount shall be levied, assessed and raised by tax upon the real and personal property liable to taxation in the city at the time and in the manner that other taxes for school purposes are raised. The common council shall have power by a two-thirds vote to reduce or reject any item included in such estimate.

2. The board of education in a union free school district which maintains a general industrial school, trade school, or a school of agriculture, mechanic arts and home making, shall include in its estimate of expenses pursuant to the provisions of sections three hundred and twenty-three and three hundred and twenty-seven of this chapter the amount that will be required to maintain such schools after applying toward the maintenance thereof the amount apportioned therefor by the commissioner of education. Such amount shall thereafter be levied, assessed and raised by tax upon the taxable property of the district at the time and in the manner that other taxes for school purposes are raised in such district.

OHIO.

GENERAL CODE.

Industrial, etc., schools.

SECTION 7722. Any board of education may establish and maintain manual training, domestic science, and commercial departments; agricultural, industrial, vocational and trades schools, also kindergartens, in connection with the public-school system; and pay the expenses of establishing and maintaining such schools from the public-school funds, as other school expenses are paid.

OREGON.

ACTS OF 1907.

CHAPTER 101.—*Industrial training.*

SECTION 13. Any union high-school board may, at its discretion, establish and maintain a department of industrial training in connection with the school under its management. The expense of maintaining such department shall be provided for in the same manner as other expenses of maintaining union high schools, and such department shall be under the managment, direction and control of such board. The State board of education shall, so far as their other duties may warrant, give such information and assistance as may seem necessary in organizing and maintaining such department and in arranging plans and outlines of work.

Filed in the office of the secretary of state February 23, 1907.

WISCONSIN.

ACTS OF 1907.

(Codified as of Statutes of 1898.)

Industrial schools.

SECTION 926–22 (as amended by ch. 401, Acts of 1909). Any city in the State of Wisconsin or any school district having within its limits a city desiring to establish, conduct and maintain a school or schools for the purpose of giving practical instruc-

tion in the useful trades to young men having attained the age of fourteen years and young women having attained the age of fourteen years, as a part of the public-school system of such city, is empowered to do so by complying with the provisions of sections 926–23 to 926–30, inclusive, Statutes of 1898.

SEC. 926–23. Such trade school or schools shall be under the supervision and control of the school boards of the respective cities or school districts in which they may be located.

SEC. 926–24. The school board of every such city or school district is given full power and authority to establish, take over and maintain a trade school or schools, equip the same with proper machinery and tools, employ a competent instructor or instructors, and give practical instruction in one or more of the common trades. Such a trade school shall not be maintained, however, unless there be an average enrollment of at least thirty scholars.

SEC. 926–25. Whenever any school board shall have established or taken over an established trade school, such school board may prepare the courses of study, employ instructors, purchase all machinery, tools and supplies, purchase or lease suitable grounds or buildings for the use of such school and exercise the same authority over such school which it now has over the schools under its charge.

SEC. 926–26 (as amended by ch. 155, Acts of 1909). Whenever any school board shall have established or taken over an already established trade school or schools, it may appoint an advisory committee to be known as the committee on trade schools, consisting of five citizens not members of the school board, each of whom is experienced in one or more of the trades to be taught in the school or schools, to assist in the administration of the trade school or schools located in that city, which committee shall be appointed by the president of such school board with the approval of the majority of the board. Such committee shall have authority, subject to the approval and ratification of the school board, to prepare courses of study, employ or dismiss instructors, purchase machinery, tools and supplies, and purchase or rent suitable grounds or buildings for the use of such trade schools. When any such committee on trade schools is appointed, two of its original members shall be appointed for the term of one year, two for the term of two years, and one for the term of three years, and thereafter, as the terms of these members so appointed expire, their successors shall be appointed each for the term of three years. In case of any vacancy during the term of any member of said committee, said school board shall fill such vacancy by appointment for such unexpired term.

SEC. 926–27. Students attending any such trade school may be required to pay for all material consumed by them in their work in such school at cost prices or in lieu thereof the school board may establish a fixed sum to be paid by each student in each course which sum shall be sufficient to cover, as nearly as may be, the cost of the material to be consumed in such course; any manufactured articles made in such school may be disposed of at the discretion of the school board, and the proceeds shall be paid into the trade-school fund.

SEC. 926–28. Whenever any such school board shall have decided to establish a trade school or schools, or to take over one already established, under the provisions of this act, a tax, not exceeding one-half of one mill on the total assessed valuation of such city shall be levied, upon the requisition of the school board, as other school taxes are levied in such city; the fund derived from such taxation shall be known as the trade-school fund, shall be used in establishing and maintaining a trade school or trade schools in such city, shall not be diverted or used for any other purpose whatsoever, and may be disposed of and disbursed by the school board of such city in the same manner and pursuant to the same regulations governing the disposition and disbursement of regular school funds by such boards.

SEC. 926–29. Any school board desiring to avail itself of the provisions of this act may, before the trade-school fund herein provided for becomes available, establish, take over, equip and maintain a trade school or schools out of the regular school funds which may be at the disposal of such school board: *Provided, however,* That all moneys used for these purposes out of the regular school funds shall be refunded within three years from the trade-school fund.

SEC. 926–30. 1. When the school board of any city of the second, third or fourth class, or the school board of any school district having within its limits such a city, shall determine to establish, take over, conduct or maintain such trade school, it shall publish notice of its intention so to do with a copy of the resolution or order expressing such determination once each week for four successive weeks in a newspaper published in said school district and shall take no further steps in said matter until the expiration of thirty days from the date of the first publication.

2. If within such thirty days there shall be filed with the clerk of such city a petition signed by a number of electors of the school district equal to twenty per centum

of the number of votes cast in the said city at the last municipal election praying that the question of the establishment, taking over, conduct and maintenance of such trade school shall be submitted to the vote of the electors of such school district, the city clerk shall at the earliest opportunity lay such petition before the common council. The common council shall thereupon at its next regular meeting by resolution or ordinance direct the city clerk to call a special election for the purpose of submitting such question to the electors of such city and school district.

3. Such election shall be noticed and conducted and canvassed in accordance with the provisions of section 943, Statutes of 1898. All electors within the territory constituting such school district, qualified to vote at any election pertaining to school district matters shall be entitled to vote.

4. If any of said school districts shall be beyond the limits of such city, the city clerk shall immediately upon the passage of the resolution or ordinance by the city council ordering such election, transmit a copy thereof to the clerk of the town or towns of which such territory is constituted. The clerk or clerks of said towns shall thereupon cause a notice of such election to be given and such election to be held and canvassed as provided in section 943.

5. If a majority of the ballots cast in such school district shall be in favor of the establishment, taking over, conducting or maintenance of such trade school, then such board shall proceed as heretofore provided to establish, take over, conduct and maintain such trade school. But if a majority shall vote against such proposition to establish, take over, conduct and maintain a trade school, the board shall take no further steps toward such end.

6. If no petition to submit such proposition to establish, take over or maintain a trade school to the vote of the electors shall be filed with the city clerk within thirty days after the first publication of the notice of the determination of the school board to take such action, then such school board may proceed as hereinbefore provided without submitting such proposition to the electors of the district.

ACTS OF 1911.

CHAPTER 347.—*Employment of children—Apprenticeship.*

SECTION 1. Sections 2377 to 2394, inclusive, of the statutes are repealed.

SEC. 2. There are added to the statutes eleven new sections to read:

Section 2377. Every contract or agreement entered into between a minor and employer, by which the minor is to learn a trade, shall be known as an indenture, and shall comply with the provisions of sections 2378 to 2386, inclusive, of the statutes. Every minor entering into such a contract shall be known as an apprentice.

Sec. 2378. Any minor may, by the execution of an indenture, bind himself as hereinafter provided, and such indenture may provide that the length of the term of the apprentice shall depend upon the degree of efficiency reached in the work assigned, but no indenture shall be made for less than one year, and if the minor is less than eighteen years of age, the indenture shall in no case be for a period of less than two years.

Sec. 2379. Any person or persons apprenticing a minor or forming any contractual relation in the nature of an apprenticeship, without complying with the provisions of sections 2377 to 2387, inclusive, of the statutes, shall upon conviction thereof be punished by a fine of not less than fifty nor more than one hundred dollars.

Sec. 2380. It shall be the duty of the commissioner of labor, the factory inspector or assistant factory inspectors to enforce the provisions of this act, and to prosecute violations of the same before any court of competent jurisdiction in this State.

Sec. 2381. Every indenture shall be signed:

(1) By the minor.

(2) By the father; and if the father be dead or legally incapable of giving consent or has abandoned his family, then

(3) By the mother; and if both the father and mother be dead or legally incapable of giving consent, then

(4) By the guardian of the minor, if any.

(5) If there be no parent or guardian with authority to sign, then by two justices of the peace of the county of residence of the minor.

(6) By the employer.

Sec. 2382. Every indenture shall contain:

(1) The names of the parties.

(2) The date of the birth of the minor.

(3) A statement of the trade the minor is to be taught, and the time at which the apprenticeship shall begin and end.

(4) An agreement stating the number of hours to be spent in work, and the number of hours to be spent in instruction. The total of such number of hours shall not exceed fifty-five in any one week.

(5) An agreement that the whole trade, as carried on by the employer, shall be taught, and an agreement as to the time to be spent at each process or machine.

(6) An agreement between the employer and the apprentice that not less than five hours per week of the aforementioned fifty-five hours per week shall be devoted to instruction. Such instruction shall include—

(*a*) Two hours a week instruction in English, in citizenship, business practice, physiology, hygiene, and the use of safety devices.

(*b*) Such other branches as may be approved by the State board of industrial education.

(7) A statement of the compensation to be paid the apprentice.

Sec. 2383. The instruction specified in section 2382 may be given in a public school, or in such other manner as may be approved by the local board of industrial education, and if there be no local board, subject to the approval of the State board of industrial education. Attendance at the public school, if any, shall be certified to by the teachers in charge of the courses, and failure to attend shall subject the apprentice to the penalty of a loss of compensation for three hours for every hour such apprentice shall be absent without good cause. It shall be the duty of the school officials to cooperate for the enforcement of this law.

Sec. 2384. It shall be lawful to include in the indenture or agreement an article stipulating that during such period of the year as the public schools shall not be in session the employer and the apprentice may be released from those portions of the indenture which affect the instruction to be given.

Sec. 2385. If either party to an indenture shall fail to perform any of the stipulations he shall forfeit not less than ten nor more than fifty dollars, on complaint, the collection of which may be made by the commissioner of labor, factory inspector, or assistant factory inspectors in any court of competent jurisdiction in this State. Any court of competent jurisdiction may in its discretion also annul the indenture. Nothing herein prescribed shall deprive the employer of the right to dismiss any apprentice who has wilfully violated the rules and regulations applying to all workmen.

Sec. 2386. The employer shall give a bonus of not less than fifty dollars to the apprentice on the expiration of the term of the indenture, and also a certificate stating the term of the indenture.

Sec. 2387. A certified copy of every indenture by which any minor may be apprenticed shall be filed by the employer with the State commissioner of labor.

SEC. 3. This act shall take effect and be in force from and after its passage and publication.

Approved June 15, 1911.

CHAPTER 505.—*Employment of children—Schools.*

SECTION 1. There is added to the statutes a new section, to read:

Section 1728c–1. 1. Whenever any evening school, continuation classes, industrial school, commercial school shall be established in any town, village, or city in this State for minors between the ages of fourteen and sixteen, every employer shall allow all minor employees over fourteen and under sixteen years of age a reduction in hours of work of not less than the number of hours the minor may by law be required to attend school.

2. The total number of hours spent by such minors at work and in the beforementioned schools shall together not exceed the total number of hours of work for which minors over fourteen and under sixteen years of age may by law be employed, except when the minor shall attend school a greater number of hours than is required by law, in which case the total number of hours may be increased by the excess of the hours of school attendance over the minimum prescribed by law.

3. Employers shall allow the reduction in hours of work at the time when the classes which the minor is by law required to attend are held whenever the working time and the class time coincide.

4. Any violation of this section shall be punished, as is provided in the case of a violation of section 1728a of the statutes.

SEC. 2. All acts and parts of acts conflicting with any provisions of this act are repealed in so far as they are inconsistent therewith.

SEC. 3. This act shall take effect and be in force from and after its passage and publication.

Approved, June 30, 1911.

CHAPTER 522.—*Employment of children—Illiterates.*

SECTION 1. There are added to the statutes seven new sections to read:

Section 1728a–11. No person shall employ a minor over fourteen years of age in any city, village, or town in which a public evening school or continuation school, for the industry in which the minor is to work, is maintained, unless he receives and places on file a written permit issued by the commissioner of labor, State factory inspector or any assistant factory inspector, or from the judge of a juvenile court where such child resides, authorizing the employment of the minor, as provided in section 1728b of the statutes, and certifying either to his ability to read at sight and write legibly simple sentences in the English language, or that he is a regular attendant at the public evening school or continuation school.

Sec. 1728a–12. No parent, guardian, or custodian shall permit a minor over fourteen years of age who has not the certificate referred to in section 1728a–11 to be employed.

Sec. 1728a–13. Any minor over fourteen years of age, required by section 1728a–11 to attend an evening school or continuation school, shall furnish to his employer each week during its session a record showing that he is a regular attendant at the evening school or continuation school. The employer shall file all records of attendance with the minor's permit to work, and no minor, subject to this act, shall be employed unless the records of attendance or absence for valid cause during the previous week be on file.

Sec. 1728a–14. Upon presentation by a minor of a certificate signed by a registered practicing physician, showing that his physical condition, or the distance necessary to be traveled, would render the required school attendance, in addition to his daily labor, prejudicial to his health, the commissioner of labor, State factory inspector, or any assistant factory inspector may issue a permit authorizing his employment for such period as he may determine.

Sec. 1728a–15. No permit issued under section 1728a shall excuse any minor from attendance at evening school, or evening continuation school.

Sec. 1728a–16. Any person, firm, or corporation, agent or manager of any corporation, who, whether for himself or for such firm or corporation, or by himself or through agents, servants, or foremen, shall violate or fail to comply with any of the provisions of sections 1728a–11 to 1728a–14, inclusive, of the statutes, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than ten nor more than one hundred dollars for each offense. Any corporation which by its agents, officers, or servants shall violate or fail to comply with any of the above provisions of this act shall be liable to the same penalty which may be recovered against such corporation in action for debt or assumpsit, brought before any court of competent jurisdiction.

Sec. 1728a–17. Any parent or guardian who suffers or permits a minor to be employed, or suffered or permitted to work in violation of sections 1728a–12 and 1728a–13 of the statutes, shall be guilty of a misdemeanor, and upon conviction thereof shall be fined not less than five nor more than twenty-five dollars.

SEC. 2. This act shall take effect and be in force from and after the first day of September, 1911.

Approved July 3, 1911.

CHAPTER 544.—*Industrial education—Salaries of teachers.*

SECTION 1. There is added to the statutes a new section to read:

Section 5531–1. No State aid shall be granted to any school for instruction given in agriculture, domestic economy, manual training or industrial branches unless the salary paid to every teacher instructing in such subjects be at least at the rate of sixty dollars per month.

SEC. 2. All acts and parts of acts conflicting with any provisions of this act are repealed in so far as they are inconsistent therewith.

SEC. 3. This act shall take effect and be in force from and after its passage and publication.

Approved July 3, 1911.

CHAPTER 616.—*Industrial education—Duties and powers of State and local boards.*

SECTION 1. There are added to the statutes 13 new sections to read:

Section 553p–1. 1. There is hereby created a State board of industrial education to be appointed by the governor. The board shall consist of six appointive members, three of whom shall be employers of labor and three of whom shall be skilled employees. The State superintendent of education and the dean of the extension department and the dean of the college of engineering of the University of Wisconsin shall be ex officio members of this board.

2. Each appointive member shall hold office for two years and shall receive traveling expenses and one hundred dollars per year. In the first appointments the governor shall designate three members to serve for one year and three members to serve for two years from the first day of July of the year in which the appointments are made. All appointments thereafter shall be for two years except appointments to fill vacancies, which shall be for the unexpired portion of the term.

3. Said board: (1) Shall have control over all State aid given under this act; (2) shall meet quarterly and at such other times as may be found necessary; (3) shall report biennially.

Sec. 553p–2. 1. The State superintendent of education shall appoint an assistant in the department of public instruction to be known as the assistant for industrial education. He shall, with the advice, consent, and direction of the State superintendent of education have general supervision over the public industrial schools and over all public evening schools, continuation schools, and commercial schools created under this act. The laws relating to agricultural schools and the Platteville Mining Trade School shall remain unaffected by this act.

2. The salary of the assistant shall be fixed by the State superintendent of education with the approval of the State board of industrial education.

3. The State superintendent of education shall have in addition to the assistant for industrial education such other assistants as he shall deem necessary for work in the same general field.

4. All positions except that of assistant for industrial education shall be filled by civil service examination, as provided by chapter 363 of the laws of 1905. But the total salary list exclusive of the salary of the assistant shall not exceed ten thousand dollars for any one year.

5. The assistant shall have all necessary expenses to attend conventions and make investigations within or outside of the State when such expenses shall have been previously authorized by the State superintendent of education.

Sec. 553p–3. 1. In every town or village or city of over five thousand inhabitants there shall be, and in towns, cities, and villages of less than five thousand inhabitants there may be, a local board of industrial education, whose duty it shall be to foster and establish and maintain industrial, commercial, continuation and evening schools. Said board may take over and maintain in the manner provided in this act any existing schools of similar nature.

2. Such board shall consist of the city superintendent of schools ex officio, or the principal of the high school ex officio, if there be no city superintendent, or the president or chairman of the local board charged with the supervision of the schools in case there be neither of the above-mentioned officers, and four other members, two employers and two employees, who shall be appointed by the local board charged with the supervision of the schools, and who shall serve without pay

3. The term of the appointive members of the local boards of industrial education shall be two years from the first of January of the year in which they are appointed: *Provided, however,* That in the first appointment two members shall be appointed who are to serve for only one year from the first of January of the year in which they are appointed. All subsequent appointments shall be for two years, except appointments to fill vacancies, which shall be for the unexpired portion of the term.

4. The local board of industrial education shall elect its officers from its membership—a chairman and a secretary. The local boards of industrial education, with the cooperation of the State board of industrial education, shall have general supervision of the instruction in the local schools created under this act.

5. No State aid shall be granted to schools created under this act without the approval of the local board of industrial education. No money appropriated by the city, town, or village for these schools shall be spent without the approval of the local board of industrial education.

6. The teachers in the schools created under this act shall be employed and their qualifications determined by the local board of industrial education.

7. This board shall have power to purchase all machinery, tools, and supplies, and purchase or lease suitable grounds or buildings for the use of the schools under its

supervision. Existing school buildings and equipment shall be used as far as practicable.

8. The board is empowered to make contracts with the extension division of the University of Wisconsin to give instruction in such branches as the department may offer when, in the judgment of the local board, such instruction can be secured to better advantage than by local provision.

9. Whenever twenty-five persons qualified to attend an industrial, commercial, continuation or evening school file a petition therefor with the local board of industrial education the board shall establish such school or schools or provide other facilities as authorized in this act.

Sec. 553p–4. 1. The local board of industrial education of every city, village, or town shall report to the common council, or village or town clerk, at or before the first day of September, in each year, the amount of money required for the next fiscal year for the support of all the schools established or to be established under this act in said city, village, or town, and for the purchase of necessary additions to school sites, fixtures, and supplies.

2. There shall be levied and collected in every city, village, or town, subject to taxation under this act, a tax upon all taxable property in said city, village, or town, at the same time and in the same manner as other taxes are levied and collected by law, which, together with the other funds provided by law and placed at the disposal of said city, village, or town for the same purpose, shall be equal to the amount of money so required by said local board of industrial education for the purposes of this act.

3. The rate of tax levied for the purposes of this act in any town, village, or city shall not in any one year exceed one-half mill for the maintenance of all schools created under this act.

4. The said taxes for the purpose named in this section shall be in addition to all other special and general taxes levied for town, village, or city purposes and shall be for the use and support of schools established under this act.

5. The treasurer of the town, village, or city shall keep such money separate from all other money, to be used exclusively for the purpose of industrial education as herein provided. All moneys appropriated and expended under this act shall be expended by the local board of industrial education and shall be paid by the town, village, or city treasurer on orders issued by said board and signed by its president and secretary.

6. All moneys received by said board shall be paid to the town, village, or city treasurer for the fund of the local board of industrial education.

Sec. 553p–5. 1. The courses of study in these schools shall be approved by the State superintendent of education and the State board of industrial education, and shall include English, citizenship, sanitation and hygiene, and the use of safety devices, and such other branches as the State superintendent and the State board of industrial education shall approve.

2. The local board of industrial education may allow pupils attending any school established under this act, who have had courses equivalent to any of those offered, to substitute other work therefor.

Sec. 553p–6. 1. Not more than ten thousand dollars shall be appropriated from the State funds for the purposes of this act in any one city, town, or village, and State aid shall not be given to more than thirty schools established under this act.

2. A school once granted State aid shall be entitled thereto as long as the character of its work meets with the approval of the State superintendent of education and the State board of industrial education.

3. The secretary of the local board of industrial education of each city, town, or village in which such school or schools are maintained shall, on the first day of July in each year, report to the State superintendent of education the cost of maintaining the school, the character of the work done, the number, names, and qualifications of the teachers employed, and such other information as may be required by the State superintendent of education.

4. If such report is satisfactory to the State superintendent of education and the State board of industrial education, and they are satisfied that the school or schools have been maintained in a satisfactory manner for not less than eight months during the year ending the thirtieth of the preceding June, the State superintendent of education shall make a certificate to that effect and file it with the secretary of state. The secretary of state shall then draw a warrant payable to the treasurer of such city, town, or village in which the industrial school is located for a sum equal to one-half the amount actually expended in such industrial school, continuation school, evening school, or commercial school, during the preceding year, but not more than three thousand dollars shall be appropriated to any one school in one year.

Sec. 553p–7. The schools established under this act shall be open to all residents of the cities, towns, and villages in which such schools are located, of fourteen years of age or over who are not by law required to attend other schools. Any person over the age of fourteen who shall reside in any town, village, or city not having an industrial school as provided in this act, and who is otherwise qualified to pursue the course of study may with the approval of the local board of industrial education in any town, village, or city having a school established under this act, be allowed to attend any school under their supervision. Such persons shall be subject to the same rules and regulations as pupils of the school who are residents of the town, village, or city in which the school is located.

Sec. 553p–8. The local board of industrial education is authorized to charge tuition fee for nonresident pupils not to exceed fifty cents per week. On or before the first day of July in each year the secretary of the local board of industrial education shall send a sworn statement to the clerk of the city, village, or town from which any such person or persons may have been admitted. This statement shall set forth the residence, name, age, and date of entrance to such school, and the number of weeks' attendance during the preceding year of each such person at the school. It shall show the amount of tuition which under the provisions of this act the town, city, or village is entitled to receive on account of each and all such pupils' attendance. This statement shall be filed as a claim against the town, village, or city where such pupil resides and allowed as other claims are allowed.

Sec. 553p–9. Students attending any school under this act may be required to pay for all material consumed by them in their work in such school at cost prices or in lieu thereof the school board may establish a fixed sum to be paid by each student in each course, which sum shall be sufficient to cover, as nearly as may be, the cost of the material to be consumed in such course; any manufactured articles made in such school and that may accumulate shall be disposed of at their market value at the discretion of the school board, and the proceeds shall be paid to the local treasurer for the fund of the local board of industrial education.

Sec. 553p–10. The State board of industrial education shall also constitute a body corporate under the name of the "board of trustees of the Stout Institute," and shall possess all powers necessary or convenient to accomplish the objects and perform the duties prescribed by law. In such capacity, such board shall also employ such clerks and assistants as may be necessary to properly conduct its affairs. The State treasurer shall be ex officio treasurer of the board, but the board may appoint a suitable person to receive fees or other moneys that may be due such board, to disburse any part thereof, to account therefor, and to pay the balance to the State treasurer.

Sec. 553p–11. Such board is authorized to accept free of cost to the State and to hold as a trustee for the State the property of the Stout Institute located at Menominee, Wisconsin, and to maintain such institute under the name of "The Stout Institute:" *Provided*, That the trustees of said Stout Institute turn over to the State, within two months after the passage and publication of this act, said property free and clear of all incumbrances and debt, released from all claims or interest which the city of Menominee or the heirs of James H. Stout may have had in said property and having put the buildings in good condition, and having made such repairs as may be necessary before turning over said property. The board is also authorized to accept such other property or moneys as it may deem advisable to be accepted, which can profitably be used by it in promoting the interests intrusted to it. Such board may purchase, have, hold, control, possess, and enjoy, in trust, for the State, for educational purposes, any lands, tenements, hereditaments, goods, and chattels, of any nature, which may be necessary and required to accomplish the purposes and objects of the board, and may sell or dispose of any personal property when in its judgment it shall be for the interests of the State.

Sec. 553p–12. The purposes and objects of the institute shall be to instruct young persons in industrial arts and occupations and the theory and art of teaching such, and to give such instruction as will lead to a fair knowledge of the liberal arts, a just and seemly appreciation of the nobility and dignity of labor, and in general to promote diligence, economy, efficiency, honor, and good citizenship.

Sec. 553p–13. The said board shall have power:

(1) To make rules, regulations, and by-laws for the government and management of the institute and the students therein, including the power to suspend or expel students for misconduct or other cause.

(2) To appoint a president of the institute and other officers, teachers, and assistants, and to employ such other persons as may be required; to fix the salary of each person so appointed or employed and to prescribe their several duties; to remove at pleasure any president, other officer, teacher, assistant, or person from any office or employment in connection with the institute.

(3) To purchase such supplies as may be necessary in the conduct of the institute and its various departments.

(4) To prescribe rules, regulations, and terms for the admission and control of the students, to prescribe courses of study and methods and means of instruction, and to issue certificates or diplomas.

(5) To cooperate with other educational institutions and agencies in instruction and training, leading to efficiency in industrial arts and occupations.

SEC. 2. There is hereby appropriated, out of any money in the State treasury not otherwise appropriated, a sum sufficient to carry into effect the provisions of this act. However, in no case shall the sum appropriated for the purpose of carrying out the provisions of this act exceed the sum of thirty thousand dollars during the fiscal year ending July 1, 1912, nor more than fifty-five thousand dollars per annum thereafter. Twenty thousand dollars of the above moneys shall be set aside annually, beginning July 1, 1911, for the purpose of maintaining the Stout Institute as provided in this act.

SEC. 3. All acts and parts of acts conflicting with any provisions of this act are repealed in so far as they are inconsistent therewith: *Provided, however*, Nothing in this act shall be construed to interfere in any manner with trade schools established under chapter 122, laws of 1907 [sections 926—22 to 926—30 of the Annotated Statutes] and amendments thereof, unless the school board of any such city or school district shall by a majority vote adopt the provisions of this act, and shall proceed in the manner provided for, for every town, village, or city of over five thousand inhabitants as provided in this act.

SEC. 4. This act shall take effect and be in force from and after its passage and publication.

Approved July 7, 1911.

CHAPTER 660.—*Industrial education—Attendance of minors at school required.*

SECTION 1. Subsection 1 of section 1728c—1 of the statutes is amended to read:

(Section 1728c—1) 1. Whenever any evening school, continuation classes, industrial school, or commercial school, shall be established in any town, village, or city in this State for minors between the ages of fourteen and sixteen, working under permit as now provided by law, every such child, residing within any town, village, or city in which any such school is established, shall attend such school not less than five hours per week for six months in each year, until such child becomes sixteen years of age, and every employer shall allow all minor employees over fourteen and under sixteen years of age a reduction in hours of work of not less than the number of hours the minor * * * is by this section required to attend school.

SEC. 2. This act shall take effect and be in force from and after its passage and publication.

Approved July 14, 1911.

CHAPTER XVII.

SELECTED BIBLIOGRAPHY ON INDUSTRIAL EDUCATION.

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SELECTED BIBLIOGRAPHY ON INDUSTRIAL EDUCATION.

A selected bibliography on industrial education is incorporated with the present report covering the main studies and investigations of the subject already made both in the United States and abroad. It is desirable to indicate the principal sources of information on industrial education in foreign countries, because the subject has now reached in the United States the stage where exact information rather than general discussions of foreign systems is desired. This can, in the main, be supplied only by the authors and in the languages of the various countries having well-developed systems of industrial education.

The list presented below has been selected from thousands of titles, embracing documents, books, and articles in periodicals. For each foreign country, those books and reports are included which will give as full and correct an account as is available of the status of industrial education, as it exists there to-day. Where several works cover the same subject matter, as a rule only the more recent and more comprehensive are included. As important material in English is more limited than material in French and in German, it was impossible to make as rigorous a selection of that in the English language as of that in the other two languages.

It has been considered undesirable to attempt any classification of references by subject matter, as most of the more important works treat of many or all of the important subjects related to industrial education. The titles are presented, therefore, separated into official and unofficial publications and arranged alphabetically by countries. A few exceptions will be found to this arrangement in those cases where the important works dealing with the subject in a given country are so few as to make the division into official and unofficial publications useless. An additional group of general works includes those dealing with the problem so comprehensively as to cover many countries, and those concerned chiefly with its theoretical aspects.

Attention is called to the lists of journals which are devoted to industrial education published in the various foreign countries. They furnish an interesting picture of the contemporary situation, and contain much material concerning textbooks, methods, and the practical problems to be confronted in the administration of trade and continuation schools.

After an exhaustive search through the magazine literature of the subject in English, it was deemed inexpedient to present a list of magazine references. The hundreds of titles examined indicate a constant repetition of the same subject matter frequently by the same authors; and the report of which this bibliography is a part presents full information concerning the well-known schools which are the chief themes of magazine contributors.

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CHAPTER XVIII.

GENERAL TABLES.

CHAPTER XVIII.

GENERAL TABLES.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE.

The first column gives the locality and name of school, the kind of school, and the occupations taught in each school during the schedule year. The various types and classes of schools are defined and described in Chapter I.

The second column shows the number of school years embraced by the course given in each occupation, without regard to the number of weeks in the school year. In a few instances a fraction has been used in this column, because, though there is instruction provided during the number of weeks shown in the next column, the time required to complete the course is less than the full number of weeks in the school year.

The third column shows the number of weeks of instruction afforded during the year in each occupation shown in the second column.

The fourth column shows the number of pupils receiving instruction in each occupation taught.

The fifth column shows the trade theory and academic subjects in which the pupils in each occupational course receive instruction, while columns 6 to 9, "Hours per week," show the hours given per week to each subject each year in which it is studied. It should, of course, be kept in mind that pupils also receive incidentally more or less theory in immediate connection with the execution of the practice work.

This table further shows the total hours per week devoted to trade theory and academic subjects each year, and the hours per week devoted to practice work each year in the school, and also a total of the two.

In a few schools the total possible hours of school work, as shown in Table III, are not actually occupied with school work by all pupils.

Other important data, which can not be presented in this table for want of space, are given in succeeding tables.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME

A.—PHILANTHROPIC SCHOOLS.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
ALABAMA.								
Snow Hill—Snow Hill Normal and Industrial Institute (Negro—*day school*):								
Blacksmithing and wheelwrighting.	3	32	12	Mechanical drawing	8	8	8	.....
				Theory of trade	4	4	4	.....
Carpentry and sawmilling.	3	32	22	Five common-school studies.[1]	$16\frac{2}{3}$	$16\frac{2}{3}$	$16\frac{2}{3}$	.....
Printing	3	32	7					
Brickmaking and bricklaying.	2	32	9	Mechanical drawing	8	8	.....	.....
				Theory of trade	4	4	.....	.....
				Five common-school studies.[1]	$16\frac{2}{3}$	$16\frac{2}{3}$	.....	.....
Laundering	2	32	37	Theory of trade	4	9	.....	.....
				Five common-school studies.[1]	$16\frac{2}{3}$	$16\frac{2}{3}$	.....	.....
Sewing	3	32	34	Theory of trade	4	4	4	.....
				Five common-school studies.[1]	$16\frac{2}{3}$	$16\frac{2}{3}$	$16\frac{2}{3}$	.....
Tuskegee—Tuskegee Normal and Industrial Institute (Negro—*day school*):[2]								
Baking	3	36	15	Arithmetic	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
				English grammar	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
				Geography	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
				History	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
				Lectures on trade	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	.....
Basket making, broom making, and upholstering.[3]	4	36	24	English	3	3	3	3
				Geography	3	3	3	3
				History	3	3	3	3
				Lectures on trade	2	2	2	2
				Mathematics	3	3	3	3
Blacksmithing	3	36	39	Arithmetic	$1\frac{1}{2}$	$1\frac{1}{2}$	.....	.....
				English grammar	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	.....
Harness making and carriage trimming.	3	36	26	Geography	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	.....
				History	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	.....
				Lectures on trade	3	3	3	.....
				Mechanical drawing	4	4	4	.....
				Algebra	.....	.....	$1\frac{1}{2}$	.....
Brickmaking	1	36	4	Arithmetic	3	.....	.....	.....
				English grammar	3	.....	.....	.....
				Geography	3	.....	.....	.....
				History	3	.....	.....	.....
				Lectures on trade	$1\frac{1}{2}$	.....	.....	.....
Bricklaying, lathing, plastering, and tile setting.	3	36	102	Arithmetic	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
				English grammar	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
				Geography	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
Shoemaking	3	36	18	History	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
Tinsmithing	3	36	21	Lectures on trade	$2\frac{1}{4}$	$2\frac{1}{4}$	$2\frac{1}{4}$	.....
				Mechanical drawing	6	6	6	.....
Carpentry and wood turning.	3	36	97	Arithmetic	$1\frac{1}{2}$	$1\frac{1}{2}$	.....	.....
				English grammar	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	.....
				Geography	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	.....
				History	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	.....
				Lectures on trade	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	.....
				Mechanical drawing	4	4	4	.....
				Algebra	.....	.....	$1\frac{1}{2}$	.....

[1] Subjects vary according to advancement of pupil.

[2] This institution also has evening classes, with courses like those for day pupils, except that evening pupils by working all day get twice the practice work, but only half the theory and academic training. The number of pupils in each trade in the evening classes is not reported. See page 326.

DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE.

A.—PHILANTHROPIC SCHOOLS.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
28⅔	20⅚	49½	28⅔	20⅚	49½	28⅔	20⅚	49½	.....	.....	.....
28⅔	20⅚	49½	28⅔	20⅚	49½	.....	.....	.....	.....	.....	.....
20⅔	28⅚	49½	25⅔	23⅚	49½	.....	.....	.....	.....	.....	.....
20⅔	28⅚	49½	20⅔	28⅚	49½	20⅔	28⅚	49½	.....	.....	.....
10½	35¼	45¾	10½	35¼	45¾	10½	35¼	45¾	.....	.....	.....
14	31¾	45¾	14	31¾	45¾	14	31¾	45¾	14	31¾	45¾
13	32¾	45¾	13	32¾	45¾	13	32¾	45¾	.....	.....	.....
13½	32¼	45¾	.....	.....	.....	.....	.....	.....	.....	.....	.....
17¼	28½	45¾	17¼	28½	45¾	17¼	28½	45¾	.....	.....	.....
14½	31¼	45¾	14½	31¼	45¾	14½	31¼	45¾	.....	.....	.....

[3] For female pupils.

[4] Broom making 2, upholstering 2.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
ALABAMA—continued.								
Tuskegee—Tuskegee Normal and Industrial Institute (Negro—*day school*)—Contd.								
Dressmaking	2	36	83	English	3	3	.....	.....
				Geography	3	3	.....	.....
Millinery	2	36	42	History	3	3	.....	.....
Plain sewing	2	36	129	Lectures on trade	2	2	.....	.....
				Mathematics	3	3	.....	.....
Electrical work	3	36	29	Arithmetic	3	.....	.....	.....
				English grammar	3	3	3	.....
				Geography	3	3	3	.....
				History	3	3	3	.....
				Lectures on trade	2½	2½	2½	.....
				Mechanical drawing	8	8	8	.....
				Algebra	.....	3	3	.....
Foundry work	2	36	13	Arithmetic	2¼	.....	.....	.....
				English grammar	2¼	2¼	.....	.....
				Geography	2¼	2¼	.....	.....
				History	2¼	2¼	.....	.....
				Lectures on trade	2¼	2¼	.....	.....
				Mechanical drawing	6	6	.....	.....
				Algebra	.....	2¼	.....	.....
Ladies' tailoring	1	36	31	English	3	.....	.....	.....
Laundering and soap making	1	36	68	Geography	3	.....	.....	.....
				History	3	.....	.....	.....
				Lectures on trade	2	.....	.....	.....
				Mathematics	3	.....	.....	.....
Laundering	1	36	7	Arithmetic	3¾	.....	.....	.....
Sawmilling	1	36	7	English grammar	3¾	.....	.....	.....
				Geography	3¾	.....	.....	.....
				History	3¾	.....	.....	.....
				Lectures on trade	¾	.....	.....	.....
Machinists	2	36	87	Arithmetic	3	.....	.....	.....
Stationary engineers	2	36	15	English grammar	3	3	.....	.....
				Geography	3	3	.....	.....
				History	3	3	.....	.....
				Lectures on trade	1½	1½	.....	.....
				Mechanical drawing	8	8	.....	.....
				Algebra	.....	3	.....	.....
Painting, house and carriage.	3	36	25	Arithmetic	2¼	.....	.....	.....
				English grammar	2¼	2¼	2¼	.....
				Geography	2¼	2¼	2¼	.....
				History	2¼	2¼	2¼	.....
				Lectures on trade	2¼	2¼	2¼	.....
				Mechanical drawing	6	6	6	.....
				Algebra	.....	2¼	2¼	.....
Plumbing and steam fitting	3	36	16	Arithmetic	3	3	.....	.....
				English grammar	3	3	3	.....
				Geography	3	3	3	.....
				History	3	3	3	.....
				Lectures on trade	1½	1½	1½	.....
				Mechanical drawing	8	8	8	.....
				Algebra	.....	.....	3	.....
Printing	3	36	24	Arithmetic	2¼	.....	.....	.....
				Composition	2¼	2¼	2¼	.....
				English grammar	2¼	2¼	2¼	.....
				Geography	2¼	2¼	2¼	.....
				History	2¼	2¼	2¼	.....
				Lectures on trade	2¼	2¼	2¼	.....
				Algebra	.....	2¼	2¼	.....
Tailoring	3	36	53	Arithmetic	1½	1½	1½	.....
				English grammar	1½	1½	1½	.....
				Geography	1½	1½	1½	.....
				History	1½	1½	1½	.....
				Lectures on trade	3	3	3	.....
				Mechanical drawing	4	4	4	.....

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
14	31¾	45¾	14	31¾	45¾	.....	.....	.....	.....	.....	.....
22½	23¼	45¾	22½	23¼	45¾	22½	23¼	45¾	.....	.....	.....
17¼	28½	45¾	17¼	28½	45¾	.....	.....	.....	.....	.....	.....
14	31¾	45¾	.....	.....	.....	.....	.....	.....	.....	.....	.....
15¾	30	45¾	.....	.....	.....	.....	.....	.....	.....	.....	.....
21½	24¼	45¾	21½	24¼	45¾	.....	.....	.....	.....	.....	.....
17¼	28½	45¾	17¼	28½	45¾	17¼	28½	45¾	.....	.....	.....
21½	24¼	45¾	21½	24¼	45¾	21½	24¼	45¾	.....	.....	.....
13½	32¼	45¾	13½	32¼	45¾	13½	32¼	45¾	.....	.....	.....
13	32¾	45¾	13	32¾	45¾	13	32¾	45¾	.....	.....	.....

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
ALABAMA—concluded.								
Tuskegee—Tuskegee Normal and Industrial Institute (Negro—*day school*)—Concluded.								
				Arithmetic	2¼	2¼	.....	.....
				English grammar	2¼	2¼	2¼	.....
				Geography	2¼	2¼	2¼	.....
Wheelwrighting	3	36	23	History	2¼	2¼	2¼	.....
				Lectures on trade	2¼	2¼	2¼	.....
				Mechanical drawing	6	6	6	.....
				Algebra	.....	.....	2¼	.....
CALIFORNIA.								
San Francisco—California School of Mechanical Arts (*day school*):								
				Algebra	3¾	.....	.....	.....
				General science	3¾	.....	.....	.....
				English	3¾	3¾	.....	.....
				Free-hand drawing	1⅞	1⅞	.....	.....
				Mechanical drawing	1⅞	3¾	.....	.....
				Chemistry	.....	3¾	.....	.....
Forging[1]	1 4	40	4	Geometry	.....	3¾	.....	.....
Machinists[1]	1 4	40	18	Algebra	.....	.....	3¾	.....
Pattern making[1]	1 4	40	8	Mechanics, Trigonometry				
				American history and government.	.....	.....	3¾	.....
				Boiler and engine tests, Electrical calculations, Heat calculations	.....	.....	.....	3¾
San Francisco—Wilmerding School of Industrial Arts (*day school*):								
				Free-hand drawing	3¾	3¾	.....	
				Mechanical drawing	3¾	3¾	.....	
				Algebra				
Bricklaying[2]	2 4	40	8	Shop geometry	1⅞	1⅞	1⅞	
Cabinetmaking[2]	2 4	40	16	Plane trigonometry				
Carpentry[2]	2 4	40	15	Elementary physics				(3)
Electrical work[2]	2 4	40	60	Elementary chemistry				
Plumbing and tinning[2]	2 4	40	24	Theoretical mechanics	1⅞	1⅞	1⅞	
Trade not yet determined[2]	2 4	40	60	Heating[4], Ventilating[4]				
				English, History	3¾	3¾	3¾	
CONNECTICUT.								
New London—Manual Training and Industrial School of New London (*day school*):								
				Mathematics	3¾	3¾	3¾	.....
Dressmaking and millinery	4	38	66	English	3¾	3¾	3¾	2¼
				Lectures on trade	7½	7½	7½	5¼
				Mechanical drawing	3¾	3¾	5¼	.....
				English	3¾	3¾	3¾	3¾
Machinists	4	38	16	Mathematics	3¾	3¾	2¼	1½
				Sciences	3¾	3¾	3¾	2¼

[1] Practice work is common to forging, machinists, and pattern making during first 2 years.
[2] Pupils may select a trade on entering school, but must make selection by beginning of third year. If selection is deferred until third year, shop practice must not include more than two trades at one time.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
17¼	28½	45¾	17¼	28½	45¾	17¼	28½	45¾	.....	.....	.....
15	[1] 11¼	26¼	16⅞	[1] 9⅜	26¼	7½	22½	30	3¾	26¼	30
15	[2] 15	30	15	[2] 15	30	7½	22½	30	3¾	26¼	30
15	7½	22½	15	7½	22½	15	7½	22½	7½	15	22½
15	7½	22½	15	7½	22½	15	7½	22½	7½	15	22½

[3] Studies not specified. Total time on all studies, 3¾ hours.
[4] Not given with carpentry, cabinetmaking, and bricklaying.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
ILLINOIS.								
Chicago—Chicago Girls' Trade School (*day school*):								
Dressmaking	(1)	52	10	None	.....	.....	.....	.....
Millinery	1	52	8					
Chicago—Lewis Institute (*day cooperative school*):[2]								
Metal trades. (This school does not teach specific trades, but gives a general course covering pattern making, foundry work, machine-shop practice, and forging.)	2	(6)	48	Chemistry	[3] 35	.....	.....	.....
				English composition, literature, and public speaking.	[4] 5	.....	.....	.....
				Machine sketching	[5] 10	.....	.....	.....
				Mechanical drawing	[3] 10	.....	.....	.....
				Physics	[4] 5	.....	.....	.....
				Principles of mechanics.	[4] 5	.....	.....	.....
				Shop mathematics	[4] 5	.....	.....	.....
				Applied mathematics	.....	[4] 5	.....	.....
				Engineering principles, English composition, and industrial history.	.....	[4] 10 [4] 5	.....	.....
				Machine drawing	.....	[4] 10	.....	.....
				Mechanical drawing and machine design, strength of materials, demonstration of electrical and engineering principles.	.....	[3] 35	.....	.....
Glenwood—Illinois Manual Training Farm (*day school*):								
Baking	(9)	52	10	Regular grammar grade work.	15	(9)	(9)	(9)
Blacksmithing	(9)	52	20					
Cabinetmaking	(9)	52	15					
Carpentry	(9)	52	10					
Cobbling	(9)	52	15					
Laundering	(9)	52	40					
Machinists	(9)	52	20					
Printing	(9)	52	10					
Stationary engineers	(9)	52	8					
Peoria—Bradley Polytechnic Institute, horological department (*day school*):								
Watchmaking, jewelry making, and engraving.	(10)	51	[11] 325	Drawing (watch)	2	.....	.....	.....
				Theoretical watchmaking.	6	.....	.....	.....
Optics	¼	51	[12] 56	Theory of trade	3	.....	.....	.....
INDIANA.								
Indianapolis—National Trade Schools (*day school*):								
Bricklaying	¾	52	11	None	.....	.....	.....	.....
Carpentry	2	52	1	....do	.....	.....	.....	.....
Pattern making	2	52	(13)					

[8] Indefinite.
[2] Pupils get practice work in shop of cooperating establishment where employed, in addition to practice work here shown, see pages 194 to 198.
[3] For 6 weeks.
[4] For 18 weeks.
[5] For 12 weeks.
[6] Period covered 48 weeks; 24 alternate weeks in school and 24 alternate weeks in cooperating employers' shops.
[7] For 12 weeks on foundry practice and 6 weeks on pattern making.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
.....	27½	27½	.....	.....	.....	.....	.....	.....	.....	.....	.....
[4] 30	[7] 10	[4] 40	[4] 30	[8] 10	[4] 40	.....	.....	.....	.....	.....	.....
[3] 35	.....	[3] 35	[3] 35	.....	[3] 35	.....	.....	.....	.....	.....	.....
.....	[2]	.....	.....	[2]	.....	.....	.....	.....	.....	.....	.....
15	18	33	[9]	[9]	[9]	[9]	[9]	[9]	[9]	[9]	[9]
8	36	44	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	2	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	52	52	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	52	52	.....	52	52	.....	.....	.....	.....	.....	.....

[8] For 12 weeks on machine-shop practice and 6 weeks on forge-shop practice.
[9] Indefinite; boys enter trade classes at 12 years of age and are kept in them until they leave the institution.
[10] Indefinite; depending on aptitude; majority in school one year or less.
[11] Including 56 pupils taking optics also.
[12] Included in watchmaking, jewelry making, and engraving.
[13] Not reported.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
INDIANA—concluded.								
Indianapolis—National Trade Schools (*day school*)—Concd.								
Lithographing	2	52	44	Applied art	6	6	.....	.....
				Applied design	2	2	.....	.....
				Shop talks	1	1½	.....	.....
				Chemistry	.....	6	.....	.....
Machinists	2	52	25	Applied mathematics	3	.....	.....	.....
				Mechanical drawing	3	.....	.....	.....
				Shop talks	1	.....	.....	.....
				Machine design	.....	8	.....	.....
Molding	2	52	29	Chemistry	6	9	.....	.....
				Mechanical drawing	3	.....	.....	.....
				Shop talks	3	3	.....	.....
Painting and paper hanging	1	52	2	None	.....	.....	.....	.....
Printing (composition and press work).[1]	2	52	93	History of printing	1	1	.....	.....
				Shop talks	1	1	.....	.....
				Typography	1	1	.....	.....
Tile and mantel setting	½	52	13	History of manufacturing and use of tile.	1	.....	.....	.....
				Shop talks	1	.....	.....	.....
MARYLAND.								
Baltimore—Maryland Institute for the Promotion of the Mechanic Arts (*day school*): Silversmithing and jewelry making	4	29	56	Lectures on trade	5	5	5	5
MASSACHUSETTS.								
Boston—Franklin Union: *Day school—(Saturday afternoon)—*								
Electrical work	2	24	30	Elementary electricity.	⅔	.....	.....	.....
				Laboratory (mechanics).				
				Mechanics and heat				
				Problems				
				Industrial electricity	.....	⅔	.....	.....
				Problems				
				Steam and gas engines.				
Gas and gasoline engineers	1	24	18	Gas and oil engines	⅔	.....	.....	.....
Steam engineering	2	24	20	Boiler details	2	.....	.....	.....
				Construction and operation.				
				Setting plain slide valves.				
				Automatic engines	.....	1⅓	.....	.....
				Condensers				
				Elevators				
				Heat and steam				
				Machinery				
				Refrigerating				
Evening school—								
Electrical work	2	24	126	Elementary electricity.	[2] 2	.....	.....	.....
				Mechanics and heat	[3] 3	.....	.....	.....
				Problems	[3] 3	[3] 3	.....	.....
				Lectures on trade	.....	[5] 1½	.....	.....
				Steam and gas engines.	.....	[3] 3	.....	.....

[1] A linotype course of 8 weeks is also given.

[2] For three-fourths school year.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
9	41	50	15½	34½	50	.....	.....	.....	.....	.....	.....
7	37	44	8	36	44	.....	.....	.....	.....	.....	.....
12	40	52	12	40	52	.....	.....	.....	.....	.....	.....
.....	48	48	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	47	50	3	47	50	.....	.....	.....	.....	.....	.....
2	50	52	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	22½	27½	5	22½	27½	5	22½	27½	5	22½	27½
⅔	3⅓	4	⅔	3⅓	4	.....	.....	.....	.....	.....	.....
⅔	3⅓	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	2	4	1⅓	2⅔	4	.....	.....	.....	.....	.....	.....
[3] 6	.....	6	[3] 6	.....	6	.....	.....	.....	.....	.....	.....
.....	[4] 6		[5] 1½	[5] 4½							
[2] 2	[2] 4										

[3] For one-sixth school year. [4] For one-twelfth school year. [5] For five-sixths school year.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
Boston — Franklin Union — Concluded.								
Evening School—Concluded.								
Firemen, boiler	¼	24	50	Boiler: Details, fittings, installation, management and feeding. Boiler design and pumps. Combustion. Mechanical stokers. Types of steam boilers.	3	.....	.....	.....
Gas and gasoline engineers	1	24	40	Gas and oil engines	1	.....	.....	.....
Machinists	2	24	61	Electricity	[1] 3	.....	.....	.....
				Elementary mechanics.	[1] 3	.....	.....	.....
				Logarithms and slide rule.	[1] 3	.....	.....	.....
				Mechanical drawing	[2] 6	.....	.....	.....
				Shop arithmetic	[1] 3	.....	.....	.....
				Machine design	.....	[3] 6	.....	.....
				Mechanics	.....	[1] 3	.....	.....
				Mechanism	.....	[1] 6	.....	.....
				Structures	.....	[1] 3	.....	.....
				Testing materials (laboratory).	.....	[4] 6	.....	.....
Sheet-metal working	1	24	10	Drawing for laying out shop problems.	5	.....	.....	.....
Steam engineering	2	24	75	Boiler details. Construction and operation of pumps and simple engines. Setting plain slide valves.	3	.....	.....	.....
				Automatic engines. Condensers. Elevators. Engines. Heat and steam. Indicators. Machinery. Refrigerating.	.....	2	.....	.....
Boston—Massachusetts Charitable Mechanic Association Evening Trade School (*evening school*):								
Bricklaying	3	24	19	None	.....	.....	.....	.....
Sheet-metal working	3	24	50					
Carpentry	3	24	11	Geometry and lectures on trade.	3	3	3	.....
Electrical work	3	24	10	Electricity, magnetism, and underwriters' rules for wiring.	3	3	3	.....
Plumbing	3	24	76	Drainage, ventilation, and hot and cold water supply.	2	2	2	.....

[1] For one-fourth school year.

[2] For one-half school year.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
3	3	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	5	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	.....	6	6	.....	6	.....	.....	.....	.....	.....	.....
5	1	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	3	6	2	4	6	.....	.....	.....	.....	.....	.....
.....	6	6	.....	6	6	.....	6	6	.....	.....	.....
3	3	6	3	3	6	3	3	6	.....	.....	.....
3	3	6	3	3	6	3	3	6	.....	.....	.....
2	4	6	2	4	6	2	4	6	.....	.....	.....

[3] For three-eighths school year.

[4] For one-eighth school year.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—concluded.								
Boston—North Bennet Street Industrial School (*evening school*):								
Cement work	2	28	6	None				
Dressmaking, advanced	2	28	21					
Dressmaking, elementary	2	28	16					
Wood turning	2	28	15					
Woodworking	2	28	42					
Pottery	2	28	45	do				
Printing	2	28	25					
Stone carving	2	28	6					
Wood carving	2	28	2					
MISSOURI.								
St. Louis—David Ranken, Jr., School of Mechanical Trades:								
Day school[2]								
Bricklaying	2	46	7	Drafting	7	(1)		
Carpentry	2	46	15	Mathematics	7	(1)		
Painting (house and sign)	2	46	6					
Plumbing	2	46	19					
Stationary engineering	2	46	6					
Day cooperative school[2]—								
Machinists	2	46	30	Drafting	4	(1)		
				Mathematics	3	(1)		
Evening school—								
Bricklaying	(3)	24	10	Drafting, mathematics, or plan reading.[4]	4 5			
Carpentry	(3)	24	9					
Painting	(3)	24	10					
Plumbing	(3)	24	40					
NEW YORK.								
Brooklyn—Pratt Institute: School of Household Science and Arts:								
Day school—								
Dressmaking	1	52	247	Accounts	[6] 1			
				Designing	[7] 1½			
				Physical training	[8] 1			
Millinery	¼	37	63	Accounts	1			
				Drawing	1½			
				Shopping	1½			
Sewing	¼	37	60	Physical training	1			
Evening school—								
Dressmaking	1	23	53	None				
Millinery, elementary	¼	23	[10] 34					
Sewing	1	23	26					
Millinery, advanced	¼	23	(11)	do				
Brooklyn—Pratt Institute: School of Science and Technology:								
Day school—								
Carpentry and building	1	36	39	Estimating from plans	1⅔			
				Mechanical and architectural drawing.	5			
				Mechanics	2½			
				Practical mathematics	2½			

[1] Course not yet formulated.
[2] Pupils get practice work in shop of cooperating establishment where employed, see page 205.
[3] Indefinite.
[4] Optional; pupils may take either theory or practice, or both.
[5] 5 if theory or practice be taken, or 10 if both be taken.
[6] For 1 term, 3 months.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
.....	4	4	.....	4	4	.....	.....	.....	.....	.....	.....
.....	2	2	.....	2	2	.....	.....	.....	.....	.....	.....
14	26⅓	40⅓	(1)	(1)	(1)	.....	.....	.....	.....	.....	.....
7	(2)	7	(1)	(1)	(1)	.....	.....	.....	.....	.....	.....
[4] 5	[4] 5	(5)	.....	.....	.....	.....	.....	.....	.....	.....	.....
[7] 2½ [6] 2 (9)	[7] 27½ [6] 28 [6] 48½	[8] 30 [6] 48½	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	26	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	29	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
11⅔	24⅙	35⅚	.....	.....	.....	.....	.....	.....	.....	.....	.....

[7] For 2 terms, 6 months.
[8] For 3 terms, 9 months.
[9] None for 1 term, 3 months.
[10] Including pupils who took advanced millinery.
[11] Included in number who took elementary millinery.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK—continued.								
Brooklyn—Pratt Institute: School of Science and Technology—Concluded.								
Day school—Concluded.								
Machine-shop practice and toolmaking.	1	36	42	Mechanical drawing	5	.....	.....	.....
				Mechanics	2½	.....	.....	.....
				Practical mathematics	2½	.....	.....	.....
Evening school—								
Carpentry	2	24	[1] 53	None	.....	.....	.....	.....
Painting, fresco	2	24	[2] 32					
Painting, sign	2	24	([3])					
Pattern making	2	24	([4])					
Plumbing	2	24	59					
Machinists and toolmaking	3	24	112	.....do	.....	.....	.....	.....
Sheet-metal workers	1	24	16	.....do	.....	.....	.....	.....
Steam engineers	1	24	36	Theory of trade	6	.....	.....	.....
New York—Baron de Hirsch Trade School (*day school*):								
Carpentry	½	46	9					
Electrical work	½	46	50					
Machinists	½	46	27	Mechanical drawing	3	.....	.....	.....
Painting, house, fresco, and sign.	½	46	7	Shop arithmetic	2	.....	.....	.....
Plumbing	½	46	38					
New York—Clara de Hirsch Trade School (*day school*):								
Dressmaking	1	48	12	Arithmetic	5	5	.....	.....
				Composition	5	5	.....	.....
				History	5	5	.....	.....
				Reading	5	5	.....	.....
Millinery	½–1	48	18	Arithmetic	5	5	.....	.....
				Composition	5	5	.....	.....
				History	5	5	.....	.....
				Reading	5	5	.....	.....
Sewing, hand	1–1½	48	16	Arithmetic	5	5	.....	.....
Sewing, machine	1–1½	48	25	Composition	5	5	.....	.....
				History	5	5	.....	.....
				Reading	5	5	.....	.....
New York—Hebrew Technical Institute:								
Day school—								
Electrical work and construction.[7]	3	42	25	Geography	1	.....	.....	.....
				Free-hand drawing	3	2	.....	.....
				English	3	2	2	.....
				History and civics	1	1	1	.....
Metal working (machinists, etc.).[7]	3	42	13	Visits to shops, factories, etc.	2	1	1	.....
Woodworking and pattern making.[7]	3	42	14	Mathematics	5	4	4	.....
				Mechanical drawing	3	4	4	.....
				Physics, mechanics, and electricity.	3	6	4	.....
				Lectures	1	1		.....

[1] Including pupils who took pattern making.
[2] Including pupils who took painting, sign.
[3] Included in number who took painting, fresco.
[4] Included in number who took carpentry.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
10	25⅚	35⅚	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	6	6	.....	6	6	.....	.....	.....	.....	.....	.....
.....	6	6	.....	6	6	.....	6	6	.....	.....	.....
.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	34	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
[5] 3⅓	[5] 27	[5] 30⅓	.....	.....	.....	.....	.....	.....	.....	.....	.....
([6])	[5] 40	[5] 40	.....	.....	.....	.....	.....	.....	.....	.....	.....
3⅓	30½	33⅚	.....	.....	.....	.....	.....	.....	.....	.....	.....
3⅓	27	30⅓	3⅓	27	30⅓	.....	.....	.....	.....	.....	.....
21	8	29	21	11	32	17	14	31	.....	.....	.....

[5] For 6 months.
[6] None for 6 months.
[†] Practice work taken concurrently for all trades for the first 2 years, after which pupils specialize.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK—continued.								
New York—Hebrew Technical Institute—Concluded.								
Day school—Concluded.								
Instrument making (electrical and scientific).[1]	3	42	12	Geography	1			
				Free-hand drawing	3	2		
				English	3	2	2	
				History and civics	1	1	1	
				Visits to shops, factories, etc.	2	1	1	
				Mathematics	5	4	4	
				Mechanical drawing	3	4	2	
				Physics, mechanics, and electricity.	3	6	5	
				Lectures		1	1	
Wood carving[1]	3	42	1	Geography	1			
				English	3	2	2	
				Free-hand drawing	3	2	4	
				History and civics	1	1	1	
				Visits to shops, factories, etc.	2	1	1	
				Mathematics	5	4	4	
				Mechanical drawing	3	4	2	
				Physics, mechanics, and electricity.	3	6	4	
				Lectures		1	1	
Unclassified[2]								
Evening school—								
Instrument making (electrical and scientific).	2	35	25	Drawing	2	2		
Toolmaking	2	35	23	Mathematics (optional)	1	1		
Pattern making	2	35	10	do	1	1		
New York—Hebrew Technical School for Girls (*day school*):								
Dressmaking, embroidery, and millinery.[7]	1½	52	110	Arithmetic	1½	1½		
				Composition	1½	1½		
				Drawing	3	3		
				Ethical talks	¾	¾		
				Gymnasium	3	3		
				Literature	1½	1½		
				Music	2¼	2¼		
				Physiology	1½	1½		
				Swimming	¾	¾		
New York—Henrietta Trade School (Negro—*evening school*):								
Dressmaking, advanced	(9)	27	23	None				
Dressmaking, elementary	(9)	27	25					
Janitor work	(9)	27	15					
Millinery	(9)	27	25					
Carpentry[10]								
New York—Italian Evening Trade School (*evening school*):								
Carpentry	3	34	15	do				
Dressmaking	3	34	15					
Painting, sign	4	34	22	do				
Printing	4	34	12					
Power sewing-machine operating.	½	34	14	do				

[1] Practice work taken concurrently for all trades for the first 2 years, after which pupils specialize.
[2] There are 198 first and second year pupils who have not elected trades. Their work in third year is according to trade elected.
[3] Two hours if mathematics is not taken.
[4] Four hours if mathematics is not taken.
[5] None if mathematics is not taken.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
21	8	29	21	11	32	16	16	32	.....	.....	.....
21	8	29	21	11	32	19	12	31	.....	.....	.....
(2)	(2)	(2)	(2)	(2)	(2)	.....	.....	.....	.....	.....	.....
[3] 3	[4] 3	6	[3] 3	[4] 3	6	.....	.....	.....	.....	.....	.....
[5] 1	[6] 5	6	[5] 1	[6] 5	6	.....	.....	.....	.....	.....	.....
[8] 17¼	15¼	[8] 32½	[8] 17¼	15¼	[8] 32½	.....	.....	.....	.....	.....	.....
.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	7⅓	7⅓	.....	7⅓	7⅓	.....	7⅓	7⅓	.....	.....	.....
.....	7⅓	7⅓	.....	7⅓	7⅓	.....	7⅓	7⅓	.....	7⅓	7⅓
.....	7⅓	7⅓	.....	.....	.....	.....	.....	.....	.....	.....	.....

[6] Six hours if mathematics is not taken.
[7] Cooking is taken concurrently.
[8] Including 1½ hours devoted to cooking.
[9] Not yet determined.
[10] A carpentry class was taught part of year, but was discontinued.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK—continued.								
New York—New York Trade School:								
Day school—								
Bricklaying	1	16	14	Examinations on theory of trade.	¼	.....	.....	.....
Carpentry	1	16	11	Lectures	¾	.....	.....	.....
				Plan drawing	½	.....	.....	.....
Cornice and skylight workers.	1	16	7	Examinations on theory of trade.	¼	.....	.....	.....
				Lectures	¾	.....	.....	.....
				Trade drawing	½	.....	.....	.....
Electrical work	1	16	33	Examinations on theory of trade.	1½	.....	.....	.....
				Lectures	1½	.....	.....	.....
				Plan drawing	1	.....	.....	.....
Painting and decorating	1	16	4	Examinations on theory of trade.	¼	.....	.....	.....
				Free-hand drawing	½	.....	.....	.....
				Lectures	¾	.....	.....	.....
Painting, sign	1	16	5	Examinations on theory of trade.	⅝	.....	.....	.....
Plumbing	1	16	84	Lectures	1¼	.....	.....	.....
				Plan drawing	1⅛	.....	.....	.....
Steam and hot-water fitting.	1	12	14	Examinations on theory of trade.	⅞	.....	.....	.....
				Lectures	1⅞	.....	.....	.....
				Plan drawing	1¼	.....	.....	.....
Evening school—								
Blacksmithing	3	26	9					
Bricklaying	3	26	25					
Cornice and skylight working.	3	26	61	Lectures, examinations on theory of trade and drawing.	½	4	½	.....
Painting and decorating	3	26	20					
Pattern making	3	26	10					
Electrical work	3	26	106	Drawing	½	½	½	.....
				Lectures, and examinations on theory of trade.	½	½	½	.....
Painting, sign	3	26	21	Drawing	⅔	⅔	⅔	.....
Plumbing	3	26	199	Lectures and examinations on theory of trade.	⅔	⅔	⅔	.....
Plastering	3	26	13	Lectures and examinations on theory of trade.	½	½	½	.....
Printing	3	26	28					
Steam and hot-water fitting.	2	26	24	Drawing	⅔	⅔	.....	.....
				Lectures and examinations on theory of trade.	⅔	⅔	.....	.....
New York—Pascal Institute (*day school*):								
Dressmaking[1]	(2)	42	3 36	None	.....	.....	.....	.....
Plain sewing[1]	(2)	42	(4)					
New York—Preparatory Trade School (*evening school*):								
Carpentry	3	30	36	Mechanical drawing	1½	1½	1½	.....
Plumbing	3	30	26					
Dressmaking	3	30	25	None	.....	.....	.....	.....
Millinery	3	30	25					
Electrical work	3	30	15	Mechanical drawing	1½	1½	1½	.....

[1] Cooking and some millinery taken concurrently.
[2] Indefinite.
[3] Including pupils taking plain sewing.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
1½	34½	36	.....	.....	.....	.....	.....	.....	.....	.....	.....
1½	34½	36	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	33	36	.....	.....	.....	.....	.....	.....	.....	.....	.....
1½	34½	36	.....	.....	.....	.....	.....	.....	.....	.....	.....
3¾	32¼	36	.....	.....	.....	.....	.....	.....	.....	.....	.....
3¾	32¼	36	.....	.....	.....	.....	.....	.....	.....	.....	.....
½	7	7½	½	7	7½	½	7	7½	.....	.....	.....
1	6½	7½	1	6½	7½	1	6½	7½	.....	.....	.....
¾	6¾	7½	¾	6¾	7½	¾	6¾	7½	.....	.....	.....
½	7	7½	½	7	7½	½	7	7½	.....	.....	.....
¾	6¾	7½	¾	6¾	7½	.....	.....	.....	.....	.....	.....
.....	[5] 35	[5] 35	.....	.....	.....	.....	.....	.....	.....	.....	.....
1½	4½	6	1½	4½	6	1½	4½	6	.....	.....	.....
.....	3	3	.....	3	3	.....	3	3	.....	.....	.....
1½	3	4½	1½	3	4½	1½	3	4½	.....	.....	.....

[4] Included in number taking dressmaking.
[5] Including hours given to cooking and millinery, and 1¼ hours devoted to opening exercises.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK—concluded.								
New York—St. George's Evening Trade School (*evening school*):								
Carpentry	3	28	48	Mechanical drawing	1½	1½	1½	.....
Electrical work (inside wiring)	3	28	40	None	.....	.....	.....	.....
Plumbing	3	28	30					
Sheet-metal working	3	28	16					
Rochester—Mechanics' Institute of Rochester:								
Day school—								
Dressmaking	1	36	40	Theory of trade	4⅘	.....	.....	.....
Electrical work	3	36	28	Algebra	3¾	.....	.....	.....
				Physics	6¾	.....	.....	.....
				Mechanical drawing	4½	4½	.....	.....
				English	3¾	3¾	4½	.....
				Plane geometry	.....	3¾	.....	.....
				Chemistry	.....	4½	4½	.....
				Electricity	.....	3	3¾	.....
				Algebra review	.....	.....	[4] 3¾	.....
				Mechanics	.....	.....	2½	.....
				Plane trigonometry	.....	.....	[5] 3¾	.....
				Solid geometry	.....	.....	[6] 3¾	.....
Machinists	3	36	40	Algebra	3¾	.....	.....	.....
Woodworking	3	36	30	Physics	6¾	.....	.....	.....
				English	3¾	3¾	4½	.....
				Mechanical drawing	4½	4½	4½	.....
				Chemistry	.....	4½	.....	.....
				Plane geometry	.....	3¾	.....	.....
				German	.....	3¾	5¼	.....
				Algebra review	.....	.....	[5] 3¾	.....
				Mechanics	.....	.....	2¼	.....
				Plane trigonometry	.....	.....	[4] 3¾	.....
				Solid geometry	.....	.....	[6] 3¾	.....
				Surveying	.....	.....	[4] 3	.....
Millinery	1	36	16	Theory of trade	⅘	.....	.....	.....
Day cooperative school [7]—								
Machinists	3	26	7	Mechanical drawing	4½	4½	4½	.....
Evening school—								
Buttonhole making	½	26	4	Theory of trade	⅘	.....	.....	.....
Dressmaking	1	26	40					
Millinery	1	26	30					
Sewing	1	26	25					
Carpentry	4	26	40	Architectural drawing	4½	4½	4½	4½
Masonry	4	26	41	Theory of trade	1½	1½	1½	1½
Chauffeurs	½	26	100	....do	⅘	.....	.....	.....
Gas engineering	1	26	89					
Steam engineering	1	26	20					
Electrical work	2	26	66	....do	1⅗	1	.....	.....
Joinery and cabinetmaking	2	26	12	....do	⅗	⅘	.....	.....
Tool making	2	26	30					
Machinists	3	26	198	....do	⅗	⅘	.....	.....
Painting, sign	1	26	11	....do	⅗	.....	.....	.....
Pattern making	1	26	8	....do	⅗	.....	.....	.....

[1] Pupils attending 3 nights per week.
[2] Pupils attending 2 nights per week.
[3] For first two-third year.
[4] For third one-third year.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
1 1½ 2 1½	1 3 2 1½	1 4½ 2 3	1 1½ 2 1½	1 3 2 1½	1 4½ 2 3	1 1½ 2 1½	1 3 2 1½	1 4½ 2 3	.....	.....	.....
.....	1 4½ 2 3	1 4½ 2 3	.....	1 4½ 2 3	1 4½ 2 3	.....	1 4½ 2 3	1 4½ 2 3	.....	.....	.....
4⅘	19⅕	24	.....	.....	.....	.....	.....	.....	.....	.....	.....
18¾	7½	26¼	19½	3 9 4 3	3 28½ 4 22½	18¾	12	30¾	.....	.....	.....
18¾	7½	26¼	20¼	6	26¼	3 20¼ 4 23¼	3 7½ 4 7½	3 27¾ 4 30¾	.....	.....	.....
⅘	3⅕	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
4½	(7)	4½	4½	(7)	4½	4½	(7)	4½	.....	.....	.....
⅘	3⅕	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	.....	6	6	.....	6	6	.....	6	6	.....	6
⅘	1⅕	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
1⅗	2⅖	4	1	3	4	.....	.....	.....	.....	.....	.....
⅗	5⅖	6	⅗	5⅗	6	.....	.....	.....	.....	.....	.....
⅗	5⅖	6	⅗	5⅖	6	.....	6	6	.....	.....	.....
⅘	3⅕	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
⅘	5⅕	6	.....	.....	.....	.....	.....	.....	.....	.....	.....

[5] For second one-third year.
[6] For first one-third year.
[7] Pupils get practice work in shop of cooperating establishment where employed; see page 205.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NORTH CAROLINA.								
High Point—High Point Normal and Industrial School (Negro—*day school*):								
				Civil government	3⅓	.....	.....	.....
				Elementary algebra	3⅓	.....	.....	.....
				English history	3⅓	.....	.....	.....
				Drawing	1⅓	1⅓	.....	.....
Basket making	3	35	49	English and composition.	3⅓	2⅔	.....	.....
Blacksmithing	3	35	10					
Bricklaying and plastering	3	35	18	General history	.....	2⅔	.....	.....
Carpentry	3	35	7	High school algebra	.....	3⅓	.....	.....
Dressmaking	3	35	20	English classics	.....	1⅓	1⅓	.....
Sewing	3	35	49	American literature	.....	.....	2⅔	.....
				Chemistry	.....	.....	2	.....
				Geometry	.....	.....	3⅓	.....
				Physics	.....	.....	2⅔	.....
OHIO.								
Cincinnati—Jewish Kitchen Garden Association and Trade School for Girls—(*day school*):								
Dressmaking	(2)	52	[3] 15	None	.....	.....	.....	.....
Embroidering	(2)	52	(4)					
Millinery	(2)	52	9					
Plain sewing	(2)	52	(4)					
Cincinnati—Ohio Mechanics' Institute (*evening school*):								
Blacksmithing	(2)	24	9	Shop talks and explanations.	[5] 1	.....	.....	.....
Carpentry	(2)	24	4					
Electrical work	(2)	24	19					
Foundry work	(2)	24	15					
Machinists	(2)	24	35					
Pattern making	(2)	24	87					
Plumbing	(2)	24	10					
Stationary engineers	(2)	24	12					
Tool making	(2)	24	5					
PENNSYLVANIA.								
Lancaster—Thaddeus Stevens Industrial School of Pennsylvania (*day school*):								
				American literature	1	.....	.....	.....
				History	[6] 2	.....	.....	.....
				Physiology	[6] 2	.....	.....	.....
				Arithmetic	[6] 5 / [7] 4	[6] 3	.....	.....
				Civics	[7] 2	[6] 2	.....	.....
				Commercial geography	2	[6] 2	.....	.....
				Grammar	2	2	.....	.....
Bricklaying	3	48	8	Algebra	[7] 3	4	[6] 4	.....
Carpentry	3	48	8	Drawing	[6] 6	[6] 6	[6] 8	.....
Machinists	3	48	8		.....	[7] 8		
Pattern making	3	48	8	English literature	.....	1	.....	.....
				Geometry	.....	[7] 3	[6] 3 / [8] 1	.....
				Physics	.....	[7] 2	[6] 2	.....
				Steam	.....	.....	[8] 1	.....
				Strength of materials	.....	.....	[8] 1	.....
				Trigonometry	.....	.....	[6] 3 / [8] 1	.....
				Study period	.....	.....	[8] 1	.....

[1] Including hours given to study and recreation.
[2] Indefinite.
[3] Including pupils who took embroidery and plain sewing.
[4] Included in number who took dressmaking.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[1] 22½	10	[1] 32½	[1] 22½	10	[1] 32½	[1] 22½	10	[1] 32½	.....	.....	.....
.....	36⅔	36⅔	.....	.....	.....	.....	.....	.....	.....	.....	.....
[5] 1	[5] 3	[5] 4	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	20	40	20	20	40	[6] 20 [8] 5	[6] 20 [7] 40	[6] 40 [7] 45	.....	.....	.....

[5] Usual time or unit; pupils may attend more than 1 unit.
[6] From Apr. 1 to Aug. 1.
[7] From Sept. 1. to Apr. 1.
[8] From Sept. 1 to Apr. 1 and at evening.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—continued.								
Philadelphia—Berean Manual Training and Industrial School (Negro):								
Day school—								
Power sewing machine operating.	(1)	34	8	None				
Evening school—								
Carpentry	4	34	8	do				
Tailoring	4	34	7	do				
Upholstering and chair caning.	4	34	3	do				
Dressmaking	3	34	61	Arithmetic			2	
Electrical work	2	34	3	None				
Millinery	2	34	14	None				
Philadelphia—Drexel Institute of Art, Science, and Industry.								
Day school—								
Dressmaking	1	36	106	Business customs and accounts.	11/12			
				Drawing	2 3/4			
				Gymnasium	1 5/6			
				Theory of trade	4 7/12			
Machine construction	2	36	16	Free-hand drawing	1 5/6			
				Gymnasium	1 5/6			
				English	1 5/6	1 5/6		
				Mathematics	4 7/12	4 7/12		
				Mechanical drawing	5 1/2	4 3 3/6		
				Business accounts		5 1/12		
				Descriptive geometery		4 1/12		
				Graphic statics		5 2 3/4		
				Physics		3 3/6		
				Steam engines		1/12		
				Strength of materials		5 1/12		
Millinery (short course)	1	36	[7] 41	Theory of trade	2			
Millinery (trade course)	1	36	(8)	Business customs and accounts.	11/12			
				Drawing	2 3/4			
				Gymnasium	1 5/6			
				Theory of trade	4 7/12			
Pattern making, forging, and machine construction.	3	36	54	English language	2 3/4			
				Free-hand drawing	1 5/6			
				General history		1 5/6		
				Gymnasium	1 5/6	1 5/6		
				Mathematics	4 7/12	4 7/12	4 7/12	
				Mechanical drawing	5 1/2	3 3/6	[4] 4 7/12	
				Chemistry		2 3/4		
				Descriptive geometry		1/12		
				Technical sketching		1/12		
				English language and literature.		1 5/6	1 3/6	
				Graphic statics			[5] 6 6/12	
				Physics			2 3/4	
				Political science, elementary.			1 5/6	
				Public speaking			1/12	
				Steam engines			1/12	
				Strength of materials			[4] 1 5/6	

[1] From 4 weeks to 3 months.
[2] Including 2 hours devoted to millinery.
[3] Including 2 1/6 hours given to intermissions and interval between classes.
[4] For first half year.
[5] For second half year.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
.....	50	50	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	4	4	.....	4	4	.....	4	4	.....	4	4
.....	4	4	.....	4	4	2	[2] 6	[2] 8	.....	.....	.....
.....	4	4	.....	4	4	.....	.....	.....	.....	.....	.....
$10\frac{1}{12}$	$13\frac{3}{4}$	[3] 26	.....	.....	.....	.....	.....	.....	.....	.....	.....
$15\frac{7}{12}$	$11\frac{11}{12}$	[6] 30	$15\frac{7}{12}$	$11\frac{11}{12}$	[6] 30	.....	.....	.....	.....	.....	.....
2	2	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
$10\frac{1}{12}$	$7\frac{1}{3}$	[9] 19	.....	.....	.....	.....	.....	.....	.....	.....	.....
$18\frac{1}{3}$	$9\frac{1}{6}$	[6] 30	$18\frac{1}{3}$	$9\frac{1}{6}$	[6] 30	$19\frac{1}{4}$	$8\frac{1}{4}$	[6] 30	.....	.....	.....

[6] Including $2\frac{1}{2}$ hours given to intermissions and intervals between classes.
[7] Including pupils taking millinery (trade course).
[8] Included in number taking millinery (short course).
[9] Including $1\frac{7}{12}$ hours given to intermissions and intervals between classes.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—continued.								
Philadelphia—Drexel Institute of Art, Science, and Industry—Concluded.								
Day school—Concluded.								
Sewing (hand and machine).	1½	36	[1] 85	Theory of trade and drafting.	2	2	.....	.....
Sewing (shirt waist)	1	36	([2])	.....do	2	.....	.....	.....
Evening school—								
Dressmaking	3	24	64	Theory of trade	1⅓	1⅓	1⅓	.....
Millinery	3	24	32					
Sewing (hand and machine)	3	24	[1] 15					
Machine construction	2	24	46	None	.....	.....	.....	.....
Pattern making	2	24	17					
Sewing (shirt waist)	2	24	([2])	Theory of trade	1⅓	1⅓	.....	.....
Philadelphia: Girard College (*day school*):								
				Algebra and geometry	[3] 3¾	.....	.....	.....
				Geometry	[4] 3½	.....	.....	.....
				History, English	[3] 3¾	.....	.....	.....
				History, French	[4] 3½	.....	.....	.....
				Language, English	3½	.....	.....	.....
Blacksmithing	2	42	4	Spanish	[3] 3½	.....	.....	.....
Carpentry and pattern making.	2	42	25	Bookkeeping	3¾	[3] 3¾	.....	.....
				Drawing	2	2	.....	.....
Electrical work	2	42	27	Stenography and typewriting.	[4] 3½	3½	.....	.....
Machinists	2	42	23					
Molding and core making	2	42	15	History, general	.....	[3] 3¾	.....	.....
Plumbing, steam and gas fitting.	2	42	14	Physics	.....	[3] 3¾ / [4] 10½	.....	.....
Printing	2	42	3	Physiology	.....	[4] 3¾	.....	.....
				Theory of military science.	.....	[3] 1	.....	.....
				Trigonometry	.....	[3] 3¾	.....	.....
				Vocal expression	.....	[4] ¾	.....	.....
				([5])	([5])	([5])	.....	.....
Philadelphia—Hebrew Education Society (*evening school*):								
Cigar making	½	52	15	None, except in dressmaking pupils draft a few patterns.	.....	.....	.....	.....
Dressmaking	1	52	26					
Garment cutting	¼	52	8					
Millinery	1	52	28					
Plumbing	1	52	5					
Power sewing machine operating.	([6])	52	5					
Sheet-metal working	3	52	18	Mechanical drawing	4	4	4	.....
				Making blueprints	2	2	2	.....
Philadelphia—Spring Garden Institute:								
Day school—								
Electrical work [7]	2	36	20	Mathematics	4	4	.....	.....
				Mechanical drawing	5	5	.....	.....
				Theory of trade	2	2	.....	.....
Evening school—								
Machinist	3	26	80	Arithmetic	1½	.....	.....	.....
Woodworking (pattern making, carpentry, and cabinetmaking.	3	26	32	Algebra	.....	1½	1½	.....

[1] Including pupils taking sewing (shirt waist).
[2] Included in number taking sewing (hand and machine).
[3] For first half year.
[4] For second half year.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
2	2	4	2	2	4	.....	.....	.....	.....	.....	.....
2	2	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
1⅓	2⅔	4	1⅓	2⅔	4	1⅓	2⅔	4	.....	.....	.....
.....	4	4	.....	4	4	.....	.....	.....	.....	.....	.....
1⅓	2⅔	4	1⅓	2⅔	4	.....	.....	.....	.....	.....	.....
20¾	20	40¾	[3] 21¾ [4] 20¾	[3] 19 [4] 20	40¾	.....	.....	.....	.....	.....	.....
.....	8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	4	10	6	4	10	6	4	10	.....	.....	.....
11	16½	27½	11	16½	27½	.....	.....	.....	.....	.....	.....
1½	4	5½	1½	4	5½	1½	4	5½	.....	.....	.....

[5] In addition 2 hours per week are required in military drill.
[6] Two to three weeks.
[7] Includes instruction in mechanical handiwork in metal and wood.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—continued.								
Philadelphia—Temple University:								
Day school—								
Dressmaking—								
Sewing (preparatory)	1	36	[1] 62	Lectures	5/6	.....	.....	.....
Technical course	1	36	([2])	Business forms	1 2/3	.....	.....	.....
				Designing	1 2/3	.....	.....	.....
				Historical costumes	5/6	.....	.....	.....
Millinery—								
Brief course	1	36	[3] 37	Theory of trade	1 2/3	.....	.....	.....
Technical course	1	36	([4])	Business forms	1 2/3	.....	.....	.....
				Designing	1 2/3	.....	.....	.....
				Historical costumes	5/6	.....	.....	.....
Combined course (dressmaking and millinery)	1	36	([2])	Business forms	1 2/3	.....	.....	.....
				Designing	1 2/3	.....	.....	.....
				Historical costumes	5/6	.....	.....	.....
				Theory of trades	1 2/3	.....	.....	.....
Evening school—								
Dressmaking—								
Brief course	1	32	[5] 40	Designing	1 2/3	.....	.....	.....
Sewing	1	32	([6])	Theory of trade	1	.....	.....	.....
Millinery—Brief course	1	32	15	Designing	1 2/3	.....	.....	.....
Pittsburg (Allegheny)—Avery College Training School (Negro—*day school*):								
Dressmaking	3	38	112	Elements of language	1 1/4	.....	.....	.....
Tailoring	3	38	8	Reading	1 2/3	.....	.....	.....
				Geography	1 1/2	1 2/3	.....	.....
				Arithmetic	2 1/2	1 2/3	1 2/3	.....
				Drawing	2 1/2	2 1/2	2 1/2	.....
				History	1 2/3	1 2/3	1 2/3	.....
				Lectures	2 1/2	2 1/2	2 1/2	.....
				Writing	1 2/3	1 2/3	1 2/3	.....
				Algebra	.....	1 2/3	1 2/3	.....
				Physiology	.....	1 2/3	1 2/3	.....
				Physical geography	.....	.....	1 2/3	.....
Millinery	2	38	43	Elements of language	1 1/4	.....	.....	.....
				Reading	1 2/3	.....	.....	.....
				Arithmetic	2 1/2	1 2/3	.....	.....
				Drawing	2 1/2	2 1/2	.....	.....
				Geography	1 1/2	1 2/3	.....	.....
				History	1 2/3	1 2/3	.....	.....
				Lectures	2 1/2	2 1/2	.....	.....
				Writing	1 2/3	1 2/3	.....	.....
				Algebra	.....	1 2/3	.....	.....
				Physiology	.....	1 2/3	.....	.....
Pittsburg—Carnegie Technical Schools: Margaret Morrison Carnegie School—(*evening school*):								
Millinery	2	30	42	None	.....	.....	.....	.....
Sewing and dressmaking	3	30	79	.....do	.....	.....	.....	.....

[1] Including pupils taking dressmaking, technical course, and pupils taking combined course (dressmaking and millinery).
[2] Included in number taking dressmaking, sewing (preparatory).
[3] Including pupils taking millinery, technical course.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
$\frac{5}{6}$	$\frac{5}{6}$	$1\frac{2}{3}$	.....	.....	.....	.....	.....	.....	.....	.....	.....
$4\frac{1}{6}$	$9\frac{5}{6}$	14	.....	.....	.....	.....	.....	.....	.....	.....	.....
$1\frac{2}{3}$	$3\frac{1}{3}$	5	.....	.....	.....	.....	.....	.....	.....	.....	.....
$4\frac{1}{6}$	$9\frac{5}{6}$	14	.....	.....	.....	.....	.....	.....	.....	.....	.....
$5\frac{5}{6}$	$13\frac{1}{6}$	19	.....	.....	.....	.....	.....	.....	.....	.....	.....
$1\frac{2}{3}$	4	$5\frac{2}{3}$	.....	.....	.....	.....	.....	.....	.....	.....	.....
1	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....
$1\frac{2}{3}$	4	$5\frac{2}{3}$	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	15	30	15	15	30	15	15	30	.....	.....	.....
15	15	30	15	15	30	.....	.....	.....	.....	.....	.....
.....	6	6	.....	6	6	.....	.....	.....	.....	.....	.....
.....	6	6	.....	6	6	.....	6	6	.....	.....	.....

[4] Included in number taking millinery, brief course.
[5] Including pupils taking sewing.
[6] Included in number taking brief course

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—continued.								
Pittsburg—Carnegie Technical Schools: School of Applied Industries:[1]								
Day school—								
				Arithmetic, algebra, geometry, and trigonometry.	[2] 5 [3] 4	[2] 4 [3] 4	.....	.....
				Architectural drawing.	3	[2] 2 [3] 3	.....	.....
Bricklaying	2	32	10	Chemistry	[2] 3 [3] 2	[2] 2 [3] 2	.....	.....
Electric wiring	2	32	44	English	[2] 4 [3] 3	[2] 2 [3] 3	.....	.....
Plumbing	2	32	[4] 14	Physics	[2] 3 [3] 2	[2] 2 [3] 1	.....	.....
				Estimates and costs	.....	[3] 2	.....	.....
				Hygiene	.....	[3] 1	.....	.....
				Arithmetic, algebra, geometry, and trigonometry.	4	4	.....	.....
Forging	2	32	3	Chemistry	3	2	.....	.....
Foundry work	2	32	8	English	3	2	.....	.....
Machinists	2	32	[5] 36	Hygiene	[3] 1	.....	.....	.....
Pattern making	2	32	14	Mechanical drawing	3	[2] 5 [3] 4	.....	.....
				Physics	[2] 3 [3] 2	[2] 2	.....	.....
				Estimates and costs	.....	[3] 2	.....	.....
				Arithmetic, algebra, geometry, and trigonometry.	4	.....	.....	.....
				Hygiene	[3] 1	.....	.....	.....
				Chemistry	[2] 3 [3] 2	[2] 2 [3] 1	.....	.....
Stationary engineers	2	32	18	English	3	1	.....	.....
				Mechanical drawing	3	3	.....	.....
				Physics	[2] 3 [3] 2	[2] 2	.....	.....
				Theory of trade	[3] 8	[2] 12 [3] 15	.....	.....
				Estimates and costs	.....	[3] 2	.....	.....
Evening school—				Architectural drawing.	1	1	2	2
Bricklaying	4	26	21	Mathematics	1	1	2	2
Electric wiring	4	26	55	Chemistry	.....	.....	1	.....
Plumbing	4	26	74	English	.....	.....	1	1
				Physics	.....	.....	.....	1
				Mathematics	1	2	2	2
Forging	4	26	[6] 19	Mechanical drawing	1	2	1	1
Foundry work	4	26	[7] 19	Chemistry	.....	.....	1	.....
Machinists	4	26	[6] 67	English	.....	.....	1	1
Pattern making	4	26	[7] 28	Lectures, shop talks	.....	.....	1	1
				Physics	.....	.....	.....	1
				Architectural drawing.	2	2	1	.....
				Lectures and demonstrations.	2	2	1	2
Heating and ventilating	4	26	9	Mathematics	2	2	2	2
				Chemistry	.....	.....	1	.....
				English	.....	.....	1	1
				Physics	.....	.....	.....	1

[1] Formerly School for Apprentices and Journeymen.
[2] For first half year.
[3] For second half year.
[4] Not including 3 advanced pupils having trade experience who finish course in 1 year.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[2] 18	[2] 12	30	[2] 12	[2] 18	[2] 30	.....	.....	.....	.....	.....	.....
[3] 14	[3] 16	30	[3] 14	[3] 18	[3] 32	.....	.....	.....	.....	.....	.....
[2] 16	[2] 14	[2] 30	[2] 15	[2] 15	[2] 30	.....	.....	.....	.....	.....	.....
[3] 16	[3] 15	[3] 31	[3] 14	[3] 20	[3] 34	.....	.....	.....	.....	.....	.....
[2] 16	[2] 14	[2] 30	[2] 24	[2] 6	[2] 30	.....	.....	.....	.....	.....	.....
[3] 23	[3] 8	[3] 31	[3] 26	[3] 6	32	.....	.....	.....	.....	.....	.....
2	4	6	2	4	6	6	.....	6	6	.....	6
2	4	6	4	2	6	6	.....	6	6	.....	6
6	.....	6	6	.....	6	6	.....	6	6	.....	6

[5] Not including 7 advanced pupils having trade experience who finish course in 1 year.
[6] Not including 2 advanced apprentices who finish course in 2 years.
[7] Not including 1 advanced apprentice who finishes course in 2 years.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—continued.								
Pittsburg—Carnegie Technical Schools: School of Applied Industries—Concluded.								
Evening school—Concluded.								
Painting and graining, house.	2	26	8	Chemistry	.....	1	.....	.....
Painting, sign	2	26	24	Free-hand drawing	2	2	.....	.....
				Chemistry	.....	1	.....	.....
Sheet metal and cornice workers.	4	26	[1] 25	Mechanical drawing	1	.....	.....	.....
				Mathematics	1	1	1	1
				Pattern drawing	.....	2	2	2
				English	.....	.....	.....	1
Stationary engineers	3	26	23	Chemistry	1	.....	.....	.....
				Mechanical drawing	2	[2] 2	.....	.....
				Mathematics	2	1	1	.....
				Theory of trade	1	2	4	.....
				Mechanism	.....	[3] 2	.....	.....
				English	.....	1	1	.....
Williamson School—Williamson Free School of Mechanical Trades (*day school*):								
				Geography	2	.....	.....	.....
				History	2	.....	.....	.....
				Physiology and hygiene.	2	.....	.....	.....
				Arithmetic	3	3	.....	.....
				Grammar	2	2	.....	.....
				Literature	2	2	.....	.....
				Music (vocal)	1	1	.....	.....
Bricklaying	3	46	55	Mechanical drawing	6	6	[4] 6	.....
Carpentry	3	46	54	Algebra	.....	2	[4] 2	.....
				Chemistry	.....	2	[4] 3	.....
				Physics	.....	2	[4] 3	.....
				Commercial forms	.....	.....	[4] 1	.....
				Geometry	.....	.....	[4] 3	.....
				Strength of materials	.....	.....	[5] 1½	.....
				Trigonometry	.....	.....	[4] 2 [5] 1½	.....
				Geography	2	.....	.....	.....
				History	2	.....	.....	.....
				Physiology and hygiene.	2	.....	.....	.....
				Arithmetic	3	[6] 3	.....	.....
				Grammar	2	2	.....	.....
				Literature	2	2	.....	.....
				Music (vocal)	1	1	.....	.....
Machinists	3	46	54	Mechanical drawing	6	6	[4] 6	.....
Pattern making	3	46	42	Algebra	.....	2	[4] 2	.....
				Chemistry	.....	2	[4] 3	.....
				Physics	.....	2	[4] 3	.....
				Commercial forms	.....	.....	[4] 1	.....
				Geometry	.....	.....	[4] 3	.....
				Strength of materials	.....	.....	[7] 1½	.....
				Theory of steam engine.	.....	.....	[7] 1½	.....
				Trigonometry	.....	.....	[4] 2 [7] 1½	.....

[1] Not including 1 advanced apprentice who finishes course in 2 years.
[2] For first half year.
[3] For second half year.
[4] For first 4 months.
[5] For last 7 months, academic work in evening classes.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
.....	6	6	1	5	6	.....	.....	.....	.....	.....	.....
2	4	6	3	3	6	.....	.....	.....	.....	.....	.....
2	4	6	3	3	6	3	3	6	4	2	6
6	.....	6	6	.....	6	6	.....	6	.....	.....	.....
20	20	40	20	20	40	[4] 20 [5] 3	[4] 23 [5] 43	[4] 43 [5] 46	....	....	....
20	20	40	20	20	40	[4] 20 [7] 4½	[4] 23 [7] 43	[4] 43 [7] 47½	....	....	....

[6] Mensuration.
[7] For the last 7 months, the class work being conducted in the evening.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—concluded.								
Williamson School—Williamson Free School of Mechanical Trades (*day school*)—Concluded.								
Stationary engineers	3	46	27	Geography	2	.....	.....	.....
				History	2	.....	.....	.....
				Physiology and hygiene.	2	.....	.....	.....
				Arithmetic	3	3	.....	.....
				Grammar	2	2	.....	.....
				Literature	2	2	.....	.....
				Music (vocal)	1	1	.....	.....
				Steam engineering	1	1	.....	.....
				Mechanical drawing	5	1	[1] 1	.....
				Steam boiler	.....	1	.....	.....
				Steam heating	.....	1	.....	.....
				Ventilating	.....	1	.....	.....
				Algebra	.....	2	[1] 2	.....
				Chemistry	.....	2	[1] 3	.....
				Physics	.....	2	[1] 3	.....
				Steam	.....	1	[1] 1	.....
				Alternating current	.....	.....	[1] 1	.....
				Commercial forms	.....	.....	[1] 1	.....
				Direct current	.....	.....	[1] 1	.....
				Gas and gas engines	.....	.....	[1] 1	.....
				Geometry	.....	.....	[1] 3	.....
				Refrigeration	.....	.....	[1] 1	.....
				Strength of materials	.....	.....	[2] 1½	.....
				Trigonometry	.....	.....	[1] 2 [2] 1½	.....
RHODE ISLAND.								
Providence—Rhode Island School of Design (*evening school*):								
Jewelry making	4	32	[3] 39	Drawing	2	2	2	2
Silversmithing	4	32	([4])					
Die cutting	4	32	([4])					
Loom fixing	4	32	[5] 13	Mathematics	2	.....	.....	.....
Weaving	4	32	([6])	Lectures	.....	2	.....	.....
Machinists	4	32	[7] 19	Drawing	1	.....	.....	.....
Pattern making	4	32	([8])					
Providence—Watchman Industrial School (Negro—*evening school*):								
Dressmaking	[9] 2	34	10	Theory of trade	1	1	.....	.....
Printing	[9] 2	34	5	Care and use of press, its parts, and methods of regulating same.	2½	2½	.....	.....
				Design in typesetting.				
				Proof reading				
				Punctuation				
				Spelling				

[1] For first 4 months.
[2] For last 7 months, academic work in evening classes.
[3] Including number in silversmithing and die cutting.
[4] Included in jewelry making.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
20	20	40	20	20	40	[1] 20 [2] 3	[1] 23 [2] 43	[1] 43 [2] 46	.....	.....	.....
2	4	6	2	4	6	2	4	6	2	4	6
2	4	6	2	4	6	.....	6	6	.....	6	6
1	5	6	.....	6	6	.....	6	6	.....	6	6
1	3	4	1	3	4	.....	.....	.....	.....	.....	.....
2½	7½	10	2½	7½	10	.....	.....	.....	.....	.....	.....

[5] Including number in weaving.
[6] Included in loom fixing.
[7] Including number in pattern making.
[8] Included in machinists.
[9] Minimum.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
SOUTH CAROLINA.								
Denmark—Voorhees Industrial School (Negro—*day school*):								
Blacksmithing and wheelwrighting.	3	30	15	Academic studies	25	25	25	.....
Bricklaying and plastering.	3	30	5					
Broom making	3	30	3					
Carpentry	3	30	22					
Millinery	3	30	4					
Printing	3	30	12					
Sewing and dressmaking	3	30	48					
Shoemaking	3	30	2					
Upholstering	3	30	6					
Plumbing	2	30	15	do	25	25	.....	.....
Sawmilling	2	30	22					
Woodturning	2	30	22					
(Some of these trades may be taken concurrently.)								
Mayesville—Mayesville Industrial and Educational Institute (Negro—*day school*):								
				Geography	3	.....	.....	.....
				Grammar	3	.....	.....	.....
				Literature	3	.....	.....	.....
				Spelling	3	.....	.....	.....
Blacksmithing, wheelwrighting, and horseshoeing.	4	29	20	Arithmetic	3	3	.....	.....
				History	3	3	3	.....
				Theory of trade	3	3	3	3
Bricklaying, stonemasonry, and plastering.	4	29	19	Botany	.....	3	.....	.....
				Civics	.....	3	.....	.....
Carpentry	4	29	21	Political economy	.....	3	.....	.....
Dressmaking	4	29	[1] 230	Rhetoric	.....	3	3	3
Millinery	4	29	[2] 30	Philosophy	.....	.....	3	.....
Sewing	4	29	[2] 50	Algebra	.....	.....	3	3
Tailoring	4	29	15	Chemistry	.....	.....	3	3
				Latin	.....	.....	3	3
				Astronomy	.....	.....	.....	3
				English literature	.....	.....	.....	3
				Ethics	.....	.....	.....	3
Orangeburg—Claflin University (Negro—*day school*):								
Blacksmithing	4	32	17	Academic studies	15	15	15	15
Bricklaying and plastering.	4	32	56					
Cabinetmaking	4	32	10					
Carpentry	4	32	24					
Printing	4	32	10					
Tailoring	4	32	26					
Wheelwrighting	4	32	7					
Woodworking, machine	4	32	6					
Dressmaking[4]	2	32	12	do	15	15	.....	.....
Millinery[5]	1	32	32	do	15	.....	.....	.....
Painting, carriage	3	32	3	do	15	15	15	.....
Painting, house	3	32	10					
Plain sewing	3	32	305					

[1] Also took cooking; including 30 pupils who took millinery and 50 who took sewing.
[2] Also took dressmaking.
[3] Includes hours given to cooking by pupils taking dressmaking, millinery, and sewing.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
25	22½	47½	25	22½	47½	25	22½	47½	.....	.....	.....
25	22½	47½	25	22½	47½	.....	.....	.....	.....	.....	.....
21	[3] 16½	37½	21	[3] 16½	37½	21	[3] 16½	37½	24	[3] 13½	37½
15	23¾	38¾	15	23¾	38¾	15	23¾	38¾	15	23¾	38¾
15	23¾	38¾	15	23¾	38¾	.....	.....	.....	.....	.....	.....
15	23¾	38¾	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	23¾	38¾	15	23¾	38¾	15	23¾	38¾	.....	.....	.....

[4] May be taken concurrently with millinery and cooking.
[5] May be taken concurrently with dressmaking and cooking.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

A.—PHILANTHROPIC SCHOOLS—Concluded.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
VIRGINIA.								
Hampton—Hampton Normal and Agricultural Institute (Negro and Indian—*day and evening school*): [1]								
Blacksmithing	3	(2)	28					
Bricklaying and plastering.	3	(2)	44					
Cabinetmaking	3	(2)	10					
Carpentry	3	(2)	49					
Machinists	3	(2)	13	Drawing	4	4	4	.....
Printing	3	(2)	8	Academic studies. (See pp. 316, 317.)	10	10	10	.....
Steam fitting and plumbing.	3	(2)	17					
Tinsmithing	3	(2)	2					
Upholstering	3	(2)	1					
Wheelwrighting	3	(2)	14					
Painting	3	(2)	10	Drawing	1	1	1	.....
Shoemaking	3	(2)	8	Academic studies. (See pp. 316, 317.)	10	10	10	.....
Tailoring	3	(2)	37					
Lawrenceville—St. Paul Normal and Industrial School (Negro—*day and evening school*): [1]								
Blacksmithing	3	48	15					
Bricklaying and plastering.	3	48	17					
Carpentry	3	48	13					
Harness making	3	48	3	Theory of trade and academic studies.	12	12	12	.....
Painting	3	48	3					
Printing	3	48	4					
Stationary engineers	3	48	14					
Tailoring	3	48	8					
Wheelwrighting	3	48	5					
Dressmaking	2	48	[3] 17	.....do	$12\frac{1}{4}$	$12\frac{1}{4}$	.....	.....
Plain sewing	1	48	(3)	.....do	$11\frac{1}{2}$	.....	.....	.....
Richmond—Virginia Mechanics Institute (*evening school*):								
Blacksmithing and forging.	2	30	6					
Cabinetmaking	2	30	4	Theory of trade	$1\frac{1}{2}$	[6] $1\frac{1}{2}$	.....	.....
Machinists	2	30	20					
Pattern making	2	30	14					

[1] Trade work (including drawing) during day, academic work in the evening.
[2] Trade work 52 weeks, academic work 32 weeks.
[3] Also take cooking; including pupils taking plain sewing.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Concluded.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
} 14	44	58	14	44	58	14	44	58	.....	.....	.....
} 11	47	58	11	47	58	11	47	58	.....	.....	.....
12	49	61	12	49	61	12	49	61	.....	.....	.....
$12\frac{1}{2}$	[4] $48\frac{3}{4}$	61	$12\frac{1}{2}$	[4] $48\frac{3}{4}$	61	.....	.....	.....	.....	.....	.....
$11\frac{1}{2}$	[4] $49\frac{1}{2}$	61	.....	.....	.....	.....	.....	.....	.....	.....	.....
$1\frac{1}{2}$	$8\frac{1}{2}$	10	[6] $1\frac{1}{2}$	[6] $8\frac{1}{2}$	[6] 10	.....	.....	.....	.....	.....	.....

[4] Including hours given to cooking.
[5] Included with pupils taking dressmaking.
[6] For pattern making; not definitely determined for other trades.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year. Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
ALABAMA.								
Normal—State Agricultural and Mechanical College (Negro—*day school*):								
Blacksmithing and wheelwrighting	3	42	6	Five common school subjects; the particular subjects are determined by pupils' previous education and needs.	18¾	18¾	18¾	.....
Painting, house and sign	3	42	6					
Printing	3	42	12					
Sewing	3	42	60					
Shoemaking	3	42	12					
Tailoring	3	42	15					
Bricklaying	4	42	14					
Carpentry	4	42	21	....do	18¾	18¾	18¾	18¾
Stationary engineers	4	42	9					
Laundering	2	42	22	....do	18¾	18¾	.....	.....
Millinery	2	42	4					
ARKANSAS.								
Fort Smith—Lincoln High School (Negro—*day school*):								
				Algebra	3⅓	3⅓	.....	.....
				English	3⅓	3⅓	3⅓	3⅓
				History	3⅓	3⅓	3⅓	3⅓
				Latin or sciences	3⅓	3⅓	3⅓	3⅓
Carpentry	4	36	30	Plane geometry	.....	.....	3⅓	.....
				Solid geometry	.....	.....	.....	[1]3⅓
				Trigonometry	.....	.....	.....	[1]3⅓
				Plan drawing and blueprint reading.[2]	(2)	(2)	(2)	(2)
CONNECTICUT.								
Bridgeport—State Trade School:								
Day school—								
				Free-hand drawing	(4)	(4)	(4)	.....
				Industrial history	1	1	1	.....
				Lectures and general instruction.	1	1	1	.....
Carpentry	2½	52	10					
Machinists	2½	52	13	Making and reading drawings.[5]	6¼	6¼	6¼	.....
				Spelling	½	1	1	.....
				Trade mathematics	3¼	3¼	3¼	.....
				Arithmetic	2	2	.....	.....
				Designing patterns	5	5	.....	.....
				English	1½	1½	.....	.....
Dressmaking	2	52	15	Free-hand drawing	(4)	(4)	.....	.....
				Industrial history	(4)	(4)	.....	.....
				Lectures and general instruction.	1½	1½	.....	.....
Day cooperative school[5]—								
				Industrial history	¼	¼	.....	.....
				Lectures and general instruction.	½	½	.....	.....
Machinists	2	35	35	Mechanical and free-hand drawing.	2	2	.....	.....
Tool making	2	35	25					
				Spelling	¼	¼	.....	.....
				Trade mathematics	1	1	.....	.....

[1] For half year.
[2] Given in connection with shop practice, time not specified.
[3] Including hours devoted to plan drawing and blue-print reading.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
18¾	21¾	40½	18¾	21¾	40½	18¾	21¾	40½	.....	.....	.....
18¾	21¾	40½	18¾	21¾	40½	18¾	21¾	40½	18¾	21¾	40½
18¾	21¾	40½	18¾	21¾	40½	.....	.....	.....	.....	.....	.....
13⅓	[3] 15 5/12	28¾	13⅓	[3] 15 5/12	28¾	13⅓	[3] 15 5/12	28¾	13⅓	[3] 15 5/12	28¾
12½	36½	49	12½	36½	49	12½	36½	49	.....	.....	.....
10	39	49	10	39	49	.....	.....	.....	.....	.....	.....
4	([5])	4	4	([5])	4	.....	.....	.....	.....	.....	.....

[4] Time incidentally taken from other subjects.
[5] Pupils get practice work in shop of cooperating establishment where employed. See pages 118, 119, 206.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
CONNECTICUT—concluded.								
Bridgeport—State Trade School—Concluded.								
Evening school—								
Carpentry	(1)	52	40	Making and reading drawings.[2]	2	.....	.....	.....
Machinists	(1)	52	40	Industrial history[3]	.....	.....	.....	.....
				Spelling[3]	.....	.....	.....	.....
				Trade mathematics[3]	.....	.....	.....	.....
Dressmaking	(1)	52	24	Lectures and general instruction.	2	.....	.....	.....
				Arithmetic[3]	.....	.....	.....	.....
				Designing patterns[3]	.....	.....	.....	.....
				English[3]	.....	.....	.....	.....
				Free-hand drawing[3]	.....	.....	.....	.....
				Industrial history[3]	.....	.....	.....	.....
				Spelling[3]	.....	.....	.....	.....
New Britain—State Trade School (*day school*):								
Carpentry	2	52	2	Making and reading working drawings.	10	(4)	.....	.....
Die making	2	52	3	Mathematics	5	(4)	.....	.....
Machinists	2	52	11	Theory of shop practice.	(5)	(4)	.....	.....
Pattern making	2	52	2					
Tool making	2	52	5					
South Manchester—South Manchester Evening School (*evening school*):								
Carpentry	(6)	19	30	Lectures and general instruction.	1	.....	.....	.....
Dressmaking and millinery	(6)	19	126	.....do.....	1½	.....	.....	.....
Waterbury—Waterbury Evening High School (*evening school*):								
Carpentry	3	24	146	Trade mathematics and other theory of trade.	½	½	½	.....
Sewing, dressmaking, and millinery.	2	24	40	Lectures and other theory of trade.	¼	¼	.....	.....
DISTRICT OF COLUMBIA.								
Washington—Armstrong Manual Training School (Negro):								
Day school—								
Automobile care and management.[7]	[8] 1–4	36	(9)	Academic studies of the manual training school; a few special trade pupils take no academic studies. See page 131.	(14)	(14)	(14)	(14)
Cabinetmaking and joinery.[10]	[8] 1–4	36	(9)					
Dressmaking[11]	2	36	(9)					
Electrical work	[8] 1–2	36	(9)					
Forging	[8] 1–3	36	(9)					
Laundering[12]	2	36	(9)					
Machine-shop practice	[8] 1–2	36	(9)					
Millinery[11]	[8] 1–2	36	(9)					
Pattern making and wood turning.[10]	[8] 1–4	36	(9)					
Sewing[13]	2	36	(9)					
Steam engineering[7]	[8] 1–4	36	(9)					

[1] Not yet determined.
[2] Architectural for carpentry, and mechanical for machinists.
[3] To be taken after first year.
[4] Course not yet formulated.
[5] Time incidentally taken from other subjects.
[6] Indefinite.
[7] The courses for automobile care and management, and steam engineering may be taken concurrently.
[8] Depending on academic course taken and time required to attain proficiency in the trade.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
2	4	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	34	49	(9)	(9)	(9)	.....	.....	.....	.....	.....	.....
1	7	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
1⅓	6⅔	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
½	7½	8	½	7½	8	½	7½	8	.....	.....	.....
¼	7¾	8	¼	7¾	8	.....	.....	.....	.....	.....	.....
(14)	(14)	(14)	(14)	(14)	(14)	(14)	(14)	(14)	(14)	(14)	(14)

[9] Not reported.
[10] Cabinetmaking and joinery, and pattern making and wood turning may be taken concurrently.
[11] Dressmaking and millinery may be taken concurrently; laundering may be taken concurrently with either or both of these trades.
[12] May be taken concurrently with dressmaking, millinery, or sewing, or with dressmaking and millinery.
[13] May be taken concurrently with laundering.
[14] Time varies; see page 132.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
DISTRICT OF COLUMBIA—CON.								
Washington—Armstrong Manual Training School (Negro)—Concluded.								
Evening school—								
Automobile care and management.	4	23	20	(1)	(1)	(1)	(1)	(1)
Cabinetmaking and joinery	4	23	22					
Electrical work	4	23	25					
Machine-shop practice	4	23	26					
Sewing and dressmaking	4	23	207					
Steam engineering	4	23	24					
Tailoring	4	23	20					
Millinery	2	23	96	(1)	(1)	(1)	.....	.....
Washington—McKinley Manual Training School (*evening school*):								
Cabinetmaking and wood turning.	(2)	[3] 14	45	None	.....	.....	.....	.....
Machine-shop practice	(2)	[3] 14	54					
Electrical work	(2)	[3] 14	73	Theory of electricity	2	.....	.....	.....
GEORGIA.								
Columbus—Secondary Industrial School (*day school*):								
				Arithmetic	3¾	.....	.....	.....
				Grammar	3¾	.....	.....	.....
				History	3¾	3¾	3	.....
				Mechanical drawing	4½	4½	4½	.....
Blacksmithing [5]	3	48	[6] 21	Physics	3¾	.....	3¾	.....
Carpentry [5]	3	48	(7)	Theory of trade	3¾	3¾	3¾	.....
Forging [5]	3	48	(7)	Algebra	.....	3¾	.....	.....
Machinists [5]	3	48	(7)	Chemistry	.....	3¾	.....	.....
Pattern making [5]	3	48	(7)	Civics	.....	3¾	.....	.....
				Rhetoric	.....	3¾	.....	.....
				Geometery	.....	.....	3¾	.....
				Literature	.....	.....	3	.....
				Arithmetic	3¾	.....	.....	.....
				Drawing	¾	.....	.....	.....
				Grammar	3¾	.....	.....	.....
				History, United States.	3¾	.....	.....	.....
				Physics	3¾	.....	.....	.....
				Theory of trade	4½	4½	4½	.....
				Algebra and geometry.	.....	3¾	.....	.....
				Chemistry	.....	3¾	.....	.....
Dressmaking and millinery	3	48	10	Civics, history of Europe.	.....	3¾	.....	.....
				Composition, English.	.....	3¾	.....	.....
				English classics	.....	.....	3	.....
				Geometry and trigonometry.	.....	.....	3¾	.....
				History, economics	.....	.....	3¾	.....
				Physics and chemistry	.....	.....	3¾	.....

[1] Theory taught only in connection with practice.
[2] Indefinite.
[3] For first year of school; longer in future.
[4] Two hours if pupil attends school 1 evening per week; 4 if he attends 2 evenings.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
(1)	6	6	(1)	6	6	(1)	6	6	(1)	6	6
(1)	6	6	(1)	6	6	.....	.....	.....	.....	.....	.....
.....	(4)	(4)	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	4	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
23¼	15¾	39	27	12	39	21¾	17¼	39	.....	.....	.....
20¼	18¾	39	19½	19½	39	18¾	20¼	39	.....	.....	.....

[5] First 6 months spent in woodworking shops.
[6] Including pupils taking carpentry, forging, machinists, and pattern making.
[7] Included in number taking blacksmithing.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
GEORGIA—concluded.								
Columbus—Secondary Industrial School (*day school*)—Concluded.								
				Arithmetic	3¾	.....	.....	.....
				Grammar	3¾	.....	.....	.....
				Physics	3¾	.....	.....	.....
				Drawing	3¾	3¾	4½	.....
				History	3	3	3	.....
Textile occupations	3	48	10	Theory of occupations	3¾	3¾	3¾	.....
				Algebra	.....	3¾	.....	.....
				Rhetoric	.....	3¾	.....	.....
				Chemistry	.....	3¾	3	.....
				Geometry and trigonometry.	.....	.....	3¾	.....
				Literature	.....	.....	3	.....
ILLINOIS.								
Chicago—Albert G. Lane Technical High School (*evening school*):								
Blacksmithing and toolsmithing.	(1)	16 to 18	22					
Carpentry and joinery	(1)	16 to 18	27	Mechanical drawing	2	.....	.....	.....
Foundry work	(1)	16 to 18	26	Shop mathematics	2	.....	.....	.....
Machine-shop practice	(1)	16 to 18	144					
Pattern making	(1)	16 to 18	28					
Cabinetmaking	(1)	16 to 18	115					
Elementary woodworking	(1)	16 to 18	54	None	.....	.....	.....	.....
Wood turning	(1)	16 to 18	22					
Electrical work	(1)	16 to 18	50	Electrical physics	4	.....	.....	.....
Chicago—Horace Mann (Branch) School (carpenters' apprentices [2]) (*day school*):								
				American history	3¾	3¾	3¾	3¾
				Applied arithmetic	3¾	3¾	3¾	3¾
				English	3¾	3¾	3¾	3¾
Carpentry	4	12 to 13	90	Manners, morals, hygiene, and sciences (lumber and trees).	2½	2½	2½	2½
				Mechanical drawing	10	10	10	10
				Spelling	3¾	3¾	3¾	3¾
Chicago—James Otis School (carpenters' apprentices [2]) (*day school*):								
				Arithmetic and geometry.	2½	2½	2½	2½
				Geography	2½	2½	2½	2½
				History	2½	2½	2½	2½
Carpentry	4	12 to 13	152	Language	2½	2½	2½	2½
				Mechanical drawing	10	10	10	10
				Reading	1⅔	1⅔	1⅔	1⅔
				Spelling	1⅔	1⅔	1⅔	1⅔
				Writing	1⅔	1⅔	1⅔	1⅔
Chicago—Lake High School (*evening school*):								
Cabinetmaking	(1)	16 to 18	20					
Carpentry and joinery	(1)	16 to 18	15	Theory elective:[3]				
Electrical work	(1)	16 to 18	25	When theory is not taken.	.....	.....	.....	.....
Elementary woodworking	(1)	16 to 18	18					
Forging	(1)	16 to 18	30	When theory is taken:				
Foundry work	(1)	16 to 18	15	Mathematics	2	.....	.....	.....
Machine-shop practice	(1)	16 to 18	45	Mechanical drawing.	2	.....	.....	.....
Pattern making	(1)	16 to 18	6					
Tool making	(1)	16 to 18	8					

[1] Indefinite.

[2] For description see page 209.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
21¾	17¼	39	21¾	17¼	39	21	18	39	.....	.....	.....
4	6	10	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	10	10	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	6	10	.....	.....	.....	.....	.....	.....	.....	.....	.....
27½	.....	27½	27½	.....	27½	27½	.....	27½	27½	.....	27½
25	.....	25	25	.....	25	25	.....	25	25	.....	25
.....	10	10	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	6	10	.....	.....	.....	.....	.....	.....	.....	.....	.....

[3] Few pupils take theory, though urged to do so.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
ILLINOIS—concluded.								
Chicago—Lake High School (*evening school*)—Concluded.								
Wood turning	(1)	16 to 18	20					
[Pupils may take correlated trades concurrently.]								
Chicago—Richard T. Crane Technical High School (*evening school*):								
Blacksmithing	(1)	16 to 18	20					
Cabinetmaking	(1)	16 to 18	10					
Carpentry	(1)	16 to 18	14	Theory and academic work elective:				
Electrical work	(1)	16 to 18	55					
Forging, ornamental	(1)	16 to 18	3	When theory and academic work are not taken.				
Machine-shop practice	(1)	16 to 18	52					
Molding, brass	(1)	16 to 18	18					
Molding, iron	(1)	16 to 18	17	When theory or academic work is taken.	4			
Pattern making	(1)	16 to 18	30					
Tool making	(1)	16 to 18	10					
Wood finishing	(1)	16 to 18	2					
Wood turning	(1)	16 to 18	3					
[Pupils may take one trade or two related trades.]								
Freeport—Freeport High School (*day cooperative school*):[2]								
				Algebra	3⅓			
				Free-hand drawing	3⅓			
				Manual training	3⅓	3⅓	3⅓	
				Mechanics and mechanical drawing.	3⅓		3⅓	
				English	3⅓	3⅓	3⅓	3⅓
				Shop arithmetic	3⅓	3⅓	3⅓	3⅓
				Mechanism and machines.		[4] 3⅓		
Electrical work	4	(3)	1	Physics		3⅓		
Machinists	4	(3)	11	Free-hand and mechanical drawing.		3⅓	3⅓	
Pattern making	4	(3)	3	Mechanics		[4] 3⅓	3⅓	3⅓
				Commercial geography			[4] 3⅓	
				Civics and American history.				3⅓
				Drawing and manual training.				3⅓
				Electricity and heat				3⅓
INDIANA.				Study periods	6¼	6¼	[4] 6½ / [4] 2½	6¼
Knightstown—Soldiers' and Sailors' Orphans' Home of Indiana (*day school*):								
Baking	3	[6] 40	12					
Carpentry	3	[6] 40	18					
Laundering	3	[6] 40	13					
Painting and paperhanging.	3	[6] 40	6	Regular academic grade studies.	12½	15	15	
Printing	3	[6] 40	28					
Sewing	3	[6] 40	22					
Stationary engineers	3	[6] 40	2					
Tailoring	3	[6] 40	7					

[1] Indefinite.

[2] Pupils get practice work in shop of cooperating establishment where employed. See page 187.

[3] Period covered 40 weeks. In first year, full period of 40 weeks in school; in other years, 20 alternate weeks in school and 20 alternate weeks in cooperating factory; Saturday of school week worked in factory.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	10	10	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	6	10	.....	.....	.....	.....	.....	.....	.....	.....	.....
[5] 26½	.....	[5] 26½	[5] 26½	(2)	[5] 26½	[5] 26½	(2)	[5] 26½	[5] 26½	(2)	[5] 26½
12½	15	27½	15	12½	27½	15	12½	27½	.....	.....	.....

[4] One-half year.
[5] See note [3]
[6] In addition pupils remaining at the home continue industrial work during vacation.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS.								
Beverly—Beverly Independent (independent [1]) Industrial School (*day cooperative school*): [2]								
Machinists	([3])	([4])	50	Arithmetic and business practice.	5	.....	.....	.....
				Explanations and records of shop work.	5	.....	.....	.....
				Machinists' literature and talks.	5	.....	.....	.....
				Mechanical drawing and sketching.	10	.....	.....	.....
				Personal, social, and civic duties.	5	.....	.....	.....
				Science	5	.....	.....	.....
				Shop mathematics	$3\frac{3}{4}$	.....	.....	.....
Boston—Boston School of Printing and Bookbinding [6] (independent [1]—*day school*):								
Bookbinding	2	40	[7] 66	Arithmetic	5	([8])	.....	.....
Printing	2	40	26	Current events	1	([8])	.....	.....
				Drawing	3	([8])	.....	.....
				English	7	([8])	.....	.....
				Industrial history	3	([8])	.....	.....
				Spelling	1	([8])	.....	.....
Boston—Central Evening Industrial School (independent [1]—*evening school*):								
Interior decorating	3	22	73	None	.....	.....	.....	.....
Machine-shop practice	3	22	54					
Steam engineering	3	22	40					
Boston—Girls Trade School (independent [1]—*day school*):								
Dressmaking	1	46	110	Arithmetic	$\frac{1}{2}$	.....	.....	.....
Millinery	1	46	23	Drawing	3	.....	.....	.....
Power sewing machine operating.	1	46	26	English	$\frac{1}{2}$	.....	.....	.....
				Gymnasium	$1\frac{1}{4}$	.....	.....	.....
				Household science	2	.....	.....	.....
				Spelling	$\frac{1}{2}$	.....	.....	.....
				Opening exercises	$1\frac{1}{4}$	.....	.....	.....
Boston—Glenway Industrial Classes, Oliver Wendell Holmes School District (*day school*):								
Furniture making	[9] 1	40	32	Arithmetic	$3\frac{1}{2}$	.....	.....	.....
				English	4	.....	.....	.....
				Geography	2	.....	.....	.....
				Industrial history	$2\frac{1}{2}$	.....	.....	.....
				Reading and literature	$2\frac{1}{2}$	.....	.....	.....

[1] For explanation of this term, see page 97.
[2] Pupils get practice work in shop of cooperating establishment, see page 191.
[3] Course not yet definitely determined.
[4] Period covered 50 weeks; 25 alternate weeks in school and 25 alternate weeks in an industrial establishment, working 50 hours per week under a school instructor.
[5] See note [4].

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[5] 38¾	([2])	[5] 38¾	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	5	25	([8])	([8])	([8])	.....	.....	.....	.....	.....	.....
20	15	35	([8])	([8])	([8])	.....	.....	.....	.....	.....	.....
.....	6	6	.....	6	6	.....	6	6	.....	.....	.....
9	28½	37½	.....	.....	.....	.....	.....	.....	.....	.....	.....
14½	10	24½	.....	.....	.....	.....	.....	.....	.....	.....	.....

[6] Formerly called Pre-Apprentice School for Printing and Bookbinding.
[7] Including 9 females.
[8] Course not yet formulated.
[9] A two-year course in contemplation.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
Boston—High School of Practical Arts (*day school*):								
				Algebra	3	.....	.....	.....
				Drawing	3	3¾	3¾	3¾
				English	3¾	3	3	3¾
				History	1½	2¼	2¼	2¼
				Music	¾	¾	¾	¾
Dressmaking [1]	1 4	40	[2] 227	Physical training	1½	¾	¾	¾
Millinery [1]	1 4	40	([3])	Chemistry	.....	3	.....	.....
				Geometry	.....	1½	.....	.....
				Physics	.....	.....	3	.....
				Economics	.....	.....	.....	1½
				Hygiene	.....	.....	.....	2¼
				Study periods	1½	.....	1½	.....
Boston—Quincy School (*day school*):								
				Geography	½	([5])	.....	.....
				History	1	([5])	.....	.....
				Mechanical drawing	1½	([5])	.....	.....
				Music	½	([5])	.....	.....
Elementary metal work (machine shop bench work).	2	40	45	Oral arithmetic	⅝	([5])	.....	.....
				Penmanship	1¼	([5])	.....	.....
				Reading	2½	([5])	.....	.....
				Written arithmetic	2¼	([5])	.....	.....
				Written English	2½	([5])	.....	.....
Cambridge—Evening Industrial School (independent [6]—*evening school*):								
Forging and foundry work.	3	22	20	None	.....	.....	.....	.....
Woodworking and pattern making.	3	22	32					
Machine shop practice	3	22	59	Shop mathematics	2	2	2	.....
Chicopee—Chicopee Industrial School (*day school*):								
				Algebra	3¾	.....	.....	.....
				Elementary science	3	.....	.....	.....
				English	3	3	3	3
				Mechanical drawing	3	3	3	3
Carpentry and woodworking, forging, machine shop practice, and pattern making. [7]	7 4	40	27	Music (optional)	¾	¾	¾	¾
				Plane geometry	.....	3¾	.....	.....
				Applied science (optional).	.....	.....	3	.....
				Solid geometry	.....	.....	2¼	.....
				Trigonometry	.....	.....	1½	.....
				Industrial history	.....	.....	.....	2¼
				Shop mathematics	.....	.....	.....	1½
Chicopee—Chicopee Evening Industrial School (independent [6]—*evening school*):								
Machine shop practice	4	24	[9] 100	Drawing (optional):				
Woodworking (carpentry, pattern making, and wood turning).	4	24	([10])	When taken	4	4	4	4
				When not taken	.....	.....	.....	.....

[1] Including cooking; instruction is common to both dressmaking and millinery during first year.
[2] Including number who took millinery.
[3] Included in number who took dressmaking.
[4] Including hours given to cooking.
[5] Course not yet formulated.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
15	[4] 7½	22½	15	[4] 7½	22½	15	[4] 7½	22½	15	[4] 7½	22½
13½	10	23½	(5)	(5)	(5)	.....	.....	.....	.....	.....	.....
.....	6	6	.....	6	6	.....	6	6	.....	.....	.....
2	4	6	2	4	6	2	4	6	.....	.....	.....
13½	[8] 9	22½	10½	[8] 12	22½	13½	12	25½	10½	15	25
4	4	8	4	4	8	4	4	8	4	4	8
.....	4	4	.....	4	4	.....	4	4	.....	4	4

[6] For explanation of this term, see page 97.
[7] Pupils take all trades the first 2 years and specialize in one trade the third and fourth years.
[8] Divided equally among trades.
[9] Including pupils taking woodworking (carpentry, pattern making, and wood turning).
[10] Included in number taking machine-shop practice.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
Fall River—Bradford Durfee Textile School of Fall River (independent incorporated[1]—*evening school*):								
Box and dobby loom fixing.	1	26	43	Cloth and loom calculations.	1¾	.....	.....	.....
Jacquard weaving and loom fixing.	1	26	23					
Cotton grading and stapling.	1	26	35	Cotton fiber, varieties and comparative values of cotton, selection of cotton for various yarns, and buying, selling, and shipping cotton.	1½	.....	.....	.....
Elementary dyeing.....	1	26	6	Lectures and study of the more common fibers; classification of dyestuffs, their chemical and physical properties, etc.; the affinity of each class of dyes for the more important textile fibers.	1¾	.....	.....	.....
Mule spinning.....	1	26	6	Calculations relating to mules and yarns.	1¾	.....	.....	.....
Picking and carding.....	2	26	60	Lectures on cultivation, ginning, baling, grading, and mixing cotton; lectures, demonstrations, and calculations on the various machines.	1¾	1¾	.....	.....
Plain weaving and loom fixing.	1	26	167	Lectures, demonstrations, and calculations on important plain looms.	1¾	.....	.....	.....
Ring spinning, twisting, and warp preparing.	1	26	34	Lectures and calculations in making changes in draft, twist, production, etc., for different yarns; treatment of yarns after leaving the spinning room.	1¾	.....	.....	.....
Steam engineering and electrical work.	2	26	203	Use of steam tables, relation existing between temperature, pressure, heat of liquid, heat of vaporization, volume, density; strength of boiler materials.	1¾	.....	.....	.....
				Theory of steam engines, dynamos, motors, and general care of electrical equipment.	.....	1¾	.....	.....
Textile-mill machinists....	1	26	120	Theory and operation of each machine; machine calculations; elementary mechanical drawing.	1¾	.....	.....	.....

[1] For explanation of this term, see page 503.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
1¾	1¾	3½	.....	.....	.....	.....	.....	.....	.....	.....	.....
1½	.....	1½	.....	.....	.....	.....	.....	.....	.....	.....	.....
1¾	1¾	3½	.....	.....	.....	.....	.....	.....	.....	.....	.....
1¾	1¾	3½	.....	.....	.....	.....	.....	.....	.....	.....	.....
1¾	1¾	3½	1¾	1¾	3½	.....	.....	.....	.....	.....	.....
1¾	1¾	3½	.....	.....	.....	.....	.....	.....	.....	.....	.....
1¾	1¾	3½	.....	.....	.....	.....	.....	.....	.....	.....	.....
1¾	1¾	3½	1¾	1¾	3½	.....	.....	.....	.....	.....	.....
1¾	1¾	3½	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
Fitchburg—Fitchburg High School (*day cooperative school* [1]):								
				Algebra	3⅓	.....	.....	.....
				Arithmetic (tables and simple shop problems).	3⅓	.....	.....	.....
				English and current events.	3⅓	.....	.....	.....
				Free-hand and mechanical drawing and bench work.	5⅓	.....	.....	.....
				Civics	.....	1⅓	.....	.....
				Shop mathematics, algebra, and geometry.	.....	3⅓	.....	.....
Machinists	4	(2)	33	Physics	.....	2⅔	2⅔	.....
Pattern making	4	(2)	2	English	.....	3⅓	3⅓	3⅓
Saw making	4	(2)	4	Free-hand and mechanical drawing.	.....	4	4	3⅓
				Mechanism of machines.	.....	3⅓	3⅓	2⅔
				First aid to injured	.....	.....	⅔	.....
				Chemistry	.....	.....	2⅔	4
				Shop mathematics	.....	.....	3⅓	2⅔
				Commercial geography and business methods.	.....	.....	.....	1⅓
				Physics, electricity, and heat.	.....	.....	.....	2⅔
Lawrence—Lawrence Industrial School (independent [4]): *Day school*—								
				Applied arithmetic	4⅙	.....	.....	.....
				Applied drawing	1⅔	.....	.....	.....
				Chemistry of cooking	2 1/12	.....	.....	.....
Dressmaking [5]	5 3	40	6 38	Civics	5/6	5/6	5/6	.....
Millinery [5]	5 3	40	(7)	Construction of hats	½	8 8⅓	8 8⅓	.....
				Dressmaking design	5/6	9 8⅓	9 8⅓	.....
				English	1⅔	1⅔	1⅔	.....
				Industrial history	1⅔	1⅔	1⅔	.....
Electrical work	11 3	40	12 81	Electricity	1¼	.....	(14)	.....
Machine-shop practice	11 3	40	(13)	Mechanics	1¼	.....	(14)	.....
Pattern making and molding.	11 3	40	(13)	Civics	5/6	5/6	(14)	.....
				Drafting	1¼	4⅙	(14)	.....
				English	1⅔	1⅔	(14)	.....
				Industrial history	1⅔	1⅔	(14)	.....
				Mathematics	4⅙	4⅙	(14)	.....
Wool and worsted mill occupations (sorting, scouring, carbonizing, and dusting, picking, carding, gilling, combing, designing, weaving (wool), weaving (worsted), warp preparation (wool), warp preparation (worsted)).	15 3	40	16 24	Civics	5/6	(14)	(14)	.....
				Electricity	4⅙	(14)	(14)	.....
				English	1⅔	(14)	(14)	.....
				Industrial history	1⅔	(14)	(14)	.....
				Mill arithmetic	4⅙	(14)	(14)	.....
				Talks and explanations	6½	(14)	(14)	.....

[1] Pupils get practice work in shop of cooperating establishment where employed, see page 188.
[2] Period covered, 40 weeks; first year 40 weeks in school; other years 20 alternate weeks in school and 20 alternate weeks in cooperating industrial establishments.
[3] Including hours given to study, gymnasium, and opening exercises; also see note [2].
[4] For explanation of this term see page 97.
[5] Including cooking, instruction is common to both dressmaking and millinery during first year, after which pupils specialize.
[6] Including pupils taking millinery.
[7] Included in number taking dressmaking.
[8] Taken by millinery pupils.
[9] Taken by dressmaking pupils.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[3] 23⅓	.....	[3] 23⅓	[3] 23⅓	(1)	[3] 23⅓	[3] 23⅓	(1)	[3] 23⅓	[3] 23⅓	(1)	[3] 23⅓
13 6/12	[10] 7 6/12	20⅝	12½	10½	23	12½	10½	23	.....	.....	.....
12 1/12	11¾	23⅝	11⅔	11⅓	23	(14)	(14)	(14)	.....	.....	.....
19	4	23	(14)	(14)	(14)	(14)	(14)	(14)	.....	.....	.....

[10] Including hours given to cooking.
[11] Instruction is common to these trades during first year, after which pupils specialize in one.
[12] Including pupils taking machine-shop practice and pattern making and molding.
[13] Included with electricians.
[14] Course not yet formulated.
[15] Occupations are taken up in order until all have been covered, each pupil taking 2 at a time. Other occupations will also be taught; see page 255. During the first year instruction is common to all pupils and is planned to cover cotton, wool, and worsted industries, after which they specialize.
[16] In addition to the number of pupils shown above for all occupations there were 45 pupils (employees in mills and shops) who attended alternate half days or alternate weeks for instruction in regular classes.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
Lawrence—Lawrence Industrial School (independent[1])—Concluded.								
Evening school—								
Cotton-mill occupations—								
Picking	(2)	20	15	Lectures and explanations.	[3] 1½	.....	.....	.....
Carding	(2)	20						
Drawing	(2)	20						
Spinning	(2)	20						
Twisting	(2)	20						
Spooling	(2)	20						
Warp preparing	(2)	20	26					
Weaving	(2)	20						
Wool and worsted mill occupations—								
Carding	(2)	20	43	....do.....	[4] 1½	.....	.....	.....
Gilling, worsted	(2)	20						
Picking	(2)	20						
Scouring, carbonizing, and dusting.	(2)	20						
Sorting	(2)	20						
Combing, worsted	(2)	20	96					
Drawing, worsted	(2)	20						
Mule spinning	(2)	20						
Spinning, worsted	(2)	20						
Spooling	(2)	20						
Twisting	(2)	20						
Warp preparing, wool	(2)	20						
Weaving, wool	(2)	20						
Warp preparing, worsted.	(2)	20	43					
Weaving, worsted	(2)	20						
Designing, cotton, wool, and worsted.	(2)	20	45	Arithmetic and cloth calculations.	1½	.....	.....	.....
Dyeing, cotton, wool, and worsted.	(2)	20	30	Chemistry	1	.....	.....	.....
Dressmaking (plain sewing, shirt-waist making, skirt-making, children's clothes, garment making).	1	20	433	Lectures	[5] 1/5	.....	.....	.....
Carpentry	1	20	44	Blue-print reading, Drawing, Mathematics	2	.....	.....	.....
Electrical work	1	20	114	Theory of trade	2	.....	.....	.....
Firing, boiler	1	20	91	Boiler construction, Mathematics	2	.....	.....	.....
Masonry	1	20	39	Blue-print reading, Mathematics	2	.....	.....	.....
Steam engineering	1	20	42	Boilers and engines, Mathematics	2	.....	.....	.....

[1] For explanation of this term, see page 97.
[2] Indefinite.
[3] Time given to each occupation; pupils may take more than 1 occupation at a time.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[3] 1½	[3] ½	[3] 2									
[4] 1½	[4] ½	[4] 2									
1½	½	2									
1	1	2									
[5] ⅕	[5] 1⅘	[5] 2									
2		2									
2		2									
4		4									
2		2									
4		4									

[4] Time given to each occupation except sorting; sorting, 2 hours to lectures and explanations, but no practice; pupils may take more than 1 occupation at a time.

[5] Time given to each division of dressmaking; pupils may take more than 1 division by attending more than 1 evening per week.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
Lowell—Lowell Textile School (independent incorporated[1]—*evening school*):								
Cotton-mill occupations—								
Picking and carding	1	20	60					
Combing	¼	20						
Twisting	¼	20						
Ring spinning	¼	20						
Mule spinning	¼	20						
Knitting	1	20						
Weaving	1	20	11					
Woolen-mill occupations—								
Sorting	⅛	20	8					
Scouring	⅙	20						
Carbonizing	⅙	20						
Burr picking	⅙	20						
Mixing and oiling	⅙	20		Topical lectures	[2] 1⅙	-----	-----	-----
Carding	⅙	20						
Mule spinning	1	20						
Weaving, wool and worsted.	1	20	31					
Worsted-mill occupations—								
Carding	½	20	31					
Combing	½	20						
Drawing	½	20						
Spinning and twisting	½	20						
Weaving, Dobby and Jacquard (cotton, wool, and worsted).	1	20	11					
Finishing, cotton—								
Shearing	¼	20	16	.....do.....	[3] 3	-----	-----	-----
Singeing	¼	20						
Washing	¼	20						
Napping	¼	20						
Finishing, wool and worsted—								
Burling and mending	⅙	20						
Fulling	⅙	20						
Washing and speck dyeing.	⅙	20						
Carbonizing	⅙	20						
Gigging, napping, and steaming.	⅙	20						
Brushing, shearing, and pressing.	⅙	20						
Machine-shop practice.	2	20	23	Mechanics and mechanism.	3	-----	-----	-----
Steam engineering and electrical work.	3	20	194	Mechanics and mechanism.	3	-----	-----	-----
				Lectures on electrical engines.	-----	2	-----	-----

[1] For explanation of this term see page 503.

[2] Time given to each occupation except sorting; sorting, 3 hours to lectures but no practice. Pupils may take two occupations at one time, thereby getting twice as much theory and practice as shown here

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[2] 1 4/6	[2] 1 1/6	[2] 3	.....	.....	.....	.....	.....	.....	.....	.....	.....
[3] 3	.....	[3] 3	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	.....	3	.....	3	3	.....	.....	.....	.....	.....	.....
3	.....	3	2	1	3	2	1	3	.....	.....	.....

[3] Time given to each occupation. Pupils may take two occupations at one time.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
New Bedford—New Bedford Industrial School (independent):[1]								
Day school—								
Industrial course, including—								
Building trades, Metal trades, Steam engineering, electrical work, etc.	2 4	40	75	Drawing	2 7/10	(3)	(3)	(3)
				English	1 8/10			
				Mathematics	1 8/10			
				Physical science	2 7/10			
				Theory of metal, shop-work.	2 7/10			
				Theory of wood, shop-work.	4½			
Evening school—								
Carpentry	3	30	57	Architectural drawing.[4] House framing.[4] Roofing.[4]	2	(3)	(3)	.....
Dressmaking	3	30	95	Theory of trade	2			
Millinery	3	30	95					
Machine-shop practice	3	30	35	Drafting.[4] Mathematics.[4] Theory of shop practice.[4]	2			
Steam and gasoline engineering.	3	30	100	Steam and gasoline engines.[4]	2			
New Bedford—New Bedford Textile School (independent incorporated[5]—*evening school*):								
Cotton sampling	½	21	26	Lectures on courses	1¾	.....	.....	.....
Mule spinning	1	21	34					
Ring spinning and twisting.	1	21	27					
Spooling, warping, and slashing.	1	21	18					
Weaving, fancy, and loom fixing.	½	21	57					
Weaving, plain, and loom fixing.	1	21	181					
Loom fixing	1	21	16	.....do	⅞	.....	.....	.....
Dyeing	2	21	12					
Knitting	2	21	8	.....do	1¾	1¾	.....	.....
Picking, carding, and combing.	2	22	76					
Newton—Newton Industrial School (independent[1]—*day school*):								
Electrical work, Machine-shop practice, Pattern making, Printing, Woodworking (cabinet)	6 3	44	45	Arithmetic	2¼	.....	.....	.....
				Elementary science	1½	.....	.....	.....
				Industrial geography	2¼	.....	.....	.....
				Drawing	4½	4½	4½	.....
				English	1½	1½	1½	.....
				History	.....	1½	.....	.....
				Mathematics	.....	1½	.....	.....
				Science (physics and electricity).	.....	3	.....	.....
				Chemistry, minerals, and metals.	.....	.....	2¼	.....
				Citizenship and government.	.....	.....	2¼	.....
				Shop mathematics and accounts.	.....	.....	1½	.....
				Study periods	3¾	3¾	3	.....

[1] For explanation of this term, see page 97.

[2] The course is planned to be common to all trades during first and second years. and to specialize in third and fourth years.

[3] Course not yet formulated.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
$16\frac{1}{5}$	$19\frac{4}{5}$	36	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]
2	2	4	[3]	[3]	[3]	[3]	[3]	[3]	.....	.....	.....
$1\frac{3}{4}$	$1\frac{3}{4}$	$3\frac{1}{2}$	.....	.....	.....	.....	.....	.....	.....	.....	.....
$\frac{7}{8}$	$\frac{7}{8}$	$1\frac{3}{4}$	.....	.....	.....	.....	.....	.....	.....	.....	.....
$1\frac{3}{4}$	$1\frac{3}{4}$	$3\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{3}{4}$	$3\frac{1}{2}$	.....	.....	.....	.....	.....	.....
$15\frac{3}{4}$	$14\frac{1}{4}$	30	$15\frac{3}{4}$	$14\frac{1}{4}$	30	15	15	30	.....	.....	.....

[4] Pupils take but one subject at one time; may change from one subject to another as desired.
[5] For explanation of this term, see page 503.
[6] Pupils take all trades for first and second year, after which they specialize according to adaptability.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—concluded.								
Springfield—Springfield Vocational School (*day school*):								
Ironwork (machine-shop practice and tool making).	[1] 3	40	50	Arithmetic	2½	[2]	[2]	.....
				English and spelling	2½	[2]	[2]	.....
				History	2½	[2]	[2]	.....
Woodworking (carpentry, joinery, and pattern making).				Mechanical drawing	3¾	[2]	[2]	.....
Springfield—Evening School of Trades (*evening school*):								
Electrical work	[3]	24	27	None	.....	.....	.....	.....
Machine-shop practice and tool making.	[3]	24	87					
Plumbing	[3]	24	36	Theory of trade	2	.....	.....	.....
Woodworking and pattern making.	[3]	24	15	None	.....	.....	.....	.....
Worcester—Worcester Trade School (independent [4]—*day school*):								
				History of commerce and invention.	[6] 2	.....	.....	.....
				Shop formulas	[7] 4	.....	.....	.....
				Geometry	[8] 4	[9] 4	.....	.....
				Shop computations	[9] 8; [10] 4	[11] 4	.....	.....
				Drawing	4	4	4	.....
				Natural science	[8] 4	4	6	.....
				English	4	[11] 4; [12] 2	2	2
				Shop instruction	12	12	12	[11] 12; [12] 4
Cabinetmaking [5]	[5] 4	48	41	Commercial arithmetic	.....	[12] 2	.....	.....
Pattern making [5]	[5] 4	48		Commercial geography	.....	[13] 4	.....	.....
Machinists	4	48	38	Study of triangles	.....	[14] 4	.....	.....
				Cost accounts	.....	[8] 4	[6] 4	.....
				Good citizenship	.....	[12] 2	2	2
				Bookkeeping	.....	.....	[7] 2	.....
				Commercial law	.....	.....	[8] 2	[11] 2
				Jig and fixture design	.....	.....	.....	[11] 8; [12] 12
				Strength of materials	.....	.....	.....	6
				Study periods [15]	[6] 10; [8] 8	[11] 8; [12] 10	[9] 10; [7] 8; [8] 12	[11] 8; [12] 10
MICHIGAN.								
Saginaw (east side)—Trade School (*day school*):								
Machinists	3	40	28	Theory of trade	[19]	[20]	[20]	.....

[1] Pupils take ironwork one-half of first year and woodworking the other half, and specialize in second and third years.
[2] Course not yet formulated.
[3] Indefinite.
[4] For explanation of this term, see page 97.
[5] Instruction has so far been common to both cabinetmaking and pattern making.
[6] First, second, and third quarters.
[7] Second and third quarters.
[8] Fourth quarter.
[9] First quarter.
[10] Second, third, and fourth quarters.
[11] First and second quarters.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
11¼	15	26¼	(2)	(2)	(2)	(2)	(2)	(2)	.....	.....	.....
.....	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	6	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	6	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
[15] 40	[15] 40	[16] 40	[15] 40	[15] 40	[16] 40	[15] 40	[15] 40	[16] 40	[15 17] 40 [15 18] 36	[15 17] 40 [15 18] 48	[15 16] 40 [15 16] 48
[19]	[21] 30	30	[20]	[20]	30	[20]	[20]	30	.....	.....	.....

[12] Third and fourth quarters.
[13] Third quarter.
[14] Second quarter.
[15] Pupils receive schoolroom work and practice work in alternate weeks.
[16] In addition 4 hours, alternate Saturdays, may be required for review of theory or practice.
[17] Alternate weeks, first and second quarters.
[18] Alternate weeks, third and fourth quarters.
[19] Given in connection with shop practice.
[20] Course not yet formulated; tentative plans include drawing, English and business forms, mathematics, science, and ironworking.
[21] Including hours given to theory of trade.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MISSISSIPPI.								
Alcorn—Alcorn Agricultural and Mechanical College (Negro—*day school*):								
Blacksmithing and wheelwrighting.	4	36	128	Five common-school subjects.	18¾	18¾	18¾	18¾
Carpentry and cabinetmaking.	4	36	95					
Dressmaking	3	36	32	....do	18¾	18¾	18¾	.....
Painting	3	36	35					
Sewing	3	36	111					
Shoemaking	3	36	33					
Columbus—Mississippi Industrial Institute and College (*day school*):								
				Algebra	3	.....	.....	.....
				Drawing	2	.....	.....	.....
				English grammar and composition.	4	.....	.....	.....
				Physiology	2	.....	.....	.....
				History	3	3	.....	.....
Dressmaking	3	34	222	Algebra and geometry	.....	3	.....	.....
Millinery	3	34	64	Physiography	.....	3	.....	.....
				Composition	.....	2	2	.....
				English literature	.....	2	2	.....
				Botany or zoology	.....	.....	3	.....
				Civics	.....	.....	1½	.....
				Drawing, psychology, or Latin.	.....	.....	3	.....
				Geometry	.....	.....	1½	.....
NEW JERSEY.								
Bordentown—Manual Training and Industrial School for Colored Youth (Negro—*day school*):								
				Penmanship	3	.....	.....	.....
				Geography	3	3	.....	.....
				Reading and spelling	3	3	.....	.....
				Arithmetic	3	3	3	3
				English grammar	2	2	2	2
				Music	¾	¾	¾	¾
Carpentry, cabinetmaking and house painting.[1]	6	33	53	Drawing and penmanship.	.....	3	3	.....
Sewing, millinery, and laundering.[2]	6	33	69	History of United States.	.....	.....	3	.....
				Physiology	.....	.....	3	3
				Civics	.....	.....	.....	3
				History of New Jersey	.....	.....	.....	3
				Study periods	2½	2½	2½	2½
				[3]	.....	.....	.....	[3]
Newark—Newark Technical School (*evening school*):								
Electrical wiring	2	30	19	Lectures on electricity	2	.....	.....	.....
Electroplating	2	30	17	Lectures on chemistry	2	1	.....	.....
				Laboratory work in experimental chemistry.	.....	4	.....	.....

[1] Agriculture taken concurrently.

[2] Cooking taken concurrently.

[3] Fifth-year subjects: Algebra, general history, physical geography and rhetoric, and science of agriculture, 3 hours each; music, 1½ hours, and study periods, three-fourths hour. Sixth-year subjects: Chemistry, geometry, physics, rhetoric, and science of agriculture, 3 hours each; music, 1½ hours, and study periods, three-fourths hour.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
18¾	20 5/12	39 1/6	18¾	20 5/12	39 1/6	18¾	20 5/12	39 1/6	18¾	20 5/12	39 1/6
18¾	20 5/12	39 1/6	18¾	20 5/12	39 1/6	18¾	20 5/12	39 1/6	.....	.....	.....
14	5	19	13	5	18	13	5	18	.....	.....	.....
17¼	[4] 18¼	35½	17¼	[4] 18¼	35½	17¼	[4] 18¼	35½	[5] 17¼	[5] 18¼	[5] 35½
2	2	4	.....	2	2	.....	.....	.....	.....	.....	.....
2	4	6	5	2	7	.....	.....	.....	.....	.....	.....

[4] Including hours given to agriculture by pupils taking carpentry, cabinetmaking, and house painting; to cooking by pupils taking sewing, millinery, and laundering.

[5] Including hours given to agriculture by pupils taking carpentry, cabinetmaking, and house painting; to cooking by pupils taking sewing, millinery, and laundering; fifth and sixth years same as fourth year.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW JERSEY—concluded.								
Newark—Newark Technical School (*evening school*)—Concluded.								
Plumbing	2	30	10	Lectures on chemistry	2	.....	.....	.....
				Mechanical drawing	2	2	.....	.....
				Laboratory work, chemistry	.....	4	.....	.....
Newark—Sara A. Fawcett Drawing School (*evening school*):								
Die sinking	2	30	51	Theory of trade and designing	[1] 1	[1] 1	.....	.....
Jewelry making	2	30	48					
Newark—Warren Street Elementary Industrial School (*day school*):								
Woodworking and metal working.[2]	2	40	100	Elementary physics	1½	.....	.....	.....
				Industrial history	1½	.....	.....	.....
				Spelling and writing	2½	.....	.....	.....
				Arithmetic	3¾	3¾	.....	.....
				English	3¾	3¾	.....	.....
				Free-hand drawing	1½	1½	.....	.....
				Industrial geography	2½	1½	.....	.....
				Mechanical drawing	3¾	3¾	.....	.....
				Business forms	.....	1½	.....	.....
				Elementary mechanics	.....	2½	.....	.....
				Industrial history, civics	.....	2¼	.....	.....
NEW YORK.								
Albany—Vocational School (*day school*):								
Cabinetmaking	2	38	53	Arithmetic	3¾	3¾	.....	.....
				Drafting	5	5	.....	.....
				English	3¾	3¾	.....	.....
				Geography	2½	1½	.....	.....
				History and civil government	1½	2¼	.....	.....
				Study periods	3¾	3¾	.....	.....
Sewing[4]	2	38	26	Arithmetic	3¾	3¾	.....	.....
				Drawing	[5]	[5]	.....	.....
				English	3¾	3¾	.....	.....
				Geography	2½	1½	.....	.....
				History and civil government	1½	2¼	.....	.....
				Study periods	3¾	3¾	.....	.....
Brooklyn—Brooklyn Evening Technical and Trade School (*evening school*):								
Blacksmithing	[7] 2	([8])	16	Mathematics, mechanical drawing, and blue-print reading	[5]	[5]	.....	.....
Cabinetmaking	[7] 2	([8])	25					
Carpentry and joinery	[7] 2	([8])	28					
Machinists	[7] 2	([8])	60					
Pattern making	[7] 2	([8])	20					
Plumbing	[7] 2	([8])	92					

[1] Estimated; given in connection with shop practice.
[2] Woodworking first year, metal working second year.
[3] Including 2½ hours for recess, deducted at irregular times from class periods.
[4] Pupils are also required to take cooking course.
[5] Given in connection with shop practice.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
4	4	8	6	2	8	.....	.....	.....	.....	.....	.....
[1] 1	3	4	[1] 1	3	4	.....	.....	.....	.....	.....	.....
[3] 20¼	9¾	[3] 30	[3] 20¼	9¾	[3] 30	.....	.....	.....	.....	.....	.....
20	10	30	20	10	30	.....	.....	.....	.....	.....	.....
15	[6] 15	30	15	[6] 15	30	.....	.....	.....	.....	.....	.....
([5])	[9] 8	8	([5])	[9] 8	8	.....	.....	.....	.....	.....	.....

[6] Including hours given to drawing; also includes 7½ hours given to cooking.
[7] Nominal length; few remain for entire course.
[8] 120 evenings.
[9] Including hours given to theory.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
NEW YORK—continued.								
Brooklyn—Brooklyn Evening Technical and Trade School (*evening school*)—Concluded.								
Dressmaking, advanced	[1] 2	([2])	70					
Dressmaking, elementary	[1] 2	([2])	70	Designing; Mathematics	([3])	([3])	.....	.....
Millinery, advanced	[1] 2	([2])	35					
Millinery, elementary	[1] 2	([2])	30					
Electrical installation	[1] 2	([2])	31	Elementary physics	([3])	([3])	.....	.....
Steam engineering	[1] 2	([2])	20	Mathematics	([3])	([3])	.....	.....
Printing	[1] 2	([2])	28	None	.....	.....	.....	.....
Buffalo—Seneca Vocational School (*day school*):								
				Arithmetic	2 11/12			
				Bookkeeping	1 3/4			
Cabinetmaking	2	40	17	Electricity	7 1/2			
Carpentry	2	40	17	English	1 2/3	([6])	.....	.....
Electrical work	2	40	6	Lectures at irregular intervals.	([5])			
Printing	2	40	10	Spelling	5/12			
Buffalo—Technical Evening High School (*evening school*):								
				Drawing	1 1/3	1 1/3	.....	.....
Carpentry and joinery	2	26	24	Mathematics	2/3	2/3	.....	.....
				Chemistry	2/3	2/3	2/3	.....
				Drawing	2/3	2/3	2/3	.....
Electrical work	3	26	12	Mathematics	1 1/3	1 1/3	1 1/3	1 1/3
				Physics	1 1/3	1 1/3	1 1/3	.....
				Drawing	1 1/3	.....	.....	.....
Forging	1	26	20	Mathematics	2/3	.....	.....	.....
				Study of metals	2/3	.....	.....	.....
				Mathematics	2/3	2/3	2/3	.....
Gas engineering	3	26	30	Mechanics	1 1/3	1 1/3	1 1/3	.....
				Physics	1 1/3	1 1/3	1 1/3	.....
				Rough drawing	2/3	2/3	2/3	.....
Machine-shop practice	1	26	28	Drawing	1 1/3	.....	.....	.....
				Mathematics	2/3	.....	.....	.....
Pattern making	2	26	24	Drawing	2/3	2/3	.....	.....
				Mathematics	2	2	.....	.....
				Drawing	2/3	2/3	.....	.....
Plumbing	2	26	60	Mathematics	2	2	.....	.....
				Mechanics	1 1/3	1 1/3	.....	.....
Gloversville—Vocational School (*day school*):								
				Regular school studies:				
				Seventh grade pupils	22 1/2	([8])	.....	.....
Glove making	[7] 2	40	60	Eighth grade pupils	18 3/4	([8])	.....	.....
				High school pupils	15	([8])	.....	.....
Hudson—Industrial School (*day school*):								
				Arithmetic	4 1/6	([6])	.....	.....
				English	3 1/3	([6])	.....	.....
				Geography	2 1/12	([6])	.....	.....
Woodworking	2	40	16	History and civics	5/6	([6])	.....	.....
				Spelling	2 1/12	([6])	.....	.....
				Morning exercises and intermissions.	2 1/12	([6])	.....	.....

[1] Nominal length; few remain for entire course.
[2] 120 evenings.
[3] Given in connection with practice.
[4] Including hours given to theory.
[5] Included in hours given to other subjects.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
(3)	[4] 8	8	(3)	[4] 8	8	.....	.....	.....	.....	.....	.....
(3)	[4] 8	8	(3)	[4] 8	8	.....	.....	.....	.....	.....	.....
.....	8	8	.....	8	8	.....	.....	.....	.....	.....	.....
$14\frac{1}{4}$	$13\frac{1}{4}$	$27\frac{1}{2}$	(6)	(6)	(6)	.....	.....	.....	.....	.....	.....
2	4	6	2	4	6	.....	.....	.....	.....	.....	.....
4	2	6	4	2	6	4	2	6	.....	.....	.....
$2\frac{2}{3}$	$3\frac{1}{3}$	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	2	6	4	2	6	4	2	6	.....	.....	.....
2	4	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
$2\frac{2}{3}$	$3\frac{1}{3}$	6	$2\frac{2}{3}$	$3\frac{1}{3}$	6	.....	.....	.....	.....	.....	.....
4	2	6	4	2	6	.....	.....	.....	.....	.....	.....
$22\frac{1}{2}$	$3\frac{3}{4}$	$26\frac{1}{4}$	(8)	(8)	(8)	.....	.....	.....	.....	.....	.....
$18\frac{3}{4}$	$7\frac{1}{2}$	$26\frac{1}{4}$	(8)	(8)	(8)	.....	.....	.....	.....	.....	.....
15	$11\frac{1}{4}$	$26\frac{1}{4}$	(8)	(8)	(8)	.....	.....	.....	.....	.....	.....
$14\frac{7}{13}$	$12\frac{1}{13}$	$26\frac{2}{3}$	(6)	(6)	(6)	.....	.....	.....	.....	.....	.....

[6] Course not yet formulated.
[7] It is hoped to make the course a 4-years course; there is also an evening school with enrollment of 30 open 5 evenings per week for 10 weeks, 2 hours each evening, for practice work only.
[8] Time depends upon academic grade as shown in column for first year.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK—continued.								
Iroquois—Thomas Indian School (Indian—*day school*):								
				Agriculture	2½	2½	2½	2½
				Civics	3	3	3	3
Carpentry, joinery, and cabinetmaking.	4	40	10	Drawing	1¼	1¼	1¼	1¼
				Geography	3	3	3	3
Painting	4	40	10	History	3	3	3	3
Steam fitting	4	40	5	Mathematics	1¼	1¼	1¼	1¼
				Reading	3	3	3	3
				Writing	3	3	3	3
				Agriculture	1¼	1¼	1¼	1¼
				Civics	3	3	3	3
				Drawing	1¼	1¼	1¼	1¼
Laundering [1]	4	40	20	Geography	3	3	3	3
Sewing [1]	4	40	25	History	3	3	3	3
				Household science	1¼	1¼	1¼	1¼
				Mathematics	1¼	1¼	1¼	1¼
				Reading	3	3	3	3
				Writing	3	3	3	3
Lancaster—Industrial Department, Lancaster Public Schools (*day school*):								
				Regular school studies and drawing:				
Woodworking	2	40	28	Seventh and eighth grade pupils.	20½	20½	.....	.....
				High school pupils	19	19	.....	.....
Long Island City—Long Island City Evening High and Trade School (*evening school*):								
				Mechanical drawing	(4)	.....	.....	.....
Blacksmithing	1	(3)	30	Reading of plans	(4)	.....	.....	.....
				Shop mathematics	(4)	.....	.....	.....
				Mechanical drawing	(4)	(4)	(4)	.....
Cabinetmaking, wood turning, and carpentry.	3	(3)	22	Reading of plans	(4)	(4)	(4)	.....
				Shop mathematics	(4)	(4)	(4)	.....
Dressmaking, advanced	2	(3)	104	Measurements and designing.	(4)	(4)	.....	.....
Millinery	2	(3)	40					
Electrical wiring	1	(3)	26	Applied physics	(4)	.....	.....	.....
				Mechanical drawing	(4)	(4)	(4)	.....
Machine-shop practice	1–3	(3)	56	Reading of plans	(4)	(4)	(4)	.....
				Shop mathematics	(4)	(4)	(4)	.....
Plumbing	1	(3)	39	Mathematics and sanitation.	(4)	.....	.....	.....
New York—Industrial Evening School (mostly Negro—*evening school*):								
Carpentry	(6)	(7)	10					
Dressmaking and sewing	(6)	(7)	138					
Electrical wiring	(6)	(7)	24					
Embroidering	(6)	(7)	43	Theory of trade	(4)	.....	.....	.....
Flower making, artificial	(6)	(7)	24					
Janitorial work [8]	(6)	(7)	19					
Millinery	(6)	(7)	64					

[1] Cooking is taken concurrently.
[2] Including hours given to cooking.
[3] 120 evenings.
[4] Given in connection with shop practice.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
20	20	40	20	20	40	20	20	40	20	20	40
20	[2] 20	40	20	[2] 20	40	20	[2] 20	40	20	[2] 20	40
20½	7	27½	20½	7	27½	.....	.....	.....	.....	.....	.....
19	8½	27½	19½	8½	27½	.....	.....	.....	.....	.....	.....
([4])	[5] 8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
([4])	[5] 8	8	([4])	[5] 8	8	([4])	[5] 8	8	.....	.....	.....
([4])	[5] 8	8	([4])	[5] 8	8	.....	.....	.....	.....	.....	.....
([4])	[5] 8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
([4])	[5] 8	8	([4])	[5] 8	8	([4])	[5] 8	8	.....	.....	.....
([4])	[5] 8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
([4])	[5] 8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....

[5] Including hours given to theory.
[6] Indefinite.
[7] 85 to 100 evenings.
[8] Includes care of elevator and incidental repairs on building and equipment.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
NEW YORK—continued.								
New York—Manhattan Trade School for Girls (*day school*):								
Dressmaking	1 to 1½	48	163	Arithmetic, Civics, English, Textiles	[1] 4½ / [2] 3			
Millinery		48	23					
Novelty and sample mounting.	½ to [illegible]	48	29					
Power sewing machine operating.	⅔ to 1	48	54	Drawing [3]	[1] 3 / [2] 4½			
				General exercises	1¼			
				Health exercises	1			
New York—Stuyvesant Evening Trade School (*evening school*):								
Blacksmithing	[7] 3	([8])	23	Mathematics, Mechanical drawing and reading blue prints.	([9])	([9])	([9])	
Cabinetmaking	[7] 3	([8])	14					
Carpentry	[7] 3	([8])	35					
Machinists	[7] 3	([8])	27					
Pattern making	[7] 3	([8])	20					
Electrical machine operating.	[7] 3	([8])	44	Elementary physics, Mathematics	([9])	([9])	([9])	
Electrical wiring and installation.	[7] 2	([8])	61	Elementary physics, Mathematics	([9])	([9])		
Plumbing	[7] 2	([8])	55	Mathematics, Mechanical drawing and reading blue prints.	([9])	([9])		
Stationary engineers	[7] 1	([8])	22	Elementary physics, Mathematics, Mathematics, Mechanical drawing and reading blue prints.	([9])			
Wood turning	[7] 1	([8])	13					
New York—Vocational School for Boys (*day school*):								
Bookbinding	2	46	18	Bookkeeping, Chemistry and physics, Commercial law, English, Geography, industrial and commercial, Industrial history and civics, Trade mathematics	[11] 15	[11] 15		
Carpentry	2	46	37					
Composition and presswork	2	46	34					
Electrical wiring	2	46	117					
Forging and machine-shop practice.	2	46	66					
Pattern making	2	46	15					
Plumbing	2	46	15					
New York—Washington Irving High School (*day school*):								
Bookbinding	[12] 2	38	16	Elocution, English, French, German, Latin, or Spanish, Music, Physical training, Study periods	¾ / 3¾ / 3¾ / ¾ / 1½ / 1½	¾ / 3¾ / 3¾ / ¾ / 1½ / 1½		
Dressmaking and embroidering.	[12] 2	38	173					

[1] Eighth grade and below.
[2] Above eighth grade; academic work may be dropped as soon as pupils are deemed sufficiently proficient.
[3] Pupils having no talent for drawing may drop it.
[4] 2½ hours during July and August, academic work being omitted.
[5] 22¾ hours during July and August.
[6] 25 hours during July and August.
[7] Nominal length; few remain for entire course.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[4] 9¾	[5] 25¼	[6] 35	.....	.....	.....	.....	.....	.....	.....	.....	.....
[9]	[10] 8	8	[9]	[10] 8	8	[9]	[10] 8	8	.....	.....	.....
[9]	[10] 8	8	[9]	[10] 8	8	[9]	[10] 8	8	.....	.....	.....
[9]	[10] 8	8	[9]	[10] 8	8	.....	.....	.....	.....	.....	.....
[9]	[10] 8	8	[9]	[10] 8	8	.....	.....	.....	.....	.....	.....
[9]	[10] 8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
[9]	[10] 8	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
[11] 15	[11] 20	35	[11] 15	[11] 20	35	.....	.....	.....	.....	.....	.....
12	14¼	26¼	10½	15¾	26¼	.....	.....	.....	.....	.....	.....

[8] 120 evenings.
[9] Given in connection with shop practice.
[10] Including hours given to theory.
[11] Average; instruction largely individual.
[12] As an entrance requirement to the industrial classes, one year's work in this school is required in subjects here shown, and also in mathematics, drawing, and domestic science.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK—continued.								
Rochester—School of Domestic Science and Domestic Art (*day school*):								
				Arithmetic	3¾	3¾	.....	.....
				Designing	3	3	.....	.....
				English	2½	2½	.....	.....
Dressmaking[1]	2	40	27	Hygiene	1	1	.....	.....
Millinery[1]	2	40	14	Industrial geography and history.	1½	1½	.....	.....
				Spelling	1¼	1¼	.....	.....
Rochester—Shop School (Lexington Avenue—*day school*):								
				Civics and industrial history.	1¼	1¼	.....	.....
Cabinetmaking	2	40	32	Drawing	5	5	.....	.....
Carpentry	2	40	24	English	3⅓	3⅓	.....	.....
Electrical work	2	40	38	Shop mathematics	4⅙	4⅙	.....	.....
Plumbing	2	40	18	Spelling	1¼	1¼	.....	.....
Rochester—Shop School (Washington School—*day school*):								
				Civics and industrial history.	1¼	.....	.....	.....
				Drawing	5	.....	.....	.....
				English	3⅓	.....	.....	.....
Woodworking	(4)	40	42	Shop mathematics	4⅙	.....	.....	.....
				Spelling	1¼	.....	.....	.....
Schenectady—Industrial School (*day school*):								
				Arithmetic	3⅓	(5)	.....	.....
				Drafting	5	(5)	.....	.....
				Elements of bookkeeping.	⅚	(5)	.....	.....
Woodworking and cabinetmaking.	2	38	42	English	2 1/12	(5)	.....	.....
				Geography	2½	(5)	.....	.....
				History and civics	2 11/12	(5)	.....	.....
				Spelling	1¼	(5)	.....	.....
Syracuse—Syracuse Technical High School (*day school*):								
				Physiology	¾	.....	.....	.....
				Mathematics	5¼	3¾	3¾	.....
				English	5¼	3¾	2¼	2¼
Cabinetmaking and joinery.[7]				Physical science	.....	3¾	5¼	.....
Machine-shop practice[7]	7 4	40	99	American history and civics.	.....	.....	.....	5¼
Pattern making and wood turning.[7]				Bookkeeping, chemistry, economics and commercial law, or mathematics.	.....	.....	.....	3¾
				Mechanical drawing	(8)	(8)	(8)	(8)
				Arithmetic and algebra.	3¾	.....	.....	.....
				Biologic science	3¾	.....	.....	.....
				English	3¾	2¼	2¼	3¾
				Physical geography	.....	5¼	.....	.....
Dressmaking	10 4	40	93	Bookkeeping, history, modern languages, or physics.	.....	3¾	3¾	3¾
Millinery				Applied chemistry	.....	.....	5¼	.....
				American history and civics.	.....	.....	.....	3¾

[1] Cooking taken concurrently.
[2] Including hours given to opening exercises, etc.
[3] Including 5½ hours devoted to cooking.
[4] Indefinite; when ready, pupils are promoted to Lexington Avenue shop school.
[5] Course not yet formulated.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[2] 13½	[3] 16½	[2] 30	[2] 13½	[3] 16½	[2] 30	.....	.....	.....	.....	.....	.....
15	15	30	15	15	30	.....	.....	.....	.....	.....	.....
15	12½	27½	.....	.....	.....	.....	.....	.....	.....	.....	.....
[6] 20	10	[6] 30	(5)	(5)	(5)	.....	.....	.....	.....	.....	.....
11¼	[9] 11¼	22½	11¼	[9] 11¼	22½	11¼	[9] 11¼	22½	11¼	[9] 11¼	22½
11¼	11¼	22½	11¼	11¼	22½	11¼	11¼	22½	11¼	11¼	22½

[6] Including hours given to study periods and opening exercises.
[7] Instruction is common to all these trades the first 3 years, after which pupils specialize in one trade.
[8] Given in connection with shop practice.
[9] Including mechanical drawing, given in connection with shop practice.
[10] Beginning with plain sewing and specializing in third and fourth years.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK—concluded.								
Yonkers—Trade School of Yonkers:								
Day school—								
Machine-shop practice and forging.	2	40	29	Algebra	3¾	3¾	.....	.....
				Civics	3¾	3¾	.....	.....
				English	3¾	3¾	.....	.....
Pattern making	2	40	17	Industrial geography	3¾	3¾	.....	.....
				Mechanical drawing	3¾	3¾	.....	.....
Evening school—								
Blacksmithing	(1)	(2)	36	None	.....	.....	.....	.....
Cabinetmaking	(1)	(2)	13					
Carpentry	(1)	(2)	12					
Machine-shop practice	(1)	(2)	30					
Pattern making	(1)	(2)	29					
Plumbing	(1)	(2)	54					
Yonkers—Yonkers Vocational School (*day school*):								
Carpentry	2	40	40	Regular seventh and eighth grade studies.	15	15	.....	.....
Sewing [3]	2	40	42					
OHIO.								
Cincinnati—Cincinnati Continuation School (*day cooperative school* [5]):								
				Geographic relations of shop materials.	¾	.....	.....	.....
				Making and reading of drawings.	1½	.....	.....	.....
				Reading, spelling, and writing.	¾	.....	.....	.....
				Shop arithmetic	¾	.....	.....	.....
				Physical culture	¼	¼	¼	¼
				Composition and reading.	.....	¾	.....	.....
				Iron, its manufacturing and founding.	.....	¾	.....	.....
Electrical work	4	48	10	Objective geometry	.....	¾	.....	.....
Machinists	4	48	175	Theory of shop practice.	.....	1½	.....	.....
Pattern making	4	48	25					
				Algebra	.....	.....	¾	.....
				Foreman's question box.	.....	.....	1½	.....
				History of trade, literature, civics.	.....	.....	¾	.....
				Physics	.....	.....	¾	¾
				Shop sense of proportion.	.....	.....	.....	1½
				Debating: "The man, a wage earner and voter."	.....	.....	.....	¾
				Trigonometry	.....	.....	.....	¾
Cincinnati—Cincinnati Evening School [6] (*evening school*):								
Millinery	2	(7)	200	(8)	.....	.....	.....	.....

[1] Not yet determined.
[2] 60 evenings.
[3] Pupils are also required to take the course in cooking.
[4] For sewing, includes 7½ hours given to cooking.
[5] Pupils get practice work in shop of cooperating establishment where employed; see pages 202 and 203.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
$18\frac{3}{4}$	$11\frac{1}{4}$	30	$18\frac{3}{4}$	$11\frac{1}{4}$	30	.....	.....	.....	.....	.....	.....
.....	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
15	[4] 15	30	15	[4] 15	30	.....	.....	.....	.....	.....	.....
4	([5])	4	4	([5])	4	4	([5])	4	4	([5])	4
([8])	[9] 4	4	([8])	[9] 4	4	.....	.....	.....	.....	.....	.....

[6] Held in several localities.
[7] 100 evenings.
[8] Theory taught in connection with shop practice.
[9] Including hours given to theory of trade.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—**PUBLIC SCHOOLS**—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
OHIO—concluded.								
Cleveland—Elementary Industrial School (*day school*):								
Industrial course, including cabinetwork, copper and brass work, and printing.[1]	(2)	38	100	English	3⅔	.....	.....	.....
				Geography, history	3⅓	.....	.....	.....
				Lectures, blackboard illustrations, etc.	3	.....	.....	.....
				Mathematics	3¾	.....	.....	.....
Sewing[3]	(2)	38	50	Mechanical and free-hand drawing.	(4)	.....	.....	.....
				Physiology	¾	.....	.....	.....
Cleveland—Technical High School (*evening school*):								
Cabinetmaking	2	20	15	Notes and blackboard illustrations applicable to each trade.	1⅓	1⅓	.....	.....
Machine-shop practice	2	20	46					
Millinery	2	20	20					
Pattern making	2	20	30					
Pottery making	2	20	16					
Sewing	2	20	35					
Sheet-metal pattern working.	2	20	30					
Columbus—Columbus Trades School:								
Day school—								
Printing	2	40	15	Civil government, History (including history of printing, etc.), Language and composition, Mathematics, Reading (includes different kinds of copy, headings, etc.), Spelling	9½	(6)	.....	.....
				Mechanical drawing	3½	(6)	.....	.....
Woodworking (including pattern making, wood turning, joinery, carpentry, cabinetmaking, and millwork)	2	40	60	Architecture, etc., Civil government, History (including history of trades), Language, Mathematics, Reading, Spelling	5½	(6)	.....	.....
				Mechanical drawing	4	(6)	.....	.....
Evening school—								
Pattern making	2	28	40	None	.....	.....	.....	.....
Wood turning	2	28	17					
Dayton—High Industrial School (*evening school*):								
Cabinetmaking	(7)	26	14	None	.....	.....	.....	.....
Pattern making	(7)	26	17					
Forging	(7)	26	17	....do	.....	.....	.....	.....
Machinists	(7)	26	89					

[1] First year of course; expect to specialize in these and other trades later on.
[2] Not yet determined.
[3] Cooking taken concurrently.
[4] Given in connection with shop practice.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
15	[5] 15	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
1⅓	2⅔	4	1⅓	2⅔	4	.....	.....	.....	.....	.....	.....
13	12	25	([6])	([6])	([6])	.....	.....	.....	.....	.....	.....
9½	15½	25	([6])	([6])	([6])	.....	.....	.....	.....	.....	.....
.....	10	10	.....	10	10	.....	.....	.....	.....	.....	.....
.....	4	4	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....

[5] For sewing includes hours given to cooking, for all trades includes hours given to mechanical and free-hand drawing.
[6] Not reported.
[7] Indefinite.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week. 1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA.								
Altoona—High School (*day school*):								
				German, or Greek and Roman history.	3¾	.....	.....	.....
				Algebra	3¾	3¾	.....	.....
				English	3¾	3¾	3¾	3¾
Industrial course—				Mechanical drawing	3	3	3	3
First year, cabinetmaking and machine-shop practice.				German, or medieval history.	.....	3¾	3¾	.....
Second year, pattern making and foundry work.	4	36	51	Physical geography and botany.	.....	3¾	.....	.....
Third year, blacksmithing.				Chemistry	.....	.....	3¾	.....
Fourth year, machine-shop practice.				Plane geometry, or English history.	.....	.....	3¾	.....
				Physics	.....	.....	.....	3¾
				Solid geometry and trigonometry, or United States history.	.....	.....	.....	3¾
				Study periods	3¾	.....	.....	3¾
Carlisle—United States Indian School (Indian—*day school*):								
Baking	(4)	40	6					
Blacksmithing	(4)	40	17					
Bricklaying and plastering	(4)	40	9					
Carpentry and cabinetmaking	(4)	40	39					
Carriage making and trimming and upholstering	(4)	40	4					
Harness making	(4)	40	15					
Laundering	(4)	40	24					
Painting, house and carriage	(4)	40	19	Academic (course depends on age and advancement of pupils).	15	.....	.....	.....
Plumbing and steam fitting	(4)	40	18					
Printing	(4)	40	42					
Sewing and dressmaking	(4)	40	53					
Shoemaking	(4)	40	8					
Stationary engineers	(4)	40	5					
Tailoring	(4)	40	28					
Tinsmithing	(4)	40	5					
Philadelphia—Philadelphia Trades School (*day school*):								
				American literature	1	.....	.....	.....
				Industrial history	2	.....	.....	.....
				Mensuration and algebra.	[5]5	.....	.....	.....
				Algebra	[6]5	[5]5	.....	.....
				Grammar	2	[5]2	.....	.....
				Physics	4	[5]4	.....	.....
				Drawing[7]	6	6	4	.....
				Electricity	.....	[6]2	.....	.....
				Plane geometry	.....	[6]5	.....	.....
Carpentry	3	42	11	Chemistry	.....	[6]2	[5]2	.....
Pattern making	3	42	11	Economics	.....	2	[6]2	.....
Printing	3	42	13	English literature	.....	1	[6]1	.....
				Rhetoric	.....	[6]2	[5]2	.....
				Bookkeeping	.....	.....	[6]2	.....
				Civics	.....	.....	[6]2	.....
				Commercial law	.....	.....	[5]2	.....
				Literature	.....	.....	[5]1	.....
				Plane and solid geometry.	.....	.....	[5]5	.....
				Strength of materials	.....	.....	[5]2 [6]4	.....
				Trigonometry	.....	.....	[6]3	.....

[1] Practice work equally divided between cabinetmaking and machine-shop practice; pupils often avail themselves of the opportunity to work overtime in shop practice.

[2] Practice work equally divided between pattern making and foundry work; pupils often avail themselves of the opportunity to work overtime in shop practice.

[3] Pupils often avail themselves of the opportunity to work overtime in shop practice.

[4] Indefinite.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
18	[1] 4½	22½	18	[2] 4½	22½	18	[3] 4½	22½	18	[3] 4½	22½
15	24	39	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	10	30	20	10	30	[8] 18 [9] 14	[8] 12 [9] 16	[8] 30 [9] 30	.....	.....	.....

[5] First half of year.
[6] Second half of year.
[7] Carpenters take architectural and pattern making mechanical drawing; printers do not take drawing in third year, but use the time in shop work.
[8] All trades but printing.
[9] Printing.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—continued.								
Philadelphia—Philadelphia Trades School (*day school*)—Concluded.								
				American literature	1	.....	.....	.....
				Industrial history	2	.....	.....	.....
				Mensuration and algebra.	[1] 5	.....	.....	.....
				Algebra	[2] 5	[1] 5	.....	.....
				Electricity	[2] 2	[1] 3	.....	.....
				Grammar	2	[1] 2	.....	.....
				Physics	[1] 4 [2] 2	[1] 2	.....	.....
				Mechanical drawing	6	.....	4	.....
				Architectural drawing	.....	[1] 6	.....	.....
				Economics	.....	2	.....	.....
				English literature	.....	1	.....	.....
Electrical construction	3	42	107	Free-hand drawing	.....	[2] 6	.....	.....
				Plane geometry	.....	[2] 5	.....	.....
				Chemistry	.....	[2] 2	[1] 2	.....
				Electricity and magnetism.	.....	[2] 3	[1] 3 [2] 5	.....
				Rhetoric	.....	[2] 2	[1] 2	.....
				Bookkeeping	.....	.....	[2] 2	.....
				Civics	.....	.....	[2] 2	.....
				Commercial law	.....	.....	2	.....
				Literature	.....	.....	1	.....
				Plane and solid geometry.	.....	.....	[1] 5	.....
				Trigonometry	.....	.....	[2] 3	.....
Philadelphia—Evening Trades School No. 1 (*evening school*):								
Bricklaying	3	25	10	Theory subjects, elective:				
Carpentry	3	25	23	When theory is not taken.	.....	.....	.....	.....
Electrical construction	3	25	146	When theory is taken:				
Painting, house and sign	3	25	14	Drawing [5]	[6] 5	[6] 5	[6] 5	.....
Pattern making	3	25	19	Mathematics [7]	[8] 2½	[8] 2½	[8] 2½	.....
Plastering	3	25	12	Lectures	.....	[9] 2½	[9] 2½	.....
Printing	3	25	42	Mechanical drawing [10]	.....	([10])	([10])	.....
Sheet-metal working	3	25	41					
Plumbing	3	25	98					
Philadelphia—Evening Trades School No. 2 (*evening school*):								
Bricklaying	3	25	9					
Carpentry	3	25	26	Drawing, elective:				
Electrical construction	3	25	39	When drawing is not taken.	.....	.....	.....	.....
Painting, house and sign	3	25	10	When drawing is taken.	([11])	([11])	([11])	.....
Pattern making	3	25	19					
Plastering	3	25	9					
Plumbing	3	25	18					
Steam and hot-water heating	1	25	17	Drawing, elective:				
				When drawing is not taken.	.....	.....	.....	.....
				When drawing is taken.	([11])	.....	.....	.....

[1] First half of year.
[2] Second half of year.
[3] For bricklaying, plastering, pattern making, and house and sign painting.
[4] Average: 6 one week and 4 following week for all trades except bricklaying, plastering, pattern making and house and sign painting.
[5] Architectural for carpenters, mechanical for others.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.

First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
20	10	30	21	9	30	19	11	30	.....	.....	.....
.....	[3] 6 [4] 5	[3] 6 [4] 5	.....	[3] 6 [4] 5	[3] 6 [4] 5	.....	[3] 6 [4] 5	[3] 6 [4] 5	.....	.....	.....
[6] 5 [8] 2½	[6] 5 [8] 2½	[6] 10 5	[6] 5 [8] 2½	[6] 5 [8] 2½	[6] 10 5	[6] 5 [8] 2½	[6] 5 [8] 2½	[6] 10 5			
.....	5	5	[9] 2½	[9] 2½	5	[9] 2½	[9] 2½	5	.....	.....	.....
.....	10	10	.....	10	10	.....	10	10	.....	.....	.....
[11]	[11]	10	[11]	[11]	10	[11]	[11]	10			
.....	10	10	.....	.....	.....	.....	.....	.....	.....	.....	.....
[11]	[11]	10	.....	.....	.....	.....	.....	.....	.....	.....	.....

[6] For electrical construction.
[7] Time divided between drawing and mathematics or given wholly to either.
[8] Average: 3 one week and 2 following week for all trades except electrical construction.
[9] Average: 3 one week and 2 following week, less time devoted to mechanical drawing.
[10] Elective; taken irregularly, time deducted from lectures.
[11] Drawing and shop practice alternated to suit individual needs.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—concluded.								
Scotland—Soldiers' Orphans Industrial School (*day school*):								
Baking	(1)	43	23	Regular academic grade work.	15	.....	.....	.....
Cobbling	(1)	43	7					
Dressmaking	(1)	43	75					
Machinists	(1)	43	54					
Printing	(1)	43	33					
Stationary engineers	(1)	43	11					
Tailoring	(1)	43	92					
Woodworking	(1)	43	48					
RHODE ISLAND.								
Providence—Evening Technical School (*evening school*):								
Blacksmithing	1	(2)	18	Drawing	4	.....	.....	.....
				Free-hand sketching				
				Lectures on forming, tempering, and welding.				
				Mathematics of trade				
				Physics				
				Strength and character of materials.				
				Theory of shop practice				
Dressmaking and millinery	1	(2)	21	Drafting patterns	⅔	.....	.....	.....
				Lectures on designing				
				Lectures on dressmaking and millinery.	1⅓	.....	.....	.....
				Study of materials and review of garment work.	(3)	.....	.....	.....
Electrical wiring	1	(2)	25	Lectures on applied electricity, batteries.	4	.....	.....	.....
				Making and reading working plans for wiring, installing, and insulation.				
				Mathematics of trade				
				Physics				
				Principles of electrical machinery.				
Jewelry making	1	(2)	13	Free-hand sketching and geometrical diagrams.	4	.....	.....	.....
				Lectures on designing				
				Theory of shop practice				
Machinists	1	(2)	22	Free-hand sketching	3	.....	.....	.....
				Making and reading working drawings.				
				Mathematics of trade	1	.....	.....	.....
				Lectures on mechanics, physics, and theory of shop practice.	(3)	.....	.....	.....
Pattern making	1	(2)	22	Making and reading working drawings.	3	.....	.....	.....
				Mathematics of trade	1	.....	.....	.....
				Lectures on mechanics and theory of shop practice, physics, and geometrical problems.	(3)	.....	.....	.....

[1] Indefinite; pupils must leave school when 18 years of age.
[2] Not to exceed 20; 1909–10 only about 17.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
15	15	30	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	4	6	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....

[3] Incidental.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
RHODE ISLAND—concluded.								
Providence Evening Technical School (*evening school*)—Concluded.								
Plumbing	1	(1)	20	Drainage systems, Hydraulics, Lectures, Mathematics of trade, Names and uses of tools, Physics, Pneumatics, Reading of working plans, Sanitation sketching, Theory of practice	4	.....	.....	.....
Silversmithing	1	(1)	20	Drawing, Lectures on designing, soldering, enameling, and brazing, Mathematics of trade, Theory of shop practice	4	.....	.....	.....
Steam engineering	1	(1)	6	Computations, Drawing, Lectures on action and power of steam, Mathematics of trade, Physics	4	.....	.....	.....
Providence—Technical High School (*day cooperative school*): [2]								
Machinists	4	(3)	32	Current events	3 1/3	.....	[4] 1 2/3	.....
				Physics	3 1/3	3 1/3	3 1/3	.....
				Drawing	[5] 5	3 1/3	[5] 5	3 1/3
				English	[4] 1 2/3	3 1/3	3 1/3	3 1/3
				Mathematics	3 1/3	3 1/3	[5] 5	3 1/3
				American history	.....	3 1/3	.....	.....
				Chemistry	.....	3 1/3	.....	3 1/3
				Mechanism	.....	3 1/3	[4] 1 2/3	3 1/3
				Industrial history	.....	.....	3 1/3	.....
				Commercial business	.....	.....	.....	3 1/3
				Electricity	.....	.....	.....	3 1/3
				Bookkeeping and commercial geography. [6]	.....	.....	.....	.....
WISCONSIN.								
Milwaukee—Milwaukee School of Trades for Boys: *Day school*—								
Carpentry and woodworking	2	50	12	Shop algebra	[9] 20	.....	.....	.....
				Shop arithmetic	[9] 20	.....	.....	.....
				Mechanical drawing [10]	[9] 300	[9] 300	.....	.....
				Shop geometry	[9] 10	[9] 10	.....	.....
				Shop lectures	[9] 25	[9] 25	.....	.....
Machinists and toolmaking	2	50	24	Visits to establishment shops	[9] 24	[9] 24	.....	.....
Pattern making	2	50	26	Applied mechanics and materials of construction	.....	[9] 20	.....	.....
				Shop trigonometry	.....	[9] 20	.....	.....

[1] Not to exceed 20; 1909–10 only about 17.
[2] After first year pupils get practice work in shop of cooperating establishment where employed; see note [3], also see page 193.
[3] First year, 40 weeks in school; second, third, and fourth years, 20 weeks in school, with alternate weeks in cooperating shop.
[4] Average, 2 periods one week and 3 periods following week, of 40 minutes each period.
[5] Average, 7 periods one week and 8 periods following week, of 40 minutes each period.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	4	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
$16\frac{2}{3}$	[7] $6\frac{2}{3}$	$23\frac{1}{3}$	[8] $23\frac{1}{3}$	([2])	[8] $23\frac{1}{3}$	[8] $23\frac{1}{3}$	([2])	[8] $23\frac{1}{3}$	[8] $23\frac{1}{3}$	([2])	[8] $23\frac{1}{3}$
[11] 8	[11] 36	44	[11] 8	[11] 36	44	.....	.....	.....	.....	.....	.....

[6] Given incidentally.
[7] Shop practice in school and confined to forging and carpentry by agreement with manufacturers.
[8] See note [3].
[9] Per year.
[10] Carpentry and woodworking pupils take architectural instead of mechanical drawing.
[11] Average.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED

B.—PUBLIC SCHOOLS—Concluded.

Locality, name and kind of school, and trades or vocations taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
WISCONSIN—concluded.								
Milwaukee—Milwaukee School of Trades for Boys—Concluded.								
Day school—Concluded.								
Plumbing and gas fitting	1	50	14	Mechanical drawing	[1] 300	.....	.....	.....
				Shop arithmetic	[1] 20	.....	.....	.....
				Shop geometry	[1] 10	.....	.....	.....
				Shop lectures	[1] 50	.....	.....	.....
				Visits to establishment shops	[1] 24	.....	.....	.....
Evening school—								
Carpentry and woodworking	([3])	30	24	Applied mechanics and materials of construction.	2	.....	.....	.....
				Mechanical drawing[4]				
Machinists and toolmaking	([3])	30	41	Shop algebra				
Pattern making	([3])	30	17	Shop arithmetic				
				Shop geometry				
				Shop lectures				
				Shop trigonometry				
Plumbing and gas fitting	([3])	30	9	Mechanical drawing	2	.....	.....	.....
				Shop arithmetic				
				Shop geometry				
				Shop lectures				
Milwaukee—Milwaukee School of Trades for Girls (*day school*):								
Dressmaking[5]	([6])	50	47	Applied art and design.	3	.....	.....	.....
Millinery[5]	([6])	50	43	Arithmetic	3	.....	.....	.....
				Civics and industrial history.				
				English				
				Physical training	1¼	.....	.....	.....
Platteville—Wisconsin State Mining Trade School (*day school*):								
Mining	2	38	23	Advanced arithmetic	[8] 1⅝	.....	.....	.....
				Algebra	[8] 3⅔ / [9] 2¾	.....	.....	.....
				Chemistry	[9] 3⅔	.....	.....	.....
				Physics	[8] 2¾ / [9] 1⅝	.....	.....	.....
				Plane geometry	[8] 4 1/7	.....	.....	.....
				Plane trigonometry	[9] 2¾	.....	.....	.....
				Solid geometry	[9] 3⅔	.....	.....	.....
				Elementary mechanics	.....	[8] 1⅝	.....	.....
				General geology	.....	[8] 3⅔	.....	.....
				Mechanics of materials	.....	[8] 2¾	.....	.....
				Metallurgy	.....	[9] 2¾	.....	.....
				Mining economics	.....	[9] 1 1/7	.....	.....
				Mining geology	.....	[9] 2¾	.....	.....
				Mining machinery	.....	[8] 1⅝ / [9] 3⅔	.....	.....
				Mining methods	.....	[9] 2¾	.....	.....
				Surveying	.....	[8] 1⅝	.....	.....
				Study periods	[8] 11½ / [9] 9⅓	[8] 11 1/12 / [9] 10⅝	.....	.....
				Hygiene and first aid to injured.	([10])	([10])	.....	.....
				Mining lectures	([10])	([10])	.....	.....

[1] Per year.
[2] Average.
[3] Indefinite.
[4] Carpentry and woodworking pupils take architectural instead of mechanical drawing.
[5] Cooking taken concurrently.
[6] Not yet determined.

TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Concluded.

Hours per week given to theory and other schoolroom work and to practice.											
First year.			Second year.			Third year.			Fourth year.		
Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.	Theory and other schoolroom work.	Practice.	Total.
[2] 8	36	44	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	6	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	6	8	.....	.....	.....	.....	.....	.....	.....	.....	.....
[7] 7¼	[7] 24¾	[7] 32	.....	.....	.....	.....	.....	.....	.....	.....	.....
[11] 24	16	[11] 40	[11] 23	17	[11] 40	.....	.....	.....	.....	.....	.....

[7] Not including hours given to cooking.
[8] First half of year.
[9] Second half of year.
[10] Given in 20 evening lectures of 1 hour each during the winter, in addition to time shown on this table.
[11] Not including time given to evening lectures on hygiene and first aid to injured, and to mining lectures during year.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

C.—APPRENTICESHIP SCHOOLS.

[In apprenticeship schools pupils get practice work in the shops of employers. In day schools pupils are excused from work to attend classes. See page 145 et seq.]

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
Central R. R. of New Jersey, Elizabethport, N. J. (*day school*):								
Blacksmithing	4	40 to 42	2	Mechanical drawing	1⅔	1⅔	1⅔	1⅔
Boiler making	4	40 to 42	4	Elementary mechanics	⅓	⅓	⅓	⅓
Carpentry	4	40 to 42	4					
Electrical work	4	40 to 42	1					
Machinists	4	40 to 42	47					
Pattern making	4	40 to 42	2	Total time	2	2	2	2
Chicago Great Western Rwy., Oelwein, Iowa (*day school*):								
Blacksmithing	4	52	4					
Boiler making	4	52	14					
Coach carpentry	4	52	3					
Electrical work	4	52	2					
Machinists	4	52	54	Mechanical drawing or arithmetic, algebra, and geometry.	1	1	1	1
Painting	4	52	2					
Pattern making	4	52	1					
Steam fitting	4	52	1					
Tinsmithing	4	52	1					
Woodworking	4	52	4					
Upholstering	4	52	2					
Delaware & Hudson Co., (3 localities [1]—*day schools*):								
Blacksmithing	4	52	5					
Boiler making	4	52	12					
Car building	4	52	2	Mechanical drawing	5	5	5	5
Machinists	4	52	74	Shop mathematics				
Painting	4	52	3					
Tinsmithing	4	52	3					
Delaware, Lackawanna & Western R. R. (school operated by Y. M. C. A.; 3 localities [2]—*day schools*):								
Blacksmithing	4	44	8					
Boiler making	4	44	37					
Cabinetmaking	4	44	2					
Carpentry	4	44	1					
Machinists	4	44	205	Mechanical drawing [3]	2¼	2¼	2¼	2¼
Molding	4	44	15	Shop mathematics [3]	¾	¾	¾	¾
Painting	4	44	20					
Pattern making	4	44	5	Total time [4]	3	3	3	3
Pipe fitting	4	44	1					
Tinsmithing	4	44	3					
Upholstering	4	44	1					
Erie R. R. (5 localities [5]—*day schools*):								
Blacksmithing	[6] 4	40	7					
Boiler making	[6] 4	40	37					
Car building, freight	[6] 4	40	6					
Carpentry	[6] 4	40	2					
Electrical work	[6] 4	40	1	Mechanical drawing	4	4	4	4
Machinists	[6] 4	40	181	Shop arithmetic				
Molding	[6] 4	40	7					
Pattern making	[6] 4	40	9					
Pipe fitting	[6] 4	40	5					
Tinsmithing	[6] 4	40	7					
Grand Trunk Rwy., Battle Creek, Mich. (*evening school*):								
Boiler making	4	36	1					
Electrical work	4	36	2	Mechanical drawing	4	4	4	[7] 4
Machinists	5	36	67	Shop arithmetic				
Pattern making	4	36	1					

[1] For localities and trades taught in each locality, see page 164.
[2] For localities and trades taught in each locality, see page 163.
[3] Spelling, reading, and letter writing given incidentally.
[4] Boys are also required to do 3 hours of home work.
[5] For localities and trades taught in each locality, see page 160.
[6] Pupils, if able, are permitted to complete course in 3 years, and many do so.
[7] Fifth year for machinists is same as fourth year.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

C.—APPRENTICESHIP SCHOOLS—Continued.

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
New York Central Lines, (9 localities [1]—*day schools*):								
Blacksmithing	4	48	19					
Boiler making	4	48	79					
Cabinetmaking	4	48	9					
Car building	4	48	16					
Carpentry	4	48	4	Mechanical drawing [2]	3	3	3	3
Electrical work	4	48	15	Shop mathematics [2]	1	1	1	1
Machinists	4	48	310	Total time	4	4	4	4
Molding	4	48	4					
Painting	4	48	10					
Plating	4	48	1					
Upholstering	4	48	2					
Brass-smithing	3	48	1					
Coppersmithing	3	48	1					
Mill hands (machine woodworkers)	3	48	2	Mechanical drawing [2]	3	3	3	.....
Pattern making	3	48	10	Shop mathematics [2]	1	1	1	.....
Pipe fitting	3	48	3	Total time	4	4	4	.....
Tin and copper smithing	3	48	1					
Tinsmithing	3	48	15					
Trade not reported	([3])	48	78					
				First group: [4]				
				Algebra	[5] 1	.....	.....	.....
				Arithmetic	[6] 1	.....	.....	.....
				English	[6] 1	.....	.....	.....
				Physics	[5] 1	[6] 1	.....	.....
				Mechanical drawing.	2	2	[6] 2	.....
				Geometry	.....	[6] 1	.....	.....
				Mechanism	.....	[5] 1	.....	.....
				Mechanics	.....	[5] 1	[6] 1	.....
Pennsylvania R. R., Altoona, Pa. (*day school*):				Chemistry	.....	.....	[6] 1	.....
				Machine design	.....	.....	[5] 2	.....
Blacksmithing	3	42	3	Steam practice	.....	.....	[5] 1	.....
Boiler making	3	42	6	Strength of materials.	.....	.....	[5] 1	.....
Car building	3	42	7					
Electrical repairing	3	42	6					
Machinists	3	42	170	Total time	4	4	4	.....
Molding	3	42	8					
Painting	3	42	1	Second group: [7]				
Pattern making	3	42	7	Algebra	[6] 1	.....	.....	.....
Pipe fitting	3	42	5	Geometry	[5] 1	.....	.....	.....
Plumbing	3	42	1	Physics	1	.....	.....	.....
Tinsmithing	3	42	4	Mechanical drawing.	2	2	.....	.....
				Mechanics	.....	1	.....	.....
				Mechanism	.....	[6] 1	.....	.....
				Strength of materials.	.....	[5] 1	.....	.....
				Chemistry	.....	.....	[6] 1	.....
				Experimental tests	.....	.....	[5] 2	.....
				Machine design	.....	.....	[6] 2	.....
				Shop management	.....	.....	[5] 1	.....
				Steam practice	.....	.....	1	.....
				Total time	4	4	4	.....

[1] For localities and trades taught in each locality, see pages 149 and 150.
[2] In several shops incidental instruction is given in spelling and letter writing, and in some shops some home study is required.
[3] Not reported.
[4] For boys of lower educational qualifications.
[5] For second half of year.
[6] For first half of year.
[7] For boys of higher educational qualifications.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

C.—APPRENTICESHIP SCHOOLS—Continued.

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
Santa Fe System (24 localities[1]—*day schools*):								
Blacksmithing	4	52	16					
Boiler making	4	52	53					
Brass finishing	4	52	6					
Coach carpentry and cabinet making.	4	52	37	Mechanical drawing[2]	[3] 2⅔	[3] 2⅔	[3] 2⅔	[3] 2⅔
Electrical work	4	52	3	Shop mathematics[2]	[3] 1⅓	[3] 1⅓	[3] 1⅓	[3] 1⅓
Machinists	4	52	395	Total time	4	4	4	4
Painting	4	52	17					
Pattern making	4	52	4					
Tinsmithing and pipefitting	4	52	33					
Upholstering	4	52	3					
Union Pacific R. R., Omaha, Nebr. (*evening school*):								
Blacksmithing	3	26	4					
Boiler making	3	26	3					
Cabinetmaking	3	26	3					
Carpentry	3	26	2					
Coach carpentry	3	26	8	Arithmetic[4]	2	.....	.....	.....
Electrical work	3	26	4	Elementary mechanics	.....	2	.....	.....
Machinists	3	26	47	Mechanical drawing	.....	.....	4	.....
Painting	3	26	3	Total time	2	2	4	.....
Pattern making	3	26	1					
Silver plating	3	26	2					
Steam fitting	3	26	3					
Tinsmithing	3	26	2					
Upholstering	3	26	2					
CONNECTICUT.								
Bridgeport—Metal-trades employers (operated by Y. M. C. A.—*day school*):								
				Mechanical drawing and free-hand sketching.	3	1½	.....	.....
Machinists	2	([5])	25	Shop mathematics	3	4½	.....	.....
Tool making	2	([5])	21	Total time	6	6	.....	.....
Stamford—Yale & Towne Manufacturing Co. (*day school*):								
				Trade mathematics	3	3	.....	.....
Chasing	4	35	1	Lectures and mechanical drawing.	3	3	3	3
Electroplating	4	35	1	Mechanics and theory of shop practice.	.....	.....	3	3
Die making	4	35	3	Total time	6	6	6	6
Pattern making	4	35	3					
Tool making	4	35	45					
ILLINOIS.								
Chicago—International Harvester Co. (*day school*):								
Machinists	4	52	50	Shop mathematics	2	2	2	

[1] For localities and trades taught in each locality, see page 155.
[2] Spelling, business letter writing, and elements of mechanics and physics are taught incidentally.
[3] Usual time; apportionment of time is varied to meet needs of pupils.
[4] Not required of boys who had finished eighth grade prior to becoming apprentices; they may devote the time to mechanics.
[5] School year consists of 210 hours.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

C.—APPRENTICESHIP SCHOOLS—Continued.

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
ILLINOIS—concluded.								
Chicago—Lakeside Press, Pre-apprentice (*day school*):								
Compositors	2	52	60	Algebra	1½	.....	.....	.....
				Applied arithmetic	1½	.....	.....	.....
				Bookkeeping	[1] 1½	.....	.....	.....
				Elementary science (physiography).	[1] 1½	.....	.....	.....
				English (technical) / Technical instruction	[1] 4⅛	[1] 4⅛	.....	.....
				Applied arithmetic / Bookkeeping / Plane geometry	.....	[1] 2⅝	.....	.....
				Elementary electricity. / Physiography	.....	[1] 1½	.....	.....
				Elementary mechanics.	.....	1½	.....	.....
				Total time	[2] 9¾	[2] 9¾	.....	.....
Chicago—Lakeside Press (*evening school*):								
Printing	5	30	48	Applied drawing	1	1	1	[3] 1
				Applied mathematics	1½	1½	1½	[3] 1½
				Total time	2½	2½	2½	[3] 2½
Chicago—Western Electric Co. (*day school*):								
Pattern making	3	43 or 44	11	Applied arithmetic	2	.....	.....	.....
Tool making	3	43 or 44	25	Geometrical drawing	2	.....	.....	.....
				Algebra	.....	1	.....	.....
				Plane geometry	.....	1	.....	.....
				Mechanical drawing	.....	2	1	.....
				Total time	4	4	1	.....
MASSACHUSETTS.								
Boston—North End Union School of Printing (*day school*):								
Printing	[4] 1	50	15	Theory of trade [5]	.....	.....	.....	.....
Ludlow—Ludlow Manufacturing Co. (*day school*):								
Occupations in manufacture of jute and hemp yarns, twines, and webbing, and jute bagging.	4	47	30	Arithmetic	3¾	.....	.....	([6])
				Geography	[7] 3¾	.....	.....	([6])
				Drawing	3	3	.....	([6])
				English	[7] 3¾	[7] 3¾	[7] 3¾	([6])
				History	2¼	[7] 3¾	[7] 3¾	([6])
				Physics	.....	2¼	.....	([6])
				Algebra	.....	3¾	3	([6])
				Mechanics	.....	.....	2¼	([6])
				Mill arithmetic	.....	.....	3¾	([6])
				Total time	[8] 10½	[8] 10½	[8] 10½	([6])

[1] Average.
[2] Average; alternate weeks 8¾ and 10¾, pupils being divided into two groups.
[3] Fifth year same as fourth year.
[4] A five years' apprenticeship, the first year of which is spent in this school.
[5] Given in connection with practice work, which covers 48 hours per week; in addition fortnightly lectures are given on printing and allied topics; leaflets on printing are furnished pupils.
[6] Course not yet formulated.
[7] May take both studies noted [7] in this column or may devote double time to either.
[8] In addition pupils receive 4½ hours of manual training.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

C.—APPRENTICESHIP SCHOOLS—Continued.

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—continued.								
Quincy—Fore River Shipbuilding Co. (*day school*):								
Blacksmithing	4	30	7	Free-hand drawing	[1] 2	.....	.....	.....
Coppersmithing	4	30	5	Mechanical drawing	[1] 2	.....	.....	.....
Electrical work	4	30	7	Mechanics	[1] 2	.....	.....	.....
Joinery	4	30	33	Practical arithmetic	[1] 2	.....	.....	.....
Machinists	4	30	63	Practical geometry	[1] 2	.....	.....	.....
Machinists, outside	4	30	9	Strength of materials	[1] 2	.....	.....	.....
Pattern making	4	30	4	Lectures on difficult points arising in shop work.	.....	1	1	1
Plumbing and steam fitting	4	30	8					
Sheet-metal working	4	30	6					
Ship fitters	4	30	2					
Shipwrighting	4	30	3	Total time	4	1	1	1
Chipping and calking	2	30	6	Free-hand drawing	[1] 2	.....	.....	.....
				Mechanical drawing	[1] 2	.....	.....	.....
				Mechanics	[1] 2	.....	.....	.....
				Practical arithmetic	[1] 2	.....	.....	.....
				Practical geometry	[1] 2	.....	.....	.....
				Strength of materials	[1] 2	.....	.....	.....
				Lectures on difficult points arising in shop work.	.....	1	.....	.....
				Total time	4	1	.....	.....
West Lynn—General Electric Co. (*day school*):								
				Algebra and arithmetic	[4] 6½	.....	.....	.....
				English	[5] 1¼	.....	.....	.....
				Free-hand drawing	[6] 1	.....	.....	.....
				Geometry	[6] 5½	.....	.....	.....
				Materials of construction.	[7] 1	.....	.....	.....
Instrument making	3	42	[2] 210	Shop talks	[7] 1	[4] 1	[8] 1	.....
Machinists	3	42	([3])	Mechanical drawing	.....	2	.....	.....
Tool and die making	3	42	([3])	Mechanics	.....	[7] 3	.....	.....
				Power transmission	.....	[6] 4	.....	.....
				Trigonometry	.....	[5] 4½	.....	.....
				Electricity	.....	.....	[6] 2	.....
				Jigs and fixtures	.....	.....	[4] 4	.....
				Machine parts	.....	.....	[7] 3	.....
				Strength of materials	.....	.....	[5] 4	.....
				Total time:				
				First term	7½	7½	8	.....
				Second term	8¼	6	8	.....
				Third term	6½	6	3	.....

[1] Each pupil takes two subjects in one week, covering all subjects during year.
[2] Including machinists, tool and die making, pattern making, molding, and steam fitting.
[3] Included with instrument making.
[4] For first and second terms, 28 weeks.
[5] For first term, 14 weeks.
[6] For third term, 14 weeks.
[7] For second term, 14 weeks.
[8] For second and third terms, 28 weeks.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

C.—APPRENTICESHIP SCHOOLS—Continued.

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
MASSACHUSETTS—concluded.								
West Lynn—General Electric Co. (*day school*)—Concluded.								
				Algebra and arithmetic	[2] 6½	.....	.....	.....
				English	[3] 1¼	.....	.....	.....
				Free-hand drawing	[4] 1	.....	.....	.....
Molding (brass, iron, and steel).	1⅔	42	(1)	Materials of construction.	[5] 1	.....	.....	.....
Steam fitting	1⅔	42	(1)	Mensuration	[4] 5½	.....	.....	.....
				Shop talks	[6] 1	.....	.....	.....
				Mechanical drawing	.....	[2] 3	.....	.....
				Total time:				
				First term	7½	3	.....	.....
				Second term	8¼	3	.....	.....
				Third term	7½	.....	.....	.....
				Algebra and arithmetic	[2] 6½	.....	.....	.....
				English	[3] 1¼	.....	.....	.....
				Free-hand drawing	[4] 1	.....	.....	.....
				Geometry	[4] 5½	.....	.....	.....
				Materials of construction.	[5] 1	.....	.....	.....
Pattern making	2⅔	42	(1)	Shop talks	[5] 1	[2] 1	[5] 1	.....
				Mechanics	.....	[5] 3	.....	.....
				Power transmission	.....	[4] 4	.....	.....
				Trigonometry	.....	[3] 4½	.....	.....
				Mechanical drawing	.....	2	[2] 4	.....
				Total time:				
				First term	7½	7½	4	.....
				Second term	8¼	6	5	.....
				Third term	6½	6	.....	.....
				Algebra	[2] 3	.....	.....	.....
				Chemistry	[4] 1½	.....	.....	.....
				Descriptive geometry	[6] 1½	.....	.....	.....
				Elements of physics	[2] 1½	.....	.....	.....
				Trigonometry	[2] 3	.....	.....	.....
				Mechanics	[2] 3	[2] 3	.....	.....
Testing	2⅔	42	(7)	Hydraulics	.....	[6] 3	.....	.....
				Mechanism	.....	[6] 3	.....	.....
				Dynamics of machines	.....	.....	[5] 3	.....
				Steam engine design	.....	.....	[5] 3	.....
				Strength of materials	.....	.....	[3] 3	.....
				Thermodynamics	.....	.....	[2] 1½	.....
				Valve gears	.....	.....	[3] 3	.....
				Total time:				
				First term	7½	3	7½	.....
				Second term	12	9	7½	.....
				Third term	6	6	.....	.....
MICHIGAN.								
Detroit—Cadillac Motor Car Co. (*day school*):								
Machinists	2	52	75	Free-hand sketching, Plan reading, Shop arithmetic	1	1	.....	.....

[1] Included with instrument making.
[2] For first and second terms, 28 weeks.
[3] For first term, 14 weeks.
[4] For third term, 14 weeks.
[5] For second term, 14 weeks.
[6] For second and third terms, 28 weeks.
[7] Not reported.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Continued.

C.—APPRENTICESHIP SCHOOLS—Continued.

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
NEW YORK.								
Dunkirk—American Locomotive Co. (*evening school*):								
Blacksmithing	4	34	4					
Boiler making	4	34	12					
Brass finishing	4	34	2					
Carpentry	4	34	4					
Core making	4	34	5					
Electrical work	4	34	5					
Machinists	4	34	45	Shop drawing	2	(1)	(1)	(1)
Molding	4	34	7	Shop mathematics				
Painting	4	34	1					
Pattern making	4	34	10					
Pipe fitting	4	34	2					
Tank making	4	34	2					
Tin and copper smithing	4	34	2					
New York—R. Hoe & Co. (*evening school*):								
Carpentry and millwrighting	3½	34	3	Arithmetic	4¼	2⅝	2⅝	.....
Machinists	3½	34	214	English				
Molding and general foundry work.	3½	34	5	Geometry Mechanics	.....			
Pattern making	3½	34	10	Drawing	.....	1⅝	1⅝	.....
Saw making	3½	34	4	Drawing, mechanical and free hand.	.....	.....	.....	2⅝
				Total time	4¼	4¼	4¼	2⅝
Schenectady—General Electric Co. (*day school*):								
Blacksmithing	4	48	3					
Machinists	4	48	247	Shop drawing	1⅓	1⅓	1⅓	1⅓
Molding (iron and brass)	4	48	55	Shop mathematics	2⅓	2⅓	2⅓	2⅓
Pattern making	4	48	28					
Tinsmithing	4	48	3	Total time	3½	3½	3½	3½
Solvay—Solvay Process Co. (*day school*):								
General mechanics, including elements of the following trades: Blacksmithing, carpentry, machinists, plumbing, steam fitting, and sheet metal working.	2	52	30	Free-hand drawing	6	6	.....	.....
				Mathematics	6	6	.....	.....
				Mechanics and equipment.	6	6	.....	.....
				Preparation of report	6	6	.....	.....
				Strength of materials	6	6	.....	.....
				Total time	[2] 30	[2] 30	.....	.....
PENNSYLVANIA.								
East Pittsburg—Westinghouse Electric & Manufacturing Co. (*day school*):								
Armature winding	4	52	5	Mechanical drawing	2	2	(1)	(1)
Electrical machinists	4	52	30	Shop problems	2	2	(1)	(1)
Machinists	4	52	176					
Pattern making	4	52	15	Total time	4	4	(1)	(1)
Philadelphia—George V. Cresson Co. (*day school*):								
Machinists	2	30	22	Arithmetic	2	2	.....	.....
Molding (iron)	2	30	7	Mechanical drawing	4	4	.....	.....
Millwrighting	2	30	1					
Pattern making	2	30	7	Total time	6	6	.....	.....

[1] Course not yet formulated.

[2] Alternate weeks.

TABLE I.—TRADES AND SUBJECTS TAUGHT AND TIME DEVOTED TO SCHOOLROOM WORK AND TO PRACTICE—Concluded.

C.—APPRENTICESHIP SCHOOLS—Concluded.

Locality, name and kind of school, and trades taught.	Years in course.	Weeks school was in operation during year.	Number of pupils.	Course of study, exclusive of practice, for pupils in each trade or vocation, and time devoted to each subject in each year.				
				Subject.	Hours per week.			
					1st year.	2d year.	3d year.	4th year.
PENNSYLVANIA—concluded.								
Wilmerding—Westinghouse Air Brake Co. (school operated by Y. M. C. A.—*day school*):								
				Advanced arithmetic	1 1/2	.....	.....	.....
				Algebra	1 5/6	1 5/6	.....	.....
				Business English	1 1/2	1 1/2	1 1/2	.....
				Mechanical drawing	2 5/12	2 5/12	2 5/12	.....
				Shop mathematics	1 1/2	1 1/2	1 1/2	1 1/2
				Physics	.....	1 1/2	1 1/2	.....
Machinists	4	40	25	Geometry	.....	.....	1 1/2	.....
Pattern making	4	40	2	Trigonometry	.....	.....	1 1/2	.....
				Analytical geometry	.....	.....	1 1/2	1 1/2
				Analytical mechanics	.....	.....	.....	1 5/6
				Calculus	.....	.....	.....	1 1/2
				Electrical engineering	.....	.....	.....	1 5/6
				Total time	[1] 7	[1] 7	[1] 7 1/2	[1] 6 5/12
RHODE ISLAND.								
Providence—Brown & Sharpe Manufacturing Co. (*day school*):								
Blacksmithing	3	44	2	Algebraic formula, Geometry, Making and reading working drawings, Physics, Theory of shop practice, Trigonometry	2	2	4	.....
Machinists	4	44	110	Algebraic formula, Geometry, Making and reading working drawings, Physics, Theory of shop practice, Trigonometry	2	2	4	4
Pattern making	4	44	6					

[1] Not including time occupied en route to and from classes.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE.

The first column gives locality, name and kind of school, and trade or vocation taught by teacher. The various types and classes of schools are defined and described in Chapter I.

The second column shows the experience the teacher of practice has had in the actual commercial practice of the trade. Those who have had experience in a closely allied trade are also given credit for it as if in the trade named. For instance, a blacksmith, if he had also learned the machinist's trade and worked at it, has been given credit for such trade practice in stating the length of his experience.

The third column shows the extent of experience the teacher has had in teaching the practice of the occupation. Teaching in an allied trade is credited the same as in the preceding column, but the teaching of "Manual training" has not been credited as in the trade-teaching experience.

The fourth column, as its boxhead implies, is used to bring out pertinent data relative to the qualifications of the teachers, and includes only such data as pertains to their preparation or qualification for teaching the practice of the occupation.

This table does not include the apprenticeship schools, because the practice work of the pupils is on the regular productive work of the establishment and is done under establishment supervision.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE.

A.—PHILANTHROPIC SCHOOLS.

[This table is incomplete. Data were not obtained from some schools; in certain schools reporting, data were not obtained for all teachers; and the data for teachers reported are not complete in some instances.]

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In commercial practice of trade.	In teaching practice of trade.	
ALABAMA.			
Snow Hill—Snow Hill Normal and Industrial Institute (Negro—*day school*):			
Blacksmithing	.....	3 years..	Learned trade at Hampton Institute.
Carpentry	¾ year...	6½ years.	Learned trade at Tuskegee Institute.
Tuskegee—Tuskegee Normal and Industrial Institute (Negro—*day school*):			
Basket making, broom making, and upholstering.	.....	9 years..	Took industrial course at Hampton Institute.
Blacksmithing	.....	7 years..	Learned trade at Tuskegee Institute.
Do	.....	4 years..	Do.
Bricklaying	5 years..	5 years..	Do.
Bricklaying and tile setting	.....	1 year...	Learned brick masonry at Tuskegee Institute, and tile setting at Winona Institute.
Carpentry	.....	4 years..	Learned trade at Agricultural and Mechanical College, Greensboro, N. C.
Carpentry and wood turning	.....	12 years.	Learned trade at Hampton Institute.
Carpentry	.....	2 years..	Do.
Do	.....	14 years.	Learned trade at Tuskegee Institute.
Dressmaking	.....	3 years..	
Electrical work	.....	2 years..	Studied electrical engineering at Howard University.
Foundry work	6 years..	4 years..	Learned trade at Tuskegee Institute.
Harness making and carriage trimming	3 years..	6 years..	Learned trade at Tuskegee Institute; author of book on harness making.
Ladies' tailoring	.....	5 years..	Took industrial course at Tuskegee Institute; short course at cutting school in New York.
Laundering	.....	1 year...	Took industrial course at Tuskegee Institute.
Do	.....	7 years..	Do.
Machinists and stationary engineers	5 years..	14 years.	Honorary M. E. degree, author book on steam engineering, and 3-book course of study in machine-shop work.
Millinery	16 years.	8 years..	
Painting	20 years.	1 year...	
Do	5 years..	15 years.	
Plain sewing	.....	4 years..	
Plumbing	2 years..	1 year...	Learned trade at Tuskegee Institute.
Printing	13 years.	2 years..	Learned trade at Clark University.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In commercial practice of trade.	In teaching practice of trade.	
ALABAMA—concluded.			
Tuskegee—Tuskegee Normal and Industrial Institute (Negro—*day school*)—Con.			
Shoemaking	5 years..	3 years..	Learned trade at Hampton Institute; author of books on repairing and care of shoes.
Stationary engineers	.....	4 years..	Learned trade at Tuskegee Institute.
Tailoring	2 years..	2 years..	Do.
Do	.....	3 years..	Learned trade at Tuskegee Institute and had course in cutting and drafting at a tailoring school.
Tinsmithing	10 years.	2 years..	Learned trade at Tuskegee Institute.
Wheelwrighting	15 years.	...do.....	
CALIFORNIA.			
San Francisco—California School of Mechanical Arts (*day school*):			
Forging	8 years..	28 years.	
Machinists	30 years.	2 years..	
Pattern making	6½ years.	8 years..	Took 4-year course in pattern making at California School of Mechanical Arts.
San Francisco—Wilmerding School of Industrial Arts (*day school*):			
Bricklaying	15½ years	6 years..	
Cabinetmaking	30 years.	(1)	
Carpentry	32 years.	10 years.	
Electrical work	22 years.	4 years..	
Plumbing and tinning	17 years.	10½ years	
CONNECTICUT.			
New London—Manual Training and Industrial School of New London (*day school*):			
Dressmaking and millinery	5 years..	6 years..	Author of books on dressmaking and on millinery.
Machinists	.....	21 years.	Author of books on forging, mechanical drawing, wood turning, and machine-shop practice.
Do	.....	1 year...	Studied mechanical engineering 1 year at Massachusetts Institute of Technology.
ILLINOIS.			
Chicago—Chicago Girls' Trade School (*day school*):			
Dressmaking	4 years..	1 year...	
Millinery	10 years.	1½ years.	
Chicago—Lewis Institute (*day cooperative school*):			
Forging and machine-shop practice	(1)	1 year...	Studied engineering 1 year at Armour Institute, completing engineering course at Lewis Institute.
Foundry work	18 years.	4 years..	In charge of a shop for 5 years.
Pattern making	15 years.	19 years.	Author of "Elementary Course in Woodwork;" also author of "Wood Turning."
Glenwood—Illinois Manual Training Farm (*day school*).	.....	.....	All teachers of practice are persons of experience in the work they are teaching. None of them are graduates of any school.
Peoria—Bradley Polytechnic Institute: Horological Department (*day school*):			
Engraving and optics	42 years.	14½ years	
Watchmaking and jewelry making	25 years.	6 years..	
Do	.....	12 years.	Graduate of Bradley Polytechnic Institute: Horological Department.
Do	20 years.	5 years..	
Do	.....	10 years.	Do.

[1] Length of time not reported.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher— In commercial practice of trade.	Experience of teacher— In teaching practice of trade.	Remarks.
INDIANA.			
Indianapolis—National Trade Schools (*day school*):			
Bricklaying	25 years.	(1)	
Lithographing	30 years.	(1)	
Do	25 years.	(1)	
Machinists	8 years.	(1)	
Do	...do....	(1)	
Molding	11 years.	(1)	
Painting and paper hanging	5 years.	(1)	
Pattern making	25 years.	(1)	
Printing	...do....	(1)	
Do	12 years.	(1)	
Printing (linotype)	10 years.	(1)	
Printing (presswork)	20 years.	(1)	
Tile and mantel setting	30 years.	(1)	
MARYLAND.			
Baltimore—Maryland Institute for the Promotion of the Mechanic Arts (*day school*):			
Silversmithing and jewelry making	.....	3 years.	
Do	(1)	8 years.	Author of "Theory of Design and Composition" and "Evolution of Style in Ornament." (Both unpublished.)
MASSACHUSETTS.			
Boston—Franklin Union (*day (Saturday afternoon) and evening schools*):			
Electrical work	22 years.	.....	
Do	7½ years.	½ year.	
Do	1 year.	1 year.	B. S. degree from Massachusetts Institute of Technology.
Do	.....	3 years.	B. S. and E. E. degrees from Worcester Polytechnic Institute.
Do	1 year.	1 year.	Attended Worcester Polytechnic Institute 3½ years.
Do	(1)	...do....	E. E. degree from Worcester Polytechnic Institute.
Gas engineering	(1)	8 years.	B. S. degree from Worcester Polytechnic Institute.
Steam engineering	1 year.	3 years.	B. S. degree from Massachusetts Institute of Technology.
Do	29 years.	1 year.	
Do	23 years.	.....	
Do	25 years.	1 year.	
Do	.....	11 years.	Do.
Do	4 years.	1 year.	Attended Cooper Union 4 years.
Boston—North Bennet Street Industrial School (*evening school*):			
Pottery	3 years.	3 years.	E. M. degree in ceramics, Ohio State University; author of "The Effect of Glaze on a Highly Siliceous Body."
Printing	35 years.	22 years.	
Woodworking and wood turning	8 years.	(1)	
Do	2½ years.	2½ years.	Took 2 years in industrial arts at Columbia University.
MISSOURI.			
St. Louis—David Ranken, Jr., School of Mechanical Trades (*day and evening chools*):			
Bricklaying [2]	37 years.	4 years.	
Carpentry [2]	12 years.	(1)	Learned trade at Williamson Free School of Mechanical Trades.
Painting, house and sign [2]	15 years.	(1)	Learned trade at trade school in Germany.
Plumbing [2]	31 years.	14 years.	Author of work on lead burning (unpublished).
Stationary engineers [3]	8 years.	(1)	
Do. [3]	6 years.	(1)	B. S. degree in electrical engineering, University of Missouri.

[1] Length of time not reported. [2] Teaches in day and evening schools. [3] Teaches in day school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In commercial practice of trade.	In teaching practice of trade.	
NEW YORK.			
Brooklyn—Pratt Institute: School of Household Science and Arts (*day and evening schools*):			
Dressmaking [1]	.....	5 years..	
Do.[1]	3 years..	1 year...	Graduate in domestic arts from Teachers' College, Columbia University.
Do.[1]	6 years..	20 years.	
Do.[1]	2 years..	(2)	
Do.[1]	.....	2 years..	Took 3-year course in domestic arts at Pratt Institute.
Do.[1]	⅙ year...	1 year...	Took 2-year course in dressmaking at Pratt Institute.
Do.[1]	(2)	8 years..	Took 1-year course in dressmaking at Pratt Institute.
Millinery [1]	.....	2 years..	Took 2-year course in domestic arts at Pratt Institute.
Do.[1]	1 year...	12½ years	Took 1-year course in millinery at Pratt Institute; author of "Note Book on Millinery."
Sewing and dressmaking [1]	.....	2 years..	Took 4-year normal domestic arts course at Pratt Institute.
Brooklyn—Pratt Institute; School of Science and Technology (*day and evening schools*):	.....	.....	All of the trade teachers in this school are persons of wide experience in the practice of the trades, but many of them had no teaching experience before coming to Pratt Institute.
New York—Baron de Hirsch Trade School (*day school*):			
Carpentry	10 years.	(2)	
Electrical work	15 years.	(2)	
Do	8 years..	(2)	
Machinists	10 years.	(2)	
Painting	15 years.	(2)	
Plumbing	...do....	(2)	
Do	7 years..	(2)	
New York—Clara de Hirsch Trade School (*day school*):			
Dressmaking	(2)	(2)	
Millinery	(2)	(2)	
Sewing, hand and machine	(2)	(2)	
Do	.....	(2)	Received training in Baron de Hirsch Trade School.
New York—Hebrew Technical Institute (*day and evening schools*):			
Electrical work and electrical construction.[3]	5 years..	(2)	Graduate of Cooper Union.
Instrument making (electrical and scientific).[1]	.....	(2)	Had 15 years' practical experience as an electrical engineer.
Pattern making [1]	12 years.	(2)	
Tool making [1]	26 years.	(2)	Took special technical course in private school.
Wood carving [3]	10 years.	(2)	
Woodworking [3]	14 years.	(2)	
New York—Hebrew Technical School for Girls (*day school*):			
Dressmaking	.....	10 years.	Took normal domestic arts course at Pratt Institute.
Do	5 years..	⅓ year...	Took 1-year course in dress design and pattern drafting at Pratt Institute.
Do	.....	5 years..	
Sewing and embroidering	.....	...do.....	Took 3-year course in fine arts at Teachers' College, Columbia University.
Millinery	20 years.	(2)	
Millinery and sewing	.....	14 years.	Took 2-year course in domestic arts at Pratt Institute.

[1] Teaches in both day and evening schools.
[2] Length of time not reported.
[3] Teaches in day school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher— In commercial practice of trade.	Experience of teacher— In teaching practice of trade.	Remarks.
NEW YORK—continued.			
New York—Henrietta Trade School (*Negro—evening school*):			
Janitorial work	(1)	1 year...	
Millinery	(1)	...do.....	
New York—Italian Evening Trade School (*evening school*):			
Carpentry	12 years.	(1)	Graduate of New York Trade School.
Dressmaking	2 years..	1 year...	
Power sewing machine operating	3 years..	(1)	Do.
Sign painting	.....	.....	Do.
Printing	12 years.	1 year...	
New York—New York Trade School (*day and evening schools*): [2]			
Blacksmithing [3]	20 years.	2 years..	
Bricklaying	25 years.	9 years..	
Carpentry	15 years.	12 years.	
Cornice and skylight work	30 years.	16 years.	
Do	15 years.	8 years..	
Electrical work	23 years.	15 years.	
Do	25 years.	8 years..	
Do	17 years.	7 years..	
Do	14 years.	2 years..	
Do	8 years..	5 years..	
Painting, house and fresco	52 years.	22 years.	Took 2-year course in art school.
Do	15 years.	6 years..	
Painting, sign	10 years.	3 years..	
Do	40 years.	18 years.	
Plastering [3]	30 years.	10 years.	
Pattern making [3]	20 years.	10 years.	
Do [3]	10 years.	7 years..	
Plumbing	40 years.	17 years.	
Do	18 years	11 years.	
Do	28 years.	...do.....	
Do	...do.....	6 years..	
Do	25 years.	19 years.	
Do	30 years.	5 years..	
Printing	43 years.	12 years.	
Do	16 years.	10 years.	
Steam and hot-water fitting	20 years.	12 years.	
Do	10 years.	2 years..	
New York—Pascal Institute (*day school*):			
Dressmaking	.....	11 years.	
Do	(1)	1 year...	Graduate of Pascal Institute.
Plain sewing	.....	10 years.	Took course in plain sewing and millinery at Pratt Institute.
Sewing	2 years..	10 years.	Graduate of Pascal Institute.
New York—Preparatory Trade School (*evening school*):			
Carpentry	20 years.	(1)	
Dressmaking	12 years.	(1)	Took 1-year course in domestic arts at Teachers' College, Columbia University.
Millinery	3 years..	(1)	
Do	7 years..	(1)	
Plumbing	14 years.	(1)	
New York—St. George's Evening Trade School (*evening school*):			
Carpentry	35 years.	5 years..	
Electrical work (inside wiring)	15 years.	4 years..	
Sheet-metal working	18 years.	13 years.	Took 3-year course in elementary architectural work at Cooper Union; 2-year course in sheet-metal work at New York Trade School.

[1] Length of time not reported.
[2] Not all of the teachers of the day school and of the evening school were reported separately.
[3] Teaches in evening school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In commercial practice of trade.	In teaching practice of trade.	
NEW YORK—concluded.			
Rochester—Mechanics' Institute of Rochester (*day and evening schools*):			
Cabinetmaking [1]	17 years.	2 years..	
Dressmaking [2]	10 years.	13 years.	
Do.[2]	.....	4 years..	Took 18-months course in domestic arts at Mechanics' Institute of Rochester.
Do.[1]	1½ years.	8 years..	Took 1-year course in domestic arts at Mechanics' Institute of Rochester.
Electrical work [1]	4 years..	(3)	Took 5-year course in electricity at Lehigh University.
Machinists [1]	12 years.	1 year...	
Millinery [1]	.....	4 years..	Took 2-year course in domestic arts at Mechanics' Institute of Rochester.
Do.[2]	2 years..	5 years..	Took 1-year course in millinery at Mechanics' Institute of Rochester.
Pattern making [2]	13 years.	1 year...	
Tool making [2]	17 years.	4 years..	
OHIO.			
Cincinnati—Jewish Kitchen Garden Association and Trade School for Girls (*day school*):			
Dressmaking	(3)	12 years.	Superintendent of this school for 12 years.
Millinery	(3)	(3)	Taught apprentices in wholesale establishments.
Cincinnati—Ohio Mechanics' Institute (*evening school*):			
Carpentry, foundry work, and pattern making.	19 years.	10 years.	
Machinists	12 years.	8 years..	
Stationary engineers	7 years..	1 year...	B. S. degree, Purdue University.
PENNSYLVANIA.			
Lancaster—Thaddeus Stevens Industrial School of Pennsylvania (*day school*):			
Bricklaying	9 years..	1 year...	Took 4-year course in bricklaying at Williamson Free School of Mechanical Trades.
Machinists	15 years.	...do....	
Pattern making and carpentry	7½ years.	...do....	Took 4-year course in pattern making and carpentry at Williamson Free School of Mechanical Trades.
Philadelphia—Berean Manual Training and Industrial School (Negro—*day and evening schools*):			
Carpentry [2]	27 years.	15 years.	Received mechanical training at Girard College.
Do.[2]	.....	2 years..	
Dressmaking [2]	10 years.	7 years..	Took 4-year course in general dressmaking at Drexel Institute.
Electrical work [2]	3 years..	¼ year...	
Millinery [2]	25 years.	8 years..	
Power machine operating [4]	(3)	(3)	
Sewing and dressmaking [2]	9 years..	8 years..	Took 2-year evening course in dressmaking at Drexel Institute.
Tailoring [2]	29 years.	3 years..	
Philadelphia—Drexel Institute of Art, Science, and Industry (*day and evening schools*):			
Dressmaking [1]	.....	15 years.	Took 1½-year course in dressmaking at Drexel Institute.
Do.[1]	2 years..	17 years.	Took 1-year course in dressmaking at Pratt Institute.
Forging [4]	28 years.	18 years.	

[1] Teaches in both day and evening schools.
[2] Teaches in evening school.
[3] Length of time not reported.
[4] Teaches in day school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In commercial practice of trade.	In teaching practice of trade.	
PENNSYLVANIA—continued.			
Philadelphia—Drexel Inititute of Art, Science, and Industry (*day and evening schools*)—Concluded.			
Machinists [1]	12 years.	16 years.	Author of "Machine Shop Practice."
Machine construction [1]	(2)	5 years.	
Millinery [1]		10 years.	
Do. [1]		8 years.	Took 2-year course in millinery at Drexel Institute.
Millinery [3]	(2)	...do.....	
Pattern making [1]	15 years.	18 years.	Author of manual on joinery, turning, pattern work, and sloyd.
Sewing and dressmaking [1]		17 years.	Took 2-year course in domestic arts at Drexel Institute.
Do. [1]		1 year...	Do.
Sewing and dressmaking and millinery. [3]		19 years.	Took 1-year course in domestic arts at Pratt Institute; author of book, "Lessons in Hand and Machine Sewing."
Sewing and shirtwaist making [1]		1 year...	Took 2-year course in domestic arts at Drexel Institute.
Philadelphia—Girard College (*day school*):			
Blacksmithing	13 years.	10½ years	
Carpentry	20 years.	15 years.	
Electrical work	...do.....	25 years.	Author of "Electrical Diagrams, etc."
Molding and core making	15 years.	4 years.	
Do	10 years.	8 years.	
Machinists	16 years.	17 years.	
Pattern making	38 years.	16 years.	
Plumbing	18 years.	10 years.	
Philadelphia—Hebrew Education Society (*evening school*):			
Cigar making	20 years.	8 years.	
Dressmaking		11 years.	
Garment cutting	20 years.	5 years.	
Millinery	7 years.	6 years.	
Plumbing	35 years.	8 years.	
Power sewing machine operating	4 years.	7 years.	
Sheet-metal working	8 years.	4 years.	
Philadelphia—Spring Garden Institute (*day school*):			
Electrical work	11 years.	12 years.	Took 2-year course in electrical work at Spring Garden Institute.
Do	9 years.	10 years.	
Philadelphia—Temple University (*day and evening schools*):			
Dressmaking	5 years.	27 years.	Took 2-year course at tailoring academy and 1 year at dress-cutting school; superintendent of dressmaking school at Wanamaker Institute for 13 years.
Do		3 years.	Took 2-year course in domestic arts at Drexel Institute, 2-year course in fitting and tailoring in a private school, and 2 years in drafting and cutting at dressmaking school.
Millinery		(2)	Took 2-year course in domestic arts at Pratt Institute.
Pittsburg (Allegheny)—Avery College Training School (Negro—*day school*):			
Dressmaking		3 years.	Took tailoring 1 year at Avery College Training School.
Do	2 years.	12 years.	
Millinery		1 year...	Took 2-year course in millinery at Carnegie Technical Schools: Margaret Morrison Carnegie School.
Tailoring	17 years.	9 years.	Took 5-year course in tailoring school in Paris, France.

[1] Teaches in both day and evening schools.
[2] Length of time not reported.
[3] Teaches in day school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher— In commercial practice of trade.	Experience of teacher— In teaching practice of trade.	Remarks.
PENNSYLVANIA—concluded.			
Pittsburg—Carnegie Technical Schools: Margaret Morrison Carnegie School (*evening school*):			
Dressmaking	15 years.	8 years.	
Do	4 years.	[1]	Took 2 years in normal domestic arts at Drexel Institute.
Do	14 years.	4 years.	Took 1-year course at dress-cutting school.
Millinery	9 years.	7 years.	
Do	17 years.	4 years.	
Sewing	...	...do...	
Pittsburg—Carnegie Technical School: School of Applied Industries [2] (*day and evening schools*):			
Bricklaying [3]	20 years.	5 years.	
Do [3]	18 years.	1 year.	
Electrical wiring [3]	13 years.	...do...	Took 1-year course at private electrical school.
Do. [3]	18½ years	5 years.	
Forging [3]	13 years.	3 years.	
Foundry work [3]	17 years.	...do...	
Machinists [3]	13 years.	...do...	Took 1½ years at Carnegie Technical Schools: School of Applied Industries.
Do. [3]	17½ years	2 years.	
Painting and graining [4]	20 years.	4 years.	
Pattern making [3]	7 years.	4 years.	
Do. [3]	19 years.	6 years.	
Plumbing [3]	28 years.	20 years.	
Do. [4]	31 years.	1 year.	
Do. [4]	27 years.	4 years.	
Sheet-metal working [4]	21 years.	5 years.	
Do. [4]	40 years.	3 years.	
Stationary engineers [5]	1½ years.	...do...	
Williamson School—Williamson Free School of Mechanical Trades (*day school*):			
Bricklaying	19 years.	18 years.	
Carpentry	9½ years.	2½ years.	Foreman carpenter 6 months. Took 3-year course in carpentry at Williamson Free School of Mechanical Trades.
Stationary engineers	...	12 years.	Took 3-year course in engineering at Williamson Free School of Mechanical Trades.
Machinists	1½ years.	¼ year.	Learned trade at Williamson Free School of Mechanical Trades.
Do	8½ years.	[1]	Author of "Shop Talks on Machine Shop Practice."
Pattern making	4 years.	[1]	Took full course in pattern making at Williamson Free School of Mechanical Trades.
RHODE ISLAND.			
Providence—Watchman Industrial School (Negro—*evening school*):			
Dressmaking	25 years.	1 year.	
Printing	...do...	...do...	
Providence—Rhode Island School of Design (*evening school*):			
Jewelry making	30 years.	7 years.	
Loom fixing	17¼ years	...do...	
Machinists	16 years.	5 years.	
Do	18½ years	6 years.	
Do	15 years.	4 years.	
Do	[1]	[1]	Had 6 years' experience as superintendent and manager of a machine shop.
Do	22 years.	5 years.	
Pattern making	16 years.	4 years.	
Silversmithing	23½ years	3 years.	

[1] Length of time not reported.
[2] Formerly School for Apprentices and Journeymen.
[3] Teaches in both day and evening schools.
[4] Teaches in evening school.
[5] Teaches in day school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Concluded.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In commercial practice of trade.	In teaching practice of trade.	
SOUTH CAROLINA.			
Mayesville—Mayesville Industrial and Educational Institute (Negro—*day school*):			
Blacksmithing, wheelwrighting, and horseshoeing.	(1)	4 years..	Graduate of West Virginia State College.
Carpentry	(1)	3 years..	Graduate of Mayesville Institute; took special course at Hampton Institute.
Bricklaying, stonemasonry	(1)	...do.....	Took course at Claflin University.
Dressmaking	(1)	...do.....	Took special course at Cheney Institute.
Tailoring	(1)	6 years..	Took special course at a cutting school.
Orangeburg—Claflin University (Negro—*day school*):			
Blacksmithing	(1)	2 years..	Studied trade at Claflin University.
Bricklaying	(1)	1 year...	Learned trade at Claflin University.
Cabinetmaking	30 years.	8 years..	
Do	7 years..	2 years..	
Dressmaking	.....	(1)	Do.
Painting	.....	2 years..	Learned trade at Hampton Institute.
Printing	.....	9 years..	Learned trade at Tuskegee Institute.
Sewing and millinery	.....	4 years..	
Tailoring	2 years..	.....	Learned trade at Florida Agricultural and Mechanical College.
Wheelwrighting	10 years.	1 year...	
VIRGINIA.			
Hampton—Hampton Normal and Agricultural Institute (Negro and Indian—*day and evening schools*):			
Blacksmithing	21 years.	14 years.	Trade experience in carriage work, horseshoeing, ship smithery, railroad shops.
Blacksmithing (horseshoeing)	8 years..	5 years..	Trade experience in wagon work, horseshoeing, railroad shops.
Bricklaying	3 years..	5 years..	Learned trade at Hampton Institute.
Bricklaying and plastering	26 years.	13 years.	Foreman 7 years, contractor 3 years.
Cabinetmaking	8 years..	6 years..	Learned trade at Hampton Institute.
Carpentry	25 years.	15 years.	Contractor 8 years.
Do	.....	1 year...	Learned trade at Williamson Free School of Mechanical Trades.
Do	3 years..	2 years..	Do.
Do	9 years..	2 years..	Learned trade at Hampton Institute.
Machinists	17 years.	8 years..	Foreman 8 years.
Do	1 year...	1 year...	Learned trade at Hampton Institute.
Painting	16 years.	27 years.	Master painter 4 years.
Painting, carriage	20 years.	1 year...	
Painting, house	21 years.	3 years..	
Plumbing	11 years.	8 years..	Learned steam fitting at Hampton Institute.
Shoemaking	26 years.	1 year...	Proprietor 4 years.
Steamfitting and plumbing	18 years.	8 years..	Proprietor 8 years.
Tailoring	20 years.	12 years.	
Do	9 years..	2 years..	
Tinsmithing	28 years.	10 years.	Contractor 17 years.
Do	12 years.	6 years..	Learned trade at Hampton Institute.
Wheelwrighting	21 years.	13 years.	Proprietor 2 years.
Richmond—Virginia Mechanics' Institute—(*evening school*):			
Blacksmithing and forging	5 years..	(1)	
Cabinetmaking and pattern making	6 years..	(1)	
Machinists	(1)	(1)	

[1] Length of time not reported.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS.

[This table is incomplete. Data were not obtained from some schools; in certain schools reporting, data were not obtained for all teachers; and the data for teachers reported are not complete in some instances.]

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
ARKANSAS.			
Fort Smith—Lincoln High School (Negro—*day school*):			
Carpentry	(1)	13 years.	Took 4-year normal and industrial course at Tuskegee Institute.
CONNECTICUT.			
Bridgeport—State Trade School (*day and evening schools*):			
Carpentry [2]	9 years.	10 years.	Supervised assistant teachers 6 years at Hampton Institute.
Dressmaking [2]	3 years.	1½ years.	Took 1 year in domestic arts at Teachers' College, Columbia University.
Machinists [2]	9½ years.	.....	
Do. [3]	5 years.	.....	
New Britain—State Trade School (*day school*):			
Carpentry and pattern making	12 years.	.....	
Machinists, tool making, and die making.	.....	4 years.	Attended Massachusetts Institute of Technology 2 years.
South Manchester—South Manchester Evening School (*evening school*):			
Carpentry	15 years.	26 years.	
Dressmaking	6 years.	3 years.	
Do.	12 years.	...do.....	
Do.	30 years.	...do.....	
Do.	...do.....	21 years.	
Dressmaking and millinery	26 years.	3 years.	
Waterbury—Waterbury Evening High School (*evening school*):			
Carpentry	15 years.	12 years.	Studied trade 1 year at Columbia University.
Sewing, dressmaking, and millinery	10 years.	2 years.	
Do.	4 years.	5 years.	Took 4 months in domestic arts at Pratt Institute.
DISTRICT OF COLUMBIA.			
Washington—Armstrong Manual Training School (Negro—*day and evening schools*):			
Carpentry and cabinetmaking [2]	23 years.	(1)	Took 3-month course in method of teaching carpentry, at Harvard Summer School, Cambridge, Mass.; contractor and builder, 16 years.
Dressmaking [3]	3 years.	3 years.	
Do. [3]	30 years.	3 years.	Took summer term in domestic arts at Columbia University.
Do. [3]	.....	(1)	
Do. [4]	.....	2 years.	Took short course in costume designing and tailoring at private school.
Dressmaking and tailoring [2]	8 years.	9 years.	Took 2-year course in dressmaking, tailoring, and millinery designing at private schools.
Electrical work and automobile care and management. [2]	2 years.	4 years.	Took 2-year scientific course at Howard University.
Forging, machine-shop work, and steam engineering. [2]	14 years.	(1)	Took 6-year course in trades at private schools.
Joinery, cabinetmaking, wood turning, and pattern making. [2]	(1)	(1)	Took summer course in pattern making at Harvard Summer School, Cambridge, Mass.
Millinery [3]	5 years.	2 years.	Studied millinery at private school.
Do. [2]	.....	9 years.	Took 2 short courses in millinery at private schools.

[1] Length of time not reported.
[2] Teaches in both day and evening schools.
[3] Teaches in evening school.
[4] Teaches in day school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
DISTRICT OF COLUMBIA—concluded.			
Washington—Armstrong Manual Training School (Negro—*day and evening schools*)—Concluded.			
Sewing[1]	.....	(2)	Took 2-month course in millinery and tailoring at private school.
Do.[3]	.....	6 years..	Took 18-month course in needlework at private school, and 6-week course each in plain sewing, costume designing, and dressmaking at New York University, Hampton and Manhattan institutes.
Washington—McKinley Manual Training School (*evening school*):			
Electrical work	.....	(2)	Took 1-year course in physics at Columbian University.
Do	3 years..	3 years..	B. S. degree in electrical engineering at Worcester Polytechnic Institute.
Machine-shop practice	15 years.	2 years..	
Do	19 years.	2 years..	Took 2-year course in machine and tool designing at private school.
Wood turning, cabinetwork	5 years..	2 years..	Took 2-year scientific course at Columbian University and 2-year scientific course at private school.
GEORGIA.			
Columbus—Secondary Industrial School (*day school*):			
Blacksmithing, Carpentry, Forging, Machinists, Pattern making	.....	.....	Graduate industrial course at Secondary Industrial School. Took 1 year in mechanical engineering in Cornell University.
Millinery and dressmaking	.....	2 years..	
Textile occupations	.....	.....	B. S. degree in textile engineering Georgia School of Technology.
ILLINOIS.			
Chicago—Alfred G. Lane Technical High School (*evening school*):			
Blacksmithing and toolsmithing	15 years.	10 years.	Took 1 year at Armour Institute of Technology.
Do	18 years.	2 years..	Took one term at Lewis Institute of Technology.
Cabinetmaking	7 years..	1½ years.	
Do	.....	12 years.	Took course in advanced shopwork at Armour Institute of Technology.
Do	5 years..	1½ years.	
Do	.....	2 years..	Took course in advanced shopwork at Armour Institute of Technology; pattern making, Lewis Institute; engineering, McCormick Harvester Co.
Do	.....	(2)	B. S., degree, Northern Indiana Normal School.
Do	19 years.	.....	Took special course in pattern making at Armour Institute of Technology.
Carpentry	...do.....	1½ years.	
Do	2 years..	(2)	Took short course at Armour and Lewis institutes and University of Chicago; author of "Course in Carpentry for Night Schools."
Foundry work	23 years.	4 years..	Took two evening courses at Armour Institute of Technology; author of "Notes and Formulæ of White Metal Mixture," "Bronze and Brass," and "Composition of Steel," etc.
Machine-shop practice	7 years..	12 years.	Took courses in mechanical engineering and shopwork at Armour Institute of Technology.
Do	10 years.	24 years.	
Do	15 years.	3½ years.	Took 1 year in mechanical engineering at Armour Institute of Technology.

[1] Teaches in evening school.
[2] Length of time not reported.
[3] Teaches in both day and evening schools.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
ILLINOIS—concluded.			
Chicago—Alfred G. Lane Technical High School (*evening school*)—Concluded.			
Machine-shop practice	8½ years.	4 months	
Do	12 years.	2 years.	
Do	11 years.	1 year.	B. S. degree, University of Edinburgh.
Pattern making	6 mos.	12 years.	Took course in advanced shopwork at Armour Institute of Technology.
Electrical work	7½ years.	(1)	B. S. degree, University of Chicago; author of "Philosophy of Science" and "Armature Winding."
Do	11 years.	1 year.	Took 3-year course in electrical engineering in evening classes at Armour Institute of Technology.
Wood turning	25 years.	2 years.	
Chicago—Lake High School (*evening school*):			
Cabinetmaking, Carpentry and joinery, Pattern making, Wood turning	.....	12 years.	B. S. degree, University of Chicago.
	.....	8 years.	Took course at Armour Institute of Technology.
Electrical work	.....	1 year.	B. S. degree, Vanderbilt University.
Elementary woodworking	.....	4 years.	Took evening and summer courses in pattern making and machine design at Armour Institute of Technology.
Forging	27 years.	4 years.	Foreman for 15 years.
Foundry work	9 years.	3 years.	
Machine-shop practice	11 years.	1½ years.	B. S. degree, University of Edinburgh.
Do	12 years.	7 years.	Took courses at Armour and Lewis institutes.
Chicago—Richard T. Crane Technical High School (*evening school*):			
Blacksmithing, tool making, and ornamental forging.	27 years.	4 years.	Attended Armour Institute of Technology 6 weeks; author of "Elementary Forge Work" (to be published).
Do	27 years.	3 years.	Took one term in advanced forge work at Armour Institute of Technology; foreman shipyard 1 year.
Cabinetmaking, Carpentry, Wood finishing, Wood turning	5 years.	27½ years	Author of "High School Manual Training Course in Woodwork."
Machine-shop practice	12 years.	9 years.	Took one term pattern making at Armour Institute.
Do	17 years.	2 years.	
Molding, iron and brass	16 years.	7 years.	Author of "Notes on Composition of Metals."
Pattern making	14½ yrs.	21 years.	Author of "Notes for Shoproom Work."
INDIANA.			
Knightstown—Soldiers' and Sailors' Orphans' Home of Indiana (*day school*):	.....	.....	All teachers of practice are persons of wide experience inthe work they are teaching.
MASSACHUSETTS.			
Boston—Boston School of Printing and Bookbinding[2] (independent[3]—*day school*):			
Bookbinding	5 years.	½ year.	
Printing	17 years.	½ year.	
Boston—Central Evening Industrial School (independent[3]—*evening school*):			
Interior decorating	14 years.	½ year.	Took 3-year course in designing and historic ornament at private school of design.
Do	36 years.	3 years.	Took 5-year course in ornaments and figures in school in Copenhagen; 2-year course in ornaments at trade schools in Vienna.

[1] Length of time not reported.
[2] Formerly called Pre-Apprentice School for Printing and Bookbinding.
[3] For explanation of this term, see page 97.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
MASSACHUSETTS—continued.			
Boston—Central Evening Industrial School (independent[1]—*evening school*)—Concluded.			
Machine-shop practice	27 years.	(2)	
Do	10 years.	22 years.	
Steam engineering	(2)	(2)	B. S. degree, Worcester Polytechnic Institute.
Boston—Girls' Trade School (independent[1]—*day school*):			
Dressmaking	5 years..	1 year...	Took 2-year course in dressmaking, cutting, and drafting at private schools.
Do	7 years..	4 years..	
Millinery	1 year...	2 years..	
Do	5 years..	(2)	
Power sewing machine operating	11 years.	6 years..	
Boston—High School of Practical Arts (*day school*):			
Dressmaking	13 years.	(2)	Took 2-year course in applied design, drafting, and cutting at private school.
Do	5 years..	(2)	
Do	(2)	(2)	Took one summer course in drawing, designing, and dressmaking at private school.
Millinery	(2)	(2)	
Boston—Quincy School (*day school*):			
Elementary metal work (machine-shop bench work).	9 years..	(2)	
Cambridge—Evening Industrial School (independent[1]—*evening school*):			
Forging	12½ years	4 years..	Foreman 4½ years.
Foundry work, woodworking, and pattern making.	9 years..	(2)	
Machine-shop practice	22 years.	(2)	Author of "American Steel Worker," "Toolmaking."
Do	9 years..	(2)	Took 3-year course in mathematics and mechanical engineering at private school.
Chicopee—Chicopee Evening Industrial School (independent[1]—*evening school*):			
Cabinetmaking and pattern making	30 years.	(2)	
Machinists	22 years.	1 year...	Took 3-year course in mechanical drawing and machine design at private school.
Machine-shop practice and forging	20 years.	2 years..	Took 6 weeks' summer course at Columbia University.
Machine-shop practice	9 years..	...do.....	
Chicopee—Chicopee Industrial School (*day school*):			
Cabinetmaking and pattern making	30 years.	(2)	
Machine-shop practice and forging	20 years.	2 years..	Do.
Fall River—Bradford Durfee Textile School of Fall River (independent incorporated[3]—*evening school*):			
Carding and spinning	24½ years	4 years..	
Dyeing	8 years..	7 years..	Took special course in chemistry for 5 years at Tuft's College; author of "Chemistry and Dyeing."
Do	2½ years.	(2)	Took 2-year chemistry and dyeing course in textile school.
Do	(2)	10 years.	Took 3-year course in cotton manufacturing at private school.
Textile mill machinists and steam engineering.	9 years..	6 years..	B. S. degree in mechanical engineering at Worcester Polytechnic Institute; took 1 year in experimental engineering at Cornell University; author of "Boiler Room Machinery, Engine Room Machinery, Machine shop and Drawing, Electricity for Mills."
Mule spinning	18 years.	...do.....	
Weaving and loom fixing	30 years.	11 years.	

[1] For explanation of this term, see page 97.
[2] Length of time not reported.
[3] For explanation of this term, see page 503.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
MASSACHUSETTS—continued.			
Lawrence—Lawrence Industrial School, (independent[1]—*day and evening schools*):			
Dressmaking and millinery[2]	3 years	(3)	Took 2-year course in sewing and millinery at private school; also normal course in sewing.
Electrical work[4]	10 years	1 year	
Pattern making[4]	24 years	(3)	
Textile manufacturing[2]	2 years	1½ years	Took 3-year course in wool manufacturing at private textile school.
Lowell—Lowell Textile School (independent incorporated[5]—*evening school*):			
Cotton manufacturing	3 years	1 year	Attended Lowell Textile School 3 years.
Cotton manufacturing and knitting	(3)	8 years	Do.
Jacquard weaving	17 years	4 years	
Knitting	10 years	1 year	Took 1-year course in framework knitting and hosiery at weaving college in Scotland.
Machine-shop practice	22 years	2 years	
Steam engineering	2 years	(3)	B. S. degree, Massachusetts Institute of Technology.
Weaving	11 years	6 years	Attended Lowell Textile School 3 years.
Do	31 years	14 years	Took 5-year course in textile manufacture at Leeds' University, England. Author of "Textile Design" and "Design Texts."
Do	(3)	4½ years	
Do	(3)	(3)	Attended Lowell Textile School 3 years.
Woolen and worsted yarns	6½ years	12½ years	Attended Massachusetts Institute of Technology 5 years.
Worsted yarns	19 years	8 years	
New Bedford—New Bedford Industrial School (independent[1]—*day and evening schools*):			
Building and woodworking[2]	36 years	1 year	
Dressmaking[6]	9 years	(3)	
Do.[6]	2 years	(3)	
Do.[6]	8 years	(3)	
Do.[6]		(3)	
Carpentry[6]	(3)	1 year	
Machine-shop practice[2]	20 years	(3)	
Millinery[6]	8 years	(3)	
Do.[6]	6½ years		
Do.[6]	8 years	(3)	
Do.[6]	5 years		
Gasoline engineering[6]	10 years	4 years	
Steam engineering[6]	(3)	2 years	
Do.[6]	(3)	1 year	
New Bedford—New Bedford Textile School (independent incorporated[5]—*evening school*):			
Carding, spinning, twisting, and winding.	22 years	6½ years	
Dyeing	9 years	1 year	B. S. degree, Massachusetts Institute of Technology.
Knitting	20 years	8 years	
Weaving and warp preparation	39 years	11 years	Author of "A Practical Treatise on Yarn and Cloth Calculation."
Newton—Newton Industrial School (independent[1]—*day school*):			
Machine-shop practice and electricity	5 years	(3)	Attended Hawley School of Electrical Engineering 1 year.
Pattern making	6 years	3 years	
Woodworking		2 years	Took summer course in pattern making at Massachusetts Institute of Technology.

[1] For explanation of this term, see page 97.
[2] Teaches in both day and evening schools.
[3] Length of time not reported.
[4] Teaches in day school.
[5] For explanation of this term, see page 503.
[6] Teaches in evening school.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
MASSACHUSETTS—concluded.			
Springfield—Evening School of Trades (*evening school*):			
Electrical work	1½ years.	6 years.	B. S. and M. S. degrees, Worcester Polytechnic Institute; author of "Electrical Testing and Plates of Electrical Construction."
Plumbing	9 years.	3 years.	Assistant inspector of plumbing 2 years, Springfield.
Springfield—Springfield Vocational School (*day school*):			
Carpentry, joinery, and pattern making.	21 years.	(1)	
Machine-shop practice	(1)	(1)	
Worcester—Worcester Trade School (independent[2]—*day school*):			
Carpentry	20 years.	(1)	
Machinists	13 years.	(1)	Foreman with a watch tool company 8 years.
Do	40 years.	(1)	Foreman 15 years and superintendent 15 years.
Do	28 years.	(1)	
Pattern making	30 years.	(1)	Took 3-year course in mechanical engineering at Worcester County Free Institute of Industrial Science.
Do	23 years.	½ year.	Foreman 18 years.
MICHIGAN.			
Saginaw (East Side) Trade School (*day school*):			
Machinists	8 years.	6 months	
Do	(1)	(1)	Attended Armour Institute of Technology.
MISSISSIPPI.			
Alcorn—Alcorn Agricultural and Mechanical College (Negro—*day school*):			
Painting	7 years.	11 years.	
Sewing and dressmaking	(1)	2½ years.	Learned trade at Fisk University.
Shoemaking and harness making	33 years.	5 years.	
NEW JERSEY.			
Bordentown—Manual Training and Industrial School (Negro—*day school*):			
Carpentry	11 years.	3 years.	Took 3-year course at Hampton Institute; degree "Professor of Mechanics" from Hampton Institute.
Sewing	6 years.	4 years.	Took 3-year course in drafting, cutting, and fitting in dressmaking school.
Newark—Newark Technical School (*evening school*):			
Electroplating	12½ years	(1)	
Electrical wiring	4 years.	1½ years.	B. S. and E. E. degrees, Columbia College and Columbia University.
Plumbing	18 years.	3 years.	Took 3-year course in architectural drawing school.
Newark—Sara A. Fawcett Drawing School (*evening school*):			
Die sinking	25 years.	2 years.	
Jewelry making	18 years.	14 years.	Took 5-year course in general art and design in artisan institute.
NEW YORK.			
Albany—Vocational School (*day school*)			The trade teachers in this school have had experience in the practice and theory of the trades they are teaching.

[1] Length of time not reported.

[2] For explanation of this term, see page 97.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
NEW YORK—continued.			
Brooklyn—Brooklyn Evening Technical and Trade School (*evening school*):			
Blacksmithing	12 years.	6 years..	
Carpentry and joinery	7 years..	5 years..	Took 2-year course in architecture at Pratt Institute.
Dressmaking	5 years..	...do	Took 1-year course in drafting and costume designing at Pratt Institute.
Do	.....	8 years..	Took special courses in domestic arts at Columbia University.
Electrical installation	20 years.	5 years..	Took 1-year course in mechanical drawing at Pratt Institute.
Machinists	6 years..	(1)	B. S. degree, Massachusetts Institute of Technology.
Millinery	8 years..	8 years..	
Do	(1)	10 years.	Took 4-year millinery course at Pratt Institute.
Pattern making	10 years.	(1)	B. S. degree, Cooper Union.
Plumbing	23 years.	5 years..	Took 1-year course in plumbing at Pratt Institute.
Do	25 years.	...do.....	
Printing	10 years.	3 years..	
Buffalo—Seneca Vocational School (*day school*):			
Cabinetmaking and carpentry	9 years..	1 year...	
Electrical work	.....	2 years..	B. S. degree, Alfred University.
Printing	4½ years.	6 years..	
Buffalo—Technical Evening High School (*evening school*):			
Carpentry and joinery	20 years.	10 years.	
Electrical work	4 years..	4 years..	Took 1 year in mechanical engineering at Pennsylvania State College.
Forging	15 years.	½ year...	
Gas engineering	10 years.	3 years..	
Machine-shop practice	15 years.	2 years..	
Pattern making	10 years.	1 year...	
Plumbing	12 years.	2 years..	
Do	20 years.	4 years..	
Gloversville—Vocational School (*day and evening schools*):			
Glove making[2]	23 years.	(1)	
Hudson—Industrial School (*day school*):			
Woodworking	7 years..	1 year...	
Iroquois—Thomas Indian School (Indian—*day school*):			
Carpentry, joinery, and cabinetmaking.	21½ years	7 years..	
Laundering	.....	...do.....	
Painting	7 years..	10 years.	
Sewing	15 years.	6½ years.	
Do	.....	3 years..	
Steam fitting	8½ years.	16 years.	
Lancaster—Industrial Department Lancaster Public Schools (*day school*):			
Woodworking	(1)	(1)	Took 2-year course at Mechanics' Institute.
Long Island City—Long Island City Evening High and Trade School (*evening school*):			
Carpentry	2 years..	12 years.	B. S. degree, College City of New York; M. S. degree, New York University.
Dressmaking	5 years..	5 years..	Took course in professional dressmaking at Pratt Institute.
Electrical wiring	.....	4 years..	Graduate scientific course at Yale University.
Machine-shop practice	6 years..	...do.....	Took B. S. course at New York University.
Millinery	8 years..	5 years.	Took 1 year in domestic arts at private school.
Plumbing	10 years.	1 year...	
Sewing and dressmaking	.....	4 years..	Took 2-year course in domestic arts at New York University.

[1] Length of time not reported.

[2] Teaches in both day and evening schools.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name, and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
NEW YORK—continued.			
New York—New York Industrial Evening School (mostly Negro—*evening school*):			
Carpentry and joinery	11 years.	(1)	Inspector building construction for 10 years.
Dressmaking	2 years.	3 years.	
Do	(2)	6 years.	
Do	5 years.	5 years.	
Do	10 years.	3 years.	
Electrical wiring	4 years.	2 years.	B. S. degree, Cooper Union.
Embroidering	...do....	5 years.	
Flower making	12 years.	...do....	
Janitorial work	20 years.	1 year.	Took 4-year course in technical school, Ireland.
Millinery	½ year.	3 years.	Took 1 year in domestic arts at Pratt Institute.
Do	12 years.	(1)	
New York City—Manhattan Trade School for Girls (*day school*):			
Dressmaking	23 years.	6½ years.	
Do	25 years.	3½ years.	
Do	8 years.	4 years.	
Do	1 month	...do....	Attended Manhattan Trade School for Girls 1 year.
Do	20 years.	3 years.	
Do	18 years.	7 years.	
Do	1 year.	4 years.	
Do	10 years.	2 years.	Took 1-year course in domestic arts at Teachers' College, Columbia University.
Do	4 years.	1 year.	
Elementary sewing	.....	14 years.	B. S. degree, Teachers' College, Columbia University; also attended Pratt Institute 1 year.
Do	.....	1 year.	Took 1-year course in domestic arts at Teachers' College, Columbia University.
Millinery	(1)	7 years.	Took 1-year course in millinery at Pratt Institute.
Novelty and sample mounting	5 years.	...do....	Took 1-year special course in special dressmaking at Pratt Institute.
Do	10 years.	2 years.	
Do	1½ years.	7½ years.	
Power sewing machine operating	1 year.	3½ years.	
Do	10½ years	2 months	
Do	6 years.	5 years.	
Do	1 year.	(1)	
Do	8 years.	8 years.	
Do	...do....	3 years.	
New York City—Stuyvesant Evening Trade School (*evening school*):			
Blacksmithing	16 years.	2½ years.	
Cabinetmaking	(1)	2 years.	Took 2-year mechanical course at College City of New York.
Carpentry	25 years.	5 years.	Took 3-year course in architectural drawing in private school.
Electrical wiring and installation	6 years.	1 year.	E. E. degree, Columbia University; author of "Temperature Effects on Electric Storage Batteries" and "Theory and Practice of Illumination."
Do	16 years.	3 years.	
Do	6 years.	4½ years.	E. E. degree, Brooklyn Polytechnic Institute.
Machinists	2 years.	3 years.	Took 3-year scientific course at Teachers' College, Columbia University.
Do	1 year.	8 years.	B. S. degree in mechanical engineering at Worcester Polytechnic Institute.
Pattern making	8 years.	15½ years	Took 1-year mechanical course at Massachusetts Institute of Technology.
Plumbing	31 years.	4 years.	
Do	(1)	2 years.	Supervised installation of plumbing in buildings.
Steam engineering	5 years.	1 year.	B. S. degree, College City of New York.

[1] Length of time not reported.

[2] Not reported.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
NEW YORK—concluded.			
New York City—Vocational School for Boys (*day school*).	.....	.....	At least 5 years' experience as a journeyman is required. The present force has had from 12 to 20 years' experience.
New York City—Washington Irving High School (*day school*):			
Dressmaking	.....	7 years..	Took 4-year course in drafting and dressmaking at Teachers' College, Columbia University.
Do	.....	1 year...	Took 1-year course in domestic arts at New York College.
Do	.....	10 years.	Took 2-year course in domestic arts at Columbia University.
Do	2 years..	7 years..	Took 2-year course in dressmaking and sewing at Teachers' College, Columbia University, and short course in domestic arts in private school.
Sewing and dressmaking	6 years..	(1)	Took short course in domestic arts at Armour Institute of Technology and New York University.
Do	.....	5 years..	
Do	.....	7½ years.	Took 2-year course in domestic arts at Pratt Institute; 6 months' course in dressmaking at Teachers' College, Columbia University.
Do	.....	14 years.	Took 2-year course in dressmaking at Pratt Institute.
Sewing	.....	2 years..	Took 1-year course each in domestic arts at Teachers' College, Columbia University, and New York University.
Rochester—School of Domestic Science and Domestic Art (*day school*):			
Dressmaking	(1)	4 years..	Took full dressmaking course at Mechanics' Institute of Rochester.
Millinery	(1)	3 years..	Took course in millinery at Mechanics' Institute of Rochester.
Rochester—Shop School (Lexington Avenue—*day school*):			
Cabinetmaking	10 years.	1½ years.	
Carpentry	(1)	½ year...	
Electrical work	1 year...	1½ years.	
Plumbing	5 years..	½ year...	
Schenectady—Industrial School (*day school*):			
Woodworking and cabinetmaking	5 years..	(1)	
Syracuse—Syracuse Technical High School (*day school*):			
Cabinetmaking	(1)	(1)	
Cabinetmaking, turning, and pattern making.	.....	(1)	Took summer course in pattern making, forge work, and foundry practice at Cornell University.
Dressmaking	5 years..	6 years..	Took 2-year course in domestic arts at Pratt Institute.
Joinery, turning, pattern making, and machine-shop practice.	.....	(1)	Took summer course in pattern making and molding at Cornell University.
Yonkers—Trade School of Yonkers (*day and evening schools*):			
Machine-shop practice [2]	16 years.	(1)	
Woodworking (carpentry, etc.) [2]	.....	(1)	
Yonkers—Yonkers Vocational School (*day school*):			
Carpentry	.....	(1)	Learned pattern making in Scotland.
OHIO.			
Cincinnati—Cincinnati Evening School (*evening school*).	.....	.....	All of the teachers of practice are persons of wide experience in the work they are teaching.
Cleveland—Cleveland Elementary Industrial School (*day school*).	.....	.....	The trade teachers in this school have had experience in the practice and theory of the trades they are teaching.

[1] Length of time not reported.
[2] Teaches in both day and evening schools.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
OHIO—concluded.			
Cleveland—Technical High School (*evening school*):			
Machine-shop practice	2 years.	1 year.	
Sheet-metal pattern working	10 years.	do.	
Columbus—Columbus Trades School (*day and evening schools*).			The trade teachers in this school have had practical experience in the trades they are teaching.
Dayton—High Industrial School (*evening school*):			
Cabinetmaking	4½ years.	3 years.	
Machinists and blacksmithing	6 years.	2 years.	
Machinists	8 years.	1 year.	
Pattern making	18 years.	do.	
PENNSYLVANIA.			
Altoona—High School (*day school*):			
Blacksmithing and foundry work	16 years.	1 year.	
Cabinetwork	21 years.	do.	
Pattern making	(1)	6 years.	Course in pattern making and foundry practice at Cornell Summer School.
Carlisle—United States Indian School (Indian—*day school*):			
Baking	9 years.	1 year.	
Blacksmithing	13 years.	3 years.	
Bricklaying and plastering	16 years.	5 years.	
Carpentry	21 years.	7 years.	
Do	11 years.	26 years.	
Carriage making	14 years.	5 years.	
Laundering		13 years.	
Do		1 year.	
Do	3 years.	9 mos.	
Do		8 years.	
Painting	6 years.	10 years.	
Plumbing, steam fitting	11 years.	17 years.	
Printing	20 years.	9 years.	
Printing (proof-reading course)		1 year.	
Sewing	6 years.	7 years.	
Do	4 years.	17 years.	
Do	15 years.	9 mos.	
Shoemaking	26 years.	2 mos.	
Tailoring	21 years.	8 years.	
Stationary engineers		4 years.	
Do	15 years.	9 years.	
Philadelphia—Philadelphia Trades School and Evening Trades School No. 1 (*day and evening schools*):			
Bricklaying [2]	8 years.	1 year.	
Carpentry [3]	12 years.	15 years.	
Electrical construction [3]	10 years.	3 years.	
Do.[3]	do.	1 year.	1-year course in applied electricity at Drexel Institute.
Painting, house and sign [2]	7 years.	4 years.	
Pattern making and carpentry [3]	12 years.	7 years.	
Plastering [2]	33 years.	4 years.	Master plasterer for 30 years.
Plumbing [2]	18 years.	7 years.	
Do.[2]	25 years.	1 year.	
Do.[2]	24 years.	3 years.	
Printing [3]	22 years.	4 years.	
Sheet-metal working [2]	15 years.	do.	
Philadelphia—Evening Trades School No. 2 (*evening school*):			
Bricklaying	30 years.	3 years.	Foreman for 25 years.
Electrical construction	10 years.	5 years.	1-year course in physics at University of Pennsylvania.
Do	19 years.	2 years.	
Painting and lettering	31 years.	(1)	
Pattern making	16 years.	3½ years.	
Pattern making and carpentry	20 years.	3½ years.	
Plumbing	30 years.	3 years.	

[1] Length of time not reported.
[2] Teaches in evening school.
[3] Teaches in both day and evening schools.

TABLE II.—QUALIFICATIONS OF TEACHERS OF PRACTICE.—Concluded.

B. PUBLIC SCHOOLS—Concluded.

Locality, name and kind of school, and trade or vocation taught by teacher.	Experience of teacher—		Remarks.
	In trade.	In teaching trade.	
PENNSYLVANIA—concluded.			
Scotland—Soldiers' Orphans' Industrial School (*day school*):			
Baking	11 years.	(1)	
Cobbling	10 years.	(1)	
Dressmaking	5 years..	(1)	
Do	4 years..	(1)	
Machinists	12 years.	(1)	
Printing	18 years.	(1)	
Stationary engineers	10 years.	(1)	
Do	8 years..	(1)	
Tailoring	5 years..	(1)	
Do	8 years..	(1)	
Woodworking	10 years.	(1)	
RHODE ISLAND.			
Providence—Evening Technical School (*evening school*):			
Blacksmithing	2 years..	(1)	Took 3-year course in mechanical engineering at Drexel Institute.
Dressmaking	3 years..	1 year...	
Do	4 years..	...do....	Took 3-year course in decorative arts at Rhode Island School of Design.
Electrical wiring	12 years.	(1)	
Jewelry making	11 years.	1 year...	Took 7-year course in modeling and designing at Royal College, Germany.
Jewelry and silversmithing	10½ years	...do....	Took 4-year course in modeling and designing at Rhode Island School of Design.
Machinists	14 years.	18 years.	
Pattern making	6 years..	1 year...	
Plumbing	20 years.	...do....	
Steam engineering	12 years.	15 years.	
WISCONSIN.			
Milwaukee—Milwaukee School of Trade for Boys (*day and evening schools*):			
Carpentry [2]	16 years.	1 year...	
Machinists [2]	8 years..	1½ years.	
Do.[2]	15 years.	4 years..	
Do.[2]	26 years.	2½ years.	
Pattern making [2]	18 years.	3 years..	
Plumbing [2]	6½ years.	2 months	
Milwaukee—Milwaukee School of Trades for Girls (*day school*):			
Dressmaking	30 years.	½ year...	
Do	.....	2 years..	Took 2 years in domestic arts at Teachers' College, Columbia University, New York.
Millinery	19½ years	¾ year...	Took 2-year course in millinery in private school in Europe.
Do	½ year...	½ year...	
Plattsville—Wisconsin State Mining Trade School (*day school*):			
Mining [3]	9 years..	2 years..	B. S. degree, University of Wisconsin.
Mining (blacksmithing incidental to)	7 years..	...do....	
Mining (woodworking incidental to)	20 years.	3 years..	Graduate of scientific school, Hanover, Germany.

[1] Length of time not reported.
[2] Teaches in both day and evening schools.
[3] In artificial mine in basement of building.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, TERMINAL DATES, SCHOOL DAYS AND HOURS, ETC.

The first column states the name, locality, and kind of school. The various types and classes of schools are defined and described in Chapter I.

The second column shows the year the school was established, or an industrial feature introduced by an institution previously in existence.

The third column gives the general entrance requirements, such as completion of a certain school grade, entrance examination, and the like. Column four gives the minimum age at which a pupil may enter, and column five shows the maximum age at which a pupil may enter.

The sixth column shows the fees, dues, and deposits required of pupils, and needs no explanation.

The seventh column needs no explanation.

The eighth column is intended to show the percentage of pupils who remain until they complete the course given in their occupation. Many schools are of so recent establishment that they have had no experience in this regard.

The ninth column is intended to show how much credit is given by employers for the occupational training received in the school. These answers, made as they are by the schools themselves, must not be considered as being entirely impartial.

The tenth column is intended to show the date of beginning and ending of the school year. These, in many cases, represent the school year shown in the schedule, and this column should be read as showing mainly the approximate dates only.

The eleventh column shows when a pupil may begin the school work—that is, enter the school.

The twelfth column shows the days of the week and the hours during each of such days that the school is in session, and also the time of attendance when pupils attend only a part of the time the school is in session.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
ALABAMA.					
Snow Hill—Snow Hill Normal and Industrial Institute (Negro—*day school*).	1894	Anyone furnishing written testimonials of good character.	14	None.	Entrance fee, $2; tuition fee, 75 cents per month.
Tuskegee—Tuskegee Normal and Industrial Institute (Negro—*day school*).	(1)	Anyone able to read, write, and understand addition, subtraction, multiplication, and division.	14	None.	Entrance fee, $9; no tuition fee.
CALIFORNIA.					
San Francisco — California School of Mechanical Arts (*day school*).	[2] 1875	Selected by competitive examination from grammar-school graduates in State.	None.	None.	Key deposit, 25 cents; material fee, $12 per year.
San Francisco — Wilmerding School of Industrial Arts (*day school*).	[3] 1894	Grammar-school graduates and boys over 16 years who have completed seventh grade.	None.	21	Key deposit, 25 cents.
CONNECTICUT.					
New London—Manual Training and Industrial School of New London (*day school*).	1906	Any grammar-school graduate.	14	None.	None to residents; nonresidents, $20 per year.
ILLINOIS.					
Chicago—Cnicago Girls' Trade School (*day school*).	1907	Any girl.....	13	21	None.....
Chicago—Lewis Institute (*day cooperative school*).	1909	Any boy having grammar-school education.	16	21	Registration fee, $5; chemistry damage deposit, $2, residue refunded; locker key, 75 cents, refunded upon its return; tuition fee, $50 per year.[4]
Glenwood—Illinois Manual Training Farm (*day school*).	1887	Any boy dependent upon the city because of home conditions; boys may be placed by parents if investigation proves them deserving.	12	16	Board and tuition, $15 per month if paid by parents or guardians, $10 if paid by county.

[1] Sewing, 1883; carpentry, 1884; other trades, 1886 to 1906.
[2] Opened in 1895.
[3] Opened in 1900.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.

A.—PHILANTHROPIC SCHOOLS.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No.....	20	Takes place of apprenticeship in all trades taught.	First Monday in September to last Sunday in April.	Any time.	Monday to Friday, 7 a. m. to 12 m., 1 to 5 p. m.; Saturday, 7 to 11.30 a. m.
No.....	50	.....do.....	Second Tuesday in September to fourth Thursday in May.	...do.....	Monday to Saturday: Trade classes, 7.15 a. m. to 12 m., 1 to 5 p. m.; academic classes 9 a. m. to 12 m., 1 to 4.30 p. m. Pupils attend trade and academic classes on alternate days.
No.....	80	From 2 to 4 years by most employers.	First Monday in August to early in June.	At beginning of school year.	Monday, Tuesday, Thursday, and Friday 9 a. m. to 12 m. and 12.45 to 4 p. m.; Wednesday, 9 a. m. to 12 m. and 12.45 to 2.15 p. m.
No.....	21	Generally accepted; extent not reported.	.....do.....	Any time.	Monday, Tuesday, Thursday, and Friday 9 a. m. to 12 m. and 12.45 to 4 p. m.; Wednesday, 12.45 to 2.15 p. m.
No.....	About 85.	Three years in machinists' trade.	Sept. 1 to June 15....	...do.....	Monday to Friday 8.45 a. m. to 3.30 p. m., including 2 hours intermission and ¼ hour recess.
None used.	Nearly all.	In full.....	School continues throughout year.	...do.....	Monday to Friday 9 a. m. to 4 p. m.; 1½ hours noon recess.
No.....	Not reported.	Usually day for day..	School continues throughout year, except two vacation periods.	...do.....	Monday to Friday 8.30 a. m. to 12.30 p. m. and 1 to 5 p. m., except 6 weeks in summer from 8 a. m. to 12 m. and 1 to 4 p. m.[5]
Yes.....	Very few	Not as any part.....	School continues throughout year.	...do.....	Monday to Friday 9 a. m. to 12 m. and 1.30 to 4.30 p. m.; Saturday 9 a. m. to 12 m.

[4] Boys doing satisfactory work in both school and shop of employer have tuition paid by philanthropist.
[5] Alternate weeks and every Saturday spent in employers' shops.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
ILLINOIS—concluded.					
Peoria—Bradley Polytechnic Institute: Horological Department (*day school*).	[1] 1897	References may be required; no educational requirement.	16	None.	$5 deposit on tools, refunded when returned in good order. Tuition fee 9 months, $110; 12, $135; 15, $160; 18, $180; 2 years, $200; if paid by month, $20 per month for first 3 months, $10 per month thereafter. These fees are for horological department. Optics to students of horology, $10 per course of 12 weeks; optics alone, $25 per course of 12 weeks.[2]
INDIANA.					
Indianapolis—National Trade Schools (*day school*).	[3] 1903	No limitations.....	[4] 16	None.	Tool-breakage deposit, $5; residue returned at end of year. Tuition fee, $100 per year, except bricklaying, $60, tile and mantel setting, $50, per course of six months; payable in advance
MARYLAND.					
Baltimore—Maryland Institute for the Promotion of the Mechanic Arts (*day school.*)	1907	Any reputable white person.	14	None.	Pupils of first and second years, $30; third and fourth, $40 per year; payable in advance; no refund. Each county in Maryland and each member of Baltimore city council is entitled to one free scholarship yearly for the regular 4-year course; also, each person donating $1,000 or more may appoint 1 pupil for each term of 4 years during life and thereafter from time to time the executive committee of the institution shall appoint a pupil to the scholarship.

[1] Present name adopted; established in 1886 in Laporte, Ind.; removed to Peoria in 1892.
[2] No refund for less than 1 month.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
None used.	75	Considered to be equal to full apprenticeship.	Sept. 1 to Aug. 31.....	Any time..	Monday to Friday 8 a. m. to 12 m., 1 to 5 p. m., and optics 5 to 6 p. m.; Saturday 8 a. m. to 12 m.
No.....	60	About 3 years in molding, machinists, printing, and lithographing; 2 years in tilesetting and bricklaying.	School continues throughout year.	...do.....	Monday to Friday, 7 a. m. to 5.30 p. m., with 1 hour recess at noon; Saturday, 7 a. m. to 12 m.
None used.	98	School too new to determine.	Oct. 3 to May 26.....	...do.....	Monday to Friday, 9 a. m. to 12 m., and 12.30 to 3 p. m.

[3] Opened in 1904.
[4] If boy is unusually large or is of mechanical inclination, may enter earlier.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
MASSACHUSETTS.					
Boston—Franklin Union:					
Day school (Saturday afternoon)—	[1] 1905	Any male working at trades taught.	16	None.	Tuition fee, gas and gasoline engineers, $10; other trades $6 per year; payable in advance; no refund.
Evening school	[2] 1905	.....do.....	16	None.	Tuition fee, gas and gasoline engineers, $10 per year; firemen, boiler, $4 per course of 3 months; other trades, $6 per year; payable in advance; no refund.
Boston—Massachusetts Charitable Mechanic Association Evening Trade School (*evening school.*)	1900	Any young man in the trades presenting certificate of good moral character.	17	24	Tuition fees, first year, $12; second, $10; third, $8.
Boston—North Bennet Street Industrial School (*evening school.*)	1881	Anyone of serious motives and reasonable ability.	[3] 14	(4)	Pupils from 14 to 19 years of age, 50 cents, house fee; over 19, $1; nonresidents of North End district of Boston, $5 per year.
MISSOURI.					
St. Louis—David Ranken, Jr., School of Mechanical Trades:					
Day school	[1] 1907	Males 15 years of age having completed sixth grade work or equivalent. Trade experience admits with less schooling. Very strong boys admitted at 14 years of age who have completed sixth grade or equivalent.	14	None.	Tuition fee, $30 per year, payable $10 per term in advance.
Day cooperative school	1910	Shop apprentices in any trade taught.	16	None.	Tuition fee, $15 per year in advance, paid by employer.
Evening school	1910	Any white male employed during day.	15	None.	2 evenings per week, $5 per term of 12 weeks; 4 evenings per week, $10 per term of 12 weeks; in advance.

[1] Opened in 1909.
[2] Opened in 1908.
[3] Seventeen for woodwork and wood turning; 16 for wood and stone carving and advanced dressmaking.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No.....	Not reported.	Not reported.....	Oct. 2 to Mar. 19.....	At beginning of half-year terms.	Saturday 2 to 6 p. m.
No.....	85	.....do.....	Sept. 27 to Mar. 24....	...do.....	Monday, Wednesday, and Thursday, 7.30 to 9.30 p. m.
No.....	88	Not as any part.....	Oct. 11 to Mar. 25.....	Any time.	Monday, Wednesday, and Friday, sheet-metal workers, 6 to 8 p. m.; others, 7 to 9 p. m.
Not reported.	100	.....do.....	Oct. 11 to Apr. 30.....	At beginning of school year; at any time in special cases.	Monday to Thursday, 7 to 9 p. m. Pupils attend 2 evenings per week except in printing, wood carving, stone carving, and pottery, 1 evening per week.
None used.	(5)	School too new to determine.	Sept. 1 to July 23.....	Any time.	Monday to Friday 8.20 a. m. to 12 m., and 1 to 4.40 p. m.; Saturday, 8.20 a. m. to 12 m.
...do.....	(5)	Hour for hour.....	.....do	...do.....	Monday, Tuesday, Thursday, and Friday, 8 to 11.30 a. m.; each boy 2 days per week.
...do.....	(5)	Not as any part.....	Oct. 1 to Mar. 31.....	...do.....	Monday to Thursday, 7.30 to 10 p. m.; each boy 2 evenings per week.

[4] Twenty years for woodwork, wood turning, pottery, and advanced dressmaking; 25 for wood and stone carving and cement work; 18 for printing, and 15 for elementary dressmaking.
[5] School too new to determine.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
NEW YORK.					
Brooklyn—Pratt Institute: School of Household Science and Arts:					
Day school	1891	Examination as to fitness of applicant.	17	None.	Tuition, sewing, $15 per term of 3 months; dressmaking, $20 per term of 3 months, or $80 per year, $20 of which is refunded as wages; millinery, $20 per term of 3 months. Other fees not reported.
Evening school	1887	.....do.....	17	None.	Tuition, sewing, $2.50 per term of 3 months; dressmaking, $5 per term of 3 months; millinery, elementary, $5 per term of 3 months, advanced $2.50. Other fees not reported.
Brooklyn—Pratt Institute: School of Science and Technology:					
Day school	1887	Persons fitted by nature or experience in trade.	17	None.	Tuition, $20 per term of 3 months, payable in advance; no refund; $3 breakage and material fee for term of 3 months.
Evening school	1887	Persons employed in related line of work.	16	None.	Tuition, $15 per 6 months; no provision for refund.
New York—Baron de Hirsch Trade School (*day school*).	1891	Any able-bodied Jewish boy who can read and write English.	16	20	None.
New York—Clara de Hirsch Trade School (*day school*)	[1] 1897	Dependent and needy Jewish girls; also non-Jewish girls up to 10 per cent of total enrollment.	14	[2] 17	Tuition, $2 per month for nonresidents of Clara de Hirsch Home for Working Girls who are able to pay.
New York—Hebrew Technical Institute:					
Day school	1884	Any Jewish boy who can pass examination in arithmetic, English, geography, and United States history.	13	17	None.
Evening school	1903	Any deserving mechanic in the trade who is found suitable for instruction given.	19	None.	$1 per month for material.

[1] Opened in 1899.

[2] Sometimes exception is made and older girl is accepted.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
None used.	Nearly all.	Not reported.....	Sept. 26 to third Thursday in June for sewing and millinery; dressmaking continuous throughout the year.	At beginning of term.	Monday to Friday 9.10 a. m. to 12.25 p. m., and 1.20 to 4.05 p. m., except dressmaking, fourth term, which is from 8 a. m. to 12 m., and 1 to 6 p. m. Monday to Friday, and 9 a. m. to 12.30 p. m. Saturday.
...do....	...do....	.....do.....	Sept. 27 to Mar. 25....	...do.....	Monday, Wednesday, and Friday 7.30 to 9.30 p. m. Sewing, dressmaking, and elementary millinery 2 evenings per week; advanced millinery 1 evening per week.
No.....	50	About 9 months, in all trades.	Sept. 20 to June 17....	Any time by examination.	Monday to Friday, 9 a. m. to 5 p. m., with 50 minutes for luncheon.
No.....	75 to 80	Not reported.....	Last of September to last of March.	...do.....	Monday, Wednesday, and Friday, 7.30 to 9.30 p. m.
No.....	85	.....do.....	Middle of August to middle of February; middle of February to middle of July.	Within first 3 weeks of half-year terms.	Monday to Thursday, 8 a. m. to 4.30 p. m.; Friday, 8 a. m. to 3.30 p. m., with 30 minutes for luncheon.
Yes.....	[3] 80 [4] 90 [5] 100	Takes place of apprenticeship.	Sept. 1 to July 31.....	Any time.	Monday to Friday, 8.30 a. m. to 12 m. and 12.30 to 6 p. m.
Yes.....	80	Not reported.....	Early September to end of June.	...do.....	First year, Monday to Friday, 9 a. m. to 12 m. and 1 to 4 p. m.; second and third years, Monday to Thursday, 9 a. m. to 12 m. and 1 to 5 p. m.; Friday, 9 a. m. to 12 m. and 1 to 4 p. m.
None used.	50	.....do.....	Early September to middle of May.	...do.....	Monday, Tuesday, and Thursday, 7.30 to 9.30 p. m.

[3] Millinery. [4] Sewing. [5] Dressmaking.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
NEW YORK—continued.					
New York—Hebrew Technical School for Girls (*day school*).	1897	Any girl (Jew or Gentile) unable to go to high school who promises to take full course. The most needy preferred.	14	17	Registration fee $2, if able to pay. Tuition 5 cents a week for those able to pay; free scholarships for others.
New York—Henrietta Trade School (Negro—*evening school*).	1909	Anyone	14	None.	None
New York—Italian Evening Trade School (*evening school*).	1909	.....do	15	None.	.....do
New York—New York Trade School:					
Day school	1881	Any young man who can read and write. Experience only necessary in taking cornice and skylight work.	17	25	Plumbing, 4 months, $45; painting, sign, 4 months, $25; painting and decorating, 4 months, $40; bricklaying, 4 months, $40; cornice and skylight workers, 4 months, $40; electrical workers, 4 months, $40; carpentry, 4 months, $40; steam and hot water fitting, 3 months, $40; payable in advance; no provision for refund.
Evening school	1881	.....do	17	25	Tuition fees: Painting and decorating, first year, $12; second and third, $6; painting, sign, first year, $12; second and third, $6; blacksmithing, first year, $12; second and third, $6; pattern making, first year, $12; second and third, $6; steam and hot water fitting, first year, $14; second and third, $7; printing, first year, $14; second and third, $7; cornice and skylight workers, first year, $15; second and third, $7.50; bricklaying, first year, $16; second and third, $8; plastering, first year, $16; second and third, $8; electrical workers, first year, $16; second and third, $8; plumbing, first year, $16, second and third, $8; reduction for second and third years dependent upon first year's standing and attendance. Paid in advance; no provision for refund.

[1] School too new to determine.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
Not reported.	90	Not reported.....	School continues throughout year.	At beginning of half-year terms.	Monday to Friday, 8.30 a. m. to 4 p. m.; 1 hour intermission.
None used.	Not reported.	(1)	Oct. 1 to May 1.....	Any time.	Monday to Thursday, 7.30 to 9 p. m.
...do....	(1)	(1)	Oct. 1 to June 1.....	...do.....	Monday to Thursday, 7.30 to 9.20 p. m.
Yes.....	97-99	Not as any part.....	Dec. 5 to Mar. 29.....	At beginning of term.	Monday to Friday, 8.30 a. m. to 12 m. and 1 to 4 p. m.; Saturday, 8.30 a. m. to 12 m.
Yes.....	80-85	.....do.....	Sept. 26 to Mar. 29....	...do.....	Monday to Saturday, 7 to 9.30 p. m.; each pupil attends 3 evenings per week.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
NEW YORK—continued.					
New York—Pascal Institute (*day school*).	1898	Any female.....	14	None.	Tuition, $5 per month, payable in advance; scholarships entitling to plain sewing, dressmaking, and cooking, costing $50, provided by philanthropists.
New York—Preparatory Trade School (*evening school*).	1903	Any one with grammar school education.	12	23	Tuition fees: Carpentry, plumbing, or electrical workers, 25 cents per month; dressmaking, 10 cents per month; millinery, 15 cents per month; payable in advance; no provision for refund.
New York—St. George's Evening Trade School (*evening school*).	1892	Boys who attend from some church, first, members of parish; second, vacancies filled by others bringing letters from a clergyman, priest, or rabbi.	[1] 12	21	Tuition fees: Electrical workers (inside wiring), plumbing, and sheet-metal workers 2 evenings per week, 15 cents per month; 3 evenings, 25 cents per month; carpentry, 2 evenings, 10 cents; 3 evenings, 15 cents; payable in advance; no provision for refund.
Rochester—Mechanics' Institute of Rochester: *Day school*.....	[2] 1885	Males of grammar school education; any female.	16	None.	Shop fee, $2 per term covering cost of materials and power. Tuition: Machinists, woodworking or electricians, $75 per year or $26 for each of 3 terms; dressmaking, $26 for 12 weeks; millinery, first 24 lessons, $8; second $9, third $10, fourth $10, payable in advance; diploma fee $2.

[1] In electrical class, 14.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
None used.	Very small.	Not as any part.....	Sept. 15 to July 1.....	Any time.	Monday to Friday, 9 a. m. to 12 m. and 1 to 5 p. m.
No.....	20	.....do.....	Oct. 1 to May 1.....	...do.....	Monday, Tuesday, Thursday, and Friday 7.45 to 9.15 p. m.; carpentry and plumbing, 4 evenings per week; electrical workers, 3; millinery and dressmaking, 2.
None used.	17	.....do.....	Oct. 10 to May 1.....	.....	Monday to Friday, 7.30 to 9 p. m.; one class 2 evenings and the other 3 evenings per week.
No.....	50	.....do.....	Sept. 13 to June 14....	At beginning of any one of three terms; at any time in unusual cases.	Monday to Saturday, 8.50 a. m. to 12 m. and 1 to 4.15 p. m. for males; 9 a. m. to 12 m. and 1 to 4 p. m. for females.

[2] Opened in 1886.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
NEW YORK—concluded.					
Rochester—Mechanics' Institute of Rochester—Concld.					
Day cooperative school.....	(1)	Apprentices of Gleason Works.	16	None.	Tuition, $7.50 per term of 3 months, paid by employer.
Evening school.....	1885	Any one.....	14	None.	Tuition, steam engineers, $10 for 26 weeks; gas engineers, $12 for 14 weeks; electricians $8, $12, and $15, respectively, for courses 1, 2, and 3 of 26 weeks each; pattern making, joining and cabinet making, machinists or tool making, $18 for 26 weeks; carpentry or masonry, $10 for 26 weeks; painting, sign, $8 for 26 weeks; sewing, $2.50, $3, and $4 for first, second, and third 24 lessons, respectively; dressmaking $10 for each first, second, and third 24 lessons; millinery, $4 for each first and second 24 lessons, and $5 for each third and fourth 24 lessons; buttonhole making, $3 for 12 lessons. All payable in advance; refund may be made. Certificate fee, 25 cents; diploma, $2.
NORTH CAROLINA.					
High Point—High Point Normal and Industrial School (Negro—*day school*).	1891	Those producing certificates of good health.	12	None.	Doctor's fee, $1; door key deposit, 25 cents. Tuition, residents, none; nonresidents, $1.50 per month; payable in advance.
OHIO.					
Cincinnati—Jewish Kitchen Garden Association and Trade School for Girls (*day school*).	[5] 1893	Any Jewish girl.....	12	None.	None.....
Cincinnati.—Ohio Mechanics' Institute (*evening school*).	1828	Any white male.....	14	None.	Laboratory fee, $2; tuition fee, $10 per year.

[1] Not reported.
[2] Males.
[3] Females.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No	.....	Hour for hour	Sept. 23 to Mar. 23	At beginning of school year.	Monday, Wednesday, and Friday, 1 to 2.30 p. m.
No	[2] 95 [3] 75	Not as any yart	do	[4]	Monday to Friday 7.30 to 9.30 p. m; steam engineers, gas engineers, and chauffeurs, 1 evening per week; electricians, painting, sign, sewing, dressmaking, millinery, and buttonhole making, 2 evenings per week; pattern making, joinery, and cabinetmaking, machinists, tool making, carpentry, and masonry, 3 evenings per week.
No	20	In full	Sept. 15 to May 18	Any time.	Monday to Friday, 8.30 a. m. to 12 m. and 1 to 4 p. m.
Not reported.	Not reported.	Not reported	School continues throughout year.	Any time.	Monday to Friday, 8 a. m. to 12 m. and 1 to 5 p. m., 20 minutes recess each half day.
No	Not reported.	One firm accepts graduates, allowing credit for 1 year.	Sept. 25 to Apr. 10	do	Monday to Friday, 7.15 to 9.15 p. m., two evenings per week.

[4] At beginning of term except in unusual cases; "domestic arts," students must enter at beginning of term.
[5] Millinery in 1909.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
PENNSYLVANIA.					
Lancaster—Thaddeus Stevens Industrial School of Pennsylvania (*day school*).	1909	Males passing mental and physical examination; first, indigent orphans; second, other orphans; third, poor boys at large.	16	18	None.
Philadelphia—Berean Manual Training and Industrial School (Negro):					
Day school	1899	Anyone	14	None.	Tuition, $0.30 per week.
Evening school	1899	do	14	None.	Tuition, carpentry, upholstering and chair caning, tailoring, millinery, and electrical workers, each $15 per year; dressmaking, $15 first and second years; $20 third year; payable in advance.
Philadelphia—Drexel Institute of Art, Science, and Industry:					
Day school	[4] 1891	Males must pass mental examination; females must pass trade examination.	15	None.	Locker deposit, 50 cents, refunded upon return of key; also $5 breakage deposit for men, residue to be returned; tuition fee per term of one-half year, machine construction, $30; pattern making, forging, and machine construction, $45; sewing, hand and machine, $12; shirt-waist course, $15; dressmaking, $35; millinery, short course, $15; millinery, trade course, $30; payable in advance; no refund except in unusual cases.
Evening school	[5] 1891	Males must pass examination in arithmetic and penmanship; females, in hand and machine sewing for sewing and dressmaking, and in addition applicants for dressmaking must submit specimen garment of own work.	[2] 14 [3] 15	None.	Locker deposit, 50 cents, refunded upon return of key. For males, $3 breakage deposit, residue to be returned; tuition per term of one-half year, machine construction, pattern making; sewing, shirt waist; dressmaking, first year, each $5; sewing, hand and machine, $4; dressmaking, second year, $10; dressmaking, third year, $7; millinery, first year, $7; second year, $8.

[1] At beginning of school year.

[2] Males.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
Yes.....	75	School too new to determine.	Apr. 1 beginning of year; session extends throughout year except month of August.	(1)	Monday to Friday, 8 a. m. to 12 m. and 1 to 5 p. m.; from Sept. 1 to Apr. 1 in 3d year, 1 hour each evening.
No.....	75	In full.....	October to June.....	Any time.	Monday to Friday, 8 a. m. to 5.30 p. m.; Saturday, 8 a. m. to 1 p. m. Thirty minutes for luncheon.
None used.	2 50 3 75	In full, except in carpentry and electrical workers.	Oct. 5 to June 18.....	...do.....	Monday to Friday, 8 to 10 p. m., 2 evenings per week; dressmaking pupils attend 4 hours Thursday afternoon of 3d year.
No.....	2 75 3 85	In full.....	Sept. 15 to June 15	...do.....	Males, Monday to Friday, 9 a. m. to 12 m., and 1 to 4 p. m.; females, sewing and millinery, short course, 2 periods of 2 hours each per week; millinery, trade course, 19 hours per week; dressmaking, 26 hours.
No.....	2 50 3 90–95	Not as any part.....	Oct. 1 to Mar. 31.....	...do.....	Monday to Friday, 7.30 to 9.30 p. m. Pupils attend 2 evenings per week.

[3] Females. [4] Opened in 1892. [5] Opened in 1902.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
PENNSYLVANIA—continued.					
Philadelphia—Girard College (*day school*).	1900	White male children orphaned of the father. Pupils enter trade classes after 3 years of mechanical training.	14	17	None.
Philadelphia—Hebrew Education Society (*evening school*).	1890	Anyone.	14	None.	None.
Philadelphia—Spring Garden Institute:					
Day school	1891	Common school education.	[1]16	None.	Matriculation fee $5. Tuition $20 per term of 12 weeks, payable in advance; no provision for refund.
Evening school	1879	Anyone.	14	None.	Tuition $5 per year, payable in advance; no provision for refund.
Philadelphia—Temple University:					
Day school	1894	Grammar school education; ability to pass examination in plain and machine sewing to enter dressmaking.	14	None.	Tuition: Dressmaking—sewing, preparatory, $5 per term of 4 months; technical, $75 per year; millinery, brief course, $10 per term of 4 months; technical course, $75 per year; combined course (dressmaking and millinery), $100 per year; payable in advance at beginning of each term; refund made in extraordinary cases.
Evening school	1894	Ability to pass examination in plain hand or machine sewing.	14	None.	Tuition: Dressmaking—sewing, $5 per term of 4 months; brief course, $10; millinery, brief course, $10 per term of 4 months; payable in advance; refund made in extraordinary cases.
Pittsburg (Allegheny)—Avery College Training School (Negro—*day school*).	1849	Ability to pass sixth grade public school; making declaration of intention to follow trade taken.	14	45	None.

[1] Usually, but left to option of teacher.

[2] School too new to determine.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
Yes	98	Generally accepted for 50 per cent.	September to June	At beginning of half year terms.	Monday to Friday, 8 a. m. to 12 m. and 1 to 5 p.m.; Saturday, 8 to 10 a. m. Recess 10.15 a. m. to 10.30 a. m.
None used.	80	About 50 per cent in sheet metal trades; not as any part in other trades.	School continues throughout year.	Any time.	Monday to Thursday, 7 to 9 p. m., except sheet-metal workers 2 hours extra Sunday morning.
No	(2)	Not as any part	Oct. 3 to June 16	Within first month.	Monday to Friday, 9 a. m. to 12 m. and 12.30 to 3 p. m.
No	70	do	Oct. 1 to Apr. 1	do	Monday to Saturday. Each pupil 2 evenings from 7.30 to 9.30 p. m. and 1 evening 8 to 9.30 p. m.
No	90	Not reported	Preparatory courses Oct. 1 to June 1; technical and combined courses, Sept. 15 to June 15.	Any time.	Technical course, Monday, Wednesday, and Friday, 9 a. m. to 2 p. m., with 20 minutes' intermission; combined course, Monday to Friday, 9 a. m. tc 2 p. m., 3 days, with 20 minutes' intermission, and 2 days of 150 minutes each; sewing, 2 days of 50 minutes each; millinery, brief course, six 50-minute periods per week.
No	90	do	Oct. 1 to June 1	do	Monday to Friday, 7.30 to 9.30 p. m. Sewing, 1 hour 2 evenings per week; other trades 3 evenings, 2 of 2 hours and 1 of 1⅔ hours.
Yes	[3] 75 [4] 62½	In full	First Monday in September to last Thursday in May.	do	Monday to Friday, 9 a. m. to 3.30 p. m., including recess of 30 minutes.

[3] Dressmaking and millinery.

[4] Tailoring.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
PENNSYLVANIA—concluded.					
Pittsburg—Carnegie Technical Schools: Margaret Morrison Carnegie School (*evening school*).	[1] 1900	Preference is given to those employed during day who are dependent upon their earnings.	17	None.	General fee, $2; breakage, $1; societies, etc., 50 cents; residue of breakage fee refunded. Tuition: Residents of Pittsburg, $5 per year; nonresidents, $7 per year; payable in advance; refund in extraordinary cases. Those entering at other than beginning of year must pay fees for entire year.
Pittsburg—Carnegie Technical Schools: School of Applied Industries: [4]					
Day school	(1)	Letters from teachers or employers required.	16	None.	General fee, $10; breakage deposit, $3, residue of which is refunded. Tuition, residents of Pittsburg, $20 per year; others, $30, paid upon entrance. Those entering in middle of year pay two-thirds of year's fee. Refunds made in meritorious cases.
Evening school	(1)	Pupils working at trades selected.	[5]	None.	General fee, $5; breakage deposit, $5, residue of which is refunded. Tuition, residents of Pittsburg, $5 per year; others, $7. Those entering in middle of year pay two-thirds of year's fee. Refunds made in meritorious cases.
Williamson School—Williamson Free School of Mechanical Trades (*day school*).	[6] 1888	Boys sufficiently advanced in common school to prove satisfactory after trial.	16	18	None

[1] Opened in 1906.
[2] Sewing and dressmaking.
[3] Millinery.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finish school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
None used.	[2] 78 [3] 98	Not reported.....	Second Monday in October to first Friday in May.	Any time prior to Christmas.	Monday, Wednesday, and Friday, 7.30 to 9.30 p. m.
No.....	60 to 65	Not generally accepted.	First Monday in October to last Friday in May.	Any time..	Monday to Friday, 9 a. m. to 5 p. m., including 1 hour intermission.
No.....	60 to 65	Not reported.....	Second Monday in October to last Friday in April.	...do.....	Monday to Friday, 7.30 to 9.30 p. m.; each pupil attends 3 evenings per week.
Yes.....	80	In full.....	Sept. 1 to July 31.....	At beginning of school year.	Monday to Friday, 8 a. m. to 12 m. and 1 to 5 p. m.; third year pupils also attend Saturday 8 a. m. to 11 a. m., and in last 7 months of third year Monday to Friday 8 to 9.30 p. m. Carpentry, bricklaying, and stationary engineers, 2 evenings per week; pattern making and machinists, 3 evenings per week.

[4] Formerly "School for Apprentices and Journeymen."
[5] Approximate minimum age for apprentices, 17; journeymen, 20.
[6] Opened in 1891.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

A.—PHILANTHROPIC SCHOOLS—Concluded.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
RHODE ISLAND.					
Providence—Watchman Industrial School (Negro—*evening school*).	1908	Must pass examinations thought necessary by president.	17	.....	Tuition, $10 per year payable in advance if able: if unable, in installments.
Providence—Rhode Island School of Design (*evening school*).	(1)	Persons engaged during the day in trades taught and who can pass satisfactory examination.	16	.....	Locker fee, $1, 50 cents of which is refunded on surrender of key. Tuition, $18 per year, in advance. Free scholarships are given by the State and city to worthy applicants.
SOUTH CAROLINA.					
Denmark—Voorhees Industrial School (Negro—*day school*).	1897	Anyone.....	14	None.	Entrance fee, $1.50. No tuition.
Mayesville—Mayesville Industrial and Educational Institute (Negro—*day school*).	1885	.....do.....	13	None.	Entrance fee, $2. No tuition.
Orangeburg—Claflin University (Negro—*day school*).	1883	.....do.....	14	None.	Registration fee, $2 per year. Tuition governed by cultural work taken, ranging from $10 to $30 per year.
VIRGINIA.					
Hampton—Hampton Normal and Agricultural Institute (Negro and Indian [4]—*day and evening schools*).	1868	Those passing satisfactory mental and physical examinations and submitting evidence of character.	17	26	Entrance fee, $10; incidental fee, $1 per year after first year. Tuition fee, $100 per year. Many scholarships are at disposal of faculty.
Lawrenceville—St. Paul Normal and Industrial School (Negro—*day and evening school*).	[6] 1883	Must pass satisfactory examination.	16	None.	Entrance fee, $10. Medical fee and incidental fee each $2 per year, payable in advance. No tuition.
Richmond—Virginia Mechanics' Institute (*evening school*).	1905	May require certificate from last school attended.	15	None.	Tuition, $3 per year; payable in advance.

[1] Incorporated 1877, opened 1878.
[2] Not reported.
[3] For school as a whole; about 10 per cent for bricklayers and plasterers.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Concluded.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No	98	Not as any part	Oct. 1 to May 28	At beginning of half-year terms.	Printing, Monday to Friday; dressmaking, Tuesday and Thursday, 8 to 10 p. m.
No	(2)	do	Sept. 26 to May 31	Any time.	Monday, Tuesday, and Thursday, 7.15 to 9.15 p. m.
No	[3] 25	In full	First Monday in October to May 15.	do	Monday to Friday, 7 a. m. to 12 m. and 1 to 5.30 p. m.
No	35	Not determined	Oct. 18 to May 18	do	Monday to Friday, 8 a. m. to 12 m. and 1 to 4.30 p. m.
No	30	In full	September to May	do	Monday to Friday, 8.15 a. m. to 12 m. and 1 to 5 p. m.
No	(2)	Accepted in full in all trades.	Trade work continues throughout year; academic work, Oct. 1 to June 1.	At beginning of school year.[5]	Trade work, Monday to Saturday 8 a. m. to 12 m. and 1 to 5 p. m.; academic work, 7 to 9 p. m., 5 evenings per week.
None used.	95	Two years in all trades.	School continues throughout year.	Any time.	Trade work, Monday to Saturday 7.30 a. m. to 12 m. and 1 to 5 p. m.; common-school instruction 5 evenings per week, 7 to 9 p. m.
do	(2)	Not reported	Sept. 27 to May 6	do	Monday to Friday, 7.30 to 9.30 p. m.

[4] Indians admitted in 1878.
[5] At any time in exceptional cases.
[6] Opened in 1884.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
ALABAMA.					
Normal—State Agricultural and Mechanical College (Negro—*day school.*)	1875	Anyone who can read and write.	(1)	None.	Tuition, none for residents of State, $5 per year for nonresidents.
ARKANSAS.					
Fort Smith—Lincoln High School (Negro—*day school*).	1902	Any pupil of high school.	(2)	21	Tuition, none for residents of district; not reported for nonresidents.
CONNECTICUT.					
Bridgeport—State Trade School:					
Day school	1910	Anyone	14	None.	Tuition, none for residents of State; not reported for nonresidents.
Day cooperative school	1910	Apprentices in machinists' or tool makers' trade.	16	None.	do
Evening school	1910	Anyone	14	None.	do
New Britain—State Trade School (*day school*).	1910	Anyone who has a rudimentary knowledge of arithmetic and can read, write, and speak English.	[4] 14	None.	do
South Manchester—South Manchester Evening School (*evening school*).	1906	Anyone employed during day.	14	None.	Deposit of $1; refunded if 45 evenings are attended.
Waterbury—Waterbury Evening High School (*evening school*).	1906	Anyone not attending day school.	14	None.	Tuition, none for residents of city; $3 per year for nonresidents.
DISTRICT OF COLUMBIA.					
Washington—Armstrong Manual Training School (Negro):					
Day school	1901	Anyone having finished eighth grade of grammar school or equivalent; anyone for special course.	None.[5]	None.	Tuition, none for residents of District of Columbia; not reported for nonresidents; pupils charged for breakage.
Evening school	1902	Anyone having common-school education.	16	None.	Tuition, none for residents of District of Columbia; not reported for nonresidents.
Washington—McKinley Manual Training School (*evening school*).	1909	Anyone not attending day school.	14	None.	Tool deposit, 25 cents; tuition, none.

[1] None; average age, 17 years.
[2] None; average age, probably 15 years.
[3] School too new to determine.
[4] Public-school pupils under 14 may attend during summer.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.

B.—PUBLIC SCHOOLS.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No	20	In full	Sept. 1 to June 1	Any time.	Monday to Friday, 7.30 to 11.45 a. m. and 1 to 4 p. m.; Saturday, 7.30 to 11.45 a. m.
None used.	70	do	Sept. 20 to June 3	At beginning of year.	Monday to Friday, 9 a. m. to 12 m. and 1.15 to 4 p. m.
Yes	(3)	Employers have agreed to give credit for 2 years in carpentry and machinists' trades.	School continues throughout year.	Any time.	Monday to Friday, 8 a. m. to 12 m. and 1 to 6 p. m.; Saturday, 8 a. m. to 12 m.
Yes	(3)	Hour for hour	Sept. 1 to May 1	do	Monday to Saturday, 8 a. m. to 12 m.; each pupil 4 hours per week.
Yes	(3)	School too new to determine.	School continues throughout year.	do	Monday to Friday, 7.30 to 9.30 p. m.; each pupil 3 evenings per week.
Yes	(3)	do	do	do	Monday to Friday, 8 a. m. to 12 m. and 1 to 6 p. m.; Saturday, 8 a. m. to 12 m.
None used.	66	Not as any part	Oct. 19 to Mar. 4	do	Monday, Tuesday, Thursday, and Friday, 7.30 to 9.30 p. m.
Yes	80	Not reported	Oct. 15 to Apr. 1	do	Monday, Tuesday, Thursday, and Friday, 7.15 to 9.15 p. m.
No	(6)	In full for plain sewing, dressmaking, and millinery; about 2 years in forging and machine shop; prepare to take examination for license to enter steam engineering and automobile care and operation.	Sept. 15 to June 20	At beginning of half-year terms.[7]	Regular course and girls' special trade course, Monday to Friday; boys' special course, Monday, Wednesday, and Thursday; regular pupils, 9 a. m. to 12.30 p. m. and 1 to 2.30 p. m.; special pupils, 9 a. m. to 12.30 p. m. and 1 to 4 p. m.
None used.	70	Not as any part	First Monday in October to fourth Wednesday in March.	Any time.	Monday, Wednesday, and Friday, 8 to 10 p. m.
do	60	Not reported	Dec. 1 to Apr. 1	do	Monday, Wednesday and Friday, 7.30 to 9.30 p. m. Machine-shop practice, cabinet-making, and wood turning divided into two groups, first group attends 1 evening per week, second group 2 evenings; electrical workers get 3 evenings.

[5] Special pupils, 16.
[6] Pupils withdraw about as follows: First year, 28 per cent; second, 25; third, 12; fourth, 5.
[7] Special pupils enter any time.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
GEORGIA.					
Columbus—Secondary Industrial School (*day school*).	1906	Any boy having finished seventh grade public school.	14	None.	Breakage deposit, $2; tuition, none for residents of city; $30 per year for nonresidents, payable in advance.
ILLINOIS.					
Chicago—Albert G. Lane Technical High School (*evening school*).	1907	Any except day-school pupils.	14	None.	Tuition, none for residents; not reported for nonresidents.
Chicago—Horace Mann (branch) School (carpenters' apprentices—*day school*).	1907	Any carpenter's apprentices.	16	None.	.....do.....
Chicago—James Otis School (carpenters' apprentices—*day school*).	1907	.....do.....	16	None.	.....do.....
Chicago—Lake High School (*evening school*).	1907	Any except day-school pupils.	14	None.	.....do.....
Chicago—Richard T. Crane Technical High School (*evening school*).	1907	.....do.....	14	None.	.....do.....
Freeport—Freeport High School (*day cooperative school*).	1909	Any boy able to pass high-school entrance examination.	[2] 14	21	Tuition, none for residents of city; $3 per month for nonresidents.
INDIANA.					
Knightstown—Soldiers' and Sailors' Orphans' Home of Indiana (*day school*).	1888	Inmates of home only; home admits orphans and children residing in the State who are children of soldiers or sailors.	13	[5] 15	None.....
MASSACHUSETTS.					
Beverly—Beverly Independent Industrial School (independent [6]—*day cooperative school*).	1909	Boys having completed the sixth grade school work.	14	21	Tuition, none for residents of Beverly; not reported for nonresidents.
Boston—Boston School of Printing and Bookbinding [7] (independent [6]—*day school*).	1910	Pupils of The Lyman School.	[8] 14	None.	Tuition, none for residents; not reported for nonresidents.
Boston—Central Evening Industrial School (independent [6]—*evening school*).	1908	Any resident of Boston working at trade during day.	14	None.	.....do.....
Boston—Girls' Trade School (independent [6]—*day school*).	[11] 1909	Any girl.....	14	18	Tuition, none for residents of Boston; $8 per month to nonresidents, paid by town from which pupil comes, one-half reimbursed by State.

[1] Except to indigent pupils.
[2] Seldom enter before 15, as law prohibits employment of children under 16 in factories.
[3] School too new to determine.
[4] After first school year pupils work in factory on Saturday.
[5] Pupils must leave at age of 16, unless time is extended to 18.
[6] For explanation of this term, see page 97.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No	55	In full	Sept. 1 to July 31	At beginning of half year terms.	Monday to Friday, 8 a. m. to 12 m. and 1 to 4 p. m.; Saturday 8 a. m. to 12 m.
No	Not reported.	Not reported	Oct. 18 to Feb. 25	Any time.	Monday to Friday, 7.30 to 9.30 p. m.
No.[1]	97	Day for day	Jan. 3 to Mar. 31	...do	Monday to Friday, 8.30 to 11.30 a. m. and 12 m. to 2.30 p. m.
No.[1]	Small.	.....do	.....do	...do	Monday to Friday, 8 to 11.30 a. m. and 12 m. to 1.30 p. m.
No	65	Not reported	Oct. 18 to Feb. 25	...do	Monday to Friday, 7.30 to 9.30 p. m.
No	20	.....do	.....do	...do	Do.
No	(3)	About 50 per cent	Sept. 1 to June 24	...do	Monday to Friday, 8.45 a. m. to 3.30 p. m.; 1½ hours intermission at noon.[4]
Yes	Not reported.	Not as any part	Sept. 15 to June 23	...do	Monday to Friday, 8.30 a. m. to 12 m. and 1.30 to 4 p. m.
Yes	(3)	School too new to determine.	Aug. 1 to July 16	...do	Theory, Monday to Friday, 8 to 11.45 a. m. and 1 to 5 p. m.; practice, Monday to Friday, 7 a. m. to 12 m. and 1 to 5 p. m.; Saturday, 7 a. m. to 12 m. alternate weeks.
Yes	(3)	Not as any part	Sept. 8 to June 22	At beginning of school year.	Monday to Friday, printing, 9 a. m. to 12 m. and 1 to 5 p. m.; bookbinding, 9 a. m. to 12 m. and 1.45 to 3.45 p. m.
None used.	9 80 10 52	Not as any part	Oct. 4 to Mar. 18	Any time.	Monday, Wednesday, and Friday, 7.30 to 9.30 p. m.
Yes	73	About 50 per cent in dressmaking and millinery.	Sept. 15 to June 22	...do	Monday to Friday, 8.30 to 5 p. m.; 1 hour intermission.

[7] Formerly called Pre-Apprentice School for Printing and Bookbinding.
[8] May enter bookbinding at 13.
[9] Steam engineering and machinists.
[10] Interior decorating.
[11] As a philanthropic enterprise in 1904.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
MASSACHUSETTS—continued.					
Boston—Glenway Industrial Classes, Oliver Wendell Holmes School District (*day school*).	1909	Anyone who does not intend to graduate in academic course.	12	None.	Tuition, none for residents; not reported for nonresidents.
Boston—High School of Practical Arts (*day school*).	1907	Graduates of city grammar school or by examination.	13	None.	Tuition, none for residents of Boston; $90 per year for nonresidents.
Boston—Quincy School (*day school*).	1909	Anyone who does not intend to graduate in academic course.	12	None.	Tuition, none for residents; not reported for nonresidents.
Cambridge—Evening Industrial School (independent[2]—*evening school*).	1906	Any male resident of Cambridge who is employed during day.	14	None.	Damage deposit, $3; residue refunded. Tuition, none for residents; not reported for nonresidents.
Chicopee—Chicopee Industrial School (*day school*).	1908	Any high-school boy electing the course.	None.	None.	Tuition, none for residents; not reported for nonresidents.
Chicopee—Chicopee Evening Industrial School (independent[2]—*evening school*).	1908	Anyone working during day at trades taught.	14	None.	Tool deposit, $3; refund made upon their return in good order; tuition, none for residents; not reported for nonresidents.
Fall River — Bradford Durfee Textile School of Fall River (independent incorporated[4]—*evening school*).	1904	Anyone desiring to become more proficient in occupations taught, or to gain a knowledge of a cotton mill occupation or of the industry as a whole.	16	None.	Tuition, none for State residents; $5 per year for nonresidents of State for each subject.
Fitchburg — Fitchburg High School (*day cooperative school*).	1908	Anyone able to enter high school.	15	None.	Tuition, none for residents; not reported for nonresidents.
Lawrence — Lawrence Industrial School (independent[2]):					
Day school	1909	Anyone having completed first 5 grades of public school.	14	None.	Tuition, none to residents of Lawrence; $100 per year (regardless of course or courses taken) for nonresidents, paid by city or town from which they come, one-half reimbursed by State.
Evening school	1908	Anyone	14	None.	Tuition, none to residents of Lawrence; $25 per year to nonresidents, paid by city or town from which they come, one-half reimbursed by State.

[1] School too new to determine.

[2] For explanation of this term, see page 97.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—PUBLIC SCHOOLS—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
Yes.....	(1)	Not as any part.....	Sept. 8 to June 22.....	At beginning of school year.	Monday to Friday, 9 a. m. to 12 m. and 2 to 4 p. m.
Yes.....	(1)	School too new to determine.	First Wednesday after Labor Day to last of June.	Any time.	Monday to Friday, 9 a. m. to 2.17 p. m.; 37 minutes intermission and 10 minutes consumed in opening each day.
Yes.....	(1)	Not as any part.....	Sept. 8 to June 22.....	At beginning of school year.	Monday to Friday, 9 a. m. to 12 m. and 2 to 4 p. m.
None used.	Not reported.	.....do.....	Second Monday in October to last Friday in March.	Any time.	Monday, Wednesday, and Friday, 7.30 to 9.30 p. m.
Yes.....	(1)	.....do.....	Day after Labor Day to school day nearest to June 30.	At beginning of school year.	Monday to Friday, first and second years, 8.30 a. m. to 1 p. m.; third and fourth years, 8.30 a. m. to 1 p. m. and 2 afternoons per week from 2.30 to 4 p. m.
None used.	(1)	.....do.....	Oct. 1 to Apr. 1.....	...do.....	Monday to Friday, 7 to 9 p. m.; pupils taking shopwork only attend 2 evenings per week; those taking drawing also attend 4 evenings.
No.....	50	Accepted in part; extent not reported.	Sept. 26 to Mar. 24....	Any time during first month.[3]	Monday, Tuesday, Thursday, and Friday, 7.30 to 9.15 p. m.; each pupil 2 evenings per week; cotton grading and stapling Saturday from 2 to 4 p. m.
Yes.....	(1)	Hour for hour.....	Sept. 7 to July 7.....	Any time.	Monday to Friday, 8 a. m. to 1 p. m.; 20 minutes intermission.
Yes.....	(1)	School too new to determine.	Sept. 8 to July 1.....	...do.....	Monday to Friday, 8.15 a. m. to 1 p. m. and 2 to 4 p. m.; hours vary with different classes.
Yes.....	67	Accepted as part; extent not reported.	Oct. 7 to Mar. 10.....	...do.....	Monday to Friday, 7.15 to 9.15 p. m.; firemen and steam engineers, 2 evenings per week; other courses 1 evening.

[3] By special provision thereafter.

[1] For explanation of this term, see page 503.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
MASSACHUSETTS—continued.					
Lowell—Lowell Textile School (independent incorporated [1]—*evening school*).	1897	Anyone who is graduate of grammar school or who can pass an examination in arithmetic and English.	None.	None.	Breakage deposit, $5 for first and second years; $10 for third and fourth years; residue refunded; tuition, none for residents of Lowell; nonresidents, $5 per year for each course; no refund except by vote of directors.
New Bedford—New Bedford Industrial School (independent [2]):					
Day school	[3] 1908	Anyone who can read and speak English and who is of legal age to begin work.	14	None.	Tuition, none for residents of New Bedford; $15 per month for nonresidents, one-half refunded if pupil leave before end of month; paid by municipality, one-half refunded by State.
Evening school	[5] 1908	Anyone desiring advancement in occupation and also women wishing to take up one of occupations taught.	14	None.	Tuition, none for residents of New Bedford; fixed by State board of education for nonresidents (paid by municipality from which nonresident comes, one-half refunded by State).
New Bedford—New Bedford Textile School (independent incorporated [1]—*evening school*).	1899	Anyone having a fair knowledge of arithmetic and English.	16	None.	Breakage deposit, $2.50; residue refunded; tuition, none for residents; not reported for nonresidents.
Newton—Newton Industrial School (independent [2]—*day school*).	1909	Any boy	14	18	Tuition, none for residents of Newton; $100 per year for complete course to nonresidents.
Springfield—Evening School of Trades (*evening school*).	1898	Anyone, but preference given those employed and former public school pupils of city.	14	None.	Material fee to residents of Springfield, machine-shop practice and tool making, $5; electricians, $4; plumbing, $8; woodworking and pattern making, $5 per term of 24 weeks; tuition, none for residents of Springfield; nonresidents, electricians, $10; machine-shop practice and tool making, $15; plumbing, $15; woodworking and pattern making, $15; per term of 24 weeks.

[1] For explanation of this term, see page 503.
[2] For explanation of this term, see page 97.
[3] Opened in 1909.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No.....	70	Accepted as part; extent not reported.	Oct. 15 to Mar. 20.....	During first 6 weeks of school year.	Monday, Tuesday, Thursday, and Friday, 7.30 to 9 p. m.; each course 2 evenings per week.
Yes.....	(4)	School too new to determine.	Sept. 8 to June 30.....	Any time.	Monday to Friday, 8.30 a. m. to 12 m. and 1.15 to 4.15 p. m.; Saturday, 8.30 a. m. to 12 m.
No.....	65	.....do.....	Oct. 1 to about May 20.	...do.....	Monday to Thursday, 7.30 to 9.30 p. m.; each pupil attends 2 evenings per week.
No.....	60	Not as any part.....	Oct. 10 to Mar. 17.....	At beginning of school year.	Monday, Tuesday; Thursday, and Friday, 7.30 to 9.15 p .m., each pupil 2 evenings per week.
Yes.....	(4)	School too new to determine.	Day after Labor Day to nearest Friday to July 15.	...do.....	Monday to Friday, 8.30 a. m. to 12 m. and 1 to 4 p. m.
No.....	75	Not as any part.....	Oct. 10 to Apr. 1.....	Any time.	Monday to Thursday, 7.15 to 9.15 p. m. Electricians, machine shop practice and tool making 2 evenings per week, plumbing 4, and woodworking and pattern-making 3.

[4] School too new to determine.
[5] Opened in 1910.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
MASSACHUSETTS—concluded.					
Springfield—Springfield Vocational School (*day school*).	1909	Boys recommended by principals of grammar schools.	14	None.	Tuition, none for residents of Springfield; not reported for nonresidents.
Worcester—Worcester Trade School (independent [2]—*day school*).	1910	Favor boys who have been admitted to high school; others who can not attend high school, if suited to work.	14	None.	Tuition, none to residents of Worcester; for nonresidents fixed by board of trustees, approved by State board, one-half paid by State and one-half by municipality from which nonresident comes.
MICHIGAN.					
Saginaw (East Side)—Trade School (*day school*).	1910	Boys residing in Saginaw, east side.	14	16	Tuition, none for residents; not reported for nonresidents.
MISSISSIPPI.					
Alcorn—Alcorn Agricultural and Mechanical College (Negro—*day school*).	1878	Anyone; if from chartered institution must present certificate of honorable dismission.	15	None.	Doctor's fee, $2.50 per per year; furniture fee, $1.50 per year; contingent fee, $3 per year; fuel fee, $3.50 per year; tuition, none for residents of State; $15 per year for nonresidents; payable in advance; no refund.
Columbus—Mississippi Industrial Institute and College (*day school*).	[3] 1884	Limited number from each county of State; must be healthy and furnish certificate of character.	16	None.	Matriculation fee, $5 per year; hospital fee, $5 per year; tuition, none for residents of State; not determined for nonresidents.
NEW JERSEY.					
Bordentown—Manual Training and Industrial School for Colored Youth (Negro—*day school*).	1894	Residents of State.....	14	None.	Matriculation fee, $1; medical fee, $1.25 per year; tuition, none.
Newark—Newark Technical School (*evening school*).	1885	Applicants for electrical workers' course pass examination in arithmetic; plumbers, in addition to examination, must have had 1 year's experience; those entering electroplating are admitted without examination.	16	None.	Tool deposit for plumbing and electrical wiring course $5, refunded; tuition, none for those too poor; electroplating, $7.50 per half year, first year, $5 per half year, second year; electrical wiring, $5 per half year; plumbing, $5 per half year; payable in advance; refund may be made upon application to trustees.

[1] School too new to determine.
[2] For explanation of this term, see p. 97.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—PUBLIC SCHOOLS—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
Yes	(1)	Not as any part	Sept. to July	At or near beginning of term in Sept. or in Feb.	Monday to Friday, 9 a. m. to 12 m, and 2 to 5 p. m.; recess of 45 minutes.
Yes	(1)	School too new to determine.	Sept. 1 to July 31	At beginning of quarter.	Monday to Friday, 8 a. m. to 12 m. and 1 to 5 p. m.; Saturday, 8 a. m. to 12 m. may be required.
None used.	(1)	do	Sept. 1 to June 24	At beginning of year.	Monday to Friday, 8 a. m. to 12 m. and 1.30 to 3.30 p. m.
No	40	In full	Sept. 7 to May 24	At beginning of any of three terms.	Monday to Friday, 7.40 a. m. to 12.30 p. m. and 2 to 5 p. m.
No	50	do	Sept. 22 to June 1	At discretion of president.	Monday to Friday, 8 a. m. to 1 p. m. and 2 to 5 p. m.; industrial classes are scattered, consequently hours will not conform with total hours shown on Table I.
Yes	85	Not as any part	Oct. 1 to May 31	Any time.	Monday to Friday, 8 a. m. to 12 m. and 1.30 to 4 p. m.; Saturday, 8 to 12 m.; 1 hour recess each week.
No	10	do	First Monday in October to second Friday in May.	do	Monday to Friday, 6.30 to 9.30 p. m.; electroplating, first year, 2 days of 2 hours each per week and 2 days of 1 hour each per week; second year, 3 days of 2 hours each and 1 of 1 hour each per week; electrical wiring, first year, 2 days of 1 hour each and 1 of 2 hours each per week; second year, 1 day of 2 hours per week; plumbing, first year, 3 days of 2 hours each and 2 days of 1 hour each per week; second year, 4 days of 2 hours each per week.

[3]Opened in 1885.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
NEW JERSEY—concluded.					
Newark—Sara A. Fawcett Drawing School (*evening school*).	1908	Anyone qualified to take the course.	15	None.	Tuition, none for residents; $20 per year for nonresidents, payable in advance; no provision for refund.
Newark—Warren Street Elementary Industrial School (*day school.*)	1910	Boys who have completed fifth grade in the city schools and show adaptation for hand work.	14	None.	Tuition, none for residents; not reported for nonresidents.
NEW YORK					
Albany—Vocational School (*day school*).	1909	Anyone having completed sixth grade.	None.	None.	Tuition, none for residents of city; nonresidents $16 per year.
Brooklyn—Brooklyn Evening Technical and Trade School (*evening school*).	1905	Adults or grammar school graduates.	15	None.	Tuition, none for residents; not reported for nonresidents.
Buffalo—Seneca Vocational School (*day school*).	1909	Public school boys who have completed sixth grade or who are 13 years of age or over.	12	None.	.....do.....
Buffalo—Technical Evening High School (*evening school*).	1904	Anyone working at trades taught or who has passed through grammar school.	18	None.	Entrance fee, $2, to be refunded after an attendance of 43 per cent of term; tuition fee, none.
Gloversville—Vocational School [2] (*day school*).	1909	Any boy or girl from grammar or high school.	14	18	Tuition, none for residents; not reported for nonresidents.
Hudson—Industrial School (*day school*).	1909	Any boy or girl who has completed sixth grade.	14	18	.....do.....
Iroquois—Thomas Indian School (Indian—*day school*).	1875	Orphan, destitute, or needy Indian children of New York State reservations.	Not reported.	Not reported.	Tuition, none.....
Lancaster—Industrial Department, Lancaster Public Schools (*day school*).	1909	Any boy from seventh and higher grades.	[3]	None.	Tuition, none for residents; not reported for nonresidents.
Long Island City—Long Island City Evening High and Trade School (*evening school*).	1905	Anyone working during day.	16	None.	.....do.....
New York—Industrial Evening School (mostly Negro—*evening school*).	1905	Anyone.....	16	None.	.....do.....
New York—Manhattan Trade School for Girls (*day school*).	[4] 1902	Any girl graduate of eighth grade who can pass examination in reading, writing, common and decimal fractions, weights and measures.	14	17	.....do.....

[1] School too new to determine.
[2] There is also an evening school; see Table I.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
None used.	75	Not as any part.....	Oct. 1 to Apr. 30.....	Any time.	Monday to Friday, 7.30 to 9.30 p. m.; each pupil 2 evenings per week.
Yes.....	(1)	.....do.....	Sept. 12 to June 30....	...do.....	Monday to Friday, 9 a. m. to 12 m. and 1 to 4 p. m.
Yes.....	Not reported.	.....do.....	Sept. 13 to June 17....	...do.....	Monday to Friday, 8.30 a. m. to 3.15 p. m.; 45 minutes intermission.
None used.	50	.....do.....	Third Monday in September to middle of May.	...do.....	Monday to Thursday, 7.45 to 9.45 p. m.
Yes.....	(1)	School too new to determine.	First Monday in September to June 25.	...do.....	Monday to Friday, 8 a. m. to 2 p. m.; 30 minutes intermission.
Yes.....	90	Not as any part.....	September to April...	At beginning of school year.	Monday, Wednesday, and Friday, 7.30 to 9.30 p. m.
Not reported.	85	School too new to determine.	Aug. 30 to June 23....	At beginning of half-year terms.	Monday to Friday, 8.30 to 11.45 a. m. and 1.15 to 3.15 p. m.
Yes.....	80	Not as any part.....	Sept. 7 to June 22.....	At beginning of school year.	Monday to Friday, 8.30 to 11.25 a. m. and 1 to 3.25 p. m.
Yes.....	85	.....do.....	Sept. 1 to June 30.....	Any time.	Monday to Friday, 8.30 a. m. to 12 m. and 1 to 4.30 p. m.; also 7.15 to 8.15 p. m.
No.....	(1)	.....do.....	September to June....	At beginning of school year.	Monday to Friday, 9 a. m. to 12 m. and 1 to 3.30 p. m.
None used.	About 1.	Not reported.....	Third Monday in September to middle of May.	Any time.	Monday to Thursday, 7.30 to 9.30 p. m.
None used.	Not reported.	Varies with individuals.	Last week in September to Easter.	...do.....	Monday to Thursday, 7.30 to 9.30 p. m.
Yes.....	....do...	Qualified for skilled workers in mounting and machine operating; as assistants in dressmaking and millinery.	School continues throughout year, except vacations, aggregating 4 weeks.	...do.....	Monday to Friday, 9 a. m. to 12.15 p. m. and 1.15 to 5 p. m. Close during July and August at 3 p. m.

[3] None; but admission of pupils under 14 is discouraged.
[4] As a New York public school, 1910.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
NEW YORK—concluded.					
New York—Stuyvesant Evening Trade School (*evening school*).	1908	Any male	14	None.	Tuition, none for residents; not reported for nonresidents.
New York—Vocational School for Boys (*day school*).	1909	Any boy having completed eighth grade, admitted on approval of principal.	14	None.	do
New York—Washington Irving High School (*day school*).	1902	Girls having completed elementary school work or having ability to pass such examination.	13	None.	do
Rochester—School of Domestic Science and Domestic Art (*day school*).	[1] 1909	Girls having completed sixth grade.	14	None.	do
Rochester—Shop School (Lexington Avenue—*day school*).	[2] 1908	Boys who have completed the sixth grade.	14	18	do
Rochester—Shop School (Washington School—*day school*).	1909	do	14	18	do
Schenectady—Industrial School (*day school*).	1909	do	14	17	do
Syracuse—Syracuse Technical High School (*day school*).	1908	Anyone having completed grammar school or its equivalent or given evidence of ability to take up the work.	None.	None.	Tuition, none for residents; nonresidents, $17 per year.
Yonkers—Trade School of Yonkers:					
Day school	[6] 1909	Anyone having completed seventh grade.	14	None.	Tuition, none for residents; not reported for nonresidents.
Evening school	1910	Anyone	16	None.	do
Yonkers—Yonkers Vocational School (*day school*).	1910	Anyone having completed sixth grade.	None.	None.	do
OHIO.					
Cincinnati—Cincinnati Continuation School (*day cooperative school*).	1909	Apprentices in shops	16	None.	do
Cincinnati—Cincinnati Evening School (*evening school*).	1906	Females not attending day school.	14	None.	Tuition, none for residents; $1 per month for nonresidents.

[1] Reorganized in 1910.
[2] Carpentry and plumbing in 1910.
[3] When ready pupils are promoted to Lexington Avenue Shop School.
[4] To indigent students only.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—PUBLIC SCHOOLS—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
None used.	Very few.	May shorten it in some cases.	Sept. 19 to May 6	Any time.	Monday to Thursday, 7.30 to 9.30 p. m.
Yes	Not reported.	Not as any part	Second Monday in September to last school day in July.	do	Monday to Friday, 9 a. m. to 12 m. and 1 to 5 p. m.
Yes	94	Not reported	Sept. 12 to June 30	do	Monday to Friday, 8.45 a. m. to 12 m. and 12.30 to 2.30 p. m.
No	91	In millinery and dressmaking girls are able to receive wage from start, whereas they usually work gratis while learning.	September to June	do	Monday to Friday, 9 a. m. to 12 m. and 12.30 to 3.30 p. m.
No	50	One establishment allows 1 year's credit for 2 years' school work in plumbing.	do	do	Monday to Friday, 8.30 to 11.30 a. m. and to 12 m. to 3 p. m.
No	(3)	(3)	do	do	Monday to Friday, 9 to 11.30 a. m. and 12.30 to 3.30 p. m.
Yes	90	Not reported	do	At beginning of half-year terms.	Monday to Friday, 8.30 to 11.30 a. m. and 12 m. to 3 p. m.
(4)	(5)	Not as any part	Tuesday after first Monday in September to latter part of June.	Any time.	Monday to Friday, 8 a. m. to 1.15 p. m.; 30 minutes for luncheon and 15 minutes recess.
Yes	80	Not reported	September to June	do	Monday to Friday, 9 a. m. to 3.30 p. m., with 30 minutes intermission.
None used.	Not reported.	Not as any part	Oct. 1 to May 1	do	Monday, Tuesday, Thursday and Friday, 7.30 to 9.30 p. m., each pupil 2 evenings per week.
Yes	Not reported.	do	Sept. to June	do	Monday to Friday; hours not reported.
Yes	(7)	Hour for hour	Sept. 1 to Aug. 1	do	Monday to Saturday, 7.30 to 11.30 a. m. and 1.30 to 5.30 p. m.; each pupil 4 hours per week.
None used.	Not reported.	Not as any part	Oct. 4 to Mar. 25	During first half session.	Monday to Thursday, 7.15 to 9.15 p. m.; each pupil 2 evenings per week.

[5] Machine-shop practice, 97 per cent; pattern making and wood turning, 90; joinery and cabinetmaking, 85; and dressmaking 98.
[6] Opened in 1910.
[7] School too new to determine.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Continued.

Locality, and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
OHIO—concluded.					
Cleveland—Elementary Industrial School (*day school*).	1909	Those having passed the fifth grade or who are over 13 years old.	[1] 13	None.	Tuition, none for residents; not reported for nonresidents.
Cleveland—Technical High School (*evening school*).	1909	Those working during day at trades taught.	None.	None.	Tuition, $5 for term of 10 weeks; $1.25 refunded if pupil attends 85 per cent of term.
Columbus—Columbus Trades School:					
Day school	1909	Boys having passed the sixth grade.	14	None.	Tuition, none for residents; not reported for nonresidents.
Evening school	1909	Any resident of Columbus.	14	None.	....do....
Dayton—High Industrial School (*evening school*).	1909	Any resident of Dayton who is employed during day.	16	None.	Breakage deposit $1; residue refunded.
PENNSYLVANIA.					
Altoona—High School (*day school*).	1905	Anyone having completed the eighth grade or its equivalent.	None.	None.	Pupils accountable for breakage. Tuition, none for residents under 21; all others, $5.50 per month, payable in advance.
Carlisle—U. S. Indian School (Indian—*day school*).	1879	Anyone of at least one-eighth Indian blood; others also admitted. See page 340.	14	21	Tuition, none, except for Indians of Five Civilized Tribes and for pupils from Porto Rico and Philippines; for these, $167 per year.
Philadelphia — Philadelphia Trades School (*day school*).	1906	Anyone 15 years of age or anyone having completed the eighth grade and otherwise qualified.	[6] 15	None.	Tuition, none for residents; not reported for nonresidents.
Philadelphia—Evening Trades School No. 1 (*evening school*).	1906	Males who can read and write and are able physically to take up work.	15	None.	....do....
Philadelphia—Evening Trades School No. 2 (*evening school*).	1907	Males who can read and write and are able physically to take up work.	14	None.	....do....
Scotland—Soldiers' Orphans' Industrial School (*day school*).	[7] 1893	Orphans or children of permanently disabled, honorably discharged Pennsylvania soldiers, sailors, and marines who served in Civil, Spanish-American, or Philippine Wars.	12	14	....do....

[1] None for pupils who have passed fifth grade.
[2] Except to indigent pupils.
[3] Pattern making or cabinetmaking, 2 evenings per week; forging or machinists, 1.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—PUBLIC SCHOOLS—Continued.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
No[2]	85	Not as any part	Second Monday in September to June.	Any time.	Monday to Friday, 8.30 to 11.30 a. m. and 12.15 to 3.15 p. m.
None used.	92	Accepted in sheet-metal pattern work, extent not reported.	October to April	At beginning of half-year terms.	Monday, Tuesday, Thursday and Friday, 7.15 to 9.15 p. m.; each class 2 evenings per week.
Yes	Not reported.	School too new to determine.	Not reported	Any time.	Monday to Friday, 8.15 to 11.30 a. m. and 1 to 3.30 p. m.
None used.	Not reported.	do	do	do	Monday to Friday, 7 to 9 p. m.
do	Not reported.	Not as any part	Oct. 1 to Mar. 31	do	Monday to Friday, 7.30 to 9.30 p. m.[3]
Yes	[4] 50	Accepted in part in machine work, blacksmithing and cabinetmaking; extent not reported.	Sept. 1 to June 1	do[5]	Monday to Friday, 9 a. m. to 12 m. and 12.30 to 2 p. m.
Yes	33	In full	Sept. 1 to June 15	do	Trade classes: Monday to Saturday, 7.30 to 11.30 a. m. and 1 to 5 p. m. Academic classes: Monday to Friday, 8.30 to 11.30 a. m. and 1 to 4 p. m. Pupils attend each division a half day and alternate forenoon and afternoon work each month.
Yes	Not reported.	Accepted; extent not reported.	Sept. 8 to June 24	do	Monday to Friday, 9 a. m. to 3.30 p. m.; 30 minutes per day intermission.
Yes	[4] 30	do	October to March	do	Monday to Friday, 7.30 to 9.30 p. m.
Yes	30	About five-eighths of 4 years.	do	do	Do.
Yes	Nearly all.[8]	Accepted; extent not reported.	Sept. 1 to June 30	do	Monday to Friday, 8.30 to 11.30 a. m. and 1.30 to 4.30 p. m.

[4] Estimated.
[5] Grammar-school pupils must enter at beginning of school year.
[6] May enter earlier if sufficiently equipped.
[7] Opened in 1895.
[8] None quit from voluntary choice.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

B.—PUBLIC SCHOOLS—Concluded.

Locality and name and kind of school.	Year school was established.	Persons accepted as pupils.			Fees, deposits, and bonds.
		General limitations.	Age limit for entrance (years).		
			Lowest.	Highest.	
RHODE ISLAND.					
Providence—Evening Technical School (*evening school*).	1909	Those employed during day desiring additional knowledge of their trade.	None.	None.	Tuition, none for residents; $40 per year for nonresidents.
Providence—Technical High School (*day cooperative school*).	1910	Grammar-school graduates who may after 3 months trial be accepted as apprentices.	14	None.	.....
WISCONSIN.					
Milwaukee—Milwaukee School of Trades for Boys:					
Day school.....	[1] 1907	Those able to read, write, and perform fundamental arithmetic.	16	None.	Material fee, $1 per month for residents under 20 years of age. Tuition, residents under 20 years, none; over 20, $5 per month; nonresidents, $15 per month, in advance; no provision for refund.
Evening school.....	1906	.....do.....	16	None.	Material fee, $1 per month for residents under 20 years of age. Tuition, residents under 20 years, none; 20 or over, $4 per month; nonresidents, $4 per month, in advance; no provision for refund.
Milwaukee—Milwaukee School of Trades for Girls (*day school*).	1909	Females able to read, write, and perform fundamental arithmetic.	14	None.	Material fee, 50 cents per month for residents under 20 years of age. Tuition, residents under 20 years, none; over 20, $5 per month; nonresidents, $15 per month, in advance; no provision for refund.
Platteville—Wisconsin State Mining Trade School (*day school*).	1908	Those having completed eighth grade or equivalent.	None.	None.	Material fee, $20 per year; breakage deposit, $5; residue refunded. Tuition, none for residents of State; $50 per year for nonresidents.

[1] School too new to determine.
[2] After first year every Saturday spent in the shop.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

B.—**PUBLIC SCHOOLS**—Concluded.

Books furnished free.	Per cent of pupils entering who finished school course.	Extent to which school work is accepted as part of apprenticeship, or as training for trade.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
Yes.....	(1)	Not as any part.....	Oct. 4 to Feb. 11.....	Any time.	Monday, Tuesday, Thursday, and Friday, 7.30 to 9.30 p. m.
Yes.....	(1)	43 per cent.....	Sept. 13 to June 24.....	At beginning of half-year terms.	Monday to Friday,[2] 9 a. m. to 3 p. m., with 20 minutes for luncheon.[3]
Yes.....	20	Not reported.....	Aug. 1 to July 15.....	Any time.	Monday to Friday, 8 a. m. to 12 m. and 1 to 5 p. m.; Saturday, 8 a. m. to 12 m.
Yes.....	None.	.....do.....	Oct. 1 to Apr. 30.....	...do.....	Monday, Tuesday, Thursday, and Friday, 7.30 to 9.30 p. m.
Yes.....	(1)	School too new to determine.	Aug. 1 to July 15.....	...do.....	Monday to Friday, 8.30 a. m. to 12 m. and 1 to 4.30 p. m.
No.....	50	Not reported.....	Sept. 7 to June 10.....	...do.....	Monday to Friday, 8 a. m. to 12 m. and 1 to 5 p. m.

[3] Time is also lost in changing classes and intermissions for preparation.
[4] As private school by Merchants & Manufacturers' Association in 1906.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

C.—APPRENTICESHIP SCHOOLS.

Locality and name and kind of school.	Year school was established.	Age limit for entrance (years).		Fees, deposits, and bonds.
		Lowest.	Highest.	
Central Railroad of New Jersey, Elizabethport, N. J. (*day school*).	1905	17	None.	None
Chicago Great Western Railway, Oelwein, Iowa (*day school*).	1908	16	20	do
Delaware and Hudson Co. (3 localities[1]—*day schools*).	1907	17	21	do
Delaware, Lackawanna and Western Railroad (3 localities[2]—*day schools*).	1910	16	21	do
Erie Railroad (5 localities[3]—*day schools*).	1908	16	21	do
Grand Trunk Railway, Battle Creek, Mich. (*evening school*).	1902	16	21	do
New York Central Lines (9 localities[4]—*day schools*).	1905	17	21	do
Pennsylvania Railroad, Altoona, Pa. (*day school*).	1910	(5)	(5)	do
Santa Fe System (24 localities[6]—*day schools*).	1907	16	22	do
Union Pacific Railroad, Omaha, Nebr. (*evening school*).	1906	16	None.	do
CONNECTICUT.				
Bridgeport—Y. M. C. A. (metal-trades employers—*day school*).	1908	14	None.	Tuition, $25 per term of 35 weeks, paid by employers.
Stamford—Yale & Towne Manufacturing Co. (*day school*).	1907	16	None.	None
ILLINOIS.				
Chicago—International Harvester Co. (*day school*).	1906	16	None.	do
Chicago—Lakeside Press:				
Day school (preapprentice)	1908	14	15	do
Evening school	1908	16	About 20	do
Chicago—Western Electric Co. (*day school*).	1907	16	20	do
MASSACHUSETTS.				
Boston—North End Union School of Printing (*day school*).	1900	16	None.	Tuition, $100 per year in quarterly or semiannual payments, by pupil.
Ludlow—Ludlow Manufacturing Co. (*day school*).	1907	14	16	None
Quincy—Fore River Shipbuilding Co. (*day school*).	1906	16	18	do
West Lynn—General Electric Co. (*day school*).	1902	[8]15	None.	do

[1] For localities, see page 164.
[2] For localities, see page 163.
[3] For localities, see page 160.
[4] For localities, see pages 149 and 150.
[5] Not reported.
[6] For localities, see page 155.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Continued.

C.—APPRENTICESHIP SCHOOLS.

Books furnished free.	Extent to which school work is accepted as part of apprenticeship.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
None used.	Hour for hour.....	Sept. 15 to June 15.	Any time .	Monday, Wednesday, and Friday, 2.45 to 4.45 p. m.; each boy attends one afternoon per week.
Yes.....	2 per cent.....	School continues throughout year.	...do.....	Monday to Saturday, 1 to 2 p. m.; each boy attends 1 hour per week.
Yes.....	Hour for hour.....	.....do.....	...do.....	Monday to Friday, 7 a. m. to 12 m. and 1 to 6 p. m.; each boy attends 5 hours per week.
Yes.....	.....do.....	Sept. 1 to Aug. 1..	...do.....	Monday to Friday, hours vary from 9 a. m. to 4.30 p. m.; each boy attends 3 hours per week.
Yes.....	.....do.....	Sept. 1 to June 30.	...do.....	Monday to Friday, 7 to 9 a. m. and 1 to 3 p. m.; Saturday, 7 to 9 a. m.; each boy attends 4 hours per week.
Yes.....	Not as any part, but is required.	Oct. 1 to June 30..	...do.....	Tuesday and Thursday, 7 to 9 p. m.
Yes.....	Hour for hour.....	September to July.	...do.....	Monday to Saturday, 7 to 9 a. m; each boy attends 4 hours per week.
Yes.....	.....do.....	First Monday in September to second Friday in July.	...do.....	Monday to Friday, 10 a. m. to 12 m., 1 to 3 p. m., and 3.30 to 5.30 p. m.; each boy attends 4 hours per week.
Yes.....	.....do.....	School continues throughout year.	...do.....	Monday to Saturday, hours vary from 7 to 9 a. m. and 1 to 3 p. m.; each boy attends 4 hours per week.
No.....	Not as any part, but is required.	October to June...	...do.....	Monday, Tuesday, Thursday, and Friday, first year, arithmetic, 7.30 to 8.30 p. m.; second year, elementary mechanics, 5.10 to 6.10 p. m.; third year, mechanical drawing, 7.30 to 9.30 p. m.; each pupil attends 2 nights per week.
No.....	Hour for hour.....	Nov. 1 to July 14..	...do.....	Monday to Saturday, 10 a. m. to 12 m. and 4 to 6 p. m.; each boy attends 6 hours per week.
No.....	.....do.....	Sept. 1 to May 4 ..	...do.....	Monday, Tuesday, Thursday, and Friday, 9 a. m. to 12 m.; each boy attends 1 period of 1½ hours per day.
None used.	.....do.....	School continues throughout year.	...do	Tuesday to Friday, 12:30 to 1:30 p. m.; each pupil attends 2 days per week.
Yes.....	.....	.....do.....	At beginning of half-year terms.	Monday to Saturday, hours not reported.
Yes.....	Not any part, but is required.	Oct. 5 to Apr. 28...	Any time.	Tuesday and Thursday, 6 to 7.15 p. m.
None used.	Hour for hour.....	Sept. 1 to June 30..	...do.....	First year, Monday, Wednesday, Thursday, and Friday; 2d, Tuesday, Wednesday, Thursday, and Friday; 3d, Friday; 4.15 to 5.15 p. m.
Yes.....	One year.....	Sept. 1 to Aug. 15..	...do	Monday to Friday, 7.20 a. m. to 12 m. and 1 to 5 p. m.; Saturday, 7.20 to 12 m.
Yes.....	Hour for hour.....	Aug. 22 to July 16.	Any time when there is a vacancy.	Monday to Friday, 8.30 to 11.30 a. m. and 1 to 4 p. m. Pupils attend one-half of each day.
(7)	.....do.....	Oct. 1 to May 1....	At beginning of year.	Monday to Saturday, 8 a. m. to 12 m. Each pupil attends 4 hours per week during first year and 1 hour during the 2d, 3d, and 4th years.
(9)	.....do.....	Sept. 1 to June 30.	At beginning of 1 of 3 terms.	Monday to Friday, 8.30 a. m. to 12 m. and 1 to 6 p. m. Pupils attend from 3 to 12 hours per week. See Table I, pages 640 and 641.

[7] Sets of practical problems.
[8] 16 for molders (brass, iron, and steel) and steamfitting.
[9] Lecture notes, problems, etc.

TABLE III.—YEAR ESTABLISHED, PERSONS ACCEPTED AS PUPILS, TERMINAL DATES, SCHOOL

C.—APPRENTICESHIP SCHOOLS—Concluded.

Locality and name and kind of school.	Year school was established.	Age limit for entrance (years).		Fees, deposits, and bonds.
		Lowest.	Highest.	
MICHIGAN.				
Detroit—Cadillac Motor Car Co. (*day school*).	1907	18	None.	None.
NEW YORK.				
Dunkirk—American Locomotive Co. (*evening school*).	1909	17	None.	.....do.....
New York—R. Hoe & Co. (*evening school*).	1872	16	18	.....do.....
Schenectady—General Electric Co. (*day school*).	1908	16	18	.....do.....
Solvay—Solvay Process Co. (*day school*)..	1908	16	18	.....do.....
PENNSYLVANIA.				
East Pittsburg—Westinghouse Electric & Manufacturing Co. (*day school*).	1909	16	21	.....do.....
Philadelphia—George V. Cresson Co. (*day school*).	1907	17	19	A deposit of $5 to cover probation of 6 months, then a deposit of $20. If apprentice proves satisfactory, these deposits are returned.
Wilmerding—Westinghouse Air Brake Co. (school operated by Y. M. C. A.—*day school*).	1906	16	None.	Locker deposit, 50 cents; refunded.
RHODE ISLAND.				
Providence—Brown & Sharpe Manufacturing Co. (*day school*).	1908	16	22	None.

FEES, ACCEPTANCE OF SCHOOL WORK ON APPRENTICESHIP, DAYS AND HOURS, ETC.—Concluded.

C.—**APPRENTICESHIP SCHOOLS**—Concluded.

Books furnished free.	Extent to which school work is accepted as part of apprenticeship.	Dates of beginning and ending of school year.	When pupils may enter.	School days and hours.
Not reported.	Hour for hour.....	School continues throughout year.	Any time.	Monday to Saturday, 12.30 to 1.30 p.m.; each boy attends 1 hour per week.
None.....	Not any part, but is required.	First week in October to first week in June.	...do	Monday, Tuesday, and Wednesday, 7.30 to 9.30 p. m.; each pupil attends 1 night per week.
Yes.....	.....do.....	First Monday in October to June 1.	...do.....	Monday to Saturday, 5.20 to 6.45 p. m. Pupils attend 3 evenings per week first 3 years, and 2 evenings per week during last 6 months.
No.....	Hour for hour.....	First week in September to last of July.	...do.....	Monday to Saturday, 8.15 a. m. to 12.15 p. m. and 1.15 to 5 p. m.; each boy attends three 70-minute periods per week.
None used.	Not reported.....	School continues throughout year.	...do.....	Monday to Friday, 8 a. m. to 3 p. m., with 1 hour intermission; pupils attend alternate weeks.
Not reported.	Hour for hour.....	.....do	...do.....	Monday to Saturday, 7 to 9 a. m.; each pupil attends 2 days per week.
No.....	About one-eighth..	First of September to third week in April.	At beginning of half-year terms.	Monday, Tuesday, Thursday, and Friday, 4 to 6 p. m. Each pupil attends 2 days of 2 hours each and 2 days of 1 hour each.
No.....	.....do.....	Middle of September to early in June.	Any time.	Monday to Friday, 7.15 to 10.45 a. m. Each pupil attends one-half time.
Yes.....	Hour for hour.....	September to June	...do.....	Monday to Friday, 7 to 9 a. m. and 1 to 3 p. m.; Saturday, 7 to 9 a. m.; classes follow each other; each boy attends 2 hours per week for the 1st and 2d years, and 4 hours per week for the 3d and 4th years.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT.

The first column shows the locality, name, and kind of school. The various types and classes of schools are defined and described in Chapter I.

The second column shows, first, the governing board—that is, the board in executive control of the school, regardless of the name by which such board is known; the number of members composing such board, how they are selected, and their occupations; and, second, like data concerning the advisory board, if there be one. The function of the "advisory" board, however composed, is of an advisory nature only, with no authority to execute its own wishes. Subcommittees of the governing board have not been considered advisory boards.

In all public schools, except the "independent" and "independent corporation" schools of Massachusetts and a few others which are noted, the governing board given is the regular school board.

The third column shows the source of materials used in the school in the practice work and, incidentally, the cost, where obtainable.

The fourth column shows of what the product, if any, of the school consists and what disposition or use is made of it. Incidentally the value of the product is given.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT.

A.—PHILANTHROPIC SCHOOLS.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
ALABAMA.			
Snow Hill—Snow Hill Normal and Industrial Institute (Negro—*day school*).	GOVERNING BOARD.—11 members; chosen by board of trustees; all teachers in the school. ADVISORY BOARD.—17 members; self-perpetuating; 2 farmers, 1 hotel proprietor, 1 lawyer, 2 merchants, 2 ministers, 1 landlord, 1 planter and merchant, 1 president of institute, 1 principal of school, 1 retired broker, 2 teachers, 1 treasurer of school, 1 not reported (woman).	(1)	Wagons, carts, bricks furniture, printing; sold in the open market.

[1] Not reported.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
ALABAMA—concluded.			
Tuskegee—Tuskegee Normal and Industrial Institute (Negro—*day school*).	GOVERNING BOARD.—18 members; appointed by the conductor of the institute; principal, treasurer, and others holding various official positions in the institute. ADVISORY BOARD.—21 members; self-perpetuating; 2 bankers, 3 capitalists, 1 corresponding secretary of institute, 1 ex-mayor New York, 1 ex-president United States, 1 lawyer, 5 merchants, 1 minister, 1 planter, 1 president institute, 3 state commissioners, 1 treasurer of institute.	School.....	Building construction and repair work, including carpentry, plumbing and steam fitting, plastering, painting, tinsmithing, bricklaying, electrical wiring, tile setting, lathing; electrical work; newspapers, books, pamphlets, commercial printing; vehicles, hand carts, wheelbarrows; harness, furniture; repair of machinery; foundry products, including sash weights, grate bars, ventilators, fire dogs, stove and machine castings; shoes; brick, tinware, clothing; laundry work; part of product used by institution and part sold in open market; receipts from products sold and work done, $2,725.
CALIFORNIA.			
San Francisco—California School of Mechanical Arts (*day school*).	GOVERNING BOARD.—7 members; self-perpetuating; 1 engineer, 5 merchants, 1 vacancy.	.....do.....	Hoists, engines, turbines, motors, castings, patterns, forgings; sold.
San Francisco—Wilmerding School of Industrial Arts (*day school*).	GOVERNING BOARD.—Number of members not reported; appointed by the governor of California; capitalists, lawyers, merchants, ministers, philanthropists. ADVISORY BOARD.—4 members; chosen by the regents of the University of California; 2 lawyers, 1 merchant, 1 president of State university, member ex officio.	School; cost, $5,408.	Furniture, plumbing sheet-metal fixtures, buildings; sold or used by school; receipts from products sold $7,179.
CONNECTICUT.			
New London—Manual Training and Industrial School of New London (*day school*).	GOVERNING BOARD.—11 members; self-perpetuating; 3 bankers, 1 builder, 1 capitalist, 1 lawyer, 1 mayor, 2 manufacturers, 1 physician, 1 superintendent public schools.	School and pupils.	No product.
ILLINOIS.			
Chicago—Chicago Girls' Trade School (*day school*).	GOVERNING BOARD.—9 members; self-perpetuating; 1 assistant superintendent, mission; 1 building contractor, 1 insurance agent, 1 iron merchant, 1 judge, 1 lawyer, 1 publisher, 2 not reported. ADVISORY BOARD.—5 members; chosen by board of directors; 1 broker, 1 capitalist, 1 court clerk, 1 printer, 1 vice president trust company.	School; cost, $200.	Articles made by millinery and sewing pupils; disposed of at public exhibits.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
ILLINOIS—concluded.			
Chicago—Lewis Institute (*day cooperative school*).	GOVERNING BOARD.—11 members; self-perpetuating; 2 bankers and manufacturers, 1 contractor and builder, 1 director institute, 1 electrical expert, 1 judge, 1 lawyer, 1 manufacturer, 1 physician, 2 university presidents.	School; cost, $500.	Patterns, tools, machine-shop articles, castings, shop equipments, etc.; "scrapped," sold, or taken by pupils after paying cost of materials.
Glenwood—Illinois Manual Training Farm (*day school*).	GOVERNING BOARD.—6 members; chosen by members of the school corporation; 2 bankers, 1 manufacturer, 1 real estate agent, 1 vice president mercantile corporation, 1 wholesale grocer. AUXILIARY BOARD.—4 members; ladies responsible for providing clothing and caring for the beds; how appointed not reported.	School.....	Wood and metal work; mostly used by institution; some sold.
Peoria—Bradley Polytechnic Institute: Horological Department (*day school*).	GOVERNING BOARD.—7 members; self-perpetuating; 2 bankers, 1 farmer, 2 judges, 1 university president, 1 university professor of sociology.	School (cost, $1,000) and pupils.	No product.
INDIANA.			
Indianapolis—National Trade Schools (*day school*).	School now in hands of receiver, undergoing reorganization.	(1)	Products from the machinery, foundry, pattern-making, carpentry, bricklaying, printing, and lithographing departments disposed of to the parties ordering the work.
MARYLAND.			
Baltimore—Maryland Institute for the Promotion of the Mechanic Arts (*day school*).	GOVERNING BOARD.—25 members; chosen by members of the institute; 1 architect, 3 bankers, 1 contractor, 1 farmer, 1 lawyer, 10 manufacturers, 3 merchants, 1 railway manager; 4 not reported.	Pupils.....	Retained or disposed of by pupils.
MASSACHUSETTS.			
Boston—Franklin Union: *Day school (Saturday afternoon).*	GOVERNING BOARD.—12 members; appointed by the State supreme court; 1 banker, 4 lawyers, 1 mayor of Boston, 1 merchant, 3 ministers, 1 representative of organized labor, 1 teacher.	School; cost $1,300, including evening school.	No product.
Evening school.....	GOVERNING BOARD.—Same as for day school.	School. (See day school.)	Do.
Boston—Massachusetts Charitable Mechanic Association Evening Trade School (*evening school*).	GOVERNING BOARD.—11 members; chosen by the members of the Massachusetts Charitable Mechanic Association; 1 manufacturer electrical supplies, 2 master builders, 1 master mason, 2 master plumbers, 2 master sheet-metal workers 1 master tile layer, 1 superintendent Farm School, 1 teacher manual training.	School; cost, $1,367.	Do.

[1] Not reported.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
MASSACHUSETTS—concluded.			
Boston—North Bennet Street Industrial School (*evening school*).	GOVERNING BOARD.—32 members; self-perpetuating; 2 bankers, 2 capitalists, 1 college president, 1 director Women's Educational and Industrial Union, 1 ex-teacher, 1 lawyer, 1 merchant, chairman of education committee, 15 philanthropists, 2 professors (college), 1 surgeon, member of Boston school committee, 4 teachers (school principals); 1 not reported. ADVISORY BOARD.—6 members; the six assistant superintendents of public schools of Boston act ex officio as an advisory board.	School; cost, $788.	No product.
MISSOURI.			
St. Louis—David Ranken, Jr., School of Mechanical Trades:			
Day school	GOVERNING BOARD.—8 members; self-perpetuating; 1 banker, 1 capitalist, 1 engineer and surveyor, 1 ex-mayor, 2 lawyers, 1 merchant, 1 retired insurance agent. ADVISORY BOARD.—14 members; chosen by the board of directors; 2 architects, 1 attorney general of Missouri, 1 contractor, 1 engineer, 1 governor of Missouri, 5 manufacturers, 1 mayor of St. Louis, 1 president American Federation of Musicians, 1 superintendent St. Louis schools.	School; cost, $5,500, including evening and cooperative schools.	Do.
Day cooperative school	GOVERNING AND ADVISORY BOARDS.—Same as for day school.	School. (See day school.)	Do.
Evening school	GOVERNING AND ADVISORY BOARDS.—Same as for day school.	.....do.....	Do.
NEW YORK.			
Brooklyn—Pratt Institute: School of Household Science and Art.			
Day school	GOVERNING BOARD.—6 members; self-perpetuating; 1 banker, 1 lawyer, 2 manufacturers, 1 manager Pratt Institute, 1 vice president oil company. ADVISORY BOARD.—8 members; chosen by board of trustees; occupations of members not reported.	Pupils, or persons for whom work is done.	Dresses, custom work; pupils retain product made from their own materials.
Evening school	GOVERNING AND ADVISORY BOARDS.—Same as for day school.	Pupils.....	Retained by pupils.
Brooklyn—Pratt Institute: School of Science and Technology.			
Day school	GOVERNING AND ADVISORY BOARDS.—Same as for School of Household Science and Art.	School.....	Tools, benches, tables, machines, apparatus; sold in open market.
Evening school	GOVERNING AND ADVISORY BOARDS.—Same as for day school.	.....do.....	No product.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
NEW YORK—continued.			
New York—Baron de Hirsch Trade School (*day school*).	GOVERNING BOARD.—13 members; self-perpetuating; 1 banker, 1 capitalist, 2 clothiers, 2 judges, 2 lawyers, 2 manufacturers, 2 merchants, 1 miner. ADVISORY BOARD.—4 members; chosen by board of trustees; 2 clothiers, 1 lawyer, 1 manufacturer.	School; cost, $8,488.	No product.
New York—Clara de Hirsch Trade School (*day school*).	GOVERNING BOARD.—13 members; self-perpetuating; 1 lawyer, 1 manager department store, 11 not reported (women). ADVISORY BOARD.—6 members; chosen by board of directors; 1 philanthropist, 1 superintendent of school; 4 not reported (women).	School; cost, $2,423.	Hats and dresses, custom work; receipts from products sold, $4,255.
New York—Hebrew Technical Institute:			
Day school	GOVERNING BOARD.—21 members; self-perpetuating; 1 architect, 2 bankers, 2 builders, 2 capitalists, 1 educator, 1 engineer, 1 inspector, 3 lawyers, 5 manufacturers, 1 merchant, 1 mining operator, 1 professor and banker.	School; cost, $2,866.	Electrical and other machines, used in the school.
Evening school	GOVERNING BOARD.—Same as for day school.	School; cost, $559.	Tools, used in the school.
New York—Hebrew Technical School for Girls (*day school*).	GOVERNING BOARD.—29 members; self-perpetuating; occupations of members not reported. ADVISORY BOARD.—3 members; chosen by board of trustees; 1 dean teachers' college, 1 president Carnegie Foundation Fund, 1 president university.	School	Underwear, aprons, shirt waists, dresses, fancy articles, etc.; sold on private orders; receipts from products sold, $2,955.
New York—Henrietta Trade School (Negro—*evening school*).	GOVERNING BOARD.—6 members; self-perpetuating; 1 business man, 1 director Cooper Union, 1 lawyer, 1 lawyer (retired), 1 philanthropist, 1 secretary Children's Aid Society.	School and pupils.	Hats, shirt waists, and dresses; disposed of by pupils who furnished the materials.
New York—Italian Evening Trade School (*evening school*).	GOVERNING BOARD.—6 members; self-perpetuating; 1 business man, 1 director Cooper Union, 1 lawyer, 1 lawyer (retired), 1 philanthropist, 1 secretary Children's Aid Society. (School committee of trustees of Children's Aid Society constitute the governing board of both this and the Henrietta Trade School.)	School	Printing, sign painting, sheets, pillow cases, and pajamas; receipts from products sold and work done, $2,300; pupils also take outside orders and retain the net profits.
New York—New York Trade School:			
Day school	GOVERNING BOARD.—7 members; self-perpetuating; 2 bankers, 1 capitalist, 1 financier, 1 lawyer; 2 not reported. ADVISORY BOARD.—29 members; 5 master painters and decorators, chosen by Master Painters' and Decorators' Association; 5 master pattern makers, chosen by Master Pattern Makers' League; 5 master plumbers, chosen by Master Plumbers' Association; 6 master steam and hot-water fitters, chosen by Master Steam and Hot Water Fitters' Association; 8 mechanics and tradesmen, chosen by the General Society of Mechanics and Tradesmen of New York.	School; cost, $3,837.	No product.
Evening school	GOVERNING AND ADVISORY BOARDS.—Same as for day school.	School; cost, $2,889.	Do.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
NEW YORK—concluded.			
New York—Pascal Institute (*day school*).	GOVERNING BOARD.—25 members; self-perpetuating; 24 philanthropists, and 1 school principal. ADVISORY BOARD.—10 members; chosen by board of directors; 5 ministers; 5 not reported.	School.....	Dresses and undergarments, custom work.
New York — Preparatory Trade School (*evening school*).	GOVERNING BOARD.—17 members; self-perpetuating; occupations of members not reported. ADVISORY BOARD.—15 members; chosen by board of directors; occupations of members not reported.	School; cost, $467.	No product.
New York—St. George's Evening Trade School (*evening school*).	GOVERNING BOARD.—11 members; self-perpetuating; 1 architect, 1 broker, 1 church treasurer, 2 lawyers, 2 ministers, 1 real estate agent; 3 not reported.	School; cost, $521.	Do.
Rochester—Mechanics' Institute of Rochester:			
Day school.....	GOVERNING BOARD.—33 members; chosen by the subscribers to the current expenses of the institute; vacancies during the year filled by the directors; 1 assistant to city engineer, 2 capitalists, 1 financial secretary of institute, 2 foundrymen, 3 lawyers, 11 manufacturers, 2 merchants, 1 patent attorney, 1 president of university, 1 property owner, 1 publisher, 1 railroad ticket agent, 1 retired manufacturer, 1 retired teacher; 4 not reported (women).	School; cost, $1,100.	Dresses, hats, furniture, cabinet work; custom work, and sold in open market.
Day cooperative school...	GOVERNING BOARD.—Same as for day school. ADVISORY BOARD.—14 members; chosen by board of directors; 1 assistant to city engineer, 1 capitalist, 1 financial secretary of institute, 1 foundryman, 1 lawyer, 4 manufacturers, 1 president of university, 1 property owner, 1 publisher; 2 not reported (women).	.....	
Evening school	GOVERNING AND ADVISORY BOARDS.—Same as for day school.	School (cost, $1,820) and pupils.	Pupils sell products made by them.
NORTH CAROLINA.			
High Point—High Point Normal and Industrial School (Negro—*day school*).	GOVERNING BOARD.—24 members; chosen by New York Yearly Meeting of the Society of Friends; 1 architect, 1 builder, 1 clerk; 12 not reported (women); 2 life insurance agents, 1 manufacturer, 1 marble dealer, 2 merchants, 1 minister, 1 physician; 1 not reported. ADVISORY BOARD.—1 member; chosen by the New York Yearly Meeting of the Society of Friends; 1 banker.	School; cost, $195.	Benches, desks, chairs; used by the institution; baskets, etc.; sold or otherwise disposed of; receipts from products sold, $20.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
OHIO.			
Cincinnati—Jewish Kitchen Garden Association and Trade School for Girls (*day school*).	GOVERNING BOARD.—8 members; chosen by members of the United Jewish Charities; 1 banker, 1 chemist, 1 manufacturer, 2 merchants, 2 retired merchants, 1 wholesale milliner. ADVISORY BOARD.—6 members; appointed by the president of the United Jewish Charities; 2 merchants, 1 wholesale milliner; 3 not reported.	School.....	Custom work.
Cincinnati—Ohio Mechanics' Institute (*evening school*).	GOVERNING BOARD.—12 members; chosen by members of the corporation having in trust the institute and its property; 1 architect, 1 judge, 1 lawyer, 6 manufacturers, 1 physician, 1 plumber; 1 not reported.	School; cost, $300.	Drafting tables, wood-turning lathes, and other needed shop equipment; used as shop equipment of institute.
PENNSYLVANIA.			
Lancaster—Thaddeus Stevens Industrial School of Pennsylvania (*day school*).	GOVERNING BOARD.—9 members; self-perpetuating; 1 banker, 2 government officials, 1 judge, 1 mayor, 1 manufacturer, 1 physician, 1 retired merchant, 1 State official.	School; cost, $1,000.	Machines, tools, benches, etc.; used by school.
Philadelphia—Berean Manual Training and Industrial School (Negro):			
Day school.....	GOVERNING BOARD.—19 members; self-perpetuating; 3 bankers, 2 capitalists, 2 lawyers, 2 manufacturers, 1 merchant, 4 ministers, 2 physicians, 1 real-estate agent, 1 superintendent mechanical school; 1 not reported.	Manufacturer for whom piecework is done.	Shirt waists and other garments; taken by manufacturers who furnish material.
Evening school.....	GOVERNING BOARD.—Same as for day school.	School and pupils.	Repair work in upholstery and chair caning; female pupils dispose of products made from materials furnished by them.
Philadelphia—Drexel Institute of Art, Science, and Industry:			
Day school.....	GOVERNING BOARD.—24 members; self-perpetuating; 1 architect, 3 bankers, 5 capitalists, 1 chief railway motive power, 1 clerk, 1 ex-ambassador, 3 lawyers, 2 manufacturers, 1 philanthropist, 3 physicians, 1 president of college, 1 State senator, 1 superintendent of schools.	.....do.....	Machine lathes, drill presses, etc.; used by institution; female pupils dispose of dresses and hats made from materials furnished by them.
Evening school.....	GOVERNING BOARD.—Same as for day school.	.....do.....	Do.
Philadelphia—Girard College (*day school*).	GOVERNING BOARD.—15 members; chosen by court of common pleas; 2 bankers, 2 city officials, 1 governor, 7 lawyers, 1 manufacturer, 1 merchant, 1 mayor.	School.....	Furniture, bookshelves, desks, ornamental work in metal, installation of electric wires, models; used by institution or given to pupils.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
PENNSYLVANIA—concluded.			
Philadelphia—Hebrew Education Society (*evening school*).	GOVERNING BOARD.—19 members; self-perpetuating; 1 banker, 1 distiller, 2 lawyers, 6 manufacturers, 3 merchants, 3 philanthropists, 1 physician, 1 retired merchant, 1 teacher. ADVISORY BOARD.—5 members; appointed by the president of the board of directors; 1 manufacturer, 2 merchants, 2 philanthropists.	School and pupils.	Cigars, sold in open market; hats, donated to charitable institutions; pupils in dressmaking classes retain products of materials furnished by them; other products used in institution or destroyed.
Philadelphia—Spring Garden Institute:			
Day school	GOVERNING BOARD.—19 members; self-perpetuating; 1 architect, 2 artists, 3 machinists, 3 manufacturers, 1 mechanical engineer, 1 painter, 8 philanthropists.	School	Electric bells, burglar alarms, annunciators, electric instruments and machines; used in equipping the institution.
Evening school	GOVERNING BOARD.—Same as for day school.	do	No product.
Philadelphia—Temple University:			
Day school	GOVERNING BOARD.—20 members; chosen by members of the university corporation; 1 assistant district attorney, 3 bankers, 1 capitalist, 1 dentist, 1 governor, 1 house painter, 1 judge, 1 life insurance agent, 2 lawyers, 1 manufacturer, 1 mayor, 1 merchant, 1 newspaper publisher, 1 president fire insurance company, 1 president of the university, 1 proprietor of laundries, 1 real-estate agent.	Pupils or persons for whom pupils do work.	Hats and garments; custom work; disposed of by pupils.
Evening school	GOVERNING BOARD.—Same as for day school.	do	Do.
Pittsburg (Allegheny)—Avery College Training School (Negro—*day school*).	GOVERNING BOARD.—3 members; chosen by board of trustees; 2 merchants, 1 principal of school. ADVISORY BOARD.—7 members; self-perpetuating; 1 dentist, 1 educator, 2 merchants, 2 physicians, 1 retired barber.	Persons for whom work is done.	Custom work; dressmaking, millinery, and tailoring; receipts from products sold, $1,957.
Pittsburg—Carnegie Technical Schools: School of Applied Industries:[1]			
Day school	GOVERNING BOARD.—8 members; self-perpetuating; 1 judge, 1 lawyer, 2 manufacturers, 1 mayor, 1 president trust company, 1 representative Carnegie Steel Co., 1 scientist.	School; cost, $13,000, including evening school.	Hand tools, machines, patterns, castings, and cabinet work; used in institution or reduced to stock.
Evening school	GOVERNING BOARD.—Same as for day school.	School (see Day school).	Sheet-metal work, castings, patterns, cabinet and hand tools; used in institution or reduced to stock.
Pittsburg—Carnegie Technical Schools: Margaret Morrison Carnegie School (*evening school*).	GOVERNING BOARD.—Same as for the School of Applied Industries.	School	No product.
Williamson School—Williamson Free School of Mechanical Trades (*day school*).	GOVERNING BOARD.—7 members; self-perpetuating; 2 capitalists and philanthropists, 2 manufacturers, 2 merchants, 1 president of foundry and machine company.	School; cost, $5,800.	Do.

[1] Formerly "School for Apprentices and Journeymen."

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

A.—PHILANTHROPIC SCHOOLS—Concluded.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
RHODE ISLAND.			
Providence—Watchman Industrial School (Negro—*night school*).	GOVERNING BOARD.—None. ADVISORY BOARD.—14 members; appointed by president of school; 1 editor, 1 expressman, 1 insurance agent, 1 janitor, 1 merchant, 4 ministers, 3 physicians, 1 stationary engineer, 1 undertaker.	School; cost, $200.	No product.
Providence—Rhode Island School of Design (*evening school*).	GOVERNING BOARD.—6 members; chosen by the annual governing membership; 1 not reported (woman); 1 merchant, 1 architect, 1 lawyer, 1 State commissioner of public schools, 1 college professor.	(1)	Do.
SOUTH CAROLINA.			
Denmark—Voorhees Industrial School (Negro—*day school*).	GOVERNING BOARD.—17 members; self-perpetuating; occupation of members not reported.	School	Product not reported; used by school and pupils.
Mayesville—Mayesville Industrial and Educational Institute (Negro—*day school*).	GOVERNING BOARD.—14 members; self-perpetuating; 1 editor, 2 farmers, 3 not reported (women); 1 insurance agent, 1 lawyer, 1 merchant, 2 ministers, 1 postmaster, 1 president of institute; 1 not reported.	(1)	No product.
Orangeburg—Claflin University (Negro—*day school*).	GOVERNING BOARD.—14 members; chosen by board of trustees; all teachers in the university. ADVISORY BOARD.—21 members; self-perpetuating; 18 ministers; 3 not reported.	(1)	Desks, chairs, benches, swings, etc.; used by school.
VIRGINIA.			
Hampton—Hampton Normal and Agricultural Institute (Negro and Indian—*day and evening school*).	GOVERNING BOARD.—14 members; self-perpetuating; 1 capitalist, 1 chemist, 1 judge, 2 manufacturers, 1 minister, 1 oyster packer, 1 president of trust company, 1 President of United States, 1 principal of institute, 1 professor in a Negro university, 1 retired banker, 1 retired merchant, 1 secretary missionary association.	School and persons for whom contract work is done.	Building construction and repair work, including bricklaying and plastering; carpentry; painting; steam fitting and plumbing; tinsmithing; printing; making and repairing vehicles and trucks; furniture; engines, gears, mufflers for gasoline motors, machines, pumps; shoes, clothing and mattresses; used in institution, sold in open market, and manufactured on contract.
Lawrenceville—St. Paul Normal and Industrial School (Negro—*day and evening school*).	GOVERNING BOARD.—4 members; chosen by board of trustees; 1 lawyer, 1 minister, 1 principal of school, 1 treasurer of school.	School	Product not reported; used by institution.
Richmond—Virginia Mechanics Institute (*evening school*).	GOVERNING BOARD.—24 members; chosen by members of school corporation; 1 banker, 1 lawyer, 15 manufacturers, 1 mechanical engineer, 6 merchants.	School; cost, $200.	No product.

[1] Not reported.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
ALABAMA.			
Normal—State Agricultural and Mechanical College (Negro—*day school*).	GOVERNING BOARD.—3 members; appointed by governor of State; 1 banker, 2 lawyers. ADVISORY BOARD.—6 members; appointed by president of college: all teachers.	(1)	Hats, dresses, etc., made by pupils for own use from materials furnished by them.
ARKANSAS.			
Fort Smith—Lincoln High School (Negro—*day school*).	GOVERNING BOARD.—6 members; elected by qualified voters of school district; 2 bankers, 1 lawyer, 3 wholesale merchants.	School; cost, $150.	Pupils make articles on orders taken.
CONNECTICUT.			
Bridgeport—State Trade School:			
Day school	GOVERNING BOARD.—6 members; appointed by the governor of State; 1 governor, 3 lawyers, 2 manufacturers.	School	No product.
Day cooperative school	GOVERNING BOARD.—Same as for day school.	(1)	Do.
Evening school	GOVERNING BOARD.—Same as for day school.	(1)	Do.
New Britain—State Trade School (*day school*).	GOVERNING BOARD.—Same as for State Trade School, Bridgeport.	School	Do.
South Manchester—South Manchester Evening School (*evening school*).	GOVERNING BOARD.—3 members; 1 elected by board of school visitors, and 2 by ninth district school committee; 1 lawyer, 1 manufacturer, 1 minister.	School and pupils.	Pupils who furnish materials retain the finished product.
Waterbury—Waterbury Evening High School (*evening school*).	GOVERNING BOARD.—8 members; elected by qualified voters; 3 lawyers, 2 manufacturers, 3 merchants.	do	Do.
DISTRICT OF COLUMBIA.			
Washington — Armstrong Manual Training School. (Negro):			
Day school	GOVERNING BOARD.—9 members; chosen by supreme court, D. C.; 2 bankers, 3 lawyers, 1 merchant, 1 professor in college; 2 not reported (women).	School and pupils.	Pupils dispose of articles made from materials brought in by them.
Evening school	GOVERNING BOARD.—Same as that for day school.	School (cost $557) and pupils.	Cabinet work and tools; used by institution; pupils retain articles made from materials brought in by them.
Washington — McKinley Manual Training School (*evening school*).	GOVERNING BOARD.—Same as that of Armstrong Manual Training School, Washington, D. C.	School and pupils.	Furniture, ornamental woodwork, tools, etc., used by school or given to pupils or visitors.
GEORGIA.			
Columbus—Secondary Industrial school (*day school*).	GOVERNING BOARD.—10 members; chosen by board of aldermen of city; 1 foreman machine shop, 2 cotton-mill officials, 2 lawyers, 1 liveryman, 1 printer, 1 salesman, 2 wholesale merchants. ADVISORY BOARD.—5 members; chosen by board of education; 1 assistant superintendent cotton mill, 3 manufacturers, 1 wholesale merchant.	School; cost, $1,225.	Cloth, twine, hosiery, towels; workbenches, tables, desks, stoves, and swings; receipts from products sold, $435.

[1] Not reported.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
ILLINOIS.			
Chicago—Albert G. Lane Technical High School (*evening school*).	GOVERNING BOARD.—21 members; appointed by the mayor; 1 capitalist, 4 lawyers, 2 manufacturers, 2 merchants, 1 minister, 4 physicians, 3 real estate dealers, 1 retired building contractor, 1 retired manufacturer, 1 retired merchant; 1 not reported (woman).	School; cost, $1,000.	School furniture and machinery, motors electrical appliances, castings, etc.; used by institution or kept by pupils after paying cost of materials.
Chicago — Horace Mann (branch) School (carpenters' apprentices—*day school*).	GOVERNING BOARD.—Same as that for Albert G. Lane Technical High School, Chicago. ADVISORY BOARD.—10 members; 5 building contractors, chosen by the Carpenters and Builders Association of Chicago; 5 journeyman carpenters, chosen by the United Brotherhood of Carpenters.	[1]	No product.
Chicago—James Otis School (carpenters' apprentices—*day school*).	GOVERNING AND ADVISORY BOARDS.—Same as those for Horace Mann (branch) School, Chicago.	[1]	Do.
Chicago—Lake High School (*evening school*).	GOVERNING BOARD.—Same as that for Albert G. Lane Technical High School, Chicago.	School.....	Furniture, repairs for machines, patterns for lathes, 1 jackscrew, machine shop, forge, and cabinet making products, etc., used by institution or kept by pupils after paying cost of materials.
Chicago—Richard T. Crane Technical High School (*evening school*).	GOVERNING BOARD.—Same as that for Albert G. Lane Technical High School, Chicago.	School; cost, $800.	Glove boxes, tables, furniture, 1 gas engine, taborets, ornamental iron and brass work, pattern work, wood novelties, tools, engine lathes, kept by pupils, after paying cost of materials.
Freeport — Freeport High School (*day cooperative school*).	GOVERNING BOARD.—10 members; elected by the qualified voters; 2 dentists, 2 manufacturers, 2 merchants, 1 physician, 1 real estate and insurance agent, 1 retired manufacturer, 1 telephone company official.	[1]	No product.
INDIANA.			
Knightstown—Soldiers' and Sailors' Orphans' Home of Indiana (*day school*).	GOVERNING BOARD.—4 members; appointed by the governor; 1 banker, 1 railroad employee, 1 retired editor; 1 not reported (woman). ADVISORY BOARD.—15 members; chosen by the State commanders of the Grand Army of the Republic and Women's Relief Corps from members of their respective organizations.	School.....	Used by institution.

[1] None used.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
MASSACHUSETTS.			
Beverly: Beverly Independent Industrial School (independent[1]—*day school*).	GOVERNING BOARD.—7 members; appointed by mayor and chairman of school committee; 2 bankers, 1 druggist, 1 landscape gardener, 1 mayor, 1 shoe factory official, 1 superintendent shoe machine manufacturing company. ADVISORY BOARD.—The officers of the manufacturing company in whose machine shop the shop practice is done; give advice unofficially.	Establishment for which work is done.	Machinery; taken by the company furnishing the material, on payment of stated piece rates.
Boston—Boston School of Printing and Bookbinding[2] (independent[1]—*day school*).	GOVERNING BOARD.—5 members; elected by qualified voters; 1 banker, 2 lawyers, 1 philanthropist, 1 physician.	School; cost, $14.	Printing, bookbinding, used by the public school.
Boston—Central Evening Industrial School (independent[1]—*evening school.*)	GOVERNING BOARD.—Same as that for Boston School of Printing and Bookbinding.	School; cost, $336.	No product.
Boston—Girls' Trade School (independent[1]—*day school*).	GOVERNING BOARD.—Same as that for Boston School of Printing and Bookbinding. ADVISORY BOARD.—10 not reported (women); chosen by the school committee	School; cost, $4,201.	Straw hats, underwear, aprons, shirt waists, dresses, millinery; sold to customers of the school; receipts from products sold, $6,837.
Boston—Glenway Industrial Classes, Oliver Wendall Holmes School District (*day school*).	GOVERNING BOARD.—Same as that for Boston School of Printing and Bookbinding.	School; cost, $42.	Kindergarten chairs, blackboard rulers, pigeonhole cases; used in schools.
Boston—High School of Practical Arts (*day school*).	GOVERNING BOARD.—Same as that for Boston School of Printing and Bookbinding. ADVISORY BOARD.—Chosen by the school committee; number and occupations not reported.	School and pupils.	Pupils keep articles made from materials furnished by them.
Boston—Quincy School (*day school*).	GOVERNING BOARD.—Same as that for Boston School of Printing and Bookbinding.	School; cost, $88.	No product.
Cambridge—Evening Industrial School (independent[1]—*evening school*).	GOVERNING BOARD.—5 members, elected by qualified voters; 1 journeyman pressman, 1 lawyer, 1 professor in college, 1 real-estate dealer, 1 not reported (woman).	School; cost, $288.	Do.
Chicopee—Chicopee Industrial School (*day school*).	GOVERNING BOARD.—9 members, elected by qualified voters; 1 clerk water board, 1 employing electrician, 1 furniture dealer, 2 merchants, 1 metal-goods manufacturer, 2 physicians, 1 undertaker.	School; cost, $550.	Do.
Chicopee—Chicopee Evening Industrial School (independent[1]—*evening school*).	GOVERNING BOARD.—Same as for day school.	School; cost, $320.	Do.
Fall River—Bradford Durfee Textile School of Fall River (independent incorporated[3]—*evening school*).	GOVERNING BOARD.—24 members; self-perpetuating body of 20 members, with 2 appointed by governor and 2 members ex officio; 1 banker, 3 lawyers, 10 manufacturers, 1 mayor (member ex officio), 1 Member of Congress, 1 merchant, 2 mill operatives, 1 superintendent of schools (member ex officio), 1 secretary carders' union, 1 secretary spinners' union, 1 secretary weavers' union, 1 State official.	School.....	Textile fabrics; sold to pupils at cost of raw materials used.

[1] For explanation of this term, see page 97.
[2] Formerly called Pre-Apprentice School for Printing and Bookbinding.
[3] For explanation of this term, see page 503.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
MASSACHUSETTS—contd.			
Fitchburg—Fitchburg High School (*day cooperative school*).	GOVERNING BOARD.—18 members, elected by qualified voters of city; 1 contractor, 1 druggist, 1 foreman cotton mill, 1 iron molder, 1 lawyer, 1 manufacturer, 5 merchants, 1 minister, 1 printer, 1 plumber, 1 real-estate dealer, 1 superintendent paper mill, 2 undertakers.	Establishments cooperating with school.	Product is the property of establishments furnishing the material.
Lawrence—Lawrence Industrial School (independent [1]):			
Day school	GOVERNING BOARD.—6 members, 5 appointed by mayor and city council, 1 member ex officio; 1 agent textile mills, 1 journeyman iron molder, 1 mayor (member ex officio), 1 member board of trade, 1 operative weaver, 1 operative wool sorter.	School (cost, $300) and manufacturers (cost, $700), for both day and evening schools.	Machine tools, wooden tools, yarn and cloth, used by institution; clothing, taken by pupils after paying cost of material.
Evening school	GOVERNING BOARD.—Same as for day school.	School and manufacturers.	Do.
Lowell—Lowell Textile School (independent incorporated [2]—*evening school*).	GOVERNING BOARD.—33 members; 20 self-perpetuating; 4 elected by alumni of school, 2 appointed by governor, 1 appointed by Lowell Textile Council, and 6 members ex officio; 3 agents of textile mills, 1 banker, 1 chairman board of aldermen, 1 chemist, 1 judge, 2 lawyers, 1 lieutenant governor, 1 mayor, 1 merchant, 1 president common council, 1 president of manufacturing company, 1 State commissioner of education, 1 superintendent of manufacturing company, 1 superintendent of city schools, 1 manufacturer, 11 textile-mill officials, 1 treasurer of machine company, 3 not reported.	School, establishments, and pupils; cost, $4,500.	Castings and parts of commercial textile machinery, sold by school to manufacturers from whom rough material has been bought; finished materials made of textile yarns are retained by pupils.
New Bedford—New Bedford Industrial School (independent [1]):			
Day school	GOVERNING BOARD.—9 members, chosen by city board of education; 1 architect, 1 banker, 1 cotton-mill overseer, 2 druggists, 2 employing machinists, 1 grain dealer, 1 philanthropist.	School; cost, $1,500.	Furniture, scientific instruments, machine-shop tools; used by institution for equipment.
Evening school	GOVERNING BOARD.—Same as for day school.	School; cost, $150.	Machine-shop tools and scientific instruments; used by institution for equipment.
New Bedford—New Bedford Textile School (independent incorporated [2]—*evening school*).	GOVERNING BOARD.—24 members; 20 self-perpetuating, 2 appointed by governor and 2 members, ex officio; 1 banker, 1 mayor, 13 officials of cotton mills, 2 officials mule spinners' union, 1 postmaster, 1 president gas and electric-light company, 1 president loom-fixers' union, 1 president school, 1 superintendent city schools, 2 not reported.	School.....	No product.

[1] For explanation of this term, see page 97.
[2] For explanation of this term, see page 503.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
MASSACHUSETTS—concld.			
Newton—Newton Industrial, School (independent[1]—*day school*).	GOVERNING BOARD.—7 members; method of appointment not reported; 1 broker, 1 capitalist, 1 furniture manufacturer, 1 grocer, 2 lawyers, 1 wholesale merchant. ADVISORY BOARD.—3 members, appointed by superintendent of public schools and director of school; 1 automobile manufacturer, 1 superintendent machine shop, 1 superintendent watch company.	School; cost, $261.	Stands, cabinets, tables, cast-iron bench blocks, and other school furniture; used by school and given to public schools.
Springfield—Evening School of Trades (*evening school*).	GOVERNING BOARD.—3 members, chosen by school committee; 1 banker, 1 teacher, 1 not reported (woman).	School; cost, $587.	Tools, woodwork, etc.; used by schools.
Springfield—Springfield Vocational School (*day school*).	GOVERNING BOARD.—Same as that of Evening School of Trades.	School; cost, about $500.	Product not reported; used by schools.
Worcester—Worcester Trade School (independent[1]—*day school*).	GOVERNING BOARD.—9 members, chosen by city council; 2 building contractors, 1 assistant general manager envelope company, 2 manufacturers emery wheels and grindstones, 1 manufacturer textile machinery, 1 operative jointer, 1 superintendent loom works, 1 superintendent steel and wire company.	School and establishments for which work is done.	Woodwork, used by the school; parts of machinery sold to establishments furnishing materials; receipts from products sold, $654.
MICHIGAN.			
Saginaw (East Side) Trade School (*day school*).	GOVERNING BOARD.—12 members, elected by qualified voters; occupations not reported.	School; cost, $100.	No product.
MISSISSIPPI.			
Alcorn—Alcorn Agricultural and Mechanical College (Negro—*day school*).	GOVERNING BOARD.—8 members, appointed by the governor; 1 banker, 1 ex-United States Senator, 1 farmer, 1 lawyer, 1 physician, 1 real-estate agent, 2 not reported.	(2)	Shoes, sold in open market; receipts from products sold, $250.
Columbus—Mississippi Industrial Institute and College (*day school*).	GOVERNING BOARD.—13 members, appointed by the governor; occupations of members not reported.	School; cost, $650.	No product.
NEW JERSEY.			
Bordentown—Manual Training and Industrial School for Colored Youth (Negro—*day school*).	GOVERNING BOARD.—5 members, appointed by president of board of education; 1 banker, 1 editor, 1 lawyer, 1 merchant, 1 physician.	School.....	Desks, tables, chairs, showcases, dresses, hats, and other articles of clothing; used by institution.
Newark—Newark Technical School (*evening school*).	GOVERNING BOARD.—10 members; 8 appointed by governor, 2 ex officio, 1 governor (ex officio), 7 manufacturers, 1 mayor (ex officio), 1 physician.	School; cost, $172.	No product.
Newark—Sara A. Fawcett Drawing School (*evening school*).	GOVERNING BOARD.—9 members, appointed by mayor; 1 building contractor, 1 druggist, 1 electrical engineer, 1 lawyer, 1 manufacturer, 2 merchants, 1 physician, 1 newspaper publisher.	School and pupils.	Novelties and dies for use in jewelry making, used by institution; pupils keep jewelry made from materials furnished by them.

[1] For explanation of this term, see page 97.

[2] Not reported.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupation of mem-members.	Materials used in school furnished by—	Product of school and how disposed of.
NEW JERSEY—concluded.			
Newark—Warren Street Elementary Industrial School (*day school*).	GOVERNING BOARD.—Same as that for Sara A. Fawcett Drawing School, Newark.	School.....	Cabinet work, picture frames, placard holders, book rests and other small objects of wood and metal, weaving frames; used by institution and by pupils.
NEW YORK.			
Albany—Vocational School (*day school*).	GOVERNING BOARD.—3 members, appointed by mayor; 3 lawyers. ADVISORY BOARD.—5 members, chosen by board of education; 1 contractor, 1 factory manager, 1 factory superintendent, 1 hotel manager, 1 printer (trades representative).	School.....	Cabinet work; used by school.
Brooklyn—Brooklyn Evening Technical and Trade School (*evening school*).	GOVERNING BOARD.—46 members, appointed by mayor; 1 editor, 13 lawyers, 7 manufacturers, 4 merchants, 4 physicians, 1 real-estate agent, 16 not reported (4 women).	School and pupils.	Printed matter and electrical wiring repairs, used in school; pupils retain articles made from materials furnished by them.
Buffalo—Seneca Vocational School (*day school*).	GOVERNING BOARD.—1 member, elected by qualified voters; 1 superintendent of education.	School; cost, $800.	No product.
Buffalo—Technical Evening High School (*evening school*).	GOVERNING BOARD.—Same as for Seneca Vocational School. ADVISORY BOARD.—Contemplated.	School; cost, $700.	Do.
Gloversville — Vocational School (*day school*).	GOVERNING BOARD.—9 members, elected by qualified voters; 2 glove manufacturers, 3 merchants, 1 overseer glove factory, 1 physician, 2 not reported (women). ADVISORY BOARD.—5 members, chosen by board of education; 2 glove manufacturers, 1 leather manufacturer, 1 manufacturers' agent, 1 merchant.	Local manufacturers.	Inseam gloves and mittens; taken by manufacturers furnishing materials.
Hudson—Industrial School (*day school*).	GOVERNING BOARD.—5 members, appointed by mayor; occupations of members not reported. ADVISORY BOARD.—5 members, chosen by board of education; 1 building contractor, 1 carpenter (union representative), 1 lumber manufacturer, 1 mason contractor, 1 vacancy.	School and pupils.	Furniture, used in public schools; pupils keep articles made from materials furnished by them.
Iroquois—Thomas Indian School (Indian — *day school*).	GOVERNING BOARD.—9 members, appointed by governor; 3 farmers (Indians), 1 lawyer, 2 retired merchants, 1 superintendent agricultural works, 1 superintendent society of natural science, 1 not reported (woman).	School (cost, $800) and pupils.	Furniture and clothing used in school; pupils keep articles made from materials furnished by them.
Lancaster—Industrial Department Lancaster Public Schools (*day school*).	GOVERNING BOARD.—5 members, elected by qualified voters; 1 building contractor, 1 drover, 1 justice of the peace, 1 physician, 1 retired farmer. ADVISORY BOARD.—5 members, appointed by principal; 2 foremen in factories, 1 journeyman carpenter (union representative), 1 merchant, 1 superintendent glass works.	School (cost, $125) and pupils (cost, $40).	Mission furniture; may be taken by pupils.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
NEW YORK—continued.			
Long Island City—Long Island City Evening High and Trade School (*evening school*).	GOVERNING BOARD.—Same as that for Brooklyn Evening Technical and Trade School. ADVISORY BOARD.—5 members, appointed by president of board of education; occupations of members not reported.	School and pupils.	Clothing and furniture, kept by institution for exhibition purposes; pupils keep hats made from materials furnished by them.
New York—Industrial Evening School (mostly Negro—*evening school*).	GOVERNING BOARD.—Same as that for Brooklyn Evening Technical and Trade School. ADVISORY BOARD.—5 members, appointed by president of board of education; occupations of members not reported.	.....do.....	No school product; pupils dispose of articles made from materials furnished by them.
New York—Manhattan Trade School for Girls (*day school*).	GOVERNING BOARD.—Same as that for Brooklyn Evening Technical and Trade School.	School; cost $8,607.	Women's and children's clothing, underwear and dresses, novelty articles; sold to customers; receipts from products sold, $20,950.
New York—Stuyvesant Evening Trade School (*evening school*).	GOVERNING BOARD.—Same as that for Brooklyn Evening Technical and Trade School.	School.....	No product.
New York—Vocational School for Boys (*day school*).	GOVERNING BOARD.—Same as that for Brooklyn Evening Technical and Trade School. ADVISORY BOARD.—3 members; appointed by president of board of education; 1 lawyer, 1 philanthropist, 1 physician.	.....do.....	Printing, cabinet making, bookbinding, taken by Board of Education; school is credited with market value of products, minus cost of materials.
New York—Washington Irving High School (*day school*).	GOVERNING BOARD.—Same as that for Brooklyn Evening Technical and Trade School.	School and pupils.	Gowns, costume designs, general designs, and bound books; disposed of by pupils, who furnish materials.
Rochester—School of Domestic Science and Domestic Art (*day school*).	GOVERNING BOARD.—5 members; elected by qualified voters; 1 ex-teacher, 3 lawyers, 1 professor in university. ADVISORY BOARD.—Contemplated.	School; cost, $250.	Clothing and millinery; retained by pupils.
Rochester—Shop School—Lexington Avenue (*day school*).	GOVERNING BOARD.—Same as that for School of Domestic Science and Domestic Art, Rochester. ADVISORY BOARD.—5 members; chosen by board of education; 4 manufacturers, 1 painter (union representative).	School; cost $2,552.	Cabinet work, furniture, electrical work, iron hurdles, rough cupboards; used by school.
Rochester—Shop School (Washington—*day school*).	GOVERNING AND ADVISORY BOARDS.—Same as those for Lexington Avenue Shop School.	School; cost, $400.	No product.
Schenectady—Industrial School (*day school*).	GOVERNING BOARD.—7 members; elected by qualified voters; occupations of members not reported. ADVISORY BOARD.—5 members; chosen by board of education; 1 chief engineer locomotive works, 1 editor, 2 factory foremen, 1 factory superintendent.	School; cost, $100.	Furniture and cabinet work; used by public schools and pupils.
Syracuse—Syracuse Technical High School (*day school*).	GOVERNING BOARD.—7 members; elected by qualified voters; 1 bookkeeper, 2 lawyers, 2 manufacturers, 1 merchant, 1 president of college. ADVISORY BOARD.—10 members; appointed by president of board of education; 1 city official, 1 lawyer, 4 manufacturers, 1 mayor, 1 representative Central Trades and Labor Council, 2 school officials.	School; cost, $500.	No product.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Continued.

B.—PUBLIC SCHOOLS—Continued.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
NEW YORK—concluded.			
Yonkers—Trade School of Yonkers:			
Day school	GOVERNING BOARD.—15 members; appointed by mayor; occupations of members not reported. ADVISORY BOARD.—5 members; chosen by board of education; 1 foreman carpenter, 1 foreman machine shop, 1 stair builder, 1 steam fitter, 1 superintendent factory.	School	Machine work and patterns; used by school.
Evening school	GOVERNING AND ADVISORY BOARDS.—Same as for day schools.	School	No product.
Yonkers—Yonkers Vocational School (*day school*).	GOVERNING AND ADVISORY BOARDS.—Same as for day schools.	School and pupils.	Cabinets, desks, chairs, etc., used by school; pupils retain clothing made from materials furnished by them.
OHIO.			
Cincinnati—Cincinnati Continuation School (*day cooperative school*).	GOVERNING BOARD.—27 members; elected by qualified voters; 2 city officials, 1 dentist, 1 druggist, 8 lawyers, 1 machinist, 3 manufacturers, 1 meat packer, 6 physicians, 1 professor in college, 1 salesman, 1 secretary Brewers' Board of Trade, 1 undertaker.	(1)	No product
Cincinnati—Cincinnati Evening School (*evening school*).	GOVERNING BOARD.—Same as for Cincinnati Continuation School.	School (cost, $400) and pupils.	Do.
Cleveland—Elementary Industrial School (*day school*).	GOVERNING BOARD.—7 members; elected by qualified voters; 1 accountant, 2 merchants, 1 minister, 2 physicians; 1 not reported (woman).	School; cost, $200.	Hatracks, hatboxes, card racks, tables, brass-work ornaments, aprons, etc.; sold at annual exhibitions; receipts from products sold, $169.
Cleveland—Technical High School (*evening school*).	GOVERNING BOARD.—Same as that for Elementary Industrial School, Cleveland.	.....do	No product.
Columbus—Columbus Trades School:			
Day school	GOVERNING BOARD.—15 members; elected by qualified voters; 1 banker, 1 clerk, 2 lawyers, 5 physicians, 1 president carriage company, 1 president printing company, 1 president university, 1 real estate agent; 2 not reported.	School; cost, $2,000.	Pupils are given articles they make.
Evening school	GOVERNING BOARD.—Same as for day school.	School; cost, $500.	No product.
Dayton—High Industrial School (*evening school*).	GOVERNING BOARD.—12 members; elected by qualified voters; 1 chief examiner mayor's office, 1 manager iron works, 3 physicians; 7 not reported.	(2)	Parts of machinery; used by school.
PENNSYLVANIA.			
Altoona—High School (*day school*).	GOVERNING BOARD.—6 members; elected by qualified voters; 1 contractor, 1 foreman car shops, 1 manufacturer, 1 merchant, 1 salesman, 1 tax collector.	School; cost, $326.	Articles of furniture, tools, forge work, etc.; disposed of by pupils after paying for cost of material.
Carlisle—United States Indian School (Indian—*day school*).	No governing or advisory board.....	School; cost, $39,167.	Harness, wagons, surreys, tinware, clothing, curtains, sheets, pillowcases, shoes, etc.; sold to private individuals and to United States Government; receipts from products sold, $2,072.

[1] None used.

[2] Not reported.

TABLE IV.—GOVERNING AND ADVISORY BOARDS, SOURCE OF MATERIALS USED IN PRACTICE WORK, AND PRODUCT—Concluded.

B.—PUBLIC SCHOOLS—Concluded.

Locality and name and kind of school.	Governing and advisory boards, number of members, by whom chosen, and occupations of members.	Materials used in school furnished by—	Product of school and how disposed of.
PENNSYLVANIA—concluded.			
Philadelphia—Evening Trades School No. 1 (*evening school*).	GOVERNING BOARD.—21 members; chosen by the judges of the courts of common pleas; 1 agent steamship company, 1 broker, 1 city assessor, 1 coal dealer, 9 lawyers, 5 manufacturers, 1 physician, 1 retired druggist, 1 undertaker.	School; cost, $2,153.	Painted signs, printed matter, electrical apparatus, benches, platforms, sheet-iron work; used by the institution or placed on exhibition.
Philadelphia—Evening Trades School No. 2 (*evening school*).	GOVERNING BOARD.—Same as that for Evening Trades School No. 1.	School (cost, estimated, $1,000) and pupils.	Signs, sheet-metal work, carpentry; school product not sold: pupils control disposition of products made from materials furnished by them.
Philadelphia—Philadelphia Trades School (*day school*).	GOVERNING BOARD.—Same as that for Evening Trade School No. 1, Philadelphia.	School; cost, $1,473.	Benches, platforms, schoolroom equipment, patterns, electrical appliances, printed matter; used in the city public schools.
Scotland—Soldiers' Orphans' Industrial School (*day school*).	GOVERNING BOARD.—11 members; 1 governor (member ex officio), 2 state senators, appointed by president of senate, 3 members of the house of representatives appointed by speaker of house, 5 members of Grand Army of the Republic, appointed by deputy commander of State.	School; cost, $14,100.	Woodwork and repairs, machinery and repairs, printed reports, clothing (including uniforms, and dresses), etc.: used by institution.
RHODE ISLAND.			
Providence—Evening Technical School (*evening school*).	GOVERNING BOARD.—6 members; chosen by the Providence school committee; 2 lawyers, 3 merchants, 1 physician.	School; cost, $1,185.	No product.
Providence—Technical High School (*day cooperative school*).	GOVERNING BOARD.—6 members; chosen by the Providence school committee; 1 editor, 3 lawyers, 1 physician, 1 teacher in university.	(1)	Do.
WISCONSIN.			
Milwaukee—Milwaukee School of Trades for Boys: *Day school*	GOVERNING BOARD.—15 members; elected by qualified voters; occupation of members not reported. ADVISORY BOARD.—5 members; appointed by president and approved by school directors; 1 actuary life-insurance company, 1 business agent Machinist's Union, 1 manufacturer engine and saw-mill machinery, 1 president iron company, 1 stove and range manufacturer.	School; cost, $3,400.	No product hitherto; tools and machines expected to be made, which will be disposed of in open market.
Evening school	GOVERNING AND ADVISORY BOARDS.—Same as for day school.	School; cost, $400.	Same as for day school.
Milwaukee—Milwaukee School of Trades for Girls (*day school*).	GOVERNING AND ADVISORY BOARDS.—Same as those for Milwaukee School of Trades for Boys.	School; cost, $1,750.	Hats and dresses; disposed of in open market; receipts from products sold, $156.
Platteville—Wisconsin State Mining Trade School (*day school*).	GOVERNING BOARD.—3 members; 2 appointed by the governor, 1 member ex officio; 1 editor and publisher, 1 lawyer, 1 State superintendent public instruction.	School; cost, $500.	No product.

[1] Not reported.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE.

This table is intended to show the equipment used in practice work and also the nature and extent of the practice work. The various types and classes of schools are defined and described in Chapter I.

As observed in the prefatory note, all schools are not included in this table, because many did not report in regard to either their shop equipment or shop practice.

The descriptions presented in this table are in some cases incomplete, as the outlines of the courses reported by the schools do not always clearly distinguish between what is done by the pupil in actual shop practice and what is taught by demonstration only in the shop or as theory only in the classroom.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE.

A.—PHILANTHROPIC SCHOOLS.

[This table is incomplete, as data were not obtained for some schools and but partial data were obtained for other schools.]

ALABAMA.

SNOW HILL—SNOW HILL NORMAL AND INDUSTRIAL INSTITUTE (NEGRO—DAY SCHOOL).

BLACKSMITHING AND WHEELWRIGHTING.—Equipment: 4 forges, blowers, and anvils, 1 swage block, 2 drill presses, a full equipment of small tools, and 1 tire setter.

Practice work, blacksmithing: *First year.*—Making fire, making lap rings, staples, hasps, hame hoops, etc. *Second year.*—Welding steel, tool making, tempering, repairing vehicles and farm implements, welding and setting axles, ironing off new work, pulling off horseshoes. *Third year.*—Making horseshoes, shoeing horses, tool making, ironing wagons, carts, wheelbarrows, and buggies, setting springs, arching axles.

Practice work, wheelwrighting: *First year.*—Making tenons, mortises, splices, miters, and other joints; making hammer, hatchet, ax, hoe, and adze handles, ox bows, yokes, singletrees, doubletrees, wagon tongues, wheelbarrows, pushcarts, plow beams, etc.; filling and building wagon wheels. *Second year.*—Repairing wheels, buggies, and wagons; laying out thimble skeins; constructing carriage bodies, buggy gear, frames, panels, and reaches, wagons, carts, etc.

BRICKMAKING.—Equipment: 1 brick machine, dry house, and kiln; ordinary tools of the trade.

Practice: *One-year course.*—Oiling the machine; cutting, hacking, and kilning; setting and burning the kiln.

BRICKLAYING.—Equipment: The ordinary tools of the trade.

Practice: Not reported.

CARPENTRY AND SAWMILLING.—Equipment: 1 planer, 1 shingle machine, 1 circular saw, 1 cut-off saw, and a full equipment of small tools.

Practice: *First year.*—Sharpening and setting edged tools; smoothing, straightening, and gauging timbers; constructing simple joints; constructing small articles, such as tables and washstand legs and stiles, rub boards, ironing boards, hammer, hatchet, hoe, and adze handles; helping advanced students; measurements; plain step building. *Second year.*—Saw filing and setting; cutting bridging, sizing sills, joists, studding, etc.; weatherboarding, shingling, flooring, and ceiling; constructing and setting window and door frames; plain stair building; brace and rafter cutting; inside finishing work. *Third year.*—Putting on hardware; laying off buildings; cabinetmaking; roof framing; stair building. One year's course in sawmilling practice, as follows: Lacing, bradding, and gluing belts; sharpening circular saws and planer knives.

LAUNDERING.—Equipment: Washing, drying, and extracting machine; mangle.

Practice: *First year.*—Washing, drying, ironing, and folding; washing flannels, linens, prints, etc. *Second year.*—Bleaching, removing stains, etc.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

ALABAMA—Continued.

SNOW HILL—SNOW HILL NORMAL AND INDUSTRIAL INSTITUTE—(NEGRO—DAY SCHOOL)—Concluded.

PRINTING.—Equipment: 1 job press, 1 paper cutter, 1 rule and lead cutter, furniture, types, and the other ordinary tools of the trade.

Practice: *First year.*—Oiling the press; practicing the lay of the case, the names of type, and type faces; composition of small jobs; running the press. *Second year.*—Making ready and running platen presses; reading and correcting proofs of small jobs; setting and distributing; mixing colors. *Third year.*—Composition and imposition; overlays and underlays on types and various kinds of cuts; display; casting off; making up and locking up.

SEWING.—Equipment: 4 sewing machines and usual sewing equipment.

Practice: *First year.*—Holding and threading needle; practice with scissors; hemming, felling, patching, darning, buttonholes and eyelets; gathering, placing on bands, tucking, ruffling, gussets; making aprons, laundry bags, iron-board covers, etc. *Second year.*—Buttonholes and eyelet making; darning, mitering corners of hems, gussets, and facings combined; piping, plaiting, patching, hemstitching, and cross stitching; taking measures, cutting by patterns; making men's, women's, and children's underwear; making wash dresses, neglige shirts, work shirts, overalls, nightshirts, etc. *Third year.*—Taking measurements for skirts, sleeves, shirt waists, etc.; drafting patterns; making and finishing waists, skirts, etc.; folding and pressing; making linings and finishing various styles of pockets and collars from individually drafted patterns and of different materials; drafting, cutting, and fitting.

TUSKEGEE—TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE (NEGRO—DAY SCHOOL).

BAKERS.—Equipment: The ordinary appliances of the trade.

Practice: *First year.*—Firing and testing ovens; sponge setting, doughing, baking sponge, dough, bread, rolls, etc. *Second year.*—Managing the oven, bench work, pie making, flour testing, bread making, cakes of various kinds and shapes, fillings and creams for cake, cake decoration.

BASKET MAKING AND BROOM MAKING; UPHOLSTERY.—Equipment: The ordinary tools and appliances required for each trade.

Practice work, basket making: *First year.*—Gathering and preparation; twisting, sewing, knotting, etc.; practice in simple forms. *Second year.*—Work in raffia, reed, and splint work; practice work in type forms; combinations of materials; individual designs from nature; scroll and decorative work. *Third year.*—Indian and African basketry, belts, beadwork, fobs, chains; making and repairing cotton baskets, hampers, and beadwork. *Fourth year.*—Review and practice teaching.

Practice work, broom making: Cleaning and dyeing broom straw; assorting stalks, sizing, and wiring; stitching and making brooms of all sizes.

Practice work, upholstery: *First year.*—Repairing, covering, cutting, and preparing materials for mattresses; making comforts, mattresses, and pillows; cording boxes; beginning chair caning on frames; drawing individual patterns for chair bottoms designed from studies; measurements, cutting, and making. *Second year.*—Upholstering box couches, hassocks, window seats, test work in designing and making articles manufactured in this division.

BLACKSMITHING.—Equipment: 1 portable forge, 9 stationary forges, blowers, anvils, and full equipment of small tools.

Practice: *First year.*—Making fires, drilling and bending, helping at forge practice, removing old shoes from horses' hoofs. *Second year.*—Making axle sets, setting axles, special practice in the use of drill bits, edge tools, and screw plates; repairing wagons; making horseshoes, clinching, leveling, welding and bending hot iron; welding steel; ironing new wagons, carts, wheelbarrows; putting work together; welding axles and tires; repairing buggies and carriages; ironing buggies. *Third year.*—Forge practice; making and fitting horseshoes; laying off work; getting angles; circles; fitting bands to cones; tool making; repairing of farm implements; building carriages and buggies; measuring tread of vehicles; leveling bodies and shifting rails for tops.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

ALABAMA—Continued.

TUSKEGEE—TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE (NEGRO—DAY SCHOOL)—Continued.

BRICKMAKING.—Equipment: 2 brick machines, pug mills, disintegrators, clay elevators, and full equipment of small tools.

Practice: Distribution and preparation of clay; mixing, drying, and handling bricks; building brick kilns; molding bricks, drying and setting different kinds of bricks, setting and burning bricks.

BRICKLAYING, PLASTERING, AND TILE SETTING.—Equipment: Complete set of tools.

Practice: *First year.*—Building scaffolds; preparing material for different kinds of brickwork. *Second year.*—Mixing concretes and mortars; distribution and proportions; testing mortars; bricklaying; bonding walls; masonry footings; concrete and brick foundations; foundation walls; making cement blocks; chimney building. *Third year.*—Bricklaying; leveling and staking out buildings; lathing and plastering; floor work in tile setting; preparing the span to be tiled; floating the cement; placing the tile and finishing; wall and ceiling work; plumbing walls; scratch coating the same; setting covers on base tile; setting the cap and finishing; metal work; preparing the floor for hearth space; laying the hearth; building brick arch; putting up, facing and lining firebrick and tile; building tile mantels.

CARPENTRY AND WOOD TURNING.—Equipment: The ordinary tools and appliances of the trade.

Practice work, carpentry: *First year.*—Sawing, planing, beveling, leveling, plumbing; making tables, screens, plain window and door frames; cleaning and sandpapering; cutting and framing floor and ceiling joists, studding, plates, and bridging. *Second year.*—Making mantels, newels, desks, washstands, bureaus, bookcases, window and door frames, stairways and frame and brick house construction; cutting and placing sills, joists, steel girders, plates, lookouts; getting lengths and cutting common, hip, valley and cripple rafters, truss construction, framing gutters, setting door and window frames, getting lengths of braces, weatherboarding, shingling, laying floors, ceiling, wainscoting, and forming ceiling panels; wood turning, setting and sharpening circular saws, practice work on scroll and band saw. *Third year.*—Inside work on frame and brick houses; laying floors, ceiling, wainscoting, forming ceiling panels, constructing stairways and porches, fitting and hanging sash, blinds, and doors, putting on hardware, finishing porches and cornices; cabinetmaking; making desks, bookcases, paper files and other articles of furniture.

Practice work, wood turning: Sharpening band saws, circular saws, edge tools, and turning tools; brazing band saws; lathe work from blue prints; practical work on machines; joinery, pattern making, practical wood turning; designing and making molding cutters.

CARRIAGE TRIMMING.—Equipment: Complete sets of tools.

Practice: *First year.*—Basting, stitching on machine, shrinking goods, trimming delivery wagons. *Second year.*—Drafting and making plain cushions and backs, pattern cutting, trimming an open buggy, making plaited cushions, setting tops, drafting tops and square biscuit work. *Third year.*—Trimming surreys, top buggies, and phaetons.

DRESSMAKING.—Equipment: Tracing, drafting, and cutting tables, sewing machines, dress forms, and ordinary appliances of the trade.

Practice: *First year.*—Measuring, drafting and cutting; making, hanging, facing, and trimming skirts. Drafting, cutting, fitting, and finishing basques. *Second year.*—Drafting waists, sleeves, and accessories to waists from measurements; cutting and fitting close and double-breasted garments; cutting and matching striped, plaid, and figured waists and skirts; advanced work in making complete dresses from different materials. *Third year.*—Fitting and pressing; practice in the use of colors; drafting jackets of different styles; making various styles of collars and pockets; lining and finishing pockets; drafting, making, and finishing various garments from different materials.

ELECTRICAL WORKERS.—Equipment: One 50-kilowatt monocyclic alternator, exciter, and switchboard; one 150-kilowatt monocyclic alternator, exciter, and switchboard; 1 Brush arc machine, and ammeters, voltmeters, wattmeters, galvanometers, and the Wheatstone bridge.

Practice: *First year.*—Experiments with voltaic cells, standard forms, resistance, electric bells, annunciators, interior wiring, molding cleats and conduits. *Second*

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

ALABAMA—Continued.

TUSKEGEE—TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE (NEGRO—DAY SCHOOL)—Continued.

year.—Electric lighting, incandescent lamps, telephone construction. *Third year.*—Direct-current generator construction, installation, and operation.

FOUNDRY WORK.—Equipment: 23-inch cupola with air blast, ordinary small tools and appliances of the trade.

Practice: *First year.*—Ramming drags; lifting and closing flasks; weighing and making up charges for melting, putting up molds, venting, sponging, drawing patterns, gate cutting. *Second year.*—Pump and engine castings, stove plate molding, fancy return work, executing original designs, lining the cupola, repairing the cupola lining, putting in sand bottom, starting fires and making-up charges for different classes of castings; tapping out and stopping in for pouring off; core making.

HARNESS MAKING.—Equipment: Complete sets of tools and appliances.

Practice: *First year.*—Making threads, practice stitching, repairing, cleaning, and oiling harness and making odd parts of single and double wagon harness, such as hame straps, breeching, side straps, traces, shaftings, fronts, lines, etc.; cutting out, fitting up, and finishing single and double wagon harness. *Second year.*—Making single and double buggy harness; making harness blacking, flexible and gig saddles, and pattern cutting. *Third year.*—Making surrey, express, track, coupe, and coach harness; pressed loop work, bristle stitching and hand lacing; making all grades of riding bridles and special sketch work.

LADIES' TAILORING.—Equipment: Same as used in plain sewing.

Practice: Postgraduate course in tailoring and advanced dressmaking.

LAUNDERING.—Equipment: 5 washers, 2 extractors, 1 mangle and ironer, full equipment of laundry requirements.

Practice: Washing and ironing, washing flannels, linens, prints, etc.; laundering laces, silks, etc.; bleaching and removing stains.

MACHINISTS AND STATIONARY ENGINEERS.—Equipment: Lathes, planers, shapers, drill presses, hand tools, engines, and all machinery used in the operations of the school; a full equipment of small tools.

Practice: *First year.*—Repair work on steam engines and pumps, printing presses, metal and wood working, laundry, agricultural, and dairy machinery; grinding chisels, punches, and drifts; clamping finished work in the vise; rough cuts with flat bastard files on the vise; laying off work for drill press; riveting work in the vise, making a rivet set, making circles for drilling and lines for planing on chalked cast-iron surface; cutting keyways and oil grooves; emery cloth and polishing at vise; cutting out shapes in sheet steel, clamping brass valves and machine parts in the vise, regrinding globe valves, repairs on valves and bibb cocks; regrinding blow-off and stopcocks, grinding twist drills and reamers; boring cored holes on the press; countersinking holes, counterboring holes, reaming holes on the press and straight lapping with centers inserted; facing holes on press; drilling at angle; drilling tapered holes, drilling tap hole for pipe tap, tapping three-fourths inch; cutting 1¼-inch pipe; clamping pipes in vise; cutting pipe to length and cut-off attachments; packing valves and glands; grinding pipe taps and dies; taking straight cuts and shear-off tools with diamond-point tool; feeding with dog, placing work in vise; bolting work on shaper for straight and angle cuts; adjusting governors; oiling engines, stopping and starting engines; sewing 2-inch belt with steel lace; sewing 6-inch belt with lace leather; gluing belts for high-grade machinery; adjusting the packing glands of the steam engine; adjusting cotters, etc. *Second year.*—Fitting connecting rods for stationary and locomotive engines; cutting down brasses; cleaning and polishing a steam engine; filing cotter ways; oiling an engine; planing brasses, measuring and squaring brasses; fitting cotter and gibs; scraping brass journals; babbiting 1½-inch journal; fitting liners to boxes; heating and preparing babbits for large journals in winter; pouring babbit metal at the top and bottom of journal at the same time; babbit work around machine screw; line shafting, and hangers; polishing and oiling same; balancing pulleys; setting and erecting; cleaning a planer; heating iron and steel, care of a forge and heating wrought iron; case hardening; tempering tool steel in oil and in water; drawing tempers and colors; packing water cylinders; packing for water and glands; feeding heavy and light oils; setting valves on duplex; filing tools for lathes and planers, in vise;

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

ALABAMA—Continued.

TUSKEGEE—TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE (NEGRO—DAY SCHOOL)—Continued.

turning straight work with diamond-point tools; turning brass, steel, and iron; making inside and outside caliper measurements; strapping work to face plate; counterbores in cylinder; boring piece strapped to face plate; boring oblong holes; turning eccentrics; drilling with counterboring drill an oblong hole; making mandrel for eccentric turning; cutting threads to accurate depths inside of hole on lathe by chasing; measuring for threads when not standard-tap size; annealing dies and renewing threads; cutting left-hand threads; measuring for and turning a round ball; making a set of five-eighths inch taps; making a jig for drilling a special piece of casting; erecting and setting a machine-tool foundation; handling jacks; erecting and assembling parts of a machine; leveling lining; repairing a gear wheel; inserting new teeth in gear wheel; straightening a shaft, bushing a pulley; repairing a burst 3-inch water pipe; re-turning a piston rod; repairing a boiler; repairing a sand hole in a water cylinder; making a pressure pump for hydraulic test; erecting steam engines, etc.

MILLINERY.—Equipment: The ordinary appliances of the trade.

Practice: *First year.*—Wiring, making folds, bindings, fitted facings, full facings, puffed edges, and a variety of bows. *Second year.*—Plain bonnets covered, trimmed, and lined; silk hat or bonnet making; toque and turban making; practice in use of combination of colors.

PAINTING, HOUSE AND CARRIAGE.—Equipment: All the ordinary tools and appliances of the trade.

Practice: *First year.*—Priming, sandpapering; practice work on samples; mixing putty to match different colors; puttying, painting houses, wagons, buggies; staining and varnishing furniture; glazing; mixing and matching colors; polishing furniture; carriage painting; metal painting; testing paints. *Second year.*—Gilding, applying wood fillers, floor painting; advanced work in house, carriage, and furniture painting; graining, striping, varnishing, polishing. *Third year.*—Sign painting, testing paints and liquids, kalsomining, painting houses, vehicles, and furniture.

PLAIN SEWING.—Equipment: 4 sewing machines and all appliances of the trade.

Practice: *First year.*—Holding and threading needle, basting, overhanging, stitching, overcasting, gathering, putting in gussets, herringbone stitching on flannel, hemstitching, tucking and whipping ruffles, chain stitching, featherstitching, making buttonholes and eyelets, darning on cashmere, slip and blind stitching, mending, darning, and patching. *Second year.*—Cutting and making men's underwear and negligee shirts; taking measure, cutting white shirts by measure; cutting, basting, stitching, and trimming underwear; cutting and making plain cotton dresses.

PLUMBING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Threading pipes for steam and water; installing hydrants, repairing faucets, packing valve stems; repairing water and steam pipes, connecting kitchen sinks, laying water pipes, tapping water mains. *Second year.*—Installing and repairing kitchen sinks, laundry tubs, and slop sinks; connecting galvanized iron range boilers, repairing steam traps, soldering and wiping seams; repairing flush tanks, making offsets in lead and iron pipes; installing and repairing lavatories, packing fuller faucets, connecting bathtubs; construction and location of cesspools; wiping brass ferrules to lead pipes; setting sanitary closets; laying terra-cotta pipe; calking cast-iron soil pipes. *Third year.*—Swinging steam mains, running sewers, placing and connecting radiators, soldering and wiping joints, setting closets, connecting bathtubs, lavatories, shower bath, and urinals.

PRINTING.—Equipment: 4 printing presses, 1 paper cutter, 1 folding machine, 1 stencil cutter, 1 addressing machine, 1 stitching machine, 1 perforating machine, 1 round cornering and punching machine, 1 mitering and cutting machine, type, and the ordinary appliances of the trade.

Practice: *First year.*—Treatment of printing rollers; making proofs, stitching books, padding; feeding platen presses; hand composition. *Second year.*—Making ready on platen presses; feeding cylinder presses; acquiring speed in composition; measuring type; making up newspaper forms; tabular composition; cutting stock, trimming books; simple composition; imposition of book forms, various forms of newspaper, and book composition; making ready on cylinder presses. *Third year.*—Typographical designing; intricate job composition.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

ALABAMA—Concluded.

TUSKEGEE—TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE (NEGRO—DAY SCHOOL)—Concluded.

SAWMILLING.—Equipment: 1 circular saw, 1 cut-off saw, 1 planer, 1 lathe, saw bench, and emery wheel.

Practice: Repairing belts by lacing, riveting, gluing; sharpening saws; grinding cutting tools and planer knives; running machines; gumming circular saw.

SHOEMAKING.—Equipment: 1 welt or turning machine, 1 rapid lockstitcher, 1 welt channeler, 1 sole channeler, 1 welt beater, 1 bobbin winder, 1 welt groover, 1 welt splitter, 2 sewing machines, and a full equipment of small tools.

Practice: *First year.*—Making wax ends; making different stitches; sharpening knives; common half-soling and heeling; preparing leather for use; soling and heeling nailed shoes; different kinds of patching and half-soling sewed shoes; preparing insoles and putting bottoms on common shoes. *Second year.*—Repairing pump-sole shoes; bottoming shoes; putting uppers together. *Third year.*—Building shoes; upper making; bottoming shoes; repairing.

TAILORING.—Equipment: Full equipment of machines and ordinary appliances of the trade.

Practice: *First year.*—Practice in the use of needle and thimble in overcasting; felling and backstitching; machine sewing; making buttonholes, flies, waistbands, straps, flaps for pockets, pockets, cutting and fitting linings; spacing buttons and button holes; application of measurements used in making trousers. *Second year.*—Making various pockets, collars, and facings, and complete vests; coat making; cutting and making canvas; making collars and sleeves; working from blue prints; making facings, foreparts, edges, joining back seam; basting linings, finishing shoulders, collars, sleeves, etc. *Third year.*—Work on ordinary garments, making coats.

TINSMITHING.—Equipment: Folding, grooving, turning, wiring, burring, forming, and setting-down machines; bench plates for holding large mandrel stakes; candle-mold stakes, square stakes, and bench shears; adjustable plate for hollow mandrel stake; snips, hawk-bill shears, circular hand shears, and full equipment of small tools.

Practice: *First year.*—Dressing and plating soldering coppers; repairing old vessels; cutting straight and curved lines; making pipes of various kinds; drafting patterns for pails; putting tin together for roofing; making elbows; repairing tin roofs; putting up conductors; laying tin roofs; standing and flat seams; making the measurements for common roofing work. *Second year.*—Making deck flanges, hoods, ventilators, revolving chimney caps, moldings, and gutters; putting up different kinds of gutters; mixing paint for tin roofs; making ridge rolls, crestings, and terminal blocks; general inside and outside work; miscellaneous work. *Third year.*—Making articles from patterns; laying out and forming advanced work; making and putting up cornices.

WHEELWRIGHTING.—Equipment: 10 double workbenches and full equipment of small tools.

Practice: *First year.*—Measurements and work with saws, planes, chisels, drawknives, bits, and spoke shaves; matching and jointing; getting working surfaces and squaring and rounding stock; work on wheelbarrows and pushcarts; making wagon parts from patterns. *Second year.*—Making patterns for wagon parts; making pushcarts; repairing farm wagons, buggies, and wheels; work on wagon and buggy parts; assembling wagon parts; laying out thimble skein axles. *Third year.*—Constructing buggies, surreys, and business wagons; arching and dropping axles; building carriage wheels; cutting buggy and surrey reaches.

CALIFORNIA.

SAN FRANCISCO—CALIFORNIA SCHOOL OF MECHANICAL ARTS (DAY SCHOOL).

FORGING.—Equipment: Not reported.

Practice: Continuous practice in forging difficult machine parts, such as engine shafts, connecting rods, and other parts; accessories for hoists, cranes, etc.; forge tools; lathe tools; carriage and wagon parts, etc. Also structural and ornamental ironwork and sundry selected jobs covering the field of forging.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

CALIFORNIA—Concluded.

SAN FRANCISCO—CALIFORNIA SCHOOL OF MECHANICAL ARTS (DAY SCHOOL)—Concluded.

MACHINIST.—Equipment: Not reported.

Practice: Work at vise, lathe, planer, shaper, milling machine, drill press, etc.; construction of engines, hoists, lathes, pumps, etc.; electrical construction—dynamos, motors, hoists, heating and lighting appliances, etc.

PATTERN MAKING.—Equipment: Not reported.

Practice: Making patterns for gear wheels, steam pumps, engines, hoists, propeller blades, dynamo frames, etc.; core work and sweep work; model making.

CONNECTICUT.

NEW LONDON—MANUAL TRAINING AND INDUSTRIAL SCHOOL OF NEW LONDON (DAY SCHOOL).

DRESSMAKING AND MILLINERY.—Equipment: 26 sewing tables, 1 cutting table, 1 triple mirror, 13 sewing machines.

Practice work, Dressmaking: Hemming, darning, patching, making buttonholes; drafting and making underclothing, children's dresses and kimonos; crocheting, braiding, and embroidering for trimming; drafting and making shirt waists, tight-fitting linings and draped waists, woolen dresses, thin summer dresses; making long winter coats, tailor-made jackets and skirts, spring suits, evening dresses.

Practice work, Millinery: Making wire and buckram frames and shapes; making and trimming straw and lace hats; advanced millinery.

MACHINIST.—Equipment: 8 lathes, 1 universal milling machine, 6 drill presses, 1 shaper, 1 power hack saw, 2 pipe cutters, 4 independent chucks, 1 arbor press, 2 reamer drills, 2 universal chucks, 1 drill grinder, 1 grindstone, one 7½ horsepower electric motor, 1 stock cutter, vises, forges, anvils, a full equipment of small tools and 1 double emery grinder.

Practice: Chipping, filing, scraping; making cylinder; centering, squaring, turning; making morse taper; turning taper; making bolt; turning cutting thread, tapping, and milling; making pulley; chucking, drilling, reaming, making arbor; annealing, tempering, grinding, and taper turning; making coupling and shaft; cutting keyway, hand-tooling, fillet, use of jig, and polishing; making pedestal box; planing, use of boring bar, fitting; making face plate; chucking, boring; inside thread cutting; making flat chuck drill; turning taper; making eccentric shaft; knurling or milling, eccentric turning; making parallels; planing; making square thread; finishing square-thread tool and testing with micrometer, cutting square thread; making tap, gasoline engines, electric motors, and machine tools; turning cast steel; filing; making lathe center.

ILLINOIS.

CHICAGO—LEWIS INSTITUTE (DAY COOPERATIVE SCHOOL).

FORGING.—Equipment: 2 large forges, 1 tempering forge, 1 brazing forge, one 200-pound steam hammer, 1 angle bender, 1 bolt header, 1 heating furnace, one 24-inch blower, anvils, and full equipment of small tools, including a post drill and emery grinder.

Practice: Not reported.

FOUNDRY WORK.—Equipment: Molding floor and benches for 16 pupils; full equipment of molders' tools and appliances; 2 core ovens; crane for handling cores and dry sand; 2 cupolas; 1 traveling crane with electric hoist; 1 tumbling barrel, and 1 wood lathe.

Practice: Not reported.

MACHINE-SHOP PRACTICE.—Equipment: 22 lathes, 3 shapers, 3 universal milling machines, 2 wet emery grinders, one 10-horsepower electric motor, 1 screw machine, 1 universal grinder, 1 planer, 2 drill presses, 1 sensitive drill press, 1 punching press, 1

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

ILLINOIS—Concluded.

CHICAGO—LEWIS INSTITUTE (DAY COOPERATIVE SCHOOL)—Concluded.

combination emery wheel and disk grinder, 1 universal cutter grinder, 1 circular metal cut-off saw, 1 traveling crane, independent electric motors, and a full equipment of small tools.

Practice: Not reported.

PATTERN MAKING.—Equipment: 8 double benches, 6 wood-turning lathes, 1 surface planer, 1 universal circular, cut-off, and rip-saw, 1 band saw, 1 grindstone, 1 emery tool grinder, 1 trimmer, 1 sandpapering machine, and 1 dry kiln.

Practice: Not reported.

GLENWOOD—ILLINOIS MANUAL TRAINING FARM (DAY SCHOOL).

BLACKSMITHING.—Equipment: 14 forges, anvils, and the ordinary tools of the trade.

Practice: Not reported.

CARPENTRY AND CABINETMAKING.—Equipment: Wood-turning lathes, boring machine, and full equipment of small tools.

Practice: Making furniture, chairs, tables, benches, desks, etc.; making general repairs about the institution.

COBBLING.—Equipment: The ordinary tools of the trade.

Practice: Making shoes and repairing.

LAUNDERING AND BAKING.—Equipment: All necessary tools and appliances.

Practice: Doing laundering and baking for the institution.

MACHINIST.—Equipment: 3 milling machines, lathes, etc.; full equipment of small tools.

Practice: Not reported.

PRINTING.—Equipment: 2 power presses, and the usual equipment type, forms, etc.

Practice: Not reported.

PEORIA—BRADLEY POLYTECHNIC INSTITUTE: HOROLOGICAL DEPARTMENT (DAY SCHOOL).

WATCHMAKING, JEWELRY MAKING, AND ENGRAVING.—Watchmaking equipment: 2 bench lathes with attachments, 1 damaskeening machine, 110 individual benches, foot wheels and lathes, 1 transit instrument, 1 chronometer, 1 compound microscope, and all necessary attachments for lathes and presses. Jewelry equipment: 1 large power flat roll; hand rolls for flat, oval, and square stock; draw plates for making wire, 2 ring benders, batteries and dynamo for plating, 3 polishing lathes, 1 shaper, 2 sensitive drill presses, 1 large screw-cutting lathe, 1 foot-power lathe and drill press, 1 gas furnace with blower, 1 sand-blast outfit, 1 enameling furnace, 1 drop press, 1 screw press, and 1 power press.

Practice work, watchmaking: Making small tools, center punch, round burnishers, hair-spring collector, jewel pushers, tapers for lathes, cement brass, drilling rest, large and small screws, square shoulders on four-millimeter wire, grinding and polishing cone pivots, large balance staffs, centering wires, setting jewels, figuring size and fitting pinions, fitting cylinders, staking on and truing wheels, making collets, drilling for pivots and pivoting, slide-rest work, wheel cutting, damaskeening, making barrel head, case springs and pivots; turning staffs for expansion balance; truing, and poising; colleting, overcoiling, vibrating, fitting hair springs to watches and timing; making stemwind, bevel, and crown wheels; turning hollow center pinion, and making countersquare to fit same; fitting wheels, pinions, and cylinder to watch; putting plug in cylinder; pivoting plain wires and staffs; making Swiss bridge and jeweling; fitting main spring and hook in barrel; making pivot drills; putting three teeth in large wheel; setting pallet stones. Advanced pupils cut and fit escape wheels for chronometers.

Practice work, jewelry making: Alloying, casting, rolling, and drawing gold and silver; making medals, class, college, and society pins; setting precious stones; enameling, plating, and Roman coloring, hard soldering, and jewelry repairing.

Practice work, engraving: Designing ciphers, monograms, scrollwork, old English, script, etc.; practice in ransferring designs to metal by the graver.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

INDIANA.

INDIANAPOLIS—NATIONAL TRADE SCHOOLS (DAY SCHOOL).

BRICKLAYING.—Equipment: The ordinary tools of the trade.

Practice: Actual building of walls.

LITHOGRAPHING.—Equipment: Lithographic presses and full equipment of small tools and appliances.

Practice: Drawing on paper and on stone; preparation of stones and plates; lettering and engraving, transferring, proving, and printing; work on flat-bed and rotary lithographic presses.

MACHINISTS.—Equipment: Lathes, shapers, drills, grinders, and a full equipment of the tools of the trade.

Practice: Drilling, shaping, planing, milling, grinding, and a general line of lathe work; chipping, filing, scraping, tapping, and reaming; assembling and testing.

MOLDING.—Equipment: Cupola with power blower, 1 traveling crane, 1 company hoist, 1 large drying oven, portable ovens for drying cores, 1 core machine, 1 crucible melting furnace, 1 pneumatic sand shaker, 1 molding machine, 1 universal power saw, 1 air compressor, 1 sand-blast machine, tumbling mills, grinders, pneumatic chisels, etc.; full equipment of small tools.

Practice: Not reported.

PAINTING.—Equipment: The ordinary tools of the trade.

Practice: Pupils do the practical work of the trade on the buildings of the institution.

PATTERN MAKING AND CARPENTRY.—Equipment: Planer, band saw, universal woodworking machine, mortising and tenoning machine, cut-off and rip saw, woodturning lathes, and a full equipment of small tools.

Practice: Building houses, sheathing and shingling; making door frames and setting them in position; constructing centers and window frames; making cases and hanging doors, lapping beams and setting bridging, erecting stud partitions, laying flooring, etc.

PRINTING.—Equipment: Printing presses, linotype machines, type and the ordinary tools and appliances of the trade.

Practice: Practice is extensive and varied, covering every description of work done in an ordinary printing establishment.

TILE AND MANTEL SETTING.—Equipment: The regular tools of the trade.

Practice: Laying tile floors and setting tiles in lavatories, etc.; laying the foundation and floating the cement for tile floors. Practice work is given in every branch of the trade.

MASSACHUSETTS.

BOSTON—FRANKLIN INSTITUTE.

DAY SCHOOL (SATURDAY AFTERNOON).

ELECTRICIANS.—Equipment: Same as that used in the evening school of the institute.

Practice: Not reported.

GAS AND GASOLINE ENGINEERS.—Equipment: Same as that used in the evening school of the institute.

Practice: Not reported.

STEAM ENGINEERS.—Equipment: Same as that used in the evening school of the institute.

Practice: Not reported.

EVENING SCHOOL.

ELECTRICIANS.—Equipment: 1 storage battery, 1 rotary converter, 8 motors and generators combined, 4 motors, batteries, switches, and a full equipment of small tools and appliances.

Practice: Not reported.

FIREMEN, BOILER.—Equipment: Not reported.

Practice: Not reported.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

MASSACHUSETTS—Continued.

BOSTON—FRANKLIN INSTITUTE—Concluded.

EVENING SCHOOL—concluded.

GAS AND GASOLINE ENGINEERS.—Equipment: 1 oil engine, 8 gasoline engines with Prony brakes, scales, and tanks for weighing fuel, magnetos, carburetors, timing devices, and the regular tools and appliances.

Practice: Not reported.

MACHINISTS.—Equipment: 2 lathes, 1 planer, 1 drill press, 1 emery wheel, complete machine tool outfit, 2 testing machines, 1 slide-valve engine and a full equipment of small tools.

Practice: Not reported.

SHEET METAL WORKERS.—Equipment: 1 burring machine, 1 set of rolls, and the ordinary tools of the trade.

Practice: Not reported.

STEAM ENGINEERS.—Equipment: 9 steam engines, 8 steam pumps, 1 air pump, 2 condensers, traps, damper regulators, reducing and safety valves, 1 tubular boiler, and the ordinary tools of the trade.

Practice: Not reported.

BOSTON—MASSACHUSETTS CHARITABLE MECHANIC ASSOCIATION EVENING TRADE SCHOOL (EVENING SCHOOL).

BRICKLAYING.—Equipment: Not reported.

Practice: *First year.*—Laying brick to a line; laying out the American bond; building of square piers and pigeonhole corners; laying out of brick footings. *Second year.*—Rowlock and bonded segmental arches; blocking, toothing, and corbeling; building and bonding of vaulted walls; polygonal and circular walls, piers, and chimneys; fireplaces and flues. *Third year.*—Laying out of bonds (Flemish, Old English, Dutch, Roman, etc.); cutting and turning of arches (straight, cambered, semicircular, three-centered, elliptical, and various forms of Gothic and Moorish arches); brick panels and cornices; laying out work from plans drawn by pupils; speed.

PLUMBING.—Equipment: Not reported.

Practice: Wiping upright and horizontal round and branch joints; soldering nipple and cap joints; wiping flange, side flange, ferrule, upright ferrule, and overcast joints; wiping outlet, inlet, and vent into trap; wiping upright, horizontal, Y-branch, plain bib vertical branch, and overhead round joint; making round, side, and upright screw-traps.

BOSTON—NORTH BENNET STREET INDUSTRIAL SCHOOL (EVENING SCHOOL).

DRESSMAKING, ADVANCED CLASSES.—Equipment: Not reported.

Practice: Taking measure, drafting patterns, cutting, basting, fitting, rectifying, stitching and finishing seams, facing placket, putting on band, hemming, cutting, basting and fitting of a plain shirt waist lining, rectifying, planning and making tucks, cutting waist from fitted lining, finishing seams, cutting, making and placing sleeves with cuffs, finishing; making woolen dress; making evening dress.

DRESSMAKING, ELEMENTARY CLASSES.—Equipment: Not reported.

Practice: Cutting, finishing seams, hemming, knitting apron; making oversleeves, machine made; making dress of washable material.

POTTERY.—Equipment: Not reported.

Practice: Building by coils; building by sections; throwing on potters wheel; casting in molds with clay slip.

PRINTING.—Equipment: Printing press, imposing stone, and type, etc.

Practice: Drawing title-page with straight-line ornamentation and lettering; working with brass rules and type.

WOOD TURNING.—Equipment: Wood-turning lathes and a full equipment of hand tools.

Practice: Centering, roughing, smoothing, turning to size, and testing with calipers; cutting to length; turning straight tapes; outer and inner curves; turning of shoulders; face plate and chuck turning.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

MASSACHUSETTS—Concluded.

BOSTON—NORTH BENNET STREET INDUSTRIAL SCHOOL (EVENING SCHOOL)—Concluded.

WOODWORKING.—Equipment: 33 work benches and full equipment of small tools, 7 wood-turning lathes, and 1 band saw.

Practice: Making simple pieces of furniture and various articles for use in the home or in the institution.

MISSOURI.

ST. LOUIS—DAVID RANKEN, JR., SCHOOL OF MECHANICAL TRADES (DAY SCHOOL).

BRICKLAYING.—Equipment: Scaffolding, trestles, semicircular, segment, elliptical and gothic forms for arches and a full equipment of small tools.

Practice: *First year.*—Tempering and mixing mortar; spreading mortar for various courses; laying brick to a line; right angle corners with stretcher, solid header and Flemish bond header courses; internal angles and bay window corners; walls, chimneys, fireplaces and flues; practice on scaffold with trestles, poles, ledgers, and putlogs and lookouts, setting window frames and door sills, turning arches over windows, door frames, and centers; cutting brick centers over wood or iron lintels and turning arches over them; cutting over arches to the line. *Second year.*—Straight 1-inch projections; dentals and panels; quoins projecting on corner and corner quoins flush with wall; setting terra cotta and cut stone trimmings; running over angle iron above window and door frames; setting fireproof partition, floor, and ceiling tile; boiler setting; smokestacks for boilers; topping out stack with ornamental head; making mortar; buttering brick; spreading mortar; laying brick; striking joints with pointing trowel, jointer, rod and knife, and steel and knife; laying out work.

CARPENTRY.—Equipment: Saw table equipped with 4 saws; 1 shaper, 1 molder, 1 surface planer, 1 boring machine, 1 mortising machine, 1 power grindstone, 4 motors, and a full equipment of small tools.

Practice: *First year.*—Exercises in joinery, joist framing and setting, bracing, spacing; framing sills, plates, girders and ties; fitting in braces; machine planing, sawing and working moldings; turning; tool grinding; setting up machine; making window frames, sash, doors, blinds, and various kinds of moldings; paneling; turning and general millwork. *Second year.*—Roof framing, cornice setting, shingling; making and setting centers, columns, and supports; heavy roof trussing; shoring; interior finish; jamb casing, base boarding, fitting and hanging doors and transoms, and setting ceiling beams; putting on hardware; cabinet work; building stairs, handrail, ramps, and casings; erecting complete buildings and full sized sections of buildings in the school shop.

PAINTING (house and sign).—Equipment: Ladders, scaffolding, full equipment of small tools and the appliances of the trade.

Practice: *First year.*—Preparation of plaster, brick, and wood surfaces; painting walls and ceilings; patching, sizing, priming; mixing colors; stippling; painting woodwork; staining; varnishing; practice with full block, full round block, and half block; drawing and stencil cutting; lining; making stencils and stenciling; shading; kalsomining; preparing walls; stenciling on water color; treatment and staining of natural wood; filling with paste, liquid, and shellac fillers; glossy, flat, rubbed and waxed finish; glazing and puttying; spacing, lettering on muslin, oil cloth, and other materials; wall and ceiling decoration; stippling heavy color; striping and two-color work; enameling, gilding, bronzing; text and ornamental lettering; designing; lettering in two or more colors. *Second year.*—Painting on brick, wood, plaster, and other surfaces; mixing colors and stains; graining; varnishing; preparing signboards; shading, blocking, lining, smalting; decorating on canvas; preparing surfaces; filling; laying out panels; pouncing, gilding, marbling; lettering on glass and japanned plates; embossing a brass plate sign; embossing a glass sign; designing panels, flowers, still life; preparing walls and ceiling for papering; hanging paper on side walls and ceiling and on wooden partition; tinting on paper.

PLUMBING.—Equipment: 6 wiping tables, 48 cast-iron solder pots and stands, 18 atmospheric gas burners, 2 soldering-iron heaters, 1 cast-iron press, 1 cast-iron melt-

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

MISSOURI—Concluded.

ST. LOUIS—DAVID RANKEN, JR., SCHOOL OF MECHANICAL TRADES (DAY SCHOOL)—Concluded.

ing pot, 2 nipple chucks, 1 pipe reamer, 2 pipe cutters, 4 gasoline furnaces, 3 chain tongs, 1 set twist drills, 1 smoke-testing machine, gas-fitting outfit, 1 pressure controller, 1 pipe-bending bench, 3 pipe-bending springs and plugs, 1 airohydrogen lead-burning apparatus, 2 compound blowpipes, 4 mandrels, 4 siphon-action water-closet fixtures, 3 bathtubs, 4 lavatory fixtures, 7 sinks, 8 range boilers, 1 double combination washtub, 1 water heater, pipes, fittings, and traps of various sizes and dimensions, and a full equipment of plumbing tools and appliances.

Practice: *First year.*—Making wiping solder and fine solder; joint wiping at the bench and on the floor; threading iron pipe; cutting nipples; lead-pipe bending; calking cast-iron pipe; elementary work in fitting up sinks, lavatories, and water-closets; lead burning. *Second year.*—Roughing in for lavatories, bathrooms, and kitchens; testing with water, air, smoke, and chemicals; lining tanks for chemicals; gas fitting; roughing in for school and office building toilet rooms; advanced lead burning and chemical plumbing; pumps; hydraulic rams; testing of traps for siphonage; miscellaneous work; floor and wall and wrought-iron system of soil and waste pipes; wiping on block-tin pipe with bismuth solder.

STATIONARY ENGINEERS.—Equipment: One 80-horsepower tubular boiler, 1 duplex feed pump, 1 centrifugal pump, 1 feed-water heater, 1 high-speed noncondensing steam engine, one 50 and one 25 kilowatt direct-current generators, 1 twin-cylinder gas engine, 1 fully equipped switchboard, 1 electric elevator, 1 water meter, 1 watt-meter, 1 pair of coal scales, 1 record steam gauge, 1 lathe, 1 drill press, 1 grinder, one 7-h rsepower motor, 1 engine indicator, 1 prony brake, 1 dead-weight gauge tester, and a full equipment of small tools and appliances.

Practice: Pupils are divided into three sections. The fireman of the day fires and cleans the furnace and boiler and cares for the pump; the engineer attends to the engine, generator, and auxiliaries, and makes any needed repairs and adjustments; the house mechanic cares for the lamps, radiators, motors, etc., in the building and keeps them in good working order, making engine, boiler, and pump tests, and elementary machine-shop work, and electrical wiring for engineers.

NEW YORK.

BROOKLYN—PRATT INSTITUTE: SCHOOL OF HOUSEHOLD SCIENCE AND ARTS.

DAY SCHOOL.

DRESSMAKING.—Equipment: 50 sewing machines, 8 power-driven sewing machines, 8 other machines, dress forms, sewing tables, and the usual sewing equipment.

Practice: *First term.*—Drafting, cutting, fitting; practice in power-machine work; making shirt-waist suits and unlined dresses. *Second term.*—Modeling in paper and crinoline; draping; block-pattern making; making lined dresses; tailoring processes; embroidery stitches. *Third term.*—Drafting, fitting, draping, and finishing; making street suits, reception gowns, and evening dresses. *Fourth term.*—Working on custom-order work.

MILLINERY.—Equipment: Not reported.

Practice: Designing, drafting, and making buckram and wire frames; making plain covered hats; making bows, covering wire frames with straw braids and other materials; making children's hats; designing, making, and trimming all styles of hats.

SEWING.—Equipment: Not reported.

Practice: Hand and machine sewing applied on an apron; darning and mending; buttonhole work; making an underwaist, a dressing sack, or kimono; drafting and making undergarments; practice in the use of machine attachments; making plain unlined shirt waists; making fine lingerie, or layettes for infants, children's underwear, pinafores, and dresses.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Continued.

BROOKLYN—PRATT INSTITUTE: SCHOOL OF HOUSEHOLD SCIENCE AND ARTS—Concluded.

EVENING SCHOOL.

DRESSMAKING.—Equipment: Day school equipment is used.

Practice: Drafting and making plain shirt-waist suits or simple unlined dresses of washable material; making a woolen skirt and drop skirt; drafting and making a lined waist.

MILLINERY.—Equipment: Not reported.

Practice: Drafting, making, and covering buckram frames; making bows; making and trimming hats; making wire frames; straw sewing; advanced work in making and trimming spring hats and bonnets.

SEWING.—Equipment: Not reported.

Practice: Hand and machine sewing applied on an apron; darning and mending; buttonhole work; making an underwaist, dressing sack, or kimono; drafting and making undergarments; practice in the use of sewing-machine attachments.

BROOKLYN—PRATT INSTITUTE: SCHOOL OF SCIENCE AND TECHNOLOGY.

DAY SCHOOL.

CARPENTRY AND BUILDING.—Equipment: 1 universal saw bench, 3 saw benches, 1 swing saw, 2 band saws, 1 jig saw, 1 planer, 2 jointers, 1 mortising machine, 1 grindstone, 1 boring machine, 1 pattern maker's lathe, 35 wood-turning lathes, 62 workbenches, 1 cabinetmaker's bench, 1 demonstration bench, 1 demonstration lathe, 1 kiln, 1 glue bench and heater, 1 gas stove, 5 trimmers, 2 saw clamps, 1 saw-brazing outfit, 48 carriage clamps, 8 hand screws, 5 clamps, and a large assortment of carpenter's tools.

Practice: Bench work and wood turning, cabinetmaking and millwork, rough framing, interior finish, roof framing, and stair building.

MACHINE-SHOP PRACTICE AND TOOL MAKING.—Equipment: 5 steam engines, 2 gas engines, 53 lathes, 4 planers, 5 shapers, 8 drill presses, 4 milling machines, 2 boring machines, 5 grinding machines, 1 punch press, 2 grindstones, 2 gas furnaces, 2 metal saws, 1 foot press, 1 drill grinder, 3 tool grinders, and a full equipment of small tools.

Practice, machine-shop practice: Chipping, filing, and fitting; turning and boring, working to micrometer and limit gauges for shrink fits; constructing high-grade machines from blue prints; building jigs; work on milling machines and universal grinders; cutting plane and spiral gears, worm wheels, etc. Tool-making, practice: Hardening and tempering in oil, lead, sand, and flame; casehardening; making, hardening, and grinding of standard gauges, plugs, reamers, drills, taps, special tools, etc.; building box tools for turret lathe heads; die designing and construction.

EVENING SCHOOL.

CARPENTRY.—Equipment: Day school equipment is used.

Practice: Bench work, operating woodworking machinery; laying out plans in carpentry, joinery, and cabinet work; roof framing; stair building; handrail and intersections, etc.

MACHINISTS AND TOOL MAKING.—Equipment: Day school equipment is used.

Practice: *First season.*—Bench work, chipping, filing, and hand fitting; practice on engine lathe, planer, shaper, and milling machine. *Second season.*—High-grade machine work and machine construction; working to micrometer and limit gauges; work on milling machine, boring mills, and grinding machinery. *Third season.*—Tool making, hardening and tempering in oil, lead, sand, and flame; casehardening; making, hardening, and grinding standard gauges, reamers, plugs, taps, special tools, etc.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Continued.

BROOKLYN—PRATT INSTITUTE: SCHOOL OF SCIENCE AND TECHNOLOGY—Concluded.

EVENING SCHOOL—concluded.

PAINTING, FRESCO.—Equipment: Booths plastered on sides and ceiling with varied forms of cove and cornice.

Practice: Preparing walls and ceilings in kalsomine; lining, laying out work, making and applying pounce and stencil, and putting on flat and shaded ornaments.

PAINTING, SIGN.—Equipment: Not reported.

Practice: Designing and spacing of plain and fancy letters; ornamental lettering in gold and colors on wood, glass, and metal; preparation of surfaces for plain and ornamental signs; lettering on wagons; striping; pictorial work; monograms; varnishing.

PATTERN MAKING.—Equipment: Use that used by day carpentry pupils.

Practice: Making solid, split, loose-piece and three-part-flask patterns, and marine and stationary engine patterns; making skeleton, marine, and Corliss cylinder patterns, loam, sweep work, and propellers.

PLUMBING.—Equipment: Not reported.

Practice: Preparing wiping cloths; soldering reams in brass, iron, lead, and tin; making solder, cup, overcast, straight, wiped, flange, and branch joints; working sheet lead into bends, traps, service boxes, and safes; lining tanks, calking iron-pipe joints, and bending with sand and kinking irons.

SHEET-METAL WORKERS.—Equipment: 1 cornice break, 1 large squaring shield, 23 sheet metal bench machines, benches, stakes, and full equipment of small tools.

Practice: Laying out work; tinsmith work; stove and furnace work; cornice work; skylights, etc.

NEW YORK—BARON DE HIRSCH TRADE SCHOOL (DAY SCHOOL).

CARPENTRY.—Equipment: Not reported.

Practice: Making the principal joints; half lap, mortise and tenon, miter and dovetail; constructing frames, tool boxes, panels, window frames, sash, doors, and door frames; house framing; building frame house (model); building full-size frame cottage, sheathing, shingling, partitioning, flooring, setting of trim; building flight of stairs and setting newel post and balusters; making tool cabinets; doing repair work.

ELECTRICAL WORKERS.—Equipment: Not reported.

Practice: Inside wiring for different combinations of bells and buttons, door trips, automatic drops, fire alarms, door openers, annunciators, etc.; wire splicing, running wire on porcelain insulators and in moldings, connecting receptacles, sockets, cut-outs, and switches for both two and three wire systems; conduit work and wiring and setting all necessary fixtures; installing a complete equipment for lighting.

MACHINISTS.—Equipment: Not reported.

Practice: Bench work; use of drill press, shaper, planer, lathe, screw machine, milling machine, and universal grinder; making gauges, templates, and calipers; chipping, filing, polishing, scraping, fitting, tapping, and threading with stock and die; drilling different metals with various types of drills at different speeds and feeds; lubricating and drill grinding, laying out work and use of jigs; making parallel clamps, V blocks, and journal boxes; making plug and ring gauges, step gauges, mandrels, face plates, etc.; cutting and fitting V and square threads and taper turning; ornamental hand turning and polishing; use of micrometer; forging, tempering, and grinding of lathe tools; making rivets, screws, and binding posts; setting the indexing device and finding the proper index circle; plain milling; spiral milling; making gear wheels and milling cutters; grinding gauges, mandrels, lathe centers, and milling cutters; making special tools for shop use; repair work; building grinders, drill and punch presses, shapers, gasoline engines, etc.; general repairing.

PAINTING, FRESCO AND SIGN.—Equipment: Not reported.

Practice work, fresco painting: Cutting stencils; painting flat and shaded ornaments; executing full-sized designs on walls and ceilings.

Practice, sign painting: Preparation of sign boards, formation and spacing of letters, laying out signs, lettering in colors, shading; lettering in gold, silver, and bronze; lettering on wood, metal, cloth, and glass.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Continued.

NEW YORK—BARON DE HIRSCH TRADE SCHOOL (DAY SCHOOL)—Concluded.

PAINTING, HOUSE.—Equipment: Not reported.

Practice: Removal of old kalsomine, cutting out and refilling cracks, preparation of walls, making size, mixing and applying kalsomine colors; removal of paint and varnish; preparation of priming, second and third coats of paint; panel work in different colors, lining, graining, staining, varnishing, cutting and use of stencils.

PLUMBING.—Equipment: Not reported.

Practice: Work with lead pipe, cast and wrought-iron pipe; gas fitting and installation of plumbing systems; tinning hatchet and straight iron; filing, soiling, and tinning brass spuds and ferrules; straightening supply pipe, casting and soldering lead seams; wiping round and branch joints in vertical and horizontal positions; making, reducing flange and round joints on brass and lead; making bends on waste and on soil pipes; making grease trap from working drawings; cutting pipe, twisting oakum, yarning and calking joints in vertical and horizontal positions; making nipple chucks, nipples, straight and bent drops with straps, offsets, and handling large screw pipes; installing, connecting, and testing gaslighting systems with ceiling and side outlets; installing from working drawings complete house drainage and water-supply systems; installing range boilers, washbasins, sinks, laundry tubs, water-closets, and urinals.

NEW YORK—CLARA DE HIRSCH TRADE SCHOOL (DAY SCHOOL).

DRESSMAKING.—Equipment: 1 power sewing machine; full equipment of sewing machines and appliances.

Practice: Sewing on all parts of a gown.

SEWING, HAND.—Equipment: The ordinary appliances.

Practice: Basting, overhanding, square hemming, outline stitch initialing, French hemming with feather-stitch initial, cotton patching, triangular patching, wool patching, cross-stitching initial, making buttonholes, eyelets, eyelet embroidery, darning stockings and linen, drawn work, feather stitching, other fancy stitches, French knots, darning tears on light and heavy weight materials, slip stitching, marking towels, cutting bias, rolling and whipping on lace on turnovers, hemstitching tucks, fringing and embroidering initials, binding seams on skirts and making plackets; running, back and combination stitching; running seams (edges overcast), French seam, hemming; bias cutting and mitered corners, gussets (three), tucking, flannel patching, shirring; making towels, aprons, napkins, skirts, etc.

SEWING, MACHINE.—Equipment: Sewing machines and all appliances.

Practice: Straight stitching, bias, bias cross, and bias stitching with space between, binding, felling three different ways, stitching squares with narrow, straight bands, mitered corners; stitching pointed bands, mitered corners; stitching on cotton tape, straight tucks, bias tucking, cross tucking, cording, straight and on bias, box plaiting, puffing, shirring, pin tucking, three different ways of lace running, tucked gown yokes; making aprons, petticoats, gowns, drawers, yokes on skirts, corset covers, skirts, house dress, infants' dresses, embroidered cushions, underwear, and kimonos, curtains, towels, napkins, etc.

NEW YORK—HEBREW TECHNICAL INSTITUTE.

DAY SCHOOL.

ELECTRICAL WORKERS AND ELECTRICAL CONSTRUCTION.—Equipment: One 10-horsepower motor, one 5-horsepower motor, one 4-horsepower gas engine, small electric motors, galvanometers, voltmeters, amperemeters, Wheatstone bridges, photometers, and other apparatus.

Practice: *Experimental work.*—Electromagnetism; primary and storage batteries; dynamos and motors; electrical measuring with amperemeter, voltmeter, and Wheatstone bridge; electrical testing of dynamos, motors, and arc lamps; construction of apparatus for use in demonstration and experiments; application of alternating currents of electricity.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Continued.

NEW YORK—HEBREW TECHNICAL INSTITUTE—Concluded.

DAY SCHOOL—concluded.

INSTRUMENT MAKING (ELECTRICAL AND SCIENTIFIC).—Equipment: 9 engine lathes, 4 speed lathes, 2 milling machines, 1 universal grinder, 2 drill presses, 1 metal saw, 1 gas furnace, 1 shaper.

Practice: Designing and constructing electrical and scientific instruments and apparatus; machining and finishing brass, copper, hard rubber, and steel; gear cutting, fitting threads, boring, taper turning, grinding, polishing, plating, making special tools.

METAL WORKING (MACHINIST, ETC.).—Equipment: One 50-horsepower steam engine, one 25-horsepower gas engine, one 40-kilowatt generator, one 15-kilowatt generator, one 15-horsepower electric motor, 12 engine lathes, 5 speed lathes, 1 planer, 1 shaper, 3 drill presses, 3 milling machines, 1 universal grinder, 1 metal saw, 1 gas furnace, 1 electric pump, 3 steam pumps, ampere lathe and engineers' tools, 4 forges.

Practice: Chipping, filing; work on speed lathe; plain and taper turning; cutting threads on engine lathe; planing; drill-press exercises; gear cutting; making tools, taps, reamers, and milling-machine cutters; grinding, forging; annealing, hardening, and tempering; forging squares, rounds, and welding, hardening, tempering, and grinding lathe tools. Practice in metal construction and the making of tools, cutters, gear wheels, etc; making, hardening, tempering, and grinding cutters, drills, and tools; constructing a speed lathe, dynamo, emery grinder, small milling machine, or electrical instrument; fitting thread and taper work; forging.

WOOD CARVING.—Equipment: 28 work benches and full equipment of small tools.

Practice: Carving from casts and working drawings; draft carving for molding; constructive furniture; making of molds and reproducing carved models in plaster.

WOODWORKING AND PATTERN MAKING.—Equipment: 29 speed lathes, 1 circular saw, 1 band saw, 1 gig saw, 1 trimmer, 28 work benches, full equipment of small tools.

Practice: Exercises with plane, chisel, saw, and other tools; joinery; gluing, staining; advanced lathe work; pattern work; molding and casting; cabinetwork; veneering and polishing; construction work in carpentry, architectural woodwork, grill work, interior finish; advanced pattern making at the bench and lathe; wood carving and wood turning.

EVENING SCHOOL.

INSTRUMENT MAKING (ELECTRICAL AND SCIENTIFIC).—Equipment: Day school equipment is used.

Practice: Same as course followed by day pupils.

PATTERN MAKING.—Equipment: Day school equipment is used.

Practice: General pattern making for automobile work, water jacket and injector core work; molding and casting in white metal; cabinetmaking and the application of woodworking machinery.

TOOL MAKING.—Equipment: Not reported.

Practice: Making taps, dies, reamers, mandrels, milling cutters, cutters for gearing, ring and plug gauges; gear cutting, tap milling, cutting cutters, profiling; grinding arbors, reamers, ring and plug gauges, and press dies; surfacing, etc.; filing, scraping, making tools, jig work, etc.; hardening and annealing steel.

NEW YORK—HEBREW TECHNICAL SCHOOL FOR GIRLS (DAY SCHOOL).

DRESSMAKING.—Equipment: 45 sewing machines and necessary tables and appliances.

Practice: Basting, hemming, overhanding, overcasting, gathering, stroking, putting on bands and machine stitching; making undergarments, child's aprons, flannelette garments, children's rompers, napery hemming, fine hand tucking, baby dresses, boys' sailor suits, drafting and making school and graduation dresses.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—**PHILANTHROPIC SCHOOLS**—Continued.

NEW YORK—Continued.

NEW YORK—HEBREW TECHNICAL SCHOOL FOR GIRLS (DAY SCHOOL)—Concluded.

EMBROIDERY.—Equipment: Not reported.
Practice: Making sampler of stitches, feather stitching, buttonholing, stars, anchors, eyelet work, French knots, border designs, drawn work, scalloping, initial work.
MILLINERY.—Equipment: Not reported.
Practice: Drafting of patterns for buckram frames; cutting buckram by pattern, wiring edges, joining frame, binding edge of brim, etc., with crinoline; covering with velveteen; milliner's fold; trimming felt hats; bow making; simple toques made over buckram or wire frames; remodeling hats, trimming; wire-frame making; altering, covering, draping; straw sewing on wire frame and without frame; trimming straw hats.

NEW YORK—ITALIAN EVENING TRADE SCHOOL (EVENING SCHOOL).

CARPENTRY.—Equipment: 12 workbenches and the ordinary tools of the trade.
Practice: Making workbenches and horses.
DRESSMAKING.—Equipment: Sewing machines and all necessary appliances.
Practice: Making the various stitches and simple unlined garments.
PAINTING, SIGN.—Equipment: The ordinary tools of the trade.
Practice: Mixing paint; making various kinds of letters—capitals and lower case; preparing boards for signs; making a line of letters with pencil and painting the letters.
POWER SEWING MACHINE OPERATING.—Equipment: 10 power sewing machines and all necessary appliances.
Practice: General management of sewing machines; making various kinds of seams, turning of corners, tucking, etc.; making pillow slips, undergarments, aprons, etc.

NEW YORK—PREPARATORY TRADE SCHOOL (EVENING SCHOOL).

CARPENTRY.—Equipment: The ordinary tools of the trade.
Practice: Not reported.
DRESSMAKING.—Equipment: Sewing machines, frames, and sewing tables.
Practice: Not reported.
ELECTRICAL WORKERS.—Equipment: The ordinary tools of the trade.
Practice: Not reported.
MILLINERY.—Equipment: Sewing machines, frames, and sewing tables.
Practice: Not reported.
PLUMBING.—Equipment: Furnaces and full equipment of small tools.
Practice: Not reported.

NEW YORK—ST. GEORGE'S EVENING TRADE SCHOOL (EVENING SCHOOL).

CARPENTRY.—Equipment: The ordinary tools of the trade.
Practice: Not reported.
ELECTRICAL WORKERS (INSIDE WIRING).—Equipment: The ordinary tools of the trade.
Practice: Inside electrical wiring and practical work with electric motors, dynamos, and batteries.
PLUMBING.—Equipment: The ordinary tools of the trade.
Practice: Not reported.
SHEET-METAL WORKERS.—Equipment: The ordinary tools of the trade.
Practice: Not reported.

NEW YORK—NEW YORK TRADE SCHOOL.

DAY SCHOOL.

CARPENTRY.—Equipment: The ordinary tools of the trade.
Practice: Bench work; laying out and constructing centers and window frames; make, case, and hang doors; lay beams and set bridging in same; erect stud partitions and lay flooring. A complete course in joinery work is also given. House construction: window frames, sashes, doors, etc., are made and set in position.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Continued.

NEW YORK—NEW YORK TRADE SCHOOL—Continued.

DAY SCHOOL—concluded.

CORNICE AND SKYLIGHT WORKERS.—Equipment: The ordinary tools of the trade.

Practice: Making molded gutter, with flat and return head; square molded leader head; octagon molded leader head; plain window cap; ornamental window cap; raised panel; plain cornice with modillions; ornamental cornice with brackets; square turret; finial; cross; pediment; dormer; ventilator; flat and hipped skylights, and bay window; hammer work, both hand and machine.

ELECTRICAL WORKERS.—Equipment: Dynamos and motors, of both direct and alternating current, and all necessary testing instruments.

Practice: Electric-light wiring; running conduits and pulling through wires; molding and cleat work; telephone, bell, and burglar-alarm wiring.

PAINTING AND DECORATING.—Equipment: The ordinary tools of the trade.

Practice: Repainting old woodwork; oil finish and flatting; mixing paint for one, two, and three coat work; painting new woodwork; priming or first coat; second and third coats; oil finish and flat finish; killing knots in woodwork; puttying and sandpapering; removing paint, by burning off and by use of paint removers; mixing paint for brickwork; painting walls and ceilings; cutting out cracks and replastering same; mixing and applying the various coats; oil finish, flat finish, and stippling; kalsomining; painting in two or more shades; color mixing; matching oil color and distemper colors; hardwood finishing; wood staining; mixing the color to produce stained effects; graining, oak, ash, cherry, walnut, and mahogany; varnishing; enameling; gilding; bronzing; lining, cutting, and preparing stencils; applying ornaments by means of stencils; tinting and blending in water color; laying out panels; glazing in oil colors; applying flat ornaments and edging same.

PAINTING, SIGN.—Equipment: The ordinary tools of the trade.

Practice: Manual instruction in preparing boards for signs; treatment of old signs for the purpose of relettering; spacing and lettering in one color; lettering in two or more colors; shading, blocking, and lining; smalting; gilding on wood and on glass; lettering on japanned plates, muslin, and wire.

PLUMBING.—Equipment: The ordinary tools of the trade.

Practice: Making seams, overcast and cupjoints; wiping five-eighth inch horizontal round, horizontal branch, upright round, upright branch, and vertical branch joints; wiping stopcock on lead pipe; flange joints; wiping small and large nipples to lead pipe; wiping half-inch horizontal round, horizontal branch, upright round, upright branch, and vertical branch joints; wiping two-inch horizontal round, upright round, and upright branch joints; wiping two and four inch short bends with ferrules; sand bends; cast-iron pipe work; gas fitting, wrought-pipe work; setting up fixtures, such as range boilers, sinks, wash trays, baths, and closets.

EVENING SCHOOL.

BLACKSMITHING.—Equipment: Blast and exhaust system, standard forges, emery wheels, and drill press. Full equipment of small tools.

Practice: Making points, hooks, staples, holdfasts, bridle irons, rings, chain links, bolts, jaw pieces, tees, and nose keys; hand forging of various kinds; making forgings for lathe, planer, and shaper tools, cold, cape, nose, and brick chisels, drill bits, star or rock drills; open-jaw wrenches; tongs of various kinds; nippers; hammers.

BRICKLAYING.—Equipment: The ordinary tools of the trade.

Practice: Laying straight walls, blocking and toothing, piers, return corners, and intersecting walls; building arches, fireplaces, flues, setting and building around window frames; fireproofing work.

CORNICE AND SKYLIGHT WORKERS.—Equipment: The ordinary tools of the trade.

Practice: Manual instruction same as followed by day pupils.

ELECTRICAL WORKERS.—Equipment: Day school equipment is used.

Practice: Manual instruction same as followed by day pupils.

PAINTING AND DECORATING.—Equipment: Day school equipment is used.

Practice: Manual instruction same as followed by day pupils.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Continued.

NEW YORK—NEW YORK TRADE SCHOOL—Concluded.

EVENING SCHOOL—concluded.

PAINTING, SIGN.—Equipment: Day school equipment is used.
Practice: Manual instruction same as followed by day pupils.
PATTERN MAKING.—Equipment: Not reported.
Practice: Making a rectangular balance weight with rounded corners, hexagonal prisms, hexagonal nut and small bearing, steam chest cover; turning flanged coupling; making ribbed bracket; turning packing gland, flanged T pipe, blank spur gear, blank bevel gear; gluing up and turning ring of segments in course for wheel pattern and tongued for chain sprocket; making patterns of steam cylinder, crosstie, crank-pin bearing, globe valve, spur wheel, pinion and pocketed chain wheel, bevel wheel and pinion, propeller wheel blade, worm, and worm wheel.
PLASTERING.—Equipment: Not reported.
Practice: Lathing, scratch and brown coat work, hard finishing, and cornicing. *First term.*—Putting on of the various coats, and simple cornicing. *Second term.*—More elaborate cornicing. *Third term.*—Completion of course in cornicing.
PLUMBING.—Equipment: Day school equipment is used.
Practice: Manual instruction same as followed by day pupils.
PRINTING.—Equipment: Presses and type.
Practice: Typesetting and printing billheads, noteheads, statements, letterheads, business cards, dodgers, circulars, blank forms, tabular work, cutting and mitering rules, making ready for press.

ROCHESTER—MECHANICS' INSTITUTE OF ROCHESTER.

DAY SCHOOL.

DRESSMAKING.—Equipment: Not reported.
Practice: Shirt-waist drafting; a skirt of practice material, measured, drafted, basted, fitted, and hung; an unlined skirt of woolen material finished according to requirements; two designs made in paper; practice in taking measure; drafting waists to measure on the figure, one finished skirt, unlined, of woolen material; taking measures of members of class; drafting sleeve, collar, shirt waist; making fitted lining; sewing on hooks and eyes; boning; correcting pattern in accordance with any necessary changes; making an entire gown or skirt and waist of differing material and of any moderate style.
ELECTRICAL WORK.—Equipment: Direct-current dynamos and motors, rotary converters, synchronous motor, induction motors, and transformers; a three-unit testing set, consisting of an alternator, rotary and direct-current motor; a large number of electrical instruments of standard make, such as voltmeters, ammeters, wattmeters, testing sets; Wheatstone bridges, galvanometers, resistance boxes and condensers; telephone and telegraph sets, one chord circuit central energy switchboard, and other useful pieces of apparatus.
Practice: Wiring of direct-current motors for operations of constant and variable speed and reversal of rotation; wiring and operating generators, singly and in parallel and testing of electrical machines.
MACHINIST.—Equipment: Lathes with gear-box attachments for thread cutting, milling machines, turret lathe, cold saw, planer, shaper, tempering furnace, drills and drill grinders, and a large variety of small tools.
Practice: Straight, taper, and curve turning, chucking in chuck and on faceplate, boring, gear cutting and knurling, thread cutting and figuring out gear ratios; simple work on miller, shaper, and grinder; making tools, cutters, drills, reamers, and mandrels requiring accurate use of milling machine and grinder; small bench grinders, small dies, and gas engines may be built by the pupils.
MILLINERY.—Equipment: Not reported.
Practice: Making buckram frames; plain hat on buckram frame; folds on crown; bows on crown, binding over edge, shirred facing and tucked facings; shirred tucks

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Continued.

ROCHESTER—MECHANICS' INSTITUTE OF ROCHESTER—Continued.

DAY SCHOOL—concluded.

around brim; making turban frame (buckram); making puff on edge, covering turban frame with folds, fancy and draped; making rosettes, different styles; insertion hats, miscellaneous bindings; trimming in different styles; making wire frames from measurements; pleating and tucking; making and covering artistic shapes; making bonnets; making twists, jabots and points, and children's fancy bonnets; tying bows and designing head dresses; sewing and draping straw; making lace, tulle, and chiffon hats; miscellaneous trimming and designing; making hats to wear, in straw, velvet, and other materials; also chiffon and draped toques, copying from French plates; steaming and mirroring velvet; hemming and steaming crepe; making mourning hats and bonnets; draping veils.

EVENING SCHOOL.

BUTTONHOLE MAKERS.—Equipment: Not reported.

Practice: Making all kinds of tailor buttonholes.

DRESSMAKING.—Equipment: Not reported.

Practice: Machine and hand sewing; mending, darning, cutting, fitting, and making unlined skirts and waists; making woolen skirt and unlined waists; making evening or street dress.

ELECTRICAL WORK.—Equipment: Day school equipment is used.

Practice: Practical wiring of direct-current motors; the wiring and operation of generators; practical testing of electrical machines.

GAS ENGINEERING.—Equipment: One 12-horsepower engine equipped for gas, gasoline, kerosene, or crude oil, make and break connection, and hot-tube ignition; one 4-cylinder, 4-cycle automobile engine, primary timer, and secondary distributer and high-tension magnets; six gas engines, and all necessary appliances.

Practice: Testing engines complete; locating and remedying trouble.

JOINERY AND CABINETMAKING.—Equipment: 24 benches, circular saw, machine jointer and planer, jig saw and mortising machine. Full equipment of small tools.

Practice: Making of doors, panel work, window frames, door frames, and stair building; construction of useful articles; practical cabinetwork, elementary carving, veneering, inlaying, rubbled glue joints, scraping, repairing broken furniture, filling, varnishing, and polishing.

MACHINIST.—Equipment: Day school equipment is used.

Practice: Straight and taper turning, curve turning, chucking, boring, gear cutting, and knurling; thread cutting; simple work on miller, shaper, and grinder; making cutters, drills, reamers, and mandrels; work on milling machine and grinder; small bench grinders, small dies, and gas engines may be built by the pupils.

MILLINERY.—Equipment: Not reported.

Practice: Trimming and draping hats; making all kinds of novelties used in millinery; renovating ribbons and velvet; mirroring velvet.

PAINTING, SIGN.—Equipment: Not reported.

Practice: Practical work in brush rendering of letter forms in different styles and the application of the same to window-card writing, box marking, glass-sign writing, and gold-leaf work.

PATTERN MAKING.—Equipment: 25 wood-turning lathes, 1 pattern-maker's lathe, 1 band saw, 1 jig saw, 1 trimmer, 24 benches, and full equipment of small tools.

Practice: Making patterns for various machines; practice in molding; making casting in brass and aluminum.

SEWING.—Equipment: Not reported.

Practice: All kinds of hand and machine drafting, cutting, fitting, and making of undergarments and dresses.

STEAM ENGINEERING.—Equipment: 20-horsepower steam engine, 1 steam engine indicator, 1 reducing wheel, 1 planimeter, 1 friction brake, 1 water meter, 1 duplex

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

NEW YORK—Concluded.

ROCHESTER—MECHANICS' INSTITUTE OF ROCHESTER—Concluded.

EVENING SCHOOL—concluded.

pump, 4 steam pumps, injectors, 1 throttling calorimeter, steam traps, damper regulators, engine cylinder arranged for valve setting, and all small tools and appliances required.

Practice: Running an engine; setting the valves; determining the horsepower from brake; indicating and a thorough working-up of the indicator card; boiler testing; overhauling pumps. A 10 to 48 hour boiler test on 300-horsepower battery of the vertical Cahall boilers is conducted by the pupils each year.

NORTH CAROLINA.

HIGH POINT—HIGH POINT NORMAL AND INDUSTRIAL SCHOOL (NEGRO—DAY SCHOOL).

BLACKSMITHING.—Equipment: Forges, anvils, and the ordinary tools of the trade.

Practice: *First year.*—Management of fires, bending, shortening, drawing down, and welding. *Second year.*—Splitting and punching, chamfering, riveting, tempering, drilling, and bolt and nut making. *Third year.*—Practical repair work, horseshoeing, and ornamental work. Filing and chipping.

BRICKLAYING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Trowel practice, spreading mortar, building piers and flues, using the plumb rule, inserting rowlock arches, plastering, trowel practice, loading the hawk, lathing, brown coating, stuccoing, brickwork. *Second year.*—Bricklaying, laying of foundations, using the spirit level, bonding and building plain walls, laying off and building fireplaces (single and double), building triangular chimneys, inserting bonded and rowlock arches (Gothic, segmental, Roman, elliptical), plastering, lathing, brown coating, white coating, stuccoing, brickwork, concreting. *Third year.*—Bricklaying, panel work in walls and fireplaces, building brick mantels, cornice work on brick walls, laying pressed bricks and tiles, plastering, lathing, brown coating, white coating, cornice work, inserting center pieces, and concreting.

CARPENTRY.—Equipment: Work benches and several complete sets of carpenter's tools.

Practice: Planing, squaring, sawing, chiseling, boring, and making the different joints required in furniture making and house building; use of steel square in measuring lumber, cutting braces, rafters, etc.

SEWING: Equipment: 6 sewing machines, dress forms, etc.

Practice: *First year.*—Making all stitches, basting, running, overcasting, backstitching, overhanding, turning of hems, hemming, stitching, felling, hemming and overhanding on patches, gathering and stroking of gathers; making buttonholes, eyelets, loops; sewing on buttons, hooks, and eyes, and tapes; darning, rolling, and sewing on ruffles; slip or blind stitching, squaring and mitering of corners. *Second year.*—Drafting, cutting, fitting, and making a suit of underclothes; sewing-machine exercises. *Third year.*—Dressmaking, including drafting, cutting, fitting, and finishing shirts, waists, and coats, with work in making different styles of dresses.

OHIO.

CINCINNATI—JEWISH KITCHEN GARDEN ASSOCIATION AND TRADE SCHOOL FOR GIRLS (DAY SCHOOL).

DRESSMAKING, SEWING, AND MILLINERY.—Equipment: Sewing machines and all necessary appliances.

Practice: Making garments, initials, scalloping, embroidery, sprays, embroidered waist, and hemming.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

OHIO—Concluded.

CINCINNATI—OHIO MECHANICS' INSTITUTE (EVENING SCHOOL).

BLACKSMITHING.—Equipment: Not reported.

Practice: Care and management of fire, bending, drawing, upsetting, punching, forming and welding iron, working and tempering steel.

CARPENTRY.—Equipment: Benches, vises, band and rip saw, 19 wood-turning lathes, 1 emery grinder, 1 wood-boring machine, and a full equipment of small tools.

Practice: Sawing, planing, chiseling, gouging, chamfering, rounding, graining, framing, and the correct use of tools.

ELECTRICIANS.—Equipment: 1 electrical machine, full set of vacuum tubes, 1 induction coil, 1 telegraph outfit, slide wire bridge, 1 Wheatstone bridge, 1 astatic galvanometer, 1 galvanometer, 3 voltmeters, 3 ammeters, 1 double scale millivoltmeter, 1 wattmeter, 1 speed indicator, 2 condensers, 1 transformer, 1 rheostat, 1 generator, motors, converters, and all necessary tools and appliances.

Practice: Not reported.

MACHINISTS.—Equipment: 7 lathes and attachments, 1 milling machine, 1 shaper, 2 drill presses, 1 cutter grinder, 1 arbor press, 1 hand-punch press, 1 polishing machine, 1 high-pressure blower, 5 gas forges, 2 coal forges, and a full equipment of anvils, vises, and small tools.

Practice: Machine and bench work, including the use of the lathe, shaper, planer, milling machine, grinder, and drill press. Cutting of threads and gears, etc.

STATIONARY ENGINEERS.—Equipment: 1 engine, 2 steam indicators, 1 planimeter, 1 standard lubricator and valves, and all necessary appliances.

Practice: Not reported.

PENNSYLVANIA.

LANCASTER—THADDEUS STEVENS INDUSTRIAL SCHOOL OF PENNSYLVANIA (DAY SCHOOL).

BRICKLAYING.—Equipment: The ordinary tools of the trade.

Practice: Erecting all kinds of buildings, range and boiler setting, stacks and all forms of concrete work.

CARPENTRY.—Equipment: Benches and full tool equipment.

Practice: Graded exercises in elementary joinery, making window frames, doors, and all kinds of carpenter work embraced in the erection of all kinds of buildings.

MACHINISTS.—Equipment: 18 lathes, 1 planer, 1 drill press, 1 shaper, 1 universal milling machine, 1 universal grinder, 1 wet grinder, 1 grindstone, and a full equipment of small tools.

Practice: Graded exercises in chipping, filing, and fitting; tool making, jig work, and all kinds of forge work.

PATTERN MAKING.—Equipment: 1 double arbor saw, 2 speed lathes, 1 wood-turning lathe, 1 band saw, 1 planer and jointer, 2 wood trimmers, 10 pattern-maker's benches, and a full equipment of small tools.

Practice: Graded exercises in elementary joinery; core-box work, and various patterns.

PHILADELPHIA—BEREAN MANUAL TRAINING AND INDUSTRIAL SCHOOL (NEGRO).

DAY SCHOOL.

POWER SEWING MACHINE OPERATING.—Equipment: 8 sewing machines operated by power.

Practice: Sewing up seams, putting on bands, making and felling hems, finishing garments.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PHILADELPHIA—BEREAN MANUAL TRAINING AND INDUSTRIAL SCHOOL (NEGRO)—Concluded.

EVENING SCHOOL.

CARPENTRY.—Equipment: 1 wood-turning lathe, 1 band saw, 1 circular saw, 1 planer and jointer, and complete set of small tools.

Practice: *First year.*—Making different joints used in carpentry. *Second and third years.*—Making doors, sashes, etc., and carpenter's cabinetwork. *Fourth year.*—Laying out floor joists; building model frame houses and construction work.

DRESSMAKING.—Equipment: Sewing machines and necessary implements.

Practice: *First year.*—Taking measurements, cutting patterns, cutting and finishing skirts, cutting waists from drafted patterns, basting, fitting, trimming, and finishing; one plain street dress completed. *Second year.*—Drafting patterns, matching stripes, model work of waist drafted to measurement, making child's dress, princess dress, afternoon or evening dress. *Third year.*—Advanced drafting, making models of inexpensive material to test designs; fancy stitches and use on dresses; princess and coat drafting; cutting and making evening gowns and tailored suit.

ELECTRICAL WORKERS.—Equipment: Batteries, apparatus for wiring, and the ordinary tools of the trade.

Practice: Not reported.

MILLINERY.—Equipment: All necessary implements.

Practice: *First year.*—Wiring, folds, fitting, facings, shirred facings, puffed edges, bows, and rosettes, fitted hat made and trimmed; one hat of choice material made. *Second year.*—Bonnets and toques made from inexpensive material; bonnet with plain crown and with puffing made, lined, and trimmed; wire frames made.

TAILORING.—Equipment: Sewing machines and all necessary appliances.

Practice: *First year.*—Taking measurements, drafting, cutting, shaping, shrinking, making and pressing trousers. *Second year.*—Cutting vests and coats from patterns. *Third year.*—Coats and vests drafted from measurements. *Fourth year.*—Drafting and making complete suits, overcoats, and dress suits.

UPHOLSTERY AND CHAIR CANING.—Equipment: The ordinary tools of the trade.

Practice: Caning and upholstering chairs and other furniture, tapestrying, making mattresses, cutting and laying carpets.

PHILADELPHIA—DREXEL INSTITUTE OF ART, SCIENCE, AND INDUSTRY.

DAY SCHOOL.

DRESSMAKING.—Equipment: Sewing machines and necessary appliances.

Practice: Making woolen dress with foundation skirt; designing and making dresses in princess form; taking measures of different forms; advanced drafting; making dresses for special occasions; handling velvet; making models of inexpensive materials; making children's dresses; finishing jackets, dresses, and coats; drafting jackets and coats, and making a "tailor-made" suit.

MACHINE CONSTRUCTION.—Equipment: 6 lathes, 4 milling machines, 1 mandrel grinder, 1 slotter, 1 planer, 1 vertical drill, 3 sensitive drills, 5 screw-cutting lathes, 2 shapers, 1 tool grinder, 1 circular saw, 2 drill presses, 1 mandrel press, 2 chuck lathes, 1 emery grinder, 1 12-horsepower compound marine engine, 3 5-horsepower electric motors.

Practice: *First year.*—Woodwork, bench work in iron, forging. *Second year.*—Woodwork; pattern making; forging; machine work, both in operation and constructing; pattern making; assembling; worm and gear work.

MILLINERY.—Equipment: Sewing machines and necessary appliances.

Practice: Wiring; folds; bindings; fitted facings; puffed edges; bows and rosettes; preparation of velvet for trimming; bandeaux; covering buckram hat frames; making one hat of choice material; making a bonnet with plain crown and puffing; lining and trimming, and a bonnet of more complex design; draped toque and practical work regulated by the requirements of the season; making wire frames; sewing straw braids; shirred hat; hats and bonnets of materials appropriate for the season.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PHILADELPHIA—DREXEL INSTITUTE OF ART, SCIENCE, AND INDUSTRY—Concluded.

DAY SCHOOL—concluded.

PATTERN MAKING, FORGING, AND MACHINE CONSTRUCTION.—Equipment: Pattern making—Lathes, band saw, jig saw, scroll saw, circular saw, molding machine, sensitive drill, and all necessary tools and appliances. Equipment: Forging—17 forges with power blast and forced exhaust, drill press, grinding machinery, and a full equipment of small tools. Equipment: Machine work—Same as that used in machine construction.

Practice: *First year.*—Woodwork, joinery, ironwork, chipping and filing. *Second year.*—Woodwork, turning, pattern making, ironwork, forging. *Third year.*—Machine work.

SEWING, HAND AND MACHINE.—Equipment: Sewing machines and all necessary appliances.

Practice: Using thread and needles, thimble, and tape measure; making different kinds of stitches, seams, hems, tucks, buttonholes; making simple garments; measurements; drafting and making undergarments of different designs; drafting, cutting; making shirt waists, cotton dresses, and garments for infants; embroidery; marking linen, drawn, and cut work.

SEWING, SHIRT WAISTS.—Equipment: Sewing machines and all necessary appliances.

Practice: Drafting skirts; making a simple shirt-waist suit from original or selected design, also a tailored shirt waist; drafting waists and skirts; making an elaborate gown of fine materials from original design, and two fine waists.

EVENING SCHOOL.

DRESSMAKING.—Equipment: Day school equipment is used.

Practice: *First year.*—Drafting one dress of woolen material with foundation skirt. *Second year.*—Taking measure of different forms for which the flat patterns are drafted. *Third year.*—Advanced drafting; making dresses on the princess form; designing models of inexpensive materials; children's dresses.

MACHINE CONSTRUCTION.—Equipment: Day school equipment is used.

Practice: Using machine tools and practical work in building machinery.

MILLINERY.—Equipment: Day school equipment is used.

Practice: *First year.*—Wiring, folds, fitted facings, puffed edge, bows and rosettes; fitted hat made, lined, and trimmed; making one hat of choice material. *Second year.*—Bonnet with plain crown and puffing, made, lined, and trimmed; practical work.

PATTERN MAKING.—Equipment: Day school equipment is used.

Practice: Turning, pattern making.

SEWING, HAND AND MACHINE.—Equipment: Day school equipment is used.

Practice: Simple stitches used in hand and machine sewing; work cut and planned.

SEWING, SHIRT WAISTS.—Equipment: Day school equipment is used.

Practice: *First year.*—Making two shirt waists. *Second year.*—Drafting patterns for shirt waists; making shirt waists of more elaborate design.

PHILADELPHIA—GIRARD COLLEGE (DAY SCHOOL).

BLACKSMITHING.—Equipment: 16 forges, each supplied with a power blast and an exhaust; anvils, and a full equipment of small tools.

Practice: Making various pieces of ornamental ironwork, drilling, and riveting; making towel racks, umbrella stands, ornamental gates, jardinière holders, lamp stands, candelabra, andirons, pokers, tongs, and shovels.

CARPENTRY AND PATTERN MAKING.—Equipment: 1 adjustable table for crosscut, rip, and rabbit saws; 1 jig saw, 1 circular saw; 1 surface planer; 1 trimmer; 10 lathes; 24 benches, and a full equipment of small tools.

Practice: Planing and squaring on all sides; making a chamfer, corner lap, middle lap, and lap miter; using hand screws in gluing and clamping; sandpapering and var-

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PHILADELPHIA—GIRARD COLLEGE (DAY SCHOOL)—Continued.

nishing; making small patterns for solid castings without cores, gauge blocks, surface plates, hammer heads, cubical blocks, washers, wrenches, brackets, etc., with joinery work and articles of cabinet ware; making cored and segment patterns, parted patterns, and core boxes, open parallel cylinders, and conical cylinders flanged, sheave wheels for green and for dry sand cores, iron flask pattern, with core boxes, half and quarter bend, with branches at different angles; placing, driving, and withdrawing nails and screws; shouldering down on square and oblique lines; making open-end mortise, mortise and tenon; dovetailing; halved dovetailing, dovetail joint with one tongue; with three tongues; taborets, book shelves, towel rollers, cabinets, stools, etc.; turning beaded cylinder, cylinder with concave and convex curves; making brace dovetail, beaded mortise and tenon, double mortise and tenon mitered; butt dovetail; towel rollers with shelf; stand for books; turning handles, mallets, dumbbells, and indian clubs; scar joint; hopper joint; making patterns for lathe shears, head and tail stock, cone pulley, slide rest, boxes, and bearings, and all the parts to complete a 10-inch speed lathe; handwheel; spur and bevel gearing; making pattern for 2-inch globe valve; slide valve engine cylinder complete; screw propeller; 10-inch bell; flywheel sweep, arms made in dry sand cores.

ELECTRICAL WORKERS.—Equipment: 11 hand lathes, 2 machine lathes, 1 water emery grinder, 1 dry emery grinder and buffing wheel, 4 sensitive drill presses, 2 electric motors, 2 dynamos, 1 heating table, 1 surface plate stand, 2 wiring cabinets, 1 battery stand containing different types of batteries, a complete working model of an electric railway, full equipment of small tools.

Practice: Cutting and preparing new material; starting, stopping, and regulating dynamos and motors; manipulating switchboards and switches; magnet winding, simple and complicated; armature winding; armature construction, commutators, etc.; simple and complicated electric-bell wiring; simple and complicated electric-gaslighting wiring; electric-light wiring, open and concealed, and in conduits; reproduction of Bell's telephone, Blake's microphone, long-distance telephone and accessories; electroplating with gold, silver, nickel, copper, and the electro deposition of metals; construction of switches of various types; construction of simple forms of arc lamps; construction and care of different forms of batteries; construction of different forms of permanent and electromagnets; application of electric heat for soldering, welding, ironing, and cooking; construction of motors and dynamos.

MACHINISTS.—Equipment: 1 slotting machine, 1 planing machine, 1 Universal milling machine, 8 lathes, 1 drill press, 1 shaping machine, 1 double emery wheel, 1 grinding machine, 1 polishing machine, vises, benches, and full equipment of small tools.

Practice: Vise work; machine work in planing, milling, and slotting; lathe work; taper turning; chuck work; drilling; work on 10-inch lathe; planer work; work on 20-inch lathe; milling, slotting, and shaping machine work; making cubes; making hexagonal nut.

MOLDING AND CORE MAKING.—Equipment: Core benches, core boxes, and core oven, 22-inch cupola with blower, 2 brass furnaces, 2 traveling cranes, and full equipment of small tools.

Practice: Making ornamental and statuary castings; mixing and casting different kinds of metal; dry sand and loam work; construction of a large flywheel; care and charging of the cupola; making grate bars, castings for flasks, bench and desk legs, blacksmiths' forges; complete castings for a 10 by 48 inch lathe, a circular saw, and a valve for a steam hammer.

PLUMBING, STEAM AND GAS FITTING.—Equipment: 10 spaces representing rooms for practice in fitting up a kitchen or a bathroom with range, boiler, sink, washtub; water-closet; bathtub; toilet stand; shower and foot bath; 5 steel-covered work benches, supplied with Bunsen burner, solder pots, and pipe holders.

Practice: Hanging and supporting lead, plain, and galvanized-iron pipe for water, gas, steam, hot water, and soil pipe, with hooks, floor and beam clamps, pipe hangers, and notching joist and bracing gas-fixture drops, and testing; running of cast-iron pipe for water, sewer, and antisiphon fitting; rewashering spigots and ball cocks; the different kinds of water-closets, tank-flushing valves; also the flushometer; making refrigerator traps; building of water filter.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PHILADELPHIA—GIRARD COLLEGE (DAY SCHOOL)—Concluded.

PRINTING.—Equipment: 1 foot press, type, 1 paper cutter, 1 imposing table, and usual printing equipment.
Practice: Distributing type, composing, making up forms, printing.

PHILADELPHIA—HEBREW EDUCATION SOCIETY (EVENING SCHOOL).

CIGAR MAKING.—Equipment: Work benches, tanks for dipping and all necessary appliances.
Practice: Not reported.
DRESSMAKING.—Equipment: 3 sewing machines and usual sewing equipment.
Practice: Making tight-fitting lining from drafted pattern; plain and fancy stitching; making a shirt waist, skirt, and dress.
GARMENT CUTTING.—Equipment: Cutting tables, shears, and all necessary equipment.
Practice: Measuring, laying out, marking, cutting, fitting.
MILLINERY.—Equipment: Not reported.
Practice: Cutting plain and bias folds; making plain and French hems; slip stitching; wiring, covering, and lining a hat; covering hats of various shapes; making bell crowns; bonnets and hats shirred and side pleated; trimming rosettes, bows.
PLUMBING.—Equipment: 8 furnaces, soldering outfits, and the ordinary tools of the trade.
Practice: Preparation of joints for wiping; wiping joints.
POWER SEWING MACHINE OPERATING.—Equipment: Power sewing machines and necessary equipment.
Practice: Threading machine, operating machine, sewing shirt waists.
SHEET-METAL WORKERS.—Equipment: Rolling machine, edge machine for cylindrical work, soldering furnace, and iron drill lathe, and the ordinary tools of the trade.
Practice: Laying out of patterns; cutting out metal according to patterns; fitting; grooving; making joints or elbows; using various machines.

PHILADELPHIA—SPRING GARDEN INSTITUTE.

DAY SCHOOL.

ELECTRICAL WORKERS.—Equipment: 1 direct-current generator, 1 dynamo, 3 motors, 3 transformers, 2 rotary transformers, and several small motors and dynamos; 1 elaborate switching system, 1 complete street-car truck equipped with motors with special gearing and standard air-brake equipment; an electric-lighting plant with alternating and direct-current generators; also have use of machine shop and woodwork equipment of the institution; full equipment of small tools; 2 mutipolar dynamos, 2 multipolar motors.
Practice: *First year.*—Constructing electric bells, burglar alarms, annunciators, etc.; exercises on various electrical connections for bell circuits, electric gaslighting, etc.; constructing and assembling parts of sockets, receptacles, switches, and electric lighting material; chipping and filing; laying out work from mechanical drawings; turning, drilling, planing, shaping, and tool grinding. *Second year.*—Tests on dynamos, motors, arc lamps, meters, transformers, etc.; advanced woodworking and mechanical handiwork, such as turning, boring, milling, planing, shaping, drilling, screw cutting, and milling machine work; construction of electrical instruments and machines.

EVENING SCHOOL.

MACHINISTS.—Equipment: 6 engine screw-cutting lathes, 1 speed lathe, 1 shaper, 1 milling machine, 1 grinding machine, 2 drill presses, 2 grindstones, buffing machines, etc., 1 gas engine, 1 electric motor, and a full equipment of small tools.
Practice: *First year.*—Chipping and filing; laying out work from mechanical drawings; fitting one piece to another and filing templet; fitting, turning, drilling, tapping,

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PHILADEDPHIA—SPRING GARDEN INSTITUTE—Concluded.

EVENING SCHOOL—concluded.

planing, shaping, and tool grinding. *Second year.*—Advanced work in chipping and filing; boring, milling, planing, shaping, drilling, scraping; external and internal screw cutting; gear cutting, and machine construction. *Third year.*—Turning and boring to limit gauges; reaming, using micrometer caliper; screw cutting; planer and shaper work; gear cutting; tool making and machine construction; cutting spur, miter, bevel, spiral, and worm gears; general machine work.

WOODWORKING (pattern making, carpentry, and cabinet making).—Equipment: 2 woodturning lathes, 1 band saw, 1 circular saw, 1 molding machine, 1 planing machine, and a full equipment of small tools.

Practice: *First year.*—Mitering picture frames, dovetailing drawers, elementary turning, making various foundry patterns and core boxes for same, bushings, and pipe connections. *Second year.*—Building up patterns by the use of segments; making hollow cylinders, plate wheels, gear blanks, and cones; making patterns for pulleys, gear blanks, and handwheels having four and six arms; making patterns for lathe heads, lathe beds and other patterns for similar purposes. *Third year.*—Making patterns for shafting hangers and pedestals; filing, hand, band, and circular saws; patterns for screw propeller wheel to be cast in a core mold; pattern for steam engine cylinder; patterns for cast teeth, spur gear, and pinion; patterns for cast teeth, bevel gear, and pinion.

PHILADELPHIA—TEMPLE UNIVERSITY.

DAY SCHOOL.

DRESSMAKING.—Equipment: 4 sewing machines, dress forms, and usual sewing equipment.

Practice: Cutting and making underwear, mending, darning, making buttonholes, hand and machine sewing.

MILLINERY.—Equipment: 24 hatstands and all necessary equipment.

Practice: Altering buckram frames; making and trimming plain covered hats; making folds, fitted facings, puffed edges, plain bindings; making wire frames and lace hats; making bows of all kinds and curling feathers.

EVENING SCHOOL.

DRESSMAKING.—Equipment: Day school equipment is used.

Practice: Same as the day course.

MILLINERY.—Equipment: Day school equipment is used.

Practice: Same as the day course.

PITTSBURG (ALLEGHENY)—AVERY COLLEGE TRAINING SCHOOL (NEGRO—DAY SCHOOL).

DRESSMAKING.—Equipment: Sewing machines, dress forms, mirrors, and usual sewing equipment.

Practice: Taking measurements, drafting foundation, skirt drafting, finishing skirt for trimmings or draping, making lined skirt, cutting waists with seams from patterns drafted by pupils, basting, fitting, planning, trimming, general finish; making dress of plain material, a waist of striped or plaid material, and a garment on the princess form; making dinner dress, evening dress, and handling velvet; making models of inexpensive materials to test the design; drafting, cutting, and making child's dress.

MILLINERY.—Equipment: Not reported.

Practice: Fitted hats made, lined, and trimmed; trimming a hat with suitable bows; making a hat with choice materials; making straw and felt hats; making, lining, and trimming bonnet with plain crown and puffing; making, lining, and trimming toque; making crape bonnet, and silk bonnet or hat; wire frame making; large velvet hat, evening bonnet, and shirred hat.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PITTSBURG (ALLEGHENY)—AVERY COLLEGE TRAINING SCHOOL (NEGRO—DAY SCHOOL)—Concluded.

TAILORING.—Equipment: Not reported.

Practice: Making buttonholes and running a machine; making pockets, waistbands, collar; basting, stitching, and pressing; padding with wadding; making different kinds of sleeves; making different stitches; making different styles of skirts, capes, etc.; practice in use of needle and thimble in general hand sewing; buttonholes, tacking; felling; backstitching, etc.; making pockets and other parts of ordinary trousers; making uniform trousers; making vest pockets, collars, and other parts of ordinary vests; making coat pockets used in ordinary coatmaking; making common vests; trousers making continued; common and uniform coat making; trousers drafting and cutting; coat, vest, and trousers making continued; making common cutaway coats, plain overcoats, and ordinary frock coats; drafting and cutting different styles of men's garments in common use.

PITTSBURG—CARNEGIE TECHNICAL SCHOOLS: MARGARET MORRISON CARNEGIE SCHOOL FOR WOMEN (EVENING SCHOOL).

MILLINERY.—Equipment: Sewing machines, wax forms with adjustable hair, and all necessary appliances.

Practice: Constructive work in wire, buckram, straw, etc.

DRESSMAKING.—Equipment: Sewing machines, dress forms, and all necessary appliances.

Practice: Comprehensive drill in fine hand and machine stitches; cutting and fitting; embroidery; making unlined cotton house dress; designing, cutting, fitting, and finishing all ordinary types of gowns, etc.

PITTSBURG—CARNEGIE TECHNICAL SCHOOLS: SCHOOL OF APPLIED INDUSTRIES.[1]

DAY SCHOOL.

BRICKLAYING.—Equipment: Scaffolding, elliptic segment, semicircle and gothic wood centers, and a full equipment of small tools and appliances.

Practice: The proper handling of mortar; striking of different kinds of joints; building straight walls of different thicknesses, angles, piers, arches, fireplaces; setting different walls, frames, and caps; building scaffolding—inside and outside; the application of fireproofing upon steel structural shapes; brick and terra-cotta floor arches, etc.; ornamental cornices; setting centers; fireproof work; fireproof and red clay brick.

ELECTRICAL WIRING.—Equipment: Standard testing instruments, portable voltmeters, ammeters, galvanometers, etc., and the usual laboratory apparatus for experiment in elementary electricity and magnetism; full equipment of small tools.

Practice: Making joints and splices; running wires on insulators, in moldings, etc.; laying out systems of distribution; calculating sizes of conductors, and installing and connecting motors, etc.; electric light and power wiring; exposed porcelain knob work, cleat work, concealed knob and tube work; iron conduits; fixture wiring; panels and switchboards; electric-bell and annunciator wiring; bells in multiple and in series; return calls; house and hotel annunciators; burglar alarms; watchmen's clock systems; telephone wiring; interior telephones, switchboard, and intercommunicating systems.

FORGING.—Equipment: 10 down-draft forges connected with blower and centrifugal fan, 4 tool-dressing cone stands, 4 form plates, cone mandrels, bins for annealing, case-hardening, and tempering in oil, brine, and cyanide of potassium. Top and bottom swages, top and bottom fullers; flat and set hammers, hot and cold cutters, leveling plates, and a full equipment of small tools.

Practice: Square, round, hexagonal, octagonal, and round steel pointing; eye bending; forging staples, gate hooks, crane hooks, S hooks, square, octagonal, and

[1] Formerly School for Apprentices and Journeymen.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PITTSBURG—CARNEGIE TECHNICAL SCHOOLS: SCHOOL OF APPLIED INDUSTRIES—Continued.

DAY SCHOOL—concluded.

hexagonal shapes; angle bending; forging shaft keys; wrenches of different shapes and devices, brackets; bending rings on edge and flat; pointing iron, upsetting; scarf, butt, V, and lock V methods of welding iron and steel; bolt heading; chain making and light ornamental work; also tools of high carbon and high speed steel, such as chipping chisels, lathe, milling, shaper, planer, and boring mill tools; repairing shop tools generally.

FOUNDRY WORK.—Equipment: 3 cupolas, 1 melting furnace for copper, brass, and other alloys, 1 crucible furnace for melting steel, titanium, vanadium, and other experimental alloys. The furnaces are equipped for gas and oil and the blast is furnished by a direct-connected positive blower; 1 tumbling barrel, 4 shank ladles, and 1 800-pound crane ladle, also 2 pattern racks, 2 molding machines, 34 flasks for floor molding, iron flasks for dry-sand molding, sweeps and sweep stands for sweep molding, bench for core making, core boxes, rods, clamps, core plates, etc. Twenty-five benches for bench molding and full equipment of small tools and appliances.

Practice: Tempering sand, molding with dry loam and green sand; making sheaves, rollers, brackets, test bars, pulleys, face plates, etc.; molding sprocket wheels in green and in dry sand; molding cylinders, sweeps, and templates, cylinder heads, pistons, drums, tees, ells, etc.; core making—making, drying, venting, handling, and setting cores; preparation and management of cupola lining; drying and care of ladles.

MACHINISTS.—Equipment: 24 benches for wire work, 1 gas furnace for tempering and hardening, 2 salt baths, 1 babbitt furnace, 16 lathes, 1 radial drill, 2 upright drills, 2 sensitive drills, 2 boring mills, 1 universal milling machine, 1 universal cutter and tool grinder, 2 grinding machines, 1 wet grinder, 1 grinding, polishing, and buffing machine, 2 drill grinders, 1 planer, 2 shapers, 1 key-seating machine, 1 cold saw, 1 hack saw, 1 arbor press, 1 portable crane. Electric motors furnish direct power to most of the machine tools. Full equipment of small tools and appliances.

Practice: Chipping and filing; chipping chamfers, flat, concave, and convex surfaces, keyways, and chipping to shoulder; cross filing, draw filing, freehand filing etc.; centering; squaring; straight and taper turning and fitting; outside and inside screw cutting; chucking; reaming; finishing and polishing; drilling; tapping, mandrel making; grinding; lapping; boring; brass turning and finishing; using milling machine; gear cutting; tool making, such as the making of taps, drills, reamers, milling cutters, and cylindrical gauges; designing and making jigs.

PATTERN MAKING.—Equipment: 36 work benches fitted with tools and rapid-acting vises, 1 universal saw bench, 1 band saw, 1 hand jointer, 1 surfacer, 1 automatic knife grinder, 1 automatic band-saw filer, 1 mechanical woodworker, 8 wood-turning lathes, 3 wood trimmers, circular and band-saw filing vises, 1 gluepot heater, 1 steel lumber rack, 1 steel pattern rack, wood hand screws, malleable clamps, eccentric clamps, and all necessary complementary equipment.

Practice: Sawing, planing, chiseling, wood turning; making a number of patterns, core prints, core boxes, etc.

PLUMBING.—Equipment: 12 workbenches, 48 gas-heated soldering pots, 4 vise benches equipped with vises and necessary clamps for holding pipe in place for pipe fitting, and all necessary tools and appliances.

Practice: Lead and solder working; calking and installing cast-iron pipe; installing and bending brass pipe; installing system of drainage; making traps and miscellaneous work; setting up sinks, water-closets, and other fixtures; fitting up bathrooms, etc.

STATIONARY ENGINEERS.—Equipment: Motive power and equipment of machine shop.

Practice: Actual operation of steam and gas power plants and electrical machinery. The discovery and correction of engine troubles, emergency repairs, etc.

EVENING SCHOOL.

BRICKLAYING.—Equipment: Day school equipment is used.

Practice: Same as taught in the day school.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PITTSBURG—CARNEGIE TECHNICAL SCHOOLS: SCHOOL OF APPLIED INDUSTRIES—Concluded.

EVENING SCHOOL—concluded.

ELECTRICAL WIRING.—Equipment: Day school equipment is used.
Practice: Same as taught in the day school.
FORGING.—Equipment: Day school equipment is used.
Practice: Same as taught in the day school.
FOUNDRY WORK.—Equipment: Day school equipment is used.
Practice: Same as taught in the day school.
HEATING AND VENTILATING.—Equipment: Heating and ventilating apparatus of the schools and those of neighboring buildings.
Practice: Not reported in full. Complete systems of heating and ventilating are installed.
MACHINISTS.—Equipment: Day school equipment is used.
Practice: Same as taught in the day school.
PAINTING AND GRAINING, HOUSE.—Equipment: Ladders, brushes, and the ordinary tools of the trade.
Practice: Mixing and applying paint, puttying, sandpapering, hardwood finishing, staining, filling, shellacking, varnishing, rubbing, polishing, refinishing, graining, etc.
PAINTING, SIGN.—Equipment: 24 hinged easels, 24 drawing boards, and the ordinary small tools of the trade.
Practice: Mixing and blending colors; preparation of various surfaces for sign purposes; coating wood, metal, brick, etc.; gilding on glass and on wood; spacing and forming letters; drawing straight and curved lines with chalk, etc.
PATTERN MAKING.—Equipment: Day school equipment is used.
Practice: Same as taught in day school.
PLUMBING.—Equipment: Day school equipment is used.
Practice: Same as taught in day school.
SHEET-METAL AND CORNICE WORKERS.—Equipment: Cornice brakes; roll and folder rolling machines; turning, wiring, swedging, burring, and grooving machines; scroll cutter; punching and bending machine; 4 soldering benches; 2 cutting benches; 16 drawing tables, and a full equipment of the tools of the trade.
Practice: Cutting along straight lines and curved lines; preparing the soldering tools; forming and assembling work; the wiring and seaming of different shaped articles; cutting miters of different kinds and at different angles in either plan or elevation; round and square elbows; intersections of round pipes under various conditions; square duct work; cornice work, such as finials, pediments, balustrades, etc.; making raking miters; moldings calling for change of profile; transition pieces; skylights; and hammered work.
STATIONARY ENGINEERS.—Equipment: Day school equipment is used.
Practice: Same as taught in the day school.

WILLIAMSON SCHOOL—WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES (DAY SCHOOL).

BRICKLAYING.—Equipment: The ordinary tools of the trade.
Practice: *First year*—Spreading mortar; building walls of various thicknesses, with return and intersections and with common, American, English, and Flemish bond; building shafts, chimney tops of various designs, and exercise on corners, angles, Greek cross, and pilasters; building octagonal bay window; building in frames, corbeling out panel with dentil work; building octagonal shaft. *Second year.*—Building bonded, rowlock, and gauged segmental, circular, semicircular, gothic, elliptical, inverted, and flat arches, pilasters and corbeling; building brick cornice with interlacing arches; quoined or fantail arch with quoins intersecting; geometrical designs in cornice work, speed and quality exercise; building in or casing hot-air heaters; boiler setting; formation of flues by corbeling; oblique herringbone pavement and formation in which bricks are laid parallel and at right angles; speed and quality exercise with

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

WILLIAMSON SCHOOL—WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES (DAY SCHOOL)—Continued.

1,000 bricks. *Third year.*—Building barn, shop, and gambrel-roof gables, with triangles along the line of rafters and with corbeling intersecting in angle at top, with horizontal courses below, semicircular arches crowned with dentil cornice, quoined arches, octagonal pilasters forming bay windows, quoins, panels, and corbeling; formation of fire or battlement walls, crown of chapel gable, upper story and crown of façade; geometric design in panel; gable design; ornamental fireplaces; Pompeian brick fireplace; speed and quality exercise with window frame "built in" with 1,000 bricks; press fronts; exterior brick walls, inclosing steel skeleton structures; fireproof arches with common bricks and hollow tiles; mixing and handling concrete and placing and finishing same; laying cement walks; repairing furnaces under boilers; laying out lines for foundations and getting levels for same; plastering.

CARPENTRY.—Equipment: 1 surface planer, 1 circular ripsaw bench, 1 universal woodworking machine, 1 grindstone, 1 wood-turning lathe, 1 trimmer, 31 work benches, vises, and a full equipment of small tools.

Practice: *First year.*—Rip and crosscut sawing; planing; gauging; scribing to square line; sawing to line; planing and graining; grinding and setting plane bits; laying out; chiseling; grinding chisels and sharpening bit; making halved joint, post with rail let in, rebate corner, butt and miter joint, mortise and tenon, tongue and grooved work, dovetailing, doweling, washboard corners with sub. and molding, door sections, double mortises, panel raising, window frame corners, door frames, jambs and trim, transoms, sliding doors with chafing strips. *Second year.*—Using band, circular, rip, and cut-off saw, planer, jointer, lathe, boring machine; filing and setting circular saw; making and setting molding cutters; grinding and setting jointer and planer knives; alterations and repair work; sash weighting, fitting, and hanging; joist setting and framing; bridging and floor laying; plain stair work; latticework; porch building; plain roof cutting; sheathing and shingling; weather boarding; placing of hardware; making arches, centers, forms and ribs, forms for concrete work, beehive arches and arches for curved walls; kerfing. *Third year.*—Staking out buildings; making and setting door and window frames; setting plates on brick walls; framing joists and studding for frame buildings; sheathing and weather boarding; derrick rigging and hoisting; roof framing; hip and valley gable ends, dormers, intersecting at different pitches, truss roof, mansard and flat decks, gambrel or broken back; sheathing, lathing, and shingling; flushing around chimneys, etc.; half timber framing; studding and ceiling joists, grounds, guides, and corner beads; interior finishing, plain door and window moldings; paneling door and window jambs, washboarding, and wainscoting; beam and paneled ceiling; winding stairs; laying out horses and setting up platforms, landings, stairways, newel posts, and handrail with ramp, ease, and turnout; hinging and hanging doors, window seats, and mantel setting; building porch with balcony and railing; finishing interior of closets and kitchen cupboards.

MACHINISTS.—Equipment: 1 grindstone, 2 tool grinders, 2 planers, 1 universal grinding machine, 1 horizontal boring machine, 1 vertical boring machine, 1 upright drill press, 1 radial drill, 1 turret lathe, 9 engine lathes, 1 speed lathe, 1 milling machine, 2 universal milling machines, 1 upright sensitive drill press, 1 slotter, 1 shaper, 2 forges with power pressure blowers, anvils, 30 machinist vises, 2 hack saws, 3 sets of mandrels, 16 English and 12 metric scales, 3 sets of dogs, 6 sets of C clamps, 1 set of rose reamers, tap and die set for machine screws, 300 lathe, planer, shaper, and boring machine tools, 8 sets of drills, 250 milling cutters, 100 fine tools, comprising inside and outside calipers, surface gauges, scribes, box squares, bevel protractors, micrometers, English, vernier, and metric height gauge, vernier calipers, stamp and figures, thread micrometers, knurling tools, pipe taps and reamers; 110 arbors and collets; button and center indicators; emery wheel dressers; straight and bevel parallels; hand chucks; and a full equipment of small tools and appliances.

Practice: *First year.*—Plain chipping, lettering (on steel and iron); flat filing, outside and inside calipering, belt lacing, forge work, practice with micrometer, crosscut filing and fitting, practice with vernier caliper, laying out, tapping; forging chisels, broaches, screwdrivers, and similar tools; soldering and sweating; practice with the

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

WILLIAMSON SCHOOL—WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES (DAY SCHOOL)—Continued.

ratchet, chipping and filing keyways, knots, hitches, and simple rigging; threading dies, hardening chisels and scrapers, scraping (spot and bearing), broaching or drifting; forge work; roughing tools, straight cut-off tools, brass and side tools; grinding and work at drill press; grinding twist drills, reamer drilling to layout, tap drilling to layout pipe, tap drilling to layout, countersinking and counterboring, speed work on "run-of-shop," jobs at drill press; calculating cutting speed, testing drill press, drilling cylindrical work perpendicular and at other angles with center line; spotting; forge work; work at the lathe; centering, parting, facing; straight turning, shouldering and chamfering, truing lathe centers, necking, filleting, filing, chucking, and simple thread cutting; forging; offset side tools, diamond points, offset parting tools, planer surfacing and down cutting tools; leveling and aligning shaft, babbitting and scraping boxes, fitting of gear teeth in broken gears (pin and dovetail method); forge work, planer or shaper work; parting, use of shoe or vise, down cutting, cutting keyways, planing hexagonal or octagonal work, forging, centering, boring, slotter, and high-speed tools. *Second year.*—Lathe work; right and left hand thread cutting; making of running, drive, and shrink fit, lathe scraping, taper turning and fitting, inside threading; knurling, crowning, angular turning, turning brass, spring winding, multiple thread cutting, centering the lathe, form turning, cutting threads on taper work, faceplate work, eccentric turning, taper boring, cutting threads in metric system; forge work; speed work on "run-of-shop" jobs and stock tools; work on vertical boring mill; chuck work, drilling, facing, boring, turning, eccentric turning, and boring, taper boring and angular work, speed work on "run-of-shop" jobs on vertical mill; forge work; work on horizontal boring mill; straight boring; turning and facing, speed work on "run-of-shop" jobs; work on slotter; surface work; keyway cutting, radial work, cornering; speed work on "run-of-shop" jobs; work on planer; double angle work, undercutting, form planing, stringing, dovetail work, speed work on "run-of-shop" jobs; work on milling machine; slabbing, end mill work, vise or shoe work, riser block work, gang milling; simple indexing. *Third year.*—Speed work on the engine lathe on "run-of-shop" work; work on milling machine; metric work, spur bevel, worm, spiral gear and rack cutting, cam milling, speed work on "run-of-shop" jobs on milling machine; hardening, water, ash, and pack anneal, open-fire hardening and tempering; muffle work, lead bath, pack heating in hardening, casehardening, open and pack work; the pyrometer, tempering by use of heated rods, treatment of high-speed steel; grinding, plain cylindrical work, taper work, surface grinding, internal grinding, lapping—internal and external, angular work, general cutter and reamer grinding—grinding formed cutters, grinding taps; flat turret lathe work, parting, simple and multiple stop, turning, shouldering, and chamfering, thread cutting, drilling, form turning, turning with 4-inch heavy bar, tapping, running square or hexagonal stock, back or reverse stop work, boring, facing, and turning, speed work on "run-of-shop" jobs; calculating, designing, laying out and making; taps, reamers, formed cutters, angular cutters, spiral mills, end mills, side milling cutters, form tools, drill press and miller collets, threading dies, twist drills, worm hob, lapping, cut end mill with center cut.

STATIONARY ENGINEERS (OPERATING).—Equipment: Not reported.

Practice: *First year.*—Plain chipping; lettering and filing; belt lacing; forge work, using the micrometer and calipers; crosscut filing and fitting, using speed indicator, ratchet, and thread-cutting dies; laying out; tapping, soldering, and sweating; operating drill press and lathe, centering, parting, facing; straight turning, shouldering and chamfering, truing lathe centers, neck-work filleting, filing, chuck work, right and left hand thread cutting, taper turning and fitting; operating shaper; parting, use of shoe or vise, down cutting, cutting keyways, planing hexagonal or octagonal work. *Second year.*—Cutting pipe to length and threading with dies; making up steam and water tight joints; soldering; preparing wire for splicing; tapping electrical joints; repairing lamp sockets and button switches; making up drip connections; setting elbows; tees, valves, cocks, and unions into a pipe line; fitting lights to sockets, use of adapters; fitting electroliers and ceiling fixtures, brackets and wall fixtures,

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

WILLIAMSON SCHOOL—WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES (DAY SCHOOL)—Continued.

setting wall switches and fuse boxes; connecting to sockets through hollow fixtures; connecting up bell circuits; exercise in the constructive features of return tubular boiler; practice with attached boiler auxiliaries; feed valves, gauges, surface blow, injectors, bottom blow, gauge cocks, water glass, safety valves, fusible plugs, draft regulators; maintaining steam; cleaning fires; cleaning boiler; preparation of boiler for inspection; construction of heavy steam lines, fitting flanges, making gasket joints; fitting up expansion bends and joints; applying heat insulating materials. *Third year.*—Repairing and maintaining water service lines; inspection for leaks; opening of line; making screwed, leaded, and cement joints; care and operation of steam pumps; starting, shutting down, packing steam and water ends, repairing or replacing water and steam end parts; setting steam valves, handling drips and lubricators; keeping pump log, taking reservoir readings; care and operation of belt and motor driven pumps; starting, shutting down, fitting belt and necessary shifting apparatus, adjustment of shaft and crank pin bearings, packing plungers, and fitting water valves; motor operation, including handling of rheostats in starting, stopping, and care of commutator and bearings; care and operation of gasoline engine, starting and stopping, care of oiling devices, circulation of water, carburetor and sparking apparatus; maintenance of battery equipment, connecting in series and in parallel, running circuits from batteries, testing batteries and circuits; maintenance of automatic bell signal system; duty as engineer in engine room of steam-driven plant, operation of turbo unit, starting, handling of drips, adjustment of automatic lubricating system, generator brushes, cutting unit in on board, regulation of voltage by field resistance, reading voltmeters, ammeters, and wattmeters, handling switches and circuit breakers, care of machine while on watch, cutting unit out on board and shutting down; operating compound reciprocating units, "warming up," handling drips and automatic lubricating system, care of machine while on watch; operation of compression refrigerating plant, starting, care of machine during run in maintenance of proper pressures on compression and suction ends; testing the plant by use of air pressure, charging plant, pumping out connections, running condenser and brine pump, mixing brine and charging brine tanks; upkeep of units and apparatus of engine room, truing commutators, filling and setting brushes, cutting out damaged armature coils, removal of armatures from machines and making repairs; adjustment of brasses, grinding and scraping valves, adjusting regulators, eccentric straps, crank and crosshead pin connections, removal and replacing piston rings, cutting gaskets, packing piston and valve stuffing boxes; testing steam boilers, examination of boiler, taking various dimensions, area of heating surfaces, recording general condition of boiler; arrangement of scales, tanks, thermometers, pyrometers, and draft gauges; bringing furnace, steam pressure, and water level to proper condition for starting test, keeping uniform conditions during test, weighing ash, writing the log, sampling steam and coal, analysis of flue gas, smoke observation, closing of test, making calculations necessary for determining results; indicating and testing steam engine under running conditions, attachment of indicator rigging, taking and interpretation of cards, adjustment of valves to get desired steam distribution, calculation of indicated horsepower, use of planimeter; care of phone batteries, upkeep of aerial, underground, and conduit cable circuits, connecting cable strands in proper circuits, adjustment of apparatus; the making, assembling, and adjustment of mechanical parts; making electrical connections, placing apparatus, and the operation of intermittent combination electric signs.

PATTERN MAKING.—Equipment: 2 electrically driven wood lathes, 6 belt-driven lathes, 1 band saw, 1 jointer, 1 combination saw, 2 trimmers, 1 shaper, 26 workbenches, 26 pattern makers' benches, and all necessary tools and appliances.

Practice: *First year.*—Exercise in sawing, crosscut and ripping, planing, working to scribe and gauge line with saw and chisel; exercises in joinery, halved corners, rail and post, halved across centers, rail and post rail let into post, single and double rebated corner, shelf and jamb, shelf and jamb tongued and grooved together, butted corner, miter corner, slip mortise and tenon, miter corner tongues together, mortise and tenon, hanched corner, post and rail, rail dovetailed to post, common dovetail,

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

PENNSYLVANIA—Concluded.

WILLIAMSON SCHOOL—WILLIAMSON FREE SCHOOL OF MECHANICAL TRADES (DAY SCHOOL)—Concluded.

sink corner dovetail, blind dovetail; wood turning, turning with roughing gouge, straight round with skew chisel, straight round ends reduced, skew chisel, tapered round and ends reduced, skew chisel; pattern-making exercises, making blocks of various sizes and shapes, bearings of elementary class, patterns for journal brasses, elliptical arms of various sizes. *Second year.*—Making hand-rail T joint, cross joint, 60° and 90° joint; making pipe fittings, one-eighth bend, elbow, elbow with bell ends, 45° connection with bell ends face-plate work, blank plate gears, trap for pipe fittings, cant or segmental work, handwheels, piston rings, blank wheels, armed wheels, belt pulleys, cone pulleys, complicated pipe fittings, bearings, shaft-aligning problems, sheave wheels, chain wheels, plate work, patterns requiring irregular partings, patterns with loose bosses and flanges, speed work on lathe and bench jobs, globe valves, throttle valves, three-way cocks, stave work, boxing-up work, three-part flask work, columns and ornamental work, locomotive cylinders, vertical and horizontal engine cylinders, Corliss cylinders, sweep or loam work, boxes for segmental cores of wheels, skeleton frame patterns and boxes, carded work, molding-machine patterns, cast gears, gear and pinion, bevel gears, miter gears, worm gears, segment gears for molding machine, master patterns.

RHODE ISLAND.

PROVIDENCE—RHODE ISLAND SCHOOL OF DESIGN.

JEWELRY MAKING AND SILVERSMITHING.—Equipment: 1 electric motor, 1 speed lathe, 2 polishing lathes, 1 emery grinder and grinding stone, 1 upright drill, 2 small furnaces, rolls of various sizes, and a full equipment of necessary benches, vises, and small tools.

Practice: Not reported.

MACHINISTS AND PATTERN MAKING.—Equipment: 2 electric motors, 8 lathes, 1 planer, 1 shaper, 2 milling machines, 1 cutter grinder, 2 builders' iron tool grinders, 1 upright drill and 1 small drill, 1 hacksaw, 1 band saw, 1 circular wood saw, 1 wood planer, 1 wood-turning lathe, benches, vises, and all necessary tools and appliances for machinists and pattern making.

Practice: Not reported.

PROVIDENCE—WATCHMAN INDUSTRIAL SCHOOL (NEGRO—EVENING SCHOOL).

DRESSMAKING.—Equipment: 7 sewing machines, dress forms, cutting and sewing tables, and the ordinary appliances of the trade.

Practice: Cutting from pattern; basting and various kinds of stitches; making shirt-waist sleeve; making and fitting two shirt waists; making shirt-waist suit.

PRINTING.—Equipment: 1 foot press, type, and the ordinary tools and appliances of the trade.

Practice: Learning the case, distributing type; making up forms, placing forms on press; presswork.

SOUTH CAROLINA.

DENMARK—VOORHEES INDUSTRIAL SCHOOL (NEGRO—DAY SCHOOL).

BLACKSMITHING.—Equipment: The ordinary tools of the trade.

Practice: Forging, drawing out, upsetting, bending, twisting, punching, cutting off, squaring up, scarfing, welding, casehardening, tempering, annealing, heading and threading bolts, making and tapping nuts, riveting and hack sawing, tire setting; forging staples, gate hooks, rasps, hammers, eyebolts, collars, chains, punches, wheel tires; general carriage and wagon work; horseshoeing; stripping and preparing foot, nailing shoes in place; making shoes to overcome difficulties with the feet, shoeing to overcome difficulties in the gait.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

SOUTH CAROLINA—Continued.

DENMARK—VOORHEES INDUSTRIAL SCHOOL (NEGRO—DAY SCHOOL)—Concluded.

BRICKLAYING AND PLASTERING.—Equipment: The ordinary tools of the trade.

Practice: Laying out buildings, putting down foundations, slaking and mixing lime, cement, mortar, etc.

CARPENTRY.—Equipment: All necessary tools and appliances.

Practice: *First year.*—Sharpening and setting tools; working out pieces of timber to different gauges and lengths; straightening, squaring, beveling, halving pieces together; making different angles for framing. *Second year.*—Framing, straightening, squaring, and plumbing; bracing, tieing, and bridging; sizing studs, joists, formation of cornices; setting window frames; shingling and flooring, rafter cutting, weatherboarding, and boxing; stair building, cutting rises and treads; furniture making; setting doors and window frames, hanging doors, putting on hard wood.

MILLINERY.—Equipment: All necessary appliances.

Practice: Plain bonnets covered, trimmed, and lined; crape bonnet, silk hat, or bonnet making; toque and turban making; drawing trimmed hats and bonnets; practice in use of combinations of color.

PLUMBING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Pipe bending, cutting threads, and tapping mains. *Second year.*—Installing brass and nickel-plated fixtures, patent couplings, and unions; soldering, laying terra-cotta pipes, soil pipes, and fittings.

PRINTING.—Equipment: 3 platen presses, complete outfit of type and furniture. Practice: *First year.*—Picking pi, feeding press, pasting and folding sheets, running stitches, etc. *Second year.*—Overlay cutting and making ready; handling and treatment of various kinds of stock; locking forms, learning cases, distributing dead matter, arranging on galley, straightaway composition. *Third year.*—Work at the case, composition, and imposition of book forms.

SEWING AND DRESSMAKING.—Equipment: All necessary appliances.

Practice: *First year.*—Taking measures; cutting and making white and negligee shirts, skirts, and shirt waists to measure; cutting and making and trimming ladies' underwear. *Second year.*—Drafting, cutting, and fitting plain skirts and basques, and finishing same. *Third year.*—Drafting sleeves, collars, and accessories to waists and skirts from measurement; advanced work in making complete dresses to measurement; cutting, fitting, and pressing garments; boning and padding waists; drafting garments of all kinds.

WOOD TURNING.—Equipment: Lathes and the ordinary tools of the trade.

Practice: Lathe work.

MAYESVILLE—MAYESVILLE INDUSTRIAL AND EDUCATIONAL INSTITUTE (NEGRO—DAY SCHOOL).

BLACKSMITHING, WHEELWRIGHTING, AND HORSESHOEING.—Equipment: Forges, drill press, punch tire bender and shrinker, anvil, and the ordinary tools of the trade.

Practice: *First year.*—Arranging fires for different kinds of work; heating iron and steel; use of screw plate, sledge, and anvil tools. *Second year.*—Use of anvil tools with helper; dressing and tempering anvil tools, drills, chisels, and punches; repair work; working steel; fitting iron to wood; welding tires; dishing wheels; setting tires and axles. *Third year.*—Making anvil tools and wrenches; work on wagons and buggies; working steel, preparing welding and tempering solutions; welding axles; making tools for various trades; designing andirons, fire sets, ornamental work; horseshoeing; wheelwrighting and painting wagons. *Fourth year.*—Making difficult forgings; making shoes for special cases; soldering, brazing, casehardening, annealing, testing steel and iron, and casting.

BRICKLAYING, STONE MASONRY, AND PLASTERING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Learning the proper use and care of tools. *Second year.*—Laying the foundation of a building; scaffolding; lathing and plastering; finishing in plaster; building flues, piers, and chimneys with one fireplace; striking joints; building brick wall with plumb and line. *Third year.*—Building chimneys with two or

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

SOUTH CAROLINA—Continued.

MAYESVILLE—MAYESVILLE INDUSTRIAL AND EDUCATIONAL INSTITUTE (NEGRO—DAY SCHOOL)—Concluded.

more fireplaces; setting grates, building walls with plumb and line, with return corners; turning arches, segmental arches; setting doors, window sills, and frames; cornice work. *Fourth year.*—Bricklaying of different kinds; chimney building and furnace work; corner work; columns and archways; plastering, preparing mortar, lathing; putting brown coat on lath, stone, or brick, and finishing same for paint or fresco, putty finish, white coat.

CARPENTRY.—Equipment: The ordinary tools of the trade.

Practice: Actual bench work, the simple use of the rough and smooth plane and the saw, the constant use of tools.

DRESSMAKING AND SEWING.—Equipment: Not reported.

Practice: Formation of various stitches, buttonhole making; French felling, sewing on lace, making plackets, wide and narrow hems; drafting, cutting, and making undergarments and fancy work; bias piecing, making buttonholes in woolen cloth, facing, sheering, darning rents in woolen cloth, piping, tucking, edgings, corners turned, gathers set into band, practice in drafting; cutting and dressmaking and fancy work.

TAILORING.—Equipment: The ordinary appliances of the trade.

Practice: *First year.*—Practice in the use of needle and thimble; general hand sewing, making buttonholes, felling, backstitching, cross-stitching, herringbone and bar tacks; making hip and side pockets, cleaning and pressing. *Second year.*—Making coat and vest pockets, and trousers; altering and repairing. *Third year.*—Making coats and vests; designing and cutting trousers. *Fourth year.*—Designing, cutting, and making coats and vests.

ORANGEBURG—CLAFLIN UNIVERSITY (NEGRO—DAY SCHOOL).

BLACKSMITHING.—Equipment: The ordinary tools of the trade.

Practice: Drawing out work, upsetting, bending, twisting, punching, welding; making links, rings, staples, etc.; making articles from pupils' drawings—hammers, nail set, chisels, tongs, flatter, swage and fuller, plow; tempering, filing, and finishing; vise and bench work, brazing, metal inlaying; ironing wagons and wheelbarrows; horseshoeing; making andirons, lamp brackets, iron grill work, etc.

BRICKLAYING AND PLASTERING.—Equipment: The ordinary tools of the trade.

Practice: Mixing mortar; spreading mortar and cutting brick; laying brick on the line; building plain and T piers; flue building; corner raising, and working on outside walls; turning jack or segmental, semicircular and gothic arches; laying brick in a veneer wall; laying pressed brick; lathing and plastering; building chimneys and fireplaces, and setting grates; boiler setting.

CABINETMAKING.—Equipment: The ordinary tools of the trade.

Practice: Making tables, washstands, chairs, bureaus, beds, closets, cabinets, etc., from designs given.

CARPENTRY.—Equipment: The ordinary tools of the trade.

Practice: Making joints, framing, roof building, stair construction, and all classes of interior finish.

DRESSMAKING.—Equipment: All necessary appliances.

Practice: Taking measurements; drafting skirts and waists; drafting and making unlined skirts and shirt waists; fitting, making, trimming, and finishing; matching stripes and plaids; drafting and making house gowns, walking skirts, jackets, and children's coats and skirts, muslin gowns; drawing and designing.

MILLINERY.—Equipment: All necessary appliances.

Practice: Making and finishing hat brims, making folds, bows, and small rosettes; making hats, drafting and making frames; making velvet hats and bonnets, straw and lace hats; trimming hats; making shirred hats and bonnets; children's hats; designing.

PAINTING, CARRIAGE.—Equipment: All necessary tools.

Practice: Applying priming coat on bodies and gears of rough stuff, glazing, applying colors and rubbing varnish, rubbing down, lettering, striping, and finishing.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

SOUTH CAROLINA—Concluded.

ORANGEBURG—CLAFLIN UNIVERSITY (NEGRO—DAY SCHOOL)—Concluded.

PAINTING, HOUSE.—Equipment: All necessary tools and appliances.

Practice: Exterior and interior painting; applying priming, second, and third coat in housework; graining of doors, glazing, enameling, varnishing; kalsomining, paperhanging, and staining of soft and hard wood.

PRINTING.—Equipment: Two job presses, two paper cutters, type, furniture, and printing-office requirements.

Practice: Practice in bookwork, learning the case, handling the stick and rule, setting and distributing type; making ready and running press, adjusting impression, mixing colors; imposition, making up and locking forms, overlaying and underlaying; measuring type and casting off copy.

SEWING.—Equipment: The ordinary appliances.

Practice: Threading needle, making a knot, and using the thimble; basting, stitching, overcasting, overhanding, (a) folded edges, (b) folded edges matching stripes, (c) selvedges; hemming; French seam with bias finish; fell seam, overhanded patch; hemmed-in patch; buttonhole stitch; herringbone stitch; making buttonholes and eyelets, sewing on buttons, making loops, sewing on hooks and eyes, putting in gussets, herringbone stitch on flannel; grafting for mending undergarments; cashmere darning; stocking darning; hemstitching, fringing, and damask hem for linen; tucking and whipping ruffle; mitered corners, chain stitching, feather stitching, slip stitching; drafting and making undergarments; bibs; child's, girls', and lady's skirts and nightgowns.

TAILORING.—Equipment: All necessary appliances.

Practice: Drafting of trousers; making trousers and vests; drafting and making coats and suits.

WHEELWRIGHTING.—Equipment: All tools and appliances required in the trade.

Practice: Working hardwood into true surfaces; use of file and spokeshave in finishing work, building wheel and axle; giving attention to "dish" of wheel and "gather" of spokes in hub; working from detail drawings; making of plowstocks; sketching and building of wheelbarrows; building one-horse wagon, delivery spring wagons, and buggies; carving, use of gouge, veneer, and parting tools; working out headblocks, carved spring bars and fancy scrolls for panel trimming, primary trimming.

WOODWORKING.—Equipment: 1 planer, matcher, and molder, one 4-sided molder, 1 universal woodworker, 1 shaper, 1 mortising machine, 1 dovetailing machine, 1 tenoning machine, 1 double-drum sander, 1 band resaw, 1 self-feeder rip saw, 1 hand-feed ripsaw, 1 variety saw, 1 jig saw, 1 cut-off saw, 1 carver, 14 wood-turning lathes, 1 dry kiln, and full equipment of small tools.

Practice: Turning plane cylinder, cylinder with raised shoulders at right angles, and at angles of 45°, inclined surfaces, concave surfaces, convex surfaces, elliptical faces, and all surfaces combined; making chisel handles, rolling pins, dumb-bells, indian clubs, and similar double-centered work of moderate length; exercise in face-plate carving, consisting of patent work, common blocks, plinths, goblets, split-wood pulleys, etc.

VIRGINIA.

HAMPTON—HAMPTON NORMAL AND AGRICULTURAL INSTITUTE (NEGRO AND INDIAN—DAY AND EVENING SCHOOLS).

BLACKSMITHING.—Equipment: 34 hand and power forges, 2 drill presses, 1 power punch and shear machine, 1 bulldozer, 1 exhaust fan, 1 power blower fan, and full equipment of small tools.

Practice: Ironing off wagons, making tools, general forge work, repairing, and horseshoeing.

BRICKLAYING AND PLASTERING.—Equipment: The ordinary tools of the trade.

Practice: Building of foundations, chimneys, fireplaces, walls, and window and door arches; mixing mortar, lathing, and setting boilers.

CABINETMAKING.—Equipment: 1 jointing machine, 1 shaper, 2 swing saws, 2 frame rip saws, 1 band saw, 2 molding and 1 mortising machines, 2 tenoning machines, 1 staple machine, 3 wood-turning lathes, 2 planing machines, 2 emory grinders, 1 pulley

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

VIRGINIA—Continued.

HAMPTON—HAMPTON NORMAL AND AGRICULTURAL INSTITUTE (NEGRO AND INDIAN—DAY AND EVENING SCHOOLS)—Concluded.

machine, 1 jig saw, 1 resaw, 1 gauge edger, 1 reversible shaper, and a full equipment of small tools.

Practice: Making cabinets, desks, tables, bookcases, etc., wood carving, upholstering, staining, finishing of woods, wood turning.

CARPENTRY.—Equipment: Use equipment of cabinetmaking department.

Practice: General construction and repairs.

MACHINISTS.—Equipment: 2 universal milling machines, 2 planers, 1 shaper, 1 arbor press, 1 overhead cylinder, 4 drill presses, 1 twist drill grinder, 1 reamer and cutter grinder, 1 emery grinder, 1 sensitive drill, 10 lathes, 1 polishing stand, 1 threading tool, 1 turret lathe, and full equipment of small tools.

Practice: Vise work, exercises on speed and engine lathes, drill press, shaper, planer, and milling machine.

PAINTING.—Equipment: Not reported.

Practice: House, sign, and carriage painting; interior hardwood finishing, paper hanging, frescoing, and varnishing.

PRINTING.—Equipment: 3 presses, 1 paper cutter, 1 wire stitcher, 1 "unamatic" punch, 1 perforator, 1 binder's-board cutter, stabbing machine, 2 numbering machines, 1 card cutter, 1 proof press, 6 stones, type, furniture, and requisite small tools.

Practice: Setting type; book and newspaper work; making ready small jobs for cylinder and small power presses; making up book pages; tabular work; proof reading; pamphlet trimming, making tablets, check and order book binding, etc.

SHOEMAKING.—Equipment: Sewing machine and ordinary tools of the trade.

Practice: Cutting and fitting uppers; making and repairing shoes; finishing pegged, nailed, and sewed shoes.

STEAM FITTING AND PLUMBING.—Equipment: Sets of stocks and dies, pipe wrenches, chain tongs, 1 reseating valve machine, 3 pipe machines, and a full equipment of small tools.

Practice: Practice in all the piping and connections necessary for heating buildings, connecting engines, boilers, and water-supply mains in both wrought and cast iron; laying, grading, and calking cast-iron and terra-cotta soil pipes; fitting up bathrooms, kitchen, and laundry, and general house plumbing; steam engine and boiler practice with Corliss and slide-valve engines and return tubular boilers.

TAILORING.—Equipment: 14 sewing machines, 1 zigzag machine, cutting and pressing tables, and the requisite implements of the trade.

Practice: Sewing by hand and machine; making buttonholes and various stitches; drafting patterns to measure; cutting, making, and fitting entire suits and overcoats.

TINSMITHING.—Equipment: Full set of stakes, 1 bender, 1 wiring, 4 burring, 3 turning, 1 grooving, 1 swedging, and 2 setting-down machines, 1 set of squaring shears, 2 folders, 1 stovepipe folder, 1 beading machine, and a full equipment of small tools.

Practice: Making tinware, roofing, spouting.

UPHOLSTERING.—Equipment: 1 sewing machine and the ordinary tools of the trade.

Practice: Plain and fancy chair caning; splint weaving and rush bottoming; mattress making and upholstering furniture.

WHEELWRIGHTING.—Equipment: 1 tenon machine, 1 boring machine, 1 jointer, 1 jointer planer, 1 pony planer, 1 mortising machine, 1 molding machine, one 4-sided molder, 1 double spindle shaper, 1 swing saw, 1 band saw, 2 rip saws, and a full equipment of small tools.

Practice: In building a cart, a farm wagon, light or heavy delivery wagon, or a plain carriage.

LAWRENCEVILLE—ST. PAUL NORMAL AND INDUSTRIAL SCHOOL (NEGRO—DAY AND EVENING SCHOOLS).

BLACKSMITHING.—Equipment: 4 forges, shrinkers, drill, and the ordinary tools of the trade.

Practice: *First year.*—Care of fires; tool work; drawing out, upsetting, bending, twisting, punching, cutting, welding, brazing, and casehardening. *Second year.*—

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Continued.

VIRGINIA—Continued.

LAWRENCEVILLE—ST. PAUL NORMAL AND INDUSTRIAL SCHOOL (NEGRO—DAY AND EVENING SCHOOLS)—Continued.

Drilling, annealing, etc.; making horseshoes, preparing the feet for shoes; regulating blasts for iron and steel, using the die, practical horseshoeing; using anvil with helper; fitting iron to woodwork; repairing buggies and wagons. *Third year.*—Forging, welding, setting axles, welding tires, jump welding, filing; making chisels, hammers, wrenches, picks, cart hooks, chains; sharpening tools, and producing the different degrees of temper.

BRICKLAYING AND PLASTERING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Making mortar tubs, boxes, and boards; making lime mortars and colored mortars; practice in wrist movements with trowel, spreading mortar; practical work on actual construction; making Flemish bond, cross bond, herring-bone bond, vertical and horizontal for English; laying brick in straight wall; striking joints, plumbing. *Second year.*—Leveling, building piers, corners, chimney breasts, flue work, stems and heads of chimneys; fireplace construction; mixing plastering, mortars; lathing, practice work in plastering; cement mortars; practice work in repairs and new construction. *Third year.*—Making arches, lintel setting, smokestacks of all shapes, cement work, laying drainage pipes, etc.; building cisterns, culverts, buttresses, setting frames, plastering, building boiler walls, setting grates, setting slate and tile mantels, terra-cotta trimming, and other ornamentation.

CARPENTRY.—Equipment: Tenoning machine, planing machine, jig saw and full equipment benches and carpenter's tools.

Practice: *First year.*—Making various joints, such as butt, dowel, miter, shoulder, tongue-and-groove, dado; simple boxwork; making mortises, tenoning, trusk tenons, bridge and scarf joints, etc.; keeping and clamping glue work, making window and doorframes, and other shopwork, also miniature house framing. *Second year.*—Actual work on buildings; setting door and window frames, casing, flooring, fitting doors and windows, etc.; repair work. *Third year.*—Taking up; foundation layouts, running lines, setting batters, leveling, making rafter and other level cuts; stair building, circular heads, paneling, etc.; cornice construction.

DRESSMAKING.—Equipment: 4 sewing machines, dress forms, and worktables.

Practice: *First year.*—Making shirt waists and shirt-waist suits; making fancy waists, sleeves, and five-gored skirts; making dressing jackets, fancy waists, sleeves, and trimmings; drafting and making spring skirts, waists, and suits. *Second year.*—Drafting and making five, seven, and nine gored and circular skirts; drafting and making tight-fitting basques; matching of plaids, striped and figured materials; drafting and making jackets, coat suits, and fancy dresses, spring and graduating dresses.

HARNESS MAKING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Making waxed threads, plain stitching; fitting, stitching, and finishing trunk handles and trunk straps; hame-strap making; making plain breeching straps, cow and horse halters, and team bridles; general harness repairing. *Second year.*—Making folded bodied breeching and girths, gag rounds, round winker straps, and round edge work in general; fitting, stitching, and finishing traces; practice on raised work; making express saddles; general repair work in carriage trimming. *Third year.*—Making gig saddles; fitting, stitching, and finishing complete sets of express harness; repairs; fitting, stitching, and finishing complete sets of buggy, surry, and coach harness; covering dashers and fenders; trimming shafts; lining buggies; making curtains, storm aprons, plain curtains, etc.

PAINTING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Simple priming, sandpapering, filling woods, spreading paint with flat and round brushes, puttying, glazing, cutting glass, applying stains and varnish, painting wagons, tables, and painting new work; applying wood fillers and metallic paints. *Second year.*—Mixing and matching colors, mixing and applying shellac, practical work; graining; calcimining; painting walls, painting furniture, striping wagons, painting surfaces. *Third year.*—Wagon and buggy painting; simple fresco work; lettering on wood, canvas, and glass; gilding, polishing.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

A.—PHILANTHROPIC SCHOOLS—Concluded.

VIRGINIA—Concluded.

LAWRENCEVILLE—ST. PAUL NORMAL AND INDUSTRIAL SCHOOL (NEGRO—DAY AND EVENING SCHOOLS)—Concluded.

PLAIN SEWING.—Equipment: 4 sewing machines, worktables, and the necessary implements.

Practice: Using the needle, thimble, and other implements; basting, running, overcasting, hemming, gathering, shirring, felling, patching, drawing, machine stitching, hemstitching, French seaming, gusseting, buttonholing, sewing on buttons, and measuring; making miniature underwear, bed and table linen, shirt waists, and dresses; practice work on aprons; handwork on soft sheer materials; cutting garments by patterns; putting them together and making proper seams; making garments by measurements; making men's shirts, nightshirts, and overalls; cutting and making fancy underwear; making plain dresses by measurement; practice in designing, cutting, and fitting.

PRINTING.—Equipment: Press, paper cutter, and type.

Practice: *First year.*—Learning the case, sizes and faces of type, distributing type, presswork, imposition of forms, cleaning and care of type. *Second year.*—Taking proof; justifying; emptying sticks, etc.; locking forms; ruling; newspaper work; card work; job setting; stapling; and tablet binding. *Third year.*—Catalogue work; imposition of forms; plain book and tablet work; operating job and cylinder presses; setting jobs of original design; tabular work.

STATIONARY ENGINEERS.—Equipment: Boiler, engine, dynamo, switchboard, exhaust steam heater, lathe, drill press, plumber's and steam fitter's tools.

Practice: Practical work throughout the course; repairing engines and pumps, care and management of steam boilers and dynamos, and wiring; practical work in drawing tools and tempering, etc.; firing.

TAILORING.—Equipment: 4 sewing machines, workbenches, and necessary implements.

Practice: *First year.*—Basting half back, whole back, and straight stitching, herringbone, cross, felling, serging, and stoting; eyelet work, tacks, buttonholes, buttons, and the various patches, belt straps, buckle straps, and the various kinds of trouser pockets; detail work on parts of trousers and vests; practical work in cleaning and pressing; making a pair of trousers by pupil's own measurement. *Second year.*—Drafting trousers, taking measurements; making vests of various styles; simple methods of dyeing; alteration and vest drafting. *Third year.*—Practical coat making, coat drafting; measurements; pressing; practical work, skirts and capes; matching colors; suit making.

WHEELWRIGHTING.—Equipment: The ordinary tools of the trade.

Practice: *First year.*—Elementary work with the drawing knife, chisel, saw, plane, and spokeshave; making the various miters, tenons, mortises, splices, etc. *Second year.*—Construction of wagon and cart wheels; construction of bars, legs, spokes, rims, etc.; making wheelbarrows; laying out and making wagon gears, including perches, headblocks, and axle beds; construction of wagons and carts. *Third year.*—Working from detail drawings; general repairing; making detail drawings for objects under construction; building buggies, bodies, and gears.

RICHMOND—VIRGINIA MECHANICS' INSTITUTE (EVENING SCHOOL).

BLACKSMITHING AND FORGING.—Equipment: 4 forges, anvils, vises, and the ordinary tools of the trade.

Practice: Not reported.

CABINETMAKING.—Equipment: 1 12-inch jointer and planer, 1 wood-turning lathe, 1 scroll saw, and a full equipment of small tools.

Practice: Not reported.

MACHINISTS.—Equipment: 2 drill presses, 2 engine lathes, 1 planer, 1 shaper, 1 bolt cutter and threader, 1 grinder, vises, and a varied assortment of small hand tools.

Practice: Not reported.

PATTERN MAKING.—Equipment: Same as used in cabinetmaking course.

Practice: Not reported.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS.

[This table is incomplete, as data were not obtained for some schools, and but partial data were obtained for other schools.]

ALABAMA.

NORMAL—STATE AGRICULTURAL AND MECHANICAL COLLEGE (NEGRO—DAY SCHOOL).

BLACKSMITHING AND WHEELWRIGHTING.—Equipment: Forges, anvils, and full sets of blacksmith's tools.
Practice: Not reported.
BRICKLAYING.—Equipment: Ordinary tools of the trade.
Practice: Repairing and building for use of school.
CARPENTRY.—Equipment: Complete sets of tools.
Practice: Repairing and building for use of school; making tables, chairs, desks.
LAUNDERING.—Equipment: Washer, dryer, extracter, mangle.
Practice: Not reported.
MILLINERY.—Equipment: Not reported.
Practice: Making hats, etc.
PRINTING.—Equipment: Presses, stitcher, type, and usual printing equipment.
Practice: All school printing.
SEWING.—Equipment: 4 sewing machines and all necessary appliances of the trade.
Practice: Making dresses.
SHOEMAKING.—Equipment: Not reported.
Practice: Making shoes.

ARKANSAS.

FORT SMITH—LINCOLN HIGH SCHOOL (NEGRO—DAY SCHOOL).

CARPENTRY.—Equipment: Complete sets of carpenter's tools.
Practice: Building houses and making small articles of furniture.

CONNECTICUT.

BRIDGEPORT—STATE TRADE SCHOOL.

DAY SCHOOL.

CARPENTRY.—Equipment: 2 wood-turning lathes, 1 jointer, 1 planer, 1 cut-off saw, 1 band saw, 2 circular saws, 1 emery grinder, 1 grindstone, 10 double benches, and a full equipment of small tools.
Practice: Making various joints used in framing; operating various machines in the construction of sash, doors, blinds, frames, and interior finish; construction of a small two-story house.
DRESSMAKING.—Equipment: 4 sewing machines, sewing and cutting tables, and the ordinary appliances of the trade.
Practice: Making all kinds of garments from the simplest articles of underwear to the designing, making, and fitting of evening gowns.
MACHINISTS.—Equipment: 1 electric motor, 2 planers, 1 drill, 1 sensitive drill, 1 saw, 5 lathes, 2 shapers, 1 universal milling machine, 2 milling machines, 1 wet grinder, 1 universal grinder, forge, anvil, vises, benches, and a full equipment of small tools.
Practice: All the important operations in bench work, on the lathe, the milling machine, the shaper, the planer, the grinder, and the drill press; making and assembling simple tools.

EVENING SCHOOL.

CARPENTRY.—Day school equipment is used.
Practice: Not reported.
DRESSMAKING.—Day school equipment is used.
Practice: Not reported.
MACHINISTS.—Day school equipment is used.
Practice: Not reported.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

CONNECTICUT—Continued.

NEW BRITAIN—STATE TRADE SCHOOL (DAY SCHOOL).

CARPENTRY.—Equipment: 1 circular saw, 1 band saw, 2 planers, 1 drill, 2 lathes, 1 grindstone, 1 emery wheel, benches, and a full equipment of small tools.

Practice: Surface and edge planing, grinding and sharpening tools; ripping and crosscut sawing; setting and filing saws; glue joint making and gluing; box making; jointing, lapping, mortising, tenoning, framing sills and joints; studding and framing for doors and windows; corner bracing; laying out rafters; making door and window frames; truss work; inside finishing, fluting, beading, chamfering, making window sash, stair treads, risers, landings, stringers, handrails, newel posts and banisters; laying inlaid floors; outside finishing, shingling, and clapboarding.

DIE MAKING.—Equipment: Machinist equipment used.

Practice: Not reported.

MACHINISTS.—Equipment: 3 drills, 10 lathes, 1 universal milling machine, 1 shaper, 3 grinders, 1 wet grinder, 1 hack saw, 1 gig saw, 2 planers, 1 punch press, 1 grindstone, 2 oil tanks, 1 gas furnace, 1 forge, 1 115-horsepower dynamo, 1 150-horsepower engine, motors, benches, vises, and a full equipment of small tools.

Practice: Straight and taper turning; centering, squaring, and turning cast iron; bolt turning, nut turning, tapping, and fitting, making drill pad for lathes, taper fitting, and center-truing tools, thread cutting on bolt, pulley turning, using chucking drills and reamers; chucking and reaming, using arbor press, keyway cutting, milling and using shaper, knurling, shaft coupling, square thread cutting, using templet for filing up square-thread tool, using gauge plats for filing tools to shape, using boring tool, reamer, and arbor work; fitting and milling machine work; using planer and shaper gauges; using hand tools, upright and twist drills; gear cutting; using taper attachment and grinding machine; stamping and filing; tapping; using cutters for fluting taps and reamers on milling machine; using high-speed tools, twist drills, making milling machinery cutters; hardening and tempering in gas furnaces; using gauges, grinder, lapping; brass work, finishing tools, die work, piping and pipe fitting.

PATTERN MAKING.—See carpentry equipment.

Practice: Surface and edge planing, grinding and sharpening tools; ripping and crosscut sawing; setting and filing saws; glue joint making and gluing; making rectangular cube, cylinder with cored hole in center, foundation base with cored space inside; making pipe—elbow cored, T cored, and return bend and cored; laying out and making pulleys; cylinder and gear work; making flasks.

TOOL MAKING.—Machinist equipment used.

Practice: Included under machinist.

WATERBURY—WATERBURY EVENING HIGH SCHOOL (EVENING SCHOOL).

CARPENTRY.—Equipment: 1 grindstone, 48 benches, and a full equipment of carpenter's tools.

Practice: Planing, sawing, crosscut and ripping; sharpening edge tools, filing and setting saws; jointing and gluing, mitering, mortising, tenoning; laying out work for framing; preparing and placing interior and exterior finish.

SEWING, DRESSMAKING, AND MILLINERY.—Equipment: 2 sewing machines, sewing tables, and the usual sewing, dressmaking, and millinery equipment.

Practice: Sewing and dressmaking; drafting and cutting from measurements and patterns; plain and fancy sewing by hand and machine; measuring and fitting; trimming and finishing; designing.

SOUTH MANCHESTER—SOUTH MANCHESTER EVENING SCHOOL (EVENING SCHOOL).

CARPENTRY.—Equipment: 1 lathe, 1 band saw, 1 rip and crosscut saw, 1 grindstone, benches, and a full equipment of small tools.

Practice: Sawing, planing, jointing; grinding and sharpening tools; filing and setting saw; making moldings, joints, miters, mortises and tenons; making tables, desks, bookcases, doors, sash, benches, picture frames.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

CONNECTICUT—Concluded.

SOUTH MANCHESTER—SOUTH MANCHESTER EVENING SCHOOL—(EVENING SCHOOL)—Concluded.

DRESSMAKING AND MILLINERY.—Equipment: 10 sewing machines, 30 sewing tables, dress forms, and the usual sewing equipment.

Practice: Stitching, sewing, basting, measuring, cutting, fitting, trimming, making various articles of underclothing, shirt waists, skirts, suits, children's clothes, light summer dress, and woolen dress; making and trimming different kinds of hats for summer and winter wear.

DISTRICT OF COLUMBIA.

WASHINGTON—ARMSTRONG MANUAL TRAINING SCHOOL (NEGRO).

DAY SCHOOL.

AUTOMOBILE CARE AND MANAGEMENT.—Equipment: Not reported.

Practice: Forging, filing, using lathe, shaper, and planer; disassembling and reassembling automobile chassis.

CABINETMAKING AND JOINERY.—Equipment: Universal saw bench, benches, and the usual tools and appliances of the trade.

Practice: Constructing model stairways, houses, porches, etc.; framing sills, cutting joists and bracing; laying out and cutting studding for partitions; framing around chimneys, cutting studding for windows and doors; framing of roof, cutting rough carriages for stairs, etc.; making chairs, china closets, pedestals, sideboards, tables, stools, etc.; staining, varnishing, finishing.

DRESSMAKING.—Equipment: 10 sewing machines, tables, and all usual sewing equipment.

Practice: Measuring, drafting, cutting and fitting linings; making skirts, shirt waists, shirt-waist suits, one-piece dresses, wash coats, fancy waists, shirts, neckwear, buttonholes, pockets, tailor-made suits; braiding garments.

ELECTRICAL WORKERS.—Equipment: Not reported.

Practice: Dynamo and motor winding, circuit, burglar alarm, annunciator, interior and exterior, light and power winding.

FORGING.—Equipment: 1 brazing forge, 1 bar cutter, forges, anvils, vises, bench, blower, exhaust fan, and a full equipment of tools.

Practice: Drawing, forming, bending, twisting, welding, upsetting, bolt and nut making, steel tool making and tempering, brazing, annealing.

LAUNDERING.—Equipment: Not reported.

Practice: Sorting clothes, washing, rinsing, hanging up; starching, sprinkling, ironing, folding; laundering collars, cuffs, napkins, aprons, caps, sleeves, shirt waists, shirts, towels, laces, embroidery, ribbons, etc.

MACHINE-SHOP WORK.—One 10-horsepower motor, 1 speed lathe, 10 engine lathes, 1 planer, 1 milling machine, 2 drill presses, 1 universal grinding machine, 1 shaper, 2 emery tool grinders, 1 grindstone, vises, and the ordinary tools of the trade.

Practice: Chipping, filing, turning, polishing, gearing, chuck and drill press work, practice on planer, drill press, and shaping machine.

MILLINERY.—Equipment: Not reported.

Practice: Drafting hat frame, making and covering buckram frame; cutting, making, placing bias fold on and lining hat; pattern taking, making bows and trimmings; trimming hat; renovating; cleaning, steaming, ironing, and curling feathers; making and covering wire frame; making fancy trimmings, flowers, and trimming hats and bonnets; making draping veils, infants' caps, and children's hats and bonnets.

PATTERN MAKING AND WOOD TURNING.—Equipment: 22 lathes, 1 trimmer, 1 emery grinder, lathe chucks, rip and crosscut saws, benches, and a full set of small tools.

Practice: Making patterns of wrenches, handwheels, brackets, pulleys, chucks, U bends, returns, coring, parts of machines, handles, cranks, etc.; turning between centers, chisel handles, mallets, newels, corner blocks, rosettes, hat stands, etc.; shellacking, varnishing.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

DISTRICT OF COLUMBIA—Continued.

WASHINGTON—ARMSTRONG MANUAL TRAINING SCHOOL (NEGRO)—Concluded.

DAY SCHOOL—concluded.

SEWING.—Equipment: Not reported.

Practice: Making an apron; machine sewing; drafting, cutting, basting, stitching, sewing of seams, trimming, tucking, ruffling, hemming, gathering, making buttonholes, stitching band; making skirts, shirt waists, underwear, etc.; fancy stitching; embroidery.

STEAM ENGINEERS.—Equipment: Not reported.

Practice: Operation and care of the steam engines and electrical machinery in the school, correcting engine troubles, making emergency repairs, and doing any work relating to the steam engineer's trade that may come up.

EVENING SCHOOL.

CABINETMAKING AND JOINERY.—Equipment: Day school equipment is used.

Practice: Sawing, planing, laying out work, nailing, gluing, lap jointing, mortising, tenoning, setting locks and hinges, making useful articles, finishing, polishing, dovetailing, doweling, staining.

MILLINERY.—Equipment: Not reported.

Practice: Making patterns by measurement; wiring, binding, covering, lining, folding; covering wire frames; designing, making bows, facing, folding, trimming, shirring, and fitting chiffon for child's hat; making and trimming straw hats; covering folding, knotting, draping a mourning toque.

SEWING AND DRESSMAKING.—Equipment: Not reported.

Practice: Sewing, making an apron; basting, running, top sewing, overcasting, hemming, stroking, gathering, making buttonholes, sewing on band; cutting and making a petticoat by measurements, ruffling, gathering, machine stitching; felling, facing, making placket, and placing yoke; cutting and making drawers, corset cover, and petticoat by pattern; plaiting, hemming, sewing on lace, tucking; placing dust ruffles and flounces; finishing with band and tape; napery hems; hemstitching; dressmaking, cutting and making skirt, plain and gored, and shirt waist; sewing seams, hem turning, sewing on band, hooks and eyes, making cuffs, setting sleeves, making plait, sewing on buttons and working buttonholes; making tucks, yoke, and trimming, placing flounces, and embroidery; renovating garments; making children's clothes.

STEAM ENGINEERS.—Equipment: Not reported.

Practice: Work in the boiler and engine room of the building.

WASHINGTON—MCKINLEY MANUAL TRAINING SCHOOL (EVENING SCHOOL).

Day manual training school equipment is used.

CABINETMAKING AND WOOD TURNING.—Equipment: 59 lathes, 2 band saws, 3 emery grinders, 1 grindstone, 1 universal saw bench, benches, and the usual tools and appliances of the trade.

Practice: Wood turning, pattern making, and cabinetwork.

ELECTRICAL WORKERS.—Equipment: Motors, dynamotor, storage battery, rheostats, switchboard, wattmeters, ammeters, voltmeters, transformers, galvanometers, with a full electrical equipment.

Practice: Installation of a shunt motor; armature winding; using ammeter and voltmeter; measurement of resistance; testing efficiency of a motor, protective devices, current-carrying capacity of conductors; tracing electric currents; care of a switchboard.

MACHINE-SHOP PRACTICE.—Equipment: 21 lathes, 3 grinders, 3 drill presses, 5 emery grinders, 5 milling machines, 1 centering machine, 1 planer, 5 shapers, 1 gas furnace, 1 metal-cutting saw, 1 hack saw, 2 center grinders, 1 arbor press, 1 switchboard, vises, and a full equipment of small tools.

Practice: Adjustment of lathe to cut parallel, tapering, cone centering, drilling, threading, gearing; use of roughing and side tools; use of broad-nose tool; adjustment

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

DISTRICT OF COLUMBIA—Concluded.

WASHINGTON—MCKINLEY MANUAL TRAINING SCHOOL (EVENING SCHOOL)—Concluded.

of shaper; chucking work in vise; adjustment and use of universal grinder and drilling machines; setting up machine for gear cutting; selection and adjustment of gears; differential indexing; gearing milling machine for differential indexing.

GEORGIA.

COLUMBUS—SECONDARY INDUSTRIAL SCHOOL (DAY SCHOOL).

CARPENTRY.—Equipment: Not reported.

Practice: Joining, scarfing, half lapping, mitering, mortising, tenoning; framing doors and windows; laying flooring; framing, sheathing, and shingling a small house; making cabinets, drawing tables, furniture and fixtures for the school; use of shaper, band and scroll saws, planer, and woodworking machinery.

DRESSMAKING.—Equipment: Not reported.

Practice. *First year.*—Cutting; fitting; making apron, cap, oversleeves; cutting gores, basting, hemming, fitting; French seaming; cutting and making underskirt; drafting pattern, cutting, and making underwaist and drawers. *Second year.*—Drafting shirt-waist pattern, making waist; drafting and making shirt-waist skirt; drafting, fitting, and making lined waist; trimming; making woolen skirt and drop skirt. *Third year.*—Fancy sewing; embroidering; outlining and drawn work; making infant's dress; drafting patterns; making fancy white dress.

FORGING.—Equipment: Not reported.

Practice: Bending, drawing, forming, upsetting, scarfing, making staples, hasps, hooks, chains, bolts, and tongs; welding iron and steel, using butt, scarf, and lap joints; making of steel tools; hardening, tempering, annealing.

MACHINISTS.—Equipment: Not reported.

Practice: *First year.*—Forge work; work on the drill press, speed lathe; chipping; filing; work on engine lathe and milling machine. *Second year.*—Turning, milling, and shaping to gauge, making of turning, driving, and pressed fits. *Third year.*—Tool making; making reamers, taps, dies, gigs, including machine work, filing, finishing, hardening, tempering; making clamps, bolts, V blocks, parallel strips; building drill and arbor presses and lathes.

MILLINERY.—Equipment: Not reported.

Practice: *First year.*—Remodeling old hats, placing and finishing wire, cutting bias folds, making bows; enlarging and reshaping hats, bendings, facings; renovating old ribbons, bows, rosettes. *Second year.*—Straw sewing; making bandeaux; freshening velvets; curling plumes; trimming and reshaping felt hats and toques; trimming and veil draping. *Third year.*—Making hat from model; finishing hats; making velvet or felt hats, bonnets for children and elderly persons, lingerie, and evening hats.

PATTERN MAKING.—Equipment: Not reported.

Practice: Making simple patterns, split and cord patterns, and those involving bench work with chisel, plane, lathe, and band saw in cutting to irregular templates, pulleys, gear wheels, and completed machine parts.

TEXTILE OCCUPATIONS.—Equipment: 1 automatic feeder, 1 combination breaker and intermediate lapper, 2 revolving flat cards, 1 head and drawing frame, 1 slubber, 1 speeder, grinding, stripping, and burnishing rolls, 1 combination warp and filling frame, 1 twister, 1 spooler, 1 quiller, 1 reel, 1 warper, 4 looms, 1 hydro-extractor, 1 skein dyeing machine; set of carder's tools and change gears; complete equipment of dobby hand looms with shuttles; harness, beams, hecks, knitting machines.

Practice: *First year.*—Designing; power and hand loom weaving; dressing the warp for the hand loom, beaming, drawing-in, reeding, placing in the loom and weaving; weaving plain and other simple weaves; operating carding and spinning machines. *Second year.*—Designing; combination, figured satin, double satin, satin granite, broken and figured satin, shaded satin, honeycomb, dress goods, novelty weaving and weaves with an extra warp or filling, figured dress goods and pick outs; continu-

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

GEORGIA—Concluded.

COLUMBUS—SECONDARY INDUSTRIAL SCHOOL (DAY SCHOOL)—Concluded.

ing the weaving and warp preparation work of the first year, taking up more complicated weaves and doing more work on the power looms, also original designs on the hand looms of a more complex nature; operating carding and spinning machines. *Third year.*—More weaving on the power loom, cloth finishing and loom fixing; knitting; running of machines; continuing carding and spinning work; changing machines from one number or hank to another; dyeing samples of yarn; doing any dyeing required for weaving purposes.

ILLINOIS.

CHICAGO—ALBERT G. LANE TECHNICAL HIGH SCHOOL (EVENING SCHOOL).

Day manual training school equipment is used.

BLACKSMITHING AND TOOL SMITHING.—Equipment of forge shop: 2 drill presses, 1 grinder, 1 single punch and shear, 1 steam hammer, 1 grindstone, 48 forges, anvils, and a full equipment of small tools.

Practice: Hand forging and general blacksmithing; steam-hammer forging; architectural and ornamental smithing; forging and tempering lathe tools; welding iron and steel; casehardening and annealing; tests of materials.

CABINETMAKING.—Equipment of woodworking shop: 3 band saws, 2 improved saw tables, 1 wood-turning lathe, 1 single surfacer, 1 hand planer and jointer, 1 boring machine, 1 grinder, 1 wet emery grinder, 1 filing bench, 4 grindstones with iron troughs and truing device, 72 double workbenches, vises, cabinets, and a full equipment of small tools, 2 sets of 4 steam-heated gluepots.

Practice: Making working drawings, glue joints, dowel joints; construction of desks, chairs, tables, mirror frames, music cabinets, etc.; wood finishing, filling, varnishing, shellacking, filling and waxing, rubbing down, polishing.

CARPENTRY AND JOINERY.—Use equipment of woodworking shop.

Practice: Sawing, planing, chiseling, mortising, tenoning, dovetailing; grinding and sharpening tools; house framing and construction.

ELECTRICAL WORKERS.—Equipment: 1 shaper, 1 universal milling machine, 5 engine lathes, 2 sensitive drills, 1 winding machine, 1 circle shear, 1 circular metal saw, 1 hack saw, 1 inclinable punch press, 1 disk slotter, 1 double dry grinder, 1 single wet grinder, 1 grindstone with trough and truing device, motor generator set.

FOUNDRY WORK.—Equipment: 1 2-ton cupola, 3 furnaces, 1 core oven, 1 grinder, 1 polisher, 1 drill press, 1 traveling crane, 1 hoist, 1 gas melting furnace, 1 core machine, 3 molding machines, 1 pneumatic riddle.

Practice: Floor molding in green sand, core making, match board making, mixing iron by analysis.

MACHINE-SHOP PRACTICE.—Equipment: 54 engine lathes with all attachments, 1 arbor lathe, 4 speed lathes, 1 sensitive drill, 1 upright drill press with power feed and back gear, 1 drilling machine, 1 radial drill, 1 boring and turning mill, 2 universal milling machines, 2 plain milling machines, 3 back-gear crank shapers, 1 crank slotter, 2 planers, 1 automatic screw machine, 1 arbor press, 1 universal grinding machine, 1 wet drill grinder, 1 double wet grinder, 3 grindstones, 1 double disk grinder, 1 double emery grinder, 1 cutter and reamer grinder, drawing frames, 2 crank shapers, 1 wet tool grinder, 1 sensitive drill press, 1 tempering furnace, benches, vises, and a complete equipment of hand tools.

Practice: Use of engine lathe, hand lathe, drill press, slotter, milling machine, shaper, and planer; cutter grinding; bench work.

PATTERN MAKING.—Equipment: 1 band saw, 6 speed lathes with attachments, 2 pattern maker's lathes with attachments, 2 wood trimmers, 1 improved saw table, 1 grindstone with iron trough and truing device, 1 set of 4 steam-heated gluepots, gluing table, 12 double benches, and a complete equipment of small tools.

Practice: Patterns for iron block, shifting fork, gibbed way; brass bushing and core work, core box plane, tool post and core box, parted pattern; faceplate work, wrenches and turnbuckles; double pattern for return bend; elbow and core box.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

ILLINOIS—Concluded.

CHICAGO—ALBERT G. LANE TECHNICAL HIGH SCHOOL (EVENING SCHOOL)—Concluded.

WOOD TURNING.—Equipment: 24 wood-turning lathes with attachments, 1 grindstone with iron trough and truing device, 1 wet grinder, 1 band saw, 1 improved saw table, 24 benches, and a full equipment of small tools.

Practice: Lacing belts; use of gouge and skew in turning cylinders; turning square grooves, fillets, hollows, beads; scraping tools in turning; faceplate work; chuck work; pattern work; rosettes, ornamental turning, candlesticks, pedestals, etc.

CHICAGO—LAKE HIGH SCHOOL (EVENING SCHOOL).

Day high school equipment is used.

CABINETMAKING.—Equipment: Not reported.

Practice: Making drawings, glue joints, dowel joints; constructing desks, chairs, tables, mirror frames, music cabinets; wood finishing, filling, varnishing, shellacking, filling and waxing, rubbing down, polishing.

CARPENTRY AND JOINERY.—Equipment: Not reported.

Practice: Use of handsaws, planes, chisels, etc.; grinding and sharpening tools; planing, mortising, tenoning, dovetailing; house framing and construction.

ELEMENTARY WOODWORK.—Equipment: 24 lathes, 2 saw benches, 2 surfaces, 1 grindstone, 6 gluepots, 1 wood trimmer, 1 cup wheel grinder, 1 pattern maker's gap lathe, 2 band saws, 3 revolving oilstones, 1 wood heating oven.

Practice: Lacing belts; use of gouge and skew in turning cylinders; turning square grooves, fillets, hollows, beads; scraping tools in turning; faceplate work; chuck work; pattern work; ornamental turning, candlesticks, pedestals, etc.

FORGING.—Equipment: 1 blower fan, 1 exhauster fan; 1 gas furnace, 1 shears, 1 drill press, 1 double grinder, 1 steam hammer, 20 forges, anvils, and a full equipment of small tools.

Practice: Hand forging; general blacksmithing; steam-hammer forging; architectural and ornamental smithing; forging and tempering lathe tools; welding iron and steel; casehardening and annealing; tests of materials.

FOUNDRY WORK.—Equipment: 1 1-ton cupola, 2 brass furnaces, 1 core oven, 1 buffer, 1 double grinder, 1 drill press, 1 cupola blower, 1 furnace blower, 1 hammer case machine, molding benches, and full equipment of small tools.

Practice: Floor molding in green sand; bench work—white metal, brass bronze, core making; mixing iron by analysis; match board making.

MACHINE-SHOP PRACTICE.—Equipment: 1 gas furnace, 2 shapers, 1 planer, 1 drill press, 1 wet tool grinder, 20 engine lathes, 1 grindstone, 2 universal milling machines, 1 slotter, 1 wet grinder, 1 wet drill grinder, 1 centering machine, 1 metal saw, 3 speed lathes, 1 disk grinder, 1 3-spindle drill press, 1 universal grinding machine, 1 hand drill, 1 center grinder, 1 plain milling machine, 1 universal tool and cutter grinder.

Practice: Use of engine lathe, hand lathe, drill press, slotter, milling machine, shaper, planer; cutter grinding; bench work.

PATTERN MAKING.—Equipment: Not reported.

Practice: Patterns for iron block, shifting fork, gibbed way, brass bushing and core work; core-box plane, tool post and core box; wrenches and turnbuckles; faceplate work; elbow and core box; double pattern for return bend; core box.

MASSACHUSETTS.

BOSTON—BOSTON SCHOOL OF PRINTING AND BOOKBINDING [1] (INDEPENDENT [2]—DAY SCHOOL).

BOOKBINDING.—Equipment: Standing, blocking, letter, plow, and finishing presses, 1 hand backer, 1 paper cutter, board shears, sewing frames, folders, and all necessary equipment.

Practice: Not reported.

[1] Formerly called Pre-Apprentice School for Printing and Bookbinding.
[2] For explanation of this term, see page 97.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

MASSACHUSETTS—Continued.

BOSTON—BOSTON SCHOOL OF PRINTING AND BOOKBINDING (INDEPENDENT—DAY SCHOOL)—Concluded.

PRINTING.—Equipment: 1 platen press, 1 hand press, 1 roller proof press, 1 paper cutter, 2 imposing stones, 1 mitering machine, 1 lead cutter, type, and a full printing equipment.

Practice: Not reported.

BOSTON—GIRLS' TRADE SCHOOL (INDEPENDENT[1]—DAY SCHOOL).

DRESSMAKING.—Equipment: Sewing machines and usual sewing equipment.

Practice: Making simple stitches; making a workbag, pincushion, 2 aprons, children's wearing apparel, underwear, embroidery, unlined dresses, shirt waists, advanced dressmaking.

MILLINERY.—Equipment: Sewing machines and usual millinery equipment.

Practice: Making wire frames on models; covering frames with all kinds of materials; making buckram frames; making over hats; sewing straw; making simple hats; making hatbands, ornaments, embroidered collars, jabots, fancy articles, etc.

POWER SEWING MACHINE OPERATING.—Equipment: Power machines for cloth and straw, 1 tucking machine, 1 buttonhole machine, 1 2-needle machine.

Practice: Simple machine stitching; making sheets, pillowcases, hospital garments, shirt waists, and underwear.

BOSTON—HIGH SCHOOL OF PRACTICAL ARTS (DAY SCHOOL).

DRESSMAKING.—Equipment: Sewing machines and usual sewing equipment.

Practice: *First year.*—Plain sewing; making the different stitches, including embroidery; running sewing machine; making underwear, drafting the patterns, measuring and cutting the materials. *Second year.*—Making unlined dresses and shirt waists, including measuring, drafting, cutting, fitting, and designing. *Third year.*—Making silk and woolen dresses. *Fourth year.*—Making tailor-made gowns, reception gowns, etc.

MILLINERY.—Equipment: Sewing machines, tables, and usual millinery equipment.

Practice: *First year.*—Taken concurrently with dressmaking. *Second year.*—Making wire frames, covering bandeaux and hat frames. *Third year.*—More advanced millinery work. *Fourth year.*—Making difficult hats and fancy neckwear; artificial flowers are also made.

BOSTON—QUINCY SCHOOL (DAY SCHOOL).

ELEMENTARY METAL WORK (MACHINE-SHOP BENCH WORK).—Equipment: 2 upright drills, 1 speed lathe with turning equipment, 1 polisher or buffer, 1 gas forge with blower, 1 grindstone, vises, workbenches, with a full equipment of all small hand tools.

Practice: Not reported.

CHICOPEE—CHICOPEE INDUSTRIAL SCHOOL (DAY SCHOOL).

CARPENTRY AND WOODWORKING.—Equipment: 6 wood-turning lathes, 1 grindstone, 1 table saw for ripping and crosscutting, 24 benches, and a full equipment of hand tools.

Practice: Not reported.

FORGING.—Equipment: 1 gas and smoke exhauster, 1 blower, 12 forges, 24 anvils, with all the ordinary tools of the trade.

Practice: Not reported.

[1] For explanation of this term, see page 97.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

MASSACHUSETTS—Continued.

CHICOPEE—CHICOPEE INDUSTRIAL SCHOOL (DAY SCHOOL)—Concluded.

MACHINE-SHOP PRACTICE.—Equipment: 14 lathes, 1 drill press, 1 sensitive drill press, 1 universal milling machine, 1 universal grinding machine, 1 shaper, 1 planer, 1 hack saw, 2 gas forges and blower, 1 emery wheel grinder, vises, and a full equipment of small tools.

Practice: Not reported.

PATTERN MAKING.—Equipment: 6 wood-turning lathes, 1 band saw, 1 grindstone, 24 benches, and a full equipment of hand tools.

Practice: Not reported.

CHICOPEE—CHICOPEE EVENING INDUSTRIAL SCHOOL (INDEPENDENT[1]—EVENING SCHOOL).

MACHINE-SHOP PRACTICE.—Day school equipment is used.

Practice: Not reported.

WOODWORKING (CARPENTRY, PATTERN MAKING, AND WOOD TURNING).—Day school equipment in carpentry and woodworking and pattern making is used.

Practice: Not reported.

FALL RIVER—BRADFORD DURFEE TEXTILE SCHOOL OF FALL RIVER (INDEPENDENT INCORPORATED[2]—EVENING SCHOOL).

Day school equipment is used.

BOX AND DOBBY LOOM FIXING.—Equipment: Use the equipment of the warp preparation and weaving department of 3 bobbin spoolers, 1 skein spooler, 1 reel, 4 knotters, 1 cone winder, 1 doubler and winder, 1 filling-bobbin winder, 1 beam warper, 1 ball warper, 1 slasher, 1 size kettle, 2 beamers, 1 harness-finding machine, 1 drawing-in frame, 27 plain looms, 6 print cloth, 1 sateen, 1 tubing, 1 light duck, 4 gingham, 1 magazine, 8 fancy cotton, 1 lappet, 1 gem, 1 fancy towel, 3 cotton, 1 damask, 1 towel, 1 narrow fabric, and 20 hand looms, 1 rise and fall Jacquard machine, 2 piano card cutters, 1 card-lacing frame, 71 dobby heads, 4 box motions, 4 single-lift single cylinders, machines for testing and sizing cloth.

Practice: Pulling down and reassembling the different kinds of box motions and all their working parts; pulling down and reassembling all kinds of modern dobby heads, leno and lapped motions; timing and setting the various parts of the looms.

COTTON GRADING AND STAPLING.—Equipment: None used.

Practice: Selecting cotton for various yarns; grading and stapling the types used in Fall River.

ELEMENTARY DYEING.—Equipment: 6 skein dyeing tubs, 1 hydro-extractor, 1 dyeing machine, 1 sizing machine, 1 drying machine, 2 bleaching kiers, 3 experimental dyeing apparatus, 1 high-pressure steam chest, 1 sample printing machine, 2 winding-on machines.

Practice: Practical work in dyeing cotton, wool, and silk, applying mordants and fixing agents.

JACQUARD WEAVING AND LOOM FIXING.—Equipment: Use the equipment of the warp preparation and weaving department, given under "Box and dobby loom fixing."

Practice: Construction, operation and setting the various motions in single and double lift jacquards; locating the number one needle on the machine; tying up machines for different tie-ups; pulling down and reassembling the machines.

MULE SPINNING.—Equipment: Use the equipment of the carding and spinning department of complete set of picking machinery, 1 automatic feeder, 1 single-beater breaker packer, 1 single-beater finisher picker, 3 revolving flat cards, 1 railway head with evener motion, 2 drawing frames, 2 sliver lap machines, 1 ribbon lap machine, 3 head combers, 1 slubber, one 10 by 5 intermediate 64 spindles, 1 roving and 1 jack frame, 5 combination warp and filling spinning frames, 1 spinning mule, 2 wet and

[1] For explanation of this term, see page 97. [2] For explanation of this term, see page 503.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

MASSACHUSETTS—Continued.

FALL RIVER—BRADFORD DURFEE TEXTILE SCHOOL OF FALL RIVER—(INDEPENDENT INCORPORATED—EVENING SCHOOL)—Concluded.

dry twisters, 1 yarn gassing machine, 2 braiding machines, 1 banding machine, necessary machines for sizing and testing yarns, 2 models fly frame builder motion, 1 model spinning frame builder motion, 1 model card bend, 1 model set of metallic drawing rolls, 5 models differential motion, etc.

Practice: Examination of the various motions in mule spinning.

PICKING AND CARDING.—Equipment: Use the equipment of the carding and spinning department, given under "Mule spinning."

Practice: Operating, assembling, and setting the principal parts of the various machines. *First year.*—Automatic feeders and openers, pickers, cards, railway heads and drawing frames. *Second year.*—Sliver lap machines, ribbon lap machines, combers, and fly frames.

PLAIN WEAVING AND LOOM FIXING.—Equipment: Use the equipment of the warp preparation and weaving department, given under "Box and dobby loom fixing."

Practice: Loom fixing; pulling down and reassembling looms; hanging and starting warps; changing from plain goods to three, four, or five harness work, etc.

RING SPINNING, TWISTING, AND WARP PREPARATION.—Equipment: Use the equipment of the carding and spinning department, given under "Mule spinning."

Practice: Use of ring spinning and twisting machinery; spooling, warping, and slashing yarn, reeling, winding and bundling yarn for knitting, dyeing and shipping.

STEAM ENGINEERS AND ELECTRICIANS.—Equipment: 1 engine, 1 engine with Prony brake, 3 steam pumps, 1 blow-off valve, 2 injectors, 1 inspirator, 1 engine indicator, 1 reducing wheel, 1 planimeter, 1 model of engine, 19 models of various kinds of valves, gauges, inspirators, injectors, steam traps, humidifiers, and lubricators cut in sections, one 3-phase alternator, 9 motors, 1 generator, 2 switchboards, 1 transformer, arc lamps, one 150-horsepower boiler, 1 plunger pump and receiver, 1 injector, 1 water heater, 1 oil separator, 1 steam separator, 1 noncondensing engine, 1 reducing valve, 1 steam damper regulator, gauges, 2 generators, 1 combined generator and feeder switchboard with a complete equipment of humidifiers, automatic fire sprinklers and complete system of mill telephones.

Practice: Study, care, and operation of the various engines, dynamos, motors, and steam and electrical apparatus of the plant.

TEXTILE MILL MACHINISTS.—Equipment: 6 engine lathes, 4 lathes, 1 universal grinding machine, 1 universal milling machine, 1 universal shaper, 1 planer, 1 stationary head drill, 1 sensitive drill, 1 twist drill grinder, 1 grinding machine, 1 tool grinder with water pump, 1 hack saw, 1 hardening and annealing furnace, 1 blower, and a very complete assortment of small tools.

Practice: Use of engine lathe, upright drills, shaper, planer, universal milling machines, grinding machine; filing, scraping, reaming, tapping, hardening and tempering steel; pipe threading.

LAWRENCE—LAWRENCE INDUSTRIAL SCHOOL (INDEPENDENT [1]—DAY SCHOOL).

DRESSMAKING.—Equipment: Sewing machines and the usual sewing equipment.

Practice: Plain sewing; elementary stitches; use of the machine; planning, cutting, fitting, and choosing materials; making aprons, corset covers, drawers, chemises, petticoats, nightgowns, waists, and dresses.

ELECTRICIAN.—Equipment: Use machine-shop equipment.

Practice: Not reported.

MACHINE-SHOP PRACTICE.—Equipment: 1 band saw, 1 circular saw, 1 buzz planer, 1 surface planer, 1 shaper, 1 engine lathe, 1 speed lathe, 1 radial drill, 1 upright drill, models for all the different motions, electric apparatus and motors, 1 steam boiler, 2 steam engines, 1 gas engine, 6 lathes, workbenches, vises, and all necessary hand tools.

Practice: Using the machines in the shop, automobiles, gas engines, etc.; manufacture of tools; taking down and erecting machines.

[1] For explanation of this term, see page 97.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

MASSACHUSETTS—Continued.

LAWRENCE—LAWRENCE INDUSTRIAL SCHOOL (INDEPENDENT—DAY SCHOOL)—Concluded.

MILLINERY.—Equipment: Sewing machines and the usual millinery equipment.

Practice: Use of wire, buckram, velvet, lining, and ribbon, making bows.

WOOL AND WORSTED MILL OCCUPATIONS.—Equipment: Cotton gin, picker, card, comb, railway head, slubber, intermediate frame, roving, spinning, spooling, twisting, and warping machines; looms, hand and power, plain and Jacquard; arrangements for dyeing and bleaching; wool and worsted washing tub, picker, card, comb, complete set of drawing and spinning machinery, finishing machines, models representing all mechanical motions of machines; baths for bleaching and dyeing.

Practice: Simple operation; carding and spinning; weaving and designing; dyeing and finishing.

LOWELL—LOWELL TEXTILE SCHOOL (INDEPENDENT INCORPORATED[1]—EVENING SCHOOL).

Day school equipment is used.

COTTON MILL OCCUPATIONS.—Equipment: Ginning machinery, 1 saw gin, 1 roller gin; opening, picking, and waste machinery; 1 opener, 3 beater-breaker lappers with attachments; 1 waste opener, 1 thread extractor; carding, combing, and drawing machinery; 5 flat cards, 2 railway heads, 2 drawing frames, stripping rolls, card grinding rolls, 1 ribbon lapper, 1 comber, 1 sliver lap machine, 1 comb; roving, spinning, and twisting machinery; 1 slubber, 1 intermediate, 1 fine frame, 1 jack frame, 1 spinning mule, 1 spooler, 2 twisters, 5 ring spinning frames, 1 fly frame, 1 mule for fine spinning; knitting machinery, 3 seamless knitting machines, 1 knitting machine with lace-front attachment, 1 knitting machine with yarn changer and striper, 1 ribber, 1 rib-knitting machine with knee and ankle splicer and plater, 2 rib-top knitting machines, 1 rib-knitting machine with knee and ankle splicer, 1 stocking machine, 1 knitting machine with splicing and plating attachments, 1 automatic knitting machine, half hose; 1 ribbed underwear machine, 1 cylinder flat-web machine, 1 Jacquard machine, one 2-thread looper, 2 sweater machines, 1 glove machine, 2 loopers, 10 sewing machines, including shell stitch, overseaming and crocheting, double-stitch covering, seaming and welting, vest finishing, etc.; miscellaneous machinery, 1 reel, 2 fly frames, 1 card feed, 1 grinding device, 1 scroll-setting device, 2 winders, 1 banding machine, 1 single-thread testing machine, 1 yarn-inspection machine, 1 knotter, 2 yarn reels, 1 yarn tester, 1 twist counter.

Practice: Not reported.

FINISHING COTTON, WOOL, AND WORSTED.—Equipment: 1 washer, 1 fulling mule, 2 gigs, 1 rolling and stretching machine, 1 steam finishing machine, 1 singeing machine, 1 brushing machine, 1 sanding and polishing machine, 1 kicking mill, 1 double shear, 1 single shear, 1 dewing machine, 1 rotary press, 1 tentering and drying machine, 1 crabbing machine, 1 napper, 1 hydro-extractor, 1 measuring and weighing machine, 1 cloth-numbering machine, 1 steam press for underwear, 1 sewing machine, soap tanks, perch, burling, and measuring tables.

Practice: Not reported.

MACHINE-SHOP PRACTICE.—Equipment: 3 engine lathes, 2 speed lathes, 1 upright drill, 1 sensitive drill, 1 planer, 1 universal milling machine, 2 grinders, 1 grindstone, 1 centering machine, 1 hack saw, all fully equipped with various attachments, 1 pattern-maker's lathe, 1 band saw, 1 saw bench, forges, anvils, gas oven, and a full equipment of small tools.

Practice: Chipping, filing, tool grinding, and tempering; straight and taper turning, screw cutting, drilling, and boring; planer work, milling machine work, gear cutting, forging, and use of woodworking tools.

STEAM ENGINEERS AND ELECTRICIANS.—Equipment: 1 steam engine, 1 surface condenser, 1 steam turbine, one 5,000-gallon pressure tank, 2 storage tanks, weighing and suction tanks, 1 pump, 1 air compressor, 1 centrifugal pump, 2 fan blowers, 1 injector, 2 dynamometers, 1 variable speed transmission, accessory engine apparatus, apparatus for testing friction and slip of belts and pulleys; generator, switchboard

[1] For explanation of this term, see page 503.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

MASSACHUSETTS—Continued.

LOWELL—LOWELL TEXTILE SCHOOL (INDEPENDENT INCORPORATED—EVENING SCHOOL)—Concluded.

wattmeter, 3 ammeters, 3 voltmeters, 2 motors, 1 millivoltmeters, shunts, galvanometers, arc-lamp resistance boxes, and all other necessary electrical apparatus.

Practice: Practice with steam engine indicator; boiler and engine tests and tests with the various electrical machines.

WEAVING.—Equipment: Cotton-warp preparation machinery, 1 spooler, 2 warpers, 1 slasher, 1 beamer, 1 winder, drawing-in frames, 1 slasher press roll, 1 expansion comb for warper, 1 quiller, set of spools, 1 universal winder; woolen and worsted warp preparation machinery, 1 jack spooler, 1 dresser, 1 reel, 1 beamer, 1 creel, hand warping and beaming frames; braiding machinery, 4 braiders; silk-preparing machinery, 1 winder, 1 ribbon quiller, 1 warper and beamer, 1 double frame; plain looms, 11 looms, 2 print-cloth looms, 1 English loom, 1 fine sateen loom, 1 loom with dobby, 1 twill loom, 1 sateen loom, 1 automatic shuttle-changing loom, one 4-harness loom, fancy looms, 1 bag loom, 2 gingham looms, 1 towel loom, 1 lappet loom, 3 cotton looms, 1 gem loom, 2 worsted looms, 1 fancy loom, one 20-harness dobby loom, 1 heavy loom, 1 blanket loom, 3 woolen looms, 1 model dobby attachment; Jacquard looms, 3 fancy looms, 2 ingrain-carpet looms, 1 silk loom, 1 tapestry loom, 1 ribbon loom, 1 silk brocade machine, 1 plush loom; 2 card-cutting machines; 45 hand looms; pattern warping stands, beaming, drawing-in stands, etc.

Practice: Preparation of warps, beaming, dressing, sizing, drawing-in, and making chains, cutting and lacing cards; spooling and quilling; weaving designs.

WOOLEN MILL OCCUPATIONS.—Equipment: Scouring and carbonizing machinery, 1 cone duster, 2 scouring bowls, with feeders, 1 apron drier, 1 carbonizing acid tank, 1 carbonizing duster, 1 rinse box, 1 hydro-extractor, 1 shoddy picker, 1 bagging stand; picking machinery, 1 burr picker, 1 mixing picker; carding machinery, 2 sets of woolen cards, 1 sample mixing card, 2 spinning mules, 1 fancy yarn twister; card grinding machinery, 1 grinding frame, 3 traverse grinders, 1 set of carder's tools, benches, baskets, etc.

Practice: Making 20 sample mixes, combining different colors and grades of stock, felting and mounting the same, part of the carding to be done by hand cards and part on the Torrence sample mixing card.

WORSTED MILL OCCUPATIONS.—Equipment: 1 double-cylinder worsted card, 1 double bowl, five-cylinder backwasher, 4 gill boxes, 1 baller (punch), 1 worsted comb. Drawing, spinning, and twisting machinery, 1 revolving creel, two 2-spindle drawing boxes, one 2-spindle weigh box, 1 first finisher, 1 dandy reducer, 3 cap spinners, 3 gill boxes, 1 cap twister, 1 second finisher, 1 rover, 1 universal winder, 1 sewing machine, 1 slubber; 1 finisher, 1 self-acting mule, scales, reels, 1 ring spinner, 1 flyer spinner, 2 ring twisters, 1 cone rover, 1 dandy rover, 1 reducer, 1 cone reducer.

NEW BEDFORD—NEW BEDFORD INDUSTRIAL SCHOOL (INDEPENDENT[1]).

DAY SCHOOL.

BUILDING TRADES, METAL TRADES, STEAM ENGINEERING, ELECTRICAL WORKERS, ETC.—Equipment, machine shop: 10 engine lathes, 1 speed lathe, 1 shaper, 1 universal grinder, 1 drill grinder, 1 wet-tool grinder, 1 upright drill, 1 sensitive drill, 1 universal miller, 1 plain miller, 1 hack saw, 1 arbor press, forge, anvils, formers, drills, cutters, and a full equipment of small tools. Equipment, woodworking: 1 saw table, 2 planers, 1 universal saw table, 1 mortiser, 1 band saw, 1 speed lathe, 1 grindstone with trueing attachment, vises, and a full equipment of hand tools, dynamo and switchboard.

Practice, building trades: Use of the woodworking machinery; joinery, butt, dovetail, blind, dado, miter, half lap and glued joints; tongue-and-groove joints; splice and dowell joints; making chests, lockers, shop benches, chairs, office furniture, vises, tables, drawing boards, T square, time-card racks. Practice, metal trades: Use of the machine-shop equipment; construction of minor parts of tools; forging; pattern making; installation of machines. Practice, steam engineering: Valve setting; indicator practice.

[1] For explanation of this term see page 97.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

MASSACHUSETTS—Continued.

NEW BEDFORD—NEW BEDFORD INDUSTRIAL SCHOOL (INDEPENDENT)—Concluded.

EVENING SCHOOL.

CARPENTRY.—Day school equipment is used.

Practice: Same as day school building trade practice.

DRESSMAKING.—Equipment: Not reported.

Practice: Hand and machine sewing; tucking, hemming, facing, shirring, ruffling, overcasting, the different dressmaking stitches; making aprons and plain shirt waists.

MACHINE-SHOP PRACTICE.—Day school equipment is used.

Practice: Same as day school metal trades practice.

MILLINERY.—Equipment: Not reported.

Practice: Making wire frame; covering frame; wiring and covering bands; making bias folds; hemming velvet; sewing straw on frame; wiring ribbon; lining hats; steaming velvet; making buckram frame; plain-fitting hats; draping; working on crepe, chiffon, and moline.

STEAM AND GASOLINE ENGINEERS.—Equipment: Not reported.

Practice: Valve setting; indicator practice; stripping and taking down gasoline engines; cleaning, adjusting, repairing, assembling, wiring; adjusting spark circuit and carburetor.

NEW BEDFORD—NEW BEDFORD TEXTILE SCHOOL (INDEPENDENT INCORPORATED[1]—EVENING SCHOOL).

Day school equipment is used.

DYEING.—Equipment: Samples of dyestuffs, dye bath, 1 printing machine, 1 water heater, 1 wooden dye beck, 1 calorimeter, 1 hydro-extractor, 1 color kettle.

Practice: Not reported.

KNITTING.—Equipment: 1 cloth dryer, 1 electric cloth cutter, 4 loopers, 3 rib top machines, 6 rib leg machines, 1 hosiery machine, 1 automatic body machine, 1 welter and automatic knee and ankle splicing rib leg machine, 2 footers, 1 knitting machine, 1 spring needle rib body machine, 5 body machines (7-stop motion), 10 automatic hosiery machines, 3 winders, 1 hosiery and underwear brusher, 1 band folding and cutting machine, 1 sweater machine, 1 glove machine, 1 automatic footer with high splice heel and double sole attachment, 1 striper, 2 trimming and overseaming machines, 1 trimming, overseaming, and hemming machine, 1 overedging machine, 2 crochet machines, 1 machine for sewing on lace, hosiery boards, 1 stocking and underwear dryer, 2 needle machines, 2 rib machines, 1 balbriggan machine, 1 rib border machine, 1 bar stitch machine, 1 chain machine, 1 lock-stitch finishing machine, 1 chain-stitch finishing machine, 1 taping machine, 2 eyeletting machines, 1 button sewer, 1 drawer strapper, 1 fancy sweater machine, 1 buttonhole machine, 1 knitting table, 1 twin needle machine, 1 collarette machine, 1 button facing machine, 1 seaming machine, 1 toggle grinder, 2 twin needle covering machines, 1 drawer finishing machine, 1 hemming and seaming machine, 1 two-feed striper and fancy pattern machine, 1 ribber, 1 selvage welt machine, 1 sleever, 1 rib leg machine with lace attachment.

Practice: Winding and preparation of cotton, lisle, wool, worsted and silk yarns; setting and adjusting machines; rib top knitting; rib leg knitting; plaiting; setting and adjusting automatic hosiery machines; knitting on automatic hosiery machines, cotton and wool stockings, fine split sole, hose and half hose; knitting men's half hose, ladies' hose, footing children's, boys', and misses' rib legs, white feet and black legs ladies' stockings, double sole, reenforced heel and toe, plaited hose and half hose with white heel and toe, fancy lace effects, on automatic hosiery machine; hemming and embroidering stockings; looping, mending, and singeing; boarding, drying, and pressing; inspecting, pairing, stamping, folding, boxing.

LOOM FIXING.—Equipment: Use equipment of weaving department.

Practice: Taking apart, assembling, resetting, and adjusting looms.

MULE SPINNING.—Equipment: Use equipment of cotton carding and spinning department. (See Picking, Carding, and Combing.)

Practice: Operating looms.

[1] For explanation of this term see page 503.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

MASSACHUSETTS—Concluded.

NEW BEDFORD—NEW BEDFORD TEXTILE SCHOOL (INDEPENDENT INCORPORATED—EVENING SCHOOL)—Concluded.

PICKING, CARDING, AND COMBING.—Equipment: Use equipment of cotton carding and spinning department, which consists of 1 cotton gin, 1 roving waste machine, 1 automatic feeder, 1 porcupine opener, 1 breaker lapper, 1 intermediate lapper, 1 beater finisher lapper, 3 flat cards, 2 sliver lap machines, 1 ribbon lap machine, 4 combers, 2 railway heads, 2 drawing frames, 1 slubber, 2 intermediates, 1 jack roving frame, 1 roving frame, 4 spinning frames, 2 spinning mules, 3 twisters, 1 banding machine, 1 yarn testing machine, 1 grinding and testing machine, 1 clothing machine, 1 conditioning machine, machines for card grinding, stripping, yarn testing, sizing, etc., models for demonstrating the different motions on the machines.

Practice: Operating mule machines.

RING SPINNING AND TWISTING.—Equipment: Use equipment of cotton carding and spinning department.

Practice: Operating.

SPOOLING, WARPING, AND SLASHING.—Equipment: 2 spoolers, 3 warpers, 1 cone winder, 3 winders, 1 quiller, 1 reel, 1 slasher.

Practice: Operating.

WEAVING AND LOOM FIXING.—Equipment: Use equipment of weaving department.

Practice: Operating, taking apart, assembling, resetting, and adjusting looms.

WEAVING, FANCY AND FIXING.—Equipment: Use equipment of weaving department of 1 gingham loom, 16 dobby looms, 1 print cloth loom, 1 narrow goods loom, 2 sateen cam looms, 4 plain cam looms, 1 lappet loom, 1 towel loom, 2 gingham looms, 3 Jacquard looms, 1 automatic shuttle changing loom, 2 automatic bobbin changing looms, 1 side cam loom, 1 twill cam loom, 1 plain cam loom, 1 card cutting machine, models for demonstrating leno motions, box motions, etc.

Practice: Operating looms; taking apart, assembling, and resetting the machinery used.

WEAVING, PLAIN, AND LOOM FIXING.—Equipment: Use equipment of weaving department.

Practice: Operating, taking apart, assembling, resetting, and adjusting looms.

NEWTON—NEWTON INDUSTRIAL SCHOOL (INDEPENDENT[1]—DAY SCHOOL).

MACHINE SHOP PRACTICE, WOODWORKING (CABINET), PATTERN MAKING, ELECTRICIANS, PRINTING.—Equipment: Lathe, drill press, planer, milling machine, and the usual tools of the trades.

Practice, machine shop: Operations on the lathe, drill press, planer, milling machine, etc. Practice, woodworking and pattern making: Operations in joinery, carpentry, cabinetmaking, and pattern making, including both wood and metal patterns. Practice, electrical work: Wiring for bells, lights, gas engines, etc.

WORCESTER—WORCESTER TRADE SCHOOL (INDEPENDENT[1]—DAY SCHOOL).

CABINETMAKING.—Equipment: 2 pattern lathes, 1 jointer, 1 planer, 1 iron saw bench, 1 tilting table saw bench, 1 sensitive drill, 1 band saw, 30 sets of lathe and bench tools.

Practice: Not reported.

MACHINISTS.—Equipment: 1 plain grinder, 1 universal grinder, 1 tool and cutter grinder, 1 twist drill grinder, 1 universal gear cutter, 2 universal milling machines, 1 plain milling machine, 1 horizontal boring and drilling machine, 3 planers, 1 shaper, 1 flat turret lathe, 10 engine lathes, 1 bench lathe, 2 upright drills, 2 hand lathes, 1 sensitive drill, 1 grinder, 1 arbor press, 1 belt-lacing machine, 1 cold saw, 1 centering machine, 1 gas forge, vises, drills, stands, and a full equipment of small tools.

Practice: Using the various tools and machines.

PATTERN MAKING.—Cabinetmaking equipment is used.

Practice: Not reported.

[1] For explanation of this term see page 97.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

MISSISSIPPI.

ALCORN—ALCORN AGRICULTURAL AND MECHANICAL COLLEGE (NEGRO—DAY SCHOOL).

BLACKSMITHING AND WHEELWRIGHTING.—Equipment: 1 spoke tenon, 1 hub bore, 2 drill presses, 1 grindstone, forges, blowers, benches, and full sets of tools for blacksmithing and for wheelwrighting.

Practice: *First year.*—Preparing forges and tools for use; use of tools. *Second year.*—Preparing horses' feet for shoes; upsetting tools; repairing; welding; wagon making. *Third year.*—Tempering and annealing; setting dies; bracing, soldering, filing, and setting up new work. *Fourth year.*—Axle setting; carriage making; horseshoeing.

CARPENTRY AND CABINETMAKING.—Equipment: 1 turning lathe, 8 circular ripsaws, 1 grindstone, 1 scroll saw, 2 mortising and boring machines, 1 trimmer, benches, vises, and a full equipment of small tools.

Practice: *First year.*—Dressing lumber; cleaning shop. *Second year.*—Making various handles; ripping and sizing lumber. *Third year.*—Dovetailing and cabinetwork. *Fourth year.*—Making doors and windows; dovetailing and cabinetwork.

DRESSMAKING.—Equipment: Not reported.

Practice: *First year.*—Drafting, cutting, fitting, and making unlined waists and skirts; drafting waists with skirts. *Second year.*—Drafting and making princess gowns; cutting and making tailor-made jackets and skirts.

PAINTING.—Equipment: 1 heavy sewing machine, 1 extension ladder, 2 trestles, 2 swing stages, and the ordinary tools and appliances of the trade.

Practice: *First year.*—Roof painting; applying priming and second coats; trimming, sandpapering, and applying lead coats. *Second year.*—Puttying, applying and rubbing rough stuff; interior and exterior work; painting farm wagons and buggies; varnishing; imitating wainscoting; graining; staining; hard oiling; rubbing varnish with felt and pumice stone; frescoing; striping carriages; glazing; frosting and staining glass; decorating; sign writing; gilding; glass embossing. *Third year.*—Varnishing carriages; frescoing; striping; ornamenting; stencil making; bronzing; making iron and plaster casts; imitating marble; painting in distemper.

SEWING.—Equipment: Not reported.

Practice: *First year.*—Basting, stitching, overcasting, hemming, gathering, buttonholing; machine sewing; cutting and making ladies' underwear. *Second year.*—Darning, patching; drafting, cutting, and making white underskirts; featherstitching; making underwaists from pattern. *Third year.*—Making dainty lingerie, including fancy muslin and flannel underskirts, nightdresses, and dressing sacks.

SHOEMAKING.—Equipment: 2 sewing machines, 1 button machine, 1 roller machine, 1 splitting machine, 1 peg-cutting machine, lasts, and a full equipment of small tools.

Practice: *First year.*—Sewing straight seams on shoes; nailing half soles; finishing; polishing; fine repairing. *Second year.*—Putting on patches; half soling; sewing on welts; measuring; repairing old heels and building new ones. *Third year.*—Repairing and finishing; rounding up insoles and outsoles; measuring feet and fitting up lasts.

COLUMBUS—MISSISSIPPI INDUSTRIAL INSTITUTE AND COLLEGE (DAY SCHOOL).

DRESSMAKING.—Equipment: Sewing machines, forms, charts, and the usual sewing equipment.

Practice: *First year.*—Basting, running, backstitching, French seaming, flat filling; plain sewing, including shirt waists, skirts, and underclothes; measuring; cutting and fitting linings and waists. *Second year.*—Fancy sewing, including more elaborate waists and thin dresses. *Third year.*—Drafting; making patterns of different styles of waists, sleeves, and skirts.

MILLINERY.—Equipment: Not reported.

Practice: Sewing; making bandeaux, wire frames, bows, and fancy facings; designing and making tailor-made and dress hats.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW JERSEY.

BORDENTOWN—MANUAL TRAINING AND INDUSTRIAL SCHOOL FOR COLORED YOUTH (NEGRO—DAY SCHOOL).

CARPENTRY, CABINETMAKING, AND HOUSE PAINTING.—Equipment: Not reported.

Practice: *First year.*—Cutting, sawing, planing, squaring, boring, joining, dovetailing, gluing, measuring. *Second year.*—Repairing building and building construction. *Third year.*—Planing; making desks, chairs, bookcases, tables, boxes, picture frames, etc.

SEWING, MILLINERY, AND LAUNDRY WORK.—Equipment: Not reported.

Practice: *First year.*—Various kinds of stitches.—*Second year.*—Making aprons, towels, bags, iron holders, sheets, napkins, pillowcases. *Third year.*—Machine sewing; making nightgowns, corset covers, kimonos, and underwear. *Fourth year.*—Hand and machine work of all kinds. *Fifth year.*—Dressmaking, measuring, drafting, cutting, fitting. *Sixth year.*—Advanced dressmaking; designing, planning, sketching; making all kinds of gowns; embroidering.

NEWARK—NEWARK TECHNICAL SCHOOL (EVENING SCHOOL).

ELECTROPLATING.—Equipment: 2 emery wheels, 4 plating vats, 3 acid tanks, 1 dynamo; chemical apparatus, tables, etc.

Practice: Preparation of work for electrodeposition, pickling, scratch brushing, polishing and buffing; stripping processes; finishing processes; lacquering.

ELECTRICAL WIRING.—Equipment: Full equipment of small tools.

Practice: Not reported.

PLUMBING.—Equipment: Pipes, joints, and a full equipment of small tools.

Practice: Preparing pipes for various kinds of joints; preparing and melting solder; making cup joint; wiping joints; soldering; fitting up and installing water-closets, bathtubs, washbasins, and hot-water tanks.

NEWARK—SARA A. FAWCETT DRAWING SCHOOL (EVENING SCHOOL).

DIE SINKING.—Equipment: Not reported.

Practice: Designing; transferring design to block of steel; cutting and filing steel block; tracing, modeling, cutting, hardening the "hub;" forming the die; forcing the hub into the die; tempering; finishing; adjusting and hardening the die.

JEWELRY MAKING.—Equipment: Not reported.

Practice: Designing; tracing design on paper, pasting it on the surface of metal; tracing it on and piercing the metal; modeling; soldering; boiling out; tooling; finishing.

NEWARK—WARREN STREET ELEMENTARY INDUSTRIAL SCHOOL (DAY SCHOOL).

WOODWORKING AND METAL WORKING.—Equipment: Woodworking—1 band saw, 1 circular saw, 12 woodworking lathes, work benches, and a full equipment of small tools. Metal working—1 engine lathe, 3 speed lathes, 1 shaper, 1 folder, 1 cutter, 1 shears, 1 grindstone, 1 emery wheel, 1 buffing wheel, 2 forges, workbenches, and a full equipment of small tools.

Practice: Woodworking—Making a model of a simple bungalow or cottage; making furniture or apparatus. Metal working—Sheet-metal work, bending, drilling, riveting, soldering, piercing, filing; tool making, chipping, filing, tempering, grinding, polishing; pattern making, casting; machine work, turning, drilling, planing.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW YORK.

ALBANY—VOCATIONAL SCHOOL (DAY SCHOOL).

CABINETMAKING.—Equipment: 6 speed lathes, 1 power oilstone and grinder, 1 universal saw bench, 1 band saw, 24 workbenches, and a full equipment of small tools; 1 emery wheel, 1 jointer, 1 circular saw, and surface planer.

Practice: Making pieces of furniture.

SEWING.—Equipment: 5 sewing machines, 25 sewing tables, and minor articles of equipment.

Practice: Drafting and making underclothes, blouses, etc.; making curtains; emming table linen; making clothing.

BROOKLYN—BROOKLYN EVENING TECHNICAL AND TRADE SCHOOL (EVENING SCHOOL).

Day manual training school equipment is used.

BLACKSMITHING.—Equipment: Forges and the ordinary tools of the trade.

Practice: Not reported.

CABINETMAKING.—Equipment: Not reported.

Practice: Planing; making half-lap corner and half-lap miter joint, mortise and tenon joint, dadoing joint, dovetailing; making picture frames, bookshelves, hanging cabinets, jewel case, inlaid; construction of furniture of pupils' design.

CARPENTRY.—Equipment: Lathes, workbenches, and the ordinary tools of the trade.

Practice: Not reported.

DRESSMAKING, ADVANCED.—Equipment: Tables, sewing machines, etc.

Practice: *First year.*—Practice in power and foot machines; drafting shirt waists, close-fitting waists, sleeves, skirts gored circular, circular gored and plaited; making unlined cotton dresses, silk petticoats, unlined tailored skirt, simple wool dresses (for children), silk shirt waists, and close-fitting lined waists; cutting, tracing, double marking, basting, fitting; seams, varieties—welt, double welt, flat stitch, lapped, strapped and slot; finishings—overcast, bound, turned and run, pinked; boning, pressing; buttonholes, hanging skirts, (*a*) plackets, (*b*) belts, etc; finishing skirts, (*a*) bottom; relining coats, handmade trimmings for gowns, (*a*) plaitings, (*b*) cording and folds, (*c*) shirring and smocking, (*d*) braiding, (*e*) fagotting. *Second year.*—Pattern modeling and draping; making linen suits (coat and skirt), skirts (plain and gored), plaited, tucked; making long, short, or eton coats; making patch bag, and flap down and up pockets; reconstruction and renovation of garments, steaming, mending, and pressing; designing and making evening gowns.

DRESSMAKING, ELEMENTARY.—Equipment: Sewing machines, tables, etc.

Practice: Hand, foot, and power machine work; drafting and making of undergarments from measurements; cutting and fitting corset cover from pattern; making French and flat fell seams, straight and bias hems; sewing on tapes and buttons; making buttonholes; making outline, chain, daisy catch, English eyelets, and feather-stitch; rolling and whipping; scalloping; shadow embroidery; sewing on of lace and embroidery; machine work, hemming, felling, gathering, tucking, stitching bias and straight bands and bindings; elective work, making white skirt, chemise, night-gown or drawers, and plain shirt waist; drafting, cutting, fitting, stitching, and finishing lingerie waist; hemstitching.

ELECTRICAL INSTALLATION.—Equipment: Dynamos, frames, and the requisite tools.

Practice: Bell work; connecting up batteries in series, in multiple, and in multiple series with elevators, bells, annunciators, push buttons and switches; conduit work; burglar-alarm wiring; connecting up batteries with windows, doors, transoms, annunciators, and clocks with burglar-alarm bells; installing wires on wooden cleats and on insulators; electric gas lighting, wiring; connecting up batteries and relay spark coil with gas key and automatic or ratchet gas burners; electric-light wiring; connecting up wall sockets and receptacles, transformers, lightning arresters, service boards, panel boards, fuse and blocks with batteries, three and four way, and pole switches; cleat work; iron conduit work; soldering cables; underground work; installing automatic light switches; installing wires on porcelain insulators and on small and large moldings; drilling slate; fitting switches and instruments.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW YORK—Continued.

BROOKLYN—BROOKLYN EVENING TECHNICAL AND TRADE SCHOOL (EVENING SCHOOL)—Concluded.

MACHINIST.—Equipment: Lathes, drills, saws, etc.
Practice: Not reported.

MILLINERY, ADVANCED.—Equipment: Tables, sewing machines, etc.
Practice: Renovating, cleaning, and pressing; remodeling old hats. Practical work: Fancy silk or velvet hat; lace hat covered plain and edge bound or tucked; children's hats and bonnets; infants' caps (lined and unlined), toques (plain and fancy), bonnets with frames of wire and of buckram, of summer and of winter material, and evening bonnets; turbans, plain and draped with fur and velvet combined, or fur and chiffon combined; flower hats and bonnets; straw hats and bonnets of plain straw, combination of straw with net, chiffon, tulle, etc., over a frame and without frame; mourning hats, bonnets, and toques; lingerie, lawn or mull, lace embroidery, etc.; raffia hats, lace; solomon-knot, and original patterns; veils, confirmation, face, bridal, mourning, and automobile.

MILLINERY, ELEMENTARY.—Equipment: Sewing machines, tables, etc.
Practice: Making plain and milliner's folds, flat, rolled or double, and French hems; cutting true, choice and long biases; seaming and joining bias strips; making plain, sectional, tucked, shirred, wired or corded and fancy facings; making head linings of silk and soft materials, such as tulle, net, etc.; making narrow, wide, double, piped, full, shirred, tucked, corded and plaited bindings; wiring buckram, felt, straw, ribbon, velvet, silk, lace, etc.; placing satin covered wire as finish to edge or trimming; placing brace wires, basting, back stitching, whipping, running, fly running, tacking, slip stitching, slip hemming, wire stitching, catch stitching, stab stitching, tie stitching, lacing stitching and tacking for crepe; cutting buckram bandeaux by pattern, wiring and covering with thin material and binding the same; making plain and fancy frame of buckram prepared for covering; wire frames made by measurements from original designs and prepared for covering; trimmings; making standard bows, butterfly, Alsatian, tied, bows made of ends, plaited and tucked bows, standard rosettes, loop, petal, gathered, plaited, shirred, shell edge, etc.; finishing and lining ears of velvet; stitching silk, velvet, tulle, and chiffon for trimming; piecing and steaming lace; mounting, curling, piecing feathers and tacking them to hat; cording and beading; renovating silk, velvet, lace, chiffon; cleaning and pressing felt, straw, and beaver; remodeling old hats; making hat covered with cloth, silk, or velvet with slip stitched edge; a covered hat with bound edge; shirred hat over a wire frame; "Liberty hat" and tucked hat, over a wire frame of chiffon, tulle, net, moline, lawn or mull; making straw hat over a frame and without frame; making a raffia hat, woven, knotted and braided; lingerie, lawn, mull, or embroidery.

PLUMBING.—Equipment: Individual fire boxes, tools, etc.
Practice: Not reported.

PRINTING.—Equipment: 1 press, 1 linotype machine, types, etc.
Practice: Not reported.

BUFFALO—SENECA VOCATIONAL SCHOOL (DAY SCHOOL).

CABINETMAKING.—Equipment: 17 workbenches, wood-turning lathe, circular saw, and all necessary small tools.
Practice: Not reported.

CARPENTRY.—Equipment: Use the equipment of cabinet department.
Practice: Not reported.

PRINTING.—Equipment: Press, type, and furniture.
Practice: Not reported.

BUFFALO—TECHNICAL EVENING HIGH SCHOOL (EVENING SCHOOL).

CARPENTRY AND JOINERY.—Equipment: 24 workbenches and the regular equipment for the trade.
Practice: Making various joints, window and door frames, staircases, etc.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW YORK—Continued.

BUFFALO—TECHNICAL EVENING HIGH SCHOOL (EVENING SCHOOL)—Concluded.

ELECTRICAL WORKERS.—Equipment: Electric motors, dynamos, testing apparatus, and requisite tools and appliances.

Practice: Installing and operating of incandescent and arc lights, heating apparatus, motors, dynamos, and generators; testing the various electric apparatus.

FORGING.—Equipment: 24 forges, anvils, and the ordinary tools of the trade.

Practice: Heating and drawing iron; welding; forging irregular forms, hooks, tongs, etc.; working in steel; forging, tempering, casehardening, brazing, and soldering.

MACHINE-SHOP PRACTICE.—Equipment: 8 lathes, 1 planer, 2 shapers, 1 drill, 1 universal grinder, 1 milling machine, 1 hack saw, and a full equipment of small tools.

Practice: Operations on all the machine tools, chipping and filing, etc.

PATTERN MAKING.—Equipment: 24 wood-turning lathes, workbenches, and a full equipment of small tools.

Practice: Making various patterns of simple and complex form.

GLOVERSVILLE—VOCATIONAL SCHOOL (DAY SCHOOL).

GLOVE MAKING.—Equipment: 16 glove-stitching machines, cutting tables, cutting blocks, thumb and fourchette dies, complete equipment for making inseam, half pique, outseam, and gauge work, 16 individual lighting equipments.

Practice: *First year.*—Sewing straight and rectangular seams, ovals, and circles; sewing straight seams on extreme edges of leather; sewing pieces of leather together; sewing slit bindings on pieces of leather; closing the pipe of thumb's inseam; inserting quirk in thumb holes; sewing slit bindings on mittens; inserting thumb quirks in mittens; closing the thumb inseam; inserting thumb in mittens; closing men's mittens inseam; making linings for mittens; placing linings in mittens; hemming the button slit and tops of mittens; inseam work on block-cut gloves; sewing on button-slit bindings; closing and inserting round thumbs; fitting up and closing unlined gloves; hemming square-cornered top and bottom slit; making table-cut half-pique gloves with quirk fingers and heart-shaped thumbs; sewing on slit bindings for round corner; closing thumb and inserting the same in heart-shaped thumb holes; inserting quirks in fourchettes and in palm of glove; closing gloves half pique; hemming button slit with reenforced hem and round-corner top; fitting up for full pique gloves. *Second year* (proposed course).—Making table-cut outseam and half-outseam gloves; sewing on slit bindings for round-corner hem; closing thumb outseam and inserting Boulton thumb in thumb hole; inserting quirks outseam in fourchettes; inserting quirks flat in fourchettes; fitting up gloves for half outseam and for full outseam; closing glove outseam; using trimmer; hemming gloves with round-corner finish and reenforced button slit; inserting Boulton thumb in thumb gauge and closing the thumb, using the gauge; inserting quirks in fourchettes; fitting up gloves for full outseam; fitting up gloves, using the gauge, and trimming the fourchettes; closing gloves, using gauge; pulling and tying ends; tacking on slit binding, and finishing the work.

HUDSON—INDUSTRIAL SCHOOL (DAY SCHOOL).

WOODWORKING.—Equipment: 22 workbenches and the ordinary tools of the trade.

Practice: Making glue joints, dowel, mortise, and tenon joints; making bookcases, closets, tables, chairs, etc.; staining, filling, and polishing woodwork.

IROQUOIS—THOMAS INDIAN SCHOOL (INDIAN—DAY SCHOOL).

CARPENTRY, JOINERY, AND CABINETMAKING.—Equipment: Workbenches, 2 lathes, and a full equipment of small tools.

Practice: Making general repairs and useful pieces of furniture.

LAUNDERING.—Equipment: 1 wood and 1 metal washer, 1 extractor, 1 wringer, 1 collar and cuff machine, galvanized tubs, electric irons, ironing boards, etc.

Practice: Not reported.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW YORK—Continued.

IROQUOIS—THOMAS INDIAN SCHOOL (INDIAN—DAY SCHOOL)—Concluded.

STEAM FITTING.—Equipment: 5 steam pumps, 3 steam valves, 36 steam traps, 3 steam separators, 11 steam gauges, 2 water heaters, 1 pipe machine, 2 pipe cutters, 3 chain tongs, 1 drill press, 1 grindstone, 2 jackscrews, and a full equipment of the requisite small tools.
Practice: Not reported.

LANCASTER—INDUSTRIAL DEPARTMENT, LANCASTER PUBLIC SCHOOLS (DAY SCHOOL).

WOODWORKING.—Equipment: Workbenches and the ordinary tools of the trade.
Practice: Not reported.

LONG ISLAND CITY—LONG ISLAND CITY EVENING HIGH AND TRADE SCHOOL (EVENING SCHOOL.)

BLACKSMITHING.—Equipment: Forges and a full equipment of small tools.
Practice: Not reported.
CABINETMAKING, WOOD TURNING, AND CARPENTRY.—Equipment: Wood-turning lathes, workbenches, and a full equipment of small tools.
Practice: Not reported.
DRESSMAKING.—Equipment: Tables, sewing machines, and the requisite implements of the trade.
Practice: Not reported.
ELECTRICAL WIRING.—Equipment: Dynamos, frames, and full equipment of small tools and appliances.
Practice: Not reported.
MACHINE-SHOP PRACTICE.—Equipment: Lathes, drills, saws, and a full equipment of small tools.
Practice: Not reported.
MILLINERY.—Equipment: Use the equipment of the dressmaking department.
Practice: Not reported.
PLUMBING.—Equipment: Individual fire boxes and the necessary small tools.
Practice: Not reported.

NEW YORK—INDUSTRIAL EVENING SCHOOL (MOSTLY NEGRO—EVENING SCHOOL).

CARPENTRY.—Equipment: 21 benches and all ordinary tools of the trade.
Practice: Making half lap, mortise and tenon, dovetail, keyed joint, wedged joint, doweled joint; use of tools.
FLOWER MAKING, ARTIFICIAL.—Equipment: Petal cutters, lead block, mallets of wood and iron, drying frame, goffers, rubber pads, pincers.
Practice: Papering wires for stems; crimping and curling; goffering; making various flowers and mounting in sprays.
MILLINERY.—Equipment: Not reported.
Practice: Cutting bandeaux, wiring, covering, adjusting; cutting linings, hemming, fastening the ends, placing the tip, lining a bonnet; cutting velvet, making folds, drafting patterns; making a plain round shape, a sloping crown, fancy brims, rolling and flaring brims; cutting the side crown; cutting and making buckram frames; sewing the brace wires; making the crown; placing the outer covering; covering the buckram frame, the upper and under brims, the side crown; adjusting separate crowns; finishing edge; taking measurements; making lace and net hats, lingerie and washable hats; making bows; preparation of trimming for hats; cleaning and steaming fabrics; cleaning lace; renovating crape and hats; crushing velvet; cleaning feathers; recurling ostrich feathers; improving flowers; freshening foliage.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW YORK—Continued.

NEW YORK—MANHATTAN TRADE SCHOOL FOR GIRLS (DAY SCHOOL).

DRESSMAKING.—Equipment: 40 sewing machines, cutting, sewing, and ironing tables, electric irons, dress forms, waist forms, sleeve form, etc.

Practice: Making the various stitches, buttonholes, special forms of sewing and seams both by hand and on the machine; measuring, hemming, tucking, matching, putting on bands, setting strings in bands, finishing hems, putting on pockets, cutting and piecing bias strips, facing edges; making and inserting ruffles; ripping; making loops; overhanding; making and applying cuffs and sleeves; pressing; mitering corners; feather stitching; setting and threading needles; winding bobbins; cleaning, oiling, and adjusting attachments on sewing machine; making aprons, bags, towels, belts, holders, bibs, caps, corset covers, aprons, sacks, nightgowns, kimonos, robes, chemises, drawers, collars, shirts, shirtwaists, garments, various kinds of trimming; putting on hooks and eyes; shirring, cording, piping, braiding, etc.

MILLINERY.—Equipment: Not reported.

Practice: Shirring, tucking, cording, rolled hem, plain fold, milliner's fold, cutting and joining bias pieces; making and covering buckles and buttons; wiring ribbons and laces; making hat linings and wiring hats; bandeaux, wire, capénet, and buckram; wire-frame construction from dimensions and models; making frames of buckram, capénet, and stiff willow; covering frames with crinoline, capénet, mull, moline, and soft willow; facings, plain, shirred, and in folds; bindings, stretch, puff, and rolled; plateaux, plain and fancy; making hats of straw, silk, chiffon, moline, and velvet; sewing trimmings on hats and sewing lining in hats; renovating ribbons, velvet, lace, feathers, flowers; machine work, plain stitching, tucking, shirring, bias strips stitched on material.

NOVELTY AND SAMPLE MOUNTING.—Equipment: Electrically heated glue pots, gas heated glue pots, hand cutters, cabinets, worktables, etc.

Practice: Making jewelry and silverware cases, lamp shades and candle shades; pasting or gluing samples of all kinds of material on cards or in books to be used by salesmen in selling goods; covering and lining boxes and cases with different materials.

POWER SEWING MACHINE OPERATING.—Equipment: 55 plain electric sewing machines and 30 special sewing machines, electric cutter, cabinets, tables, irons, etc.

Practice: Making bags, clothes, equipment for the operator, straight and bias stitching, spaced bias stitching from measurements; making and turning square corners, stitching heavy edge for tension practice; making machine table apron, plain seam, band seam, French seam, bag seam, one warp and one bias and two biases; hemming turned by hand and run through hemmer; seams run through hemmer, bag seams flat fell; quilting; banding and practice for edge stitching, turning corners, etc.; umbrella seams, slot seam, flannel seam, and seams on cloth and silk; yokes made and put on; round yokes—petticoats; round front and straight back—drawers and petticoats; bias yokes—waists; shaped yokes—aprons; round yokes—childrens' dresses; miter corner yoke—dresses; freehand tucking, special tucking; making infants' slips, children's underwear, rompers and dresses; making women's underwear, shirtwaists, aprons, house dresses, and fancy negligees.

NEW YORK—STUYVESANT EVENING TRADE SCHOOL (EVENING SCHOOL).

Uses the equipment of the day manual training school, except in plumbing and electrical wiring and installation.

BLACKSMITHING.—Equipment: 30 forges, 1 shear punch, 1 drop hammer, 1 pipe machine, 1 drill, annealing furnaces, and a full equipment of small tools.

Practice: Not reported.

CABINETMAKING.—Equipment: 12 cabinetmaker's benches, equipped with lockers and full supply of small tools, 2 power saw tables, 1 jointer, 1 jig saw, 2 band saws, 1 mortising and tenoning machine, 1 wood-turning lathe, 1 emery grinder, 1 grindstone, and full equipment of small tools.

Practice: Not reported.

CARPENTRY.—Equipment: 1 tool grinder, 1 grinding stone, 36 workbenches, and a full equipment of small tools.

Practice: Not reported.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW YORK—Continued.

NEW YORK—STUYVESANT EVENING TRADE SCHOOL (EVENING SCHOOL)—Concl'd.

ELECTRICAL WIRING AND INSTALLATION.—Equipment: Not reported.

Practice: Making repairs and putting up wires, etc., running dynamos used in the school building.

MACHINISTS.—Equipment: 23 lathes, 1 milling machine, 1 universal milling machine, 1 universal grinder, 1 cutter grinder, 1 drill grinder, 2 water-tool grinders, 1 steel cutting saw, 1 hack saw, 2 drill presses, 1 planer, 1 shaper, 1 centering machine, 1 arbor press, and a full equipment of small tools.

Practice: Turning roll and shaft; chucking; making collar, pulley, handwheel, face plate, gear blank; planing parallel, V-block, surface plate, bedplate, slide rest; screw cutting—tool post, standard and square threads, screws, bolts and nut mandrels; taper turning—lathe chuck arbor, center, drill sleeve, drill socket, collet, milling arbor; gear cutting—spur gear, bevel gear; tool making—machinist's clamp (parallel), hammer, twist drill, counterbore, milling cutters, taps, mandrel and sleeve, plug and ring gauge; construction.

PATTERN MAKING.—Equipment: Use equipment of wood-turning shop.

PLUMBING.—Equipment: Individual fire boxes and the ordinary tools of the trade.

Practice: Wiping joints of all kinds.

STATIONARY ENGINEERS.—Equipment: Not reported.

Practice: Running stationary engine and heating large buildings.

WOOD TURNING.—Equipment: 33 wood-turning lathes and the ordinary tools of the trade, 1 large pattern-maker's lathe, 1 emery grinder, 1 grindstone, and pattern-maker's benches.

NEW YORK—WASHINGTON IRVING HIGH SCHOOL (DAY SCHOOL).

DRESSMAKING AND EMBROIDERY.—Equipment: Sewing machines, tables, etc.

Practice: *First year.*—Hand stitching on bags, pincushions and corset covers; making petticoats, night dresses, combination suits, feather chain and outline stitching. *Second year.*—Making shirt waists, plain and tailored, sailor blouse waists, cotton shirts, plaited and gored, making fancy shirt waists and lined and unlined simple wool dresses; hem stitching; French embroidery; French knots and bullion stitches. *Third year.*—Modeling and draping waists, sleeves and skirts; making baby dresses, embroidered shirt waists, princess slip, wool or silk waist, wool dress, heavy wool skirt, fancy silk or wool dress, dollar dress, linen coat suits, and graduation dress, hand embroidered baby's dress, shirt waists, wool dresses, and graduation dresses; making baby clothes, underwear, shirt waists, collars, cuffs, etc. *Fourth year.*—Cleaning, mending, pressing, etc.

ROCHESTER—SCHOOL OF DOMESTIC SCIENCE AND DOMESTIC ART (DAY SCHOOL).

DRESSMAKING.—Equipment: 17 sewing desks, 3 sewing machines, cheval glass, dressmaker's forms, 8 cutting tables, and necessary implements of the trade.

Practice: Not reported.

MILLINERY.—Equipment: 8 cutting tables and necessary implements of the trade.

Practice: Not reported.

ROCHESTER—SHOP SCHOOL (LEXINGTON AVENUE—DAY SCHOOL).

CABINETMAKING.—Equipment: 2 saw benches, 1 boring machine, 1 planer, 1 band saw, 1 jointer, 1 sanding machine, 1 cut-off saw, 1 grindstone, vises, and a full equipment of cabinetmaker's tools.

Practice: "Gluing up" joints; assembling furniture; "cleaning up" of furniture; filing and setting saws; sharpening of scrapers and chisels; "getting out" rough stock; work on cut-off saw and band saw; jointing of material; planing of material; making of machine joints; setting up of machines and care of motor; fitting of furniture locks and fixtures; shellacking, staining, varnishing, rubbing, upholstering, making stains, and wax.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

NEW YORK—Continued.

ROCHESTER—SHOP SCHOOL (LEXINGTON AVENUE—DAY SCHOOL)—Concluded.

CARPENTRY.—Equipment: The ordinary tools of the trade.

Practice: Making lap joints, mortise and tenon joints and dovetailing; work on the roughing in of an ordinary dwelling; foundation walls and piers, sills, solid and boxed joists, girders and lookouts; studding and setting, ribbon or girt plates; rafters, various pitches, valley, hip and jack rafters; trussing; cornices, construction, siding and shingling; floors and subfloors; setting of door jambs, base blocks, corner blocks, head blocks, plaster casings, fillets, neck moldings, head casings, dust caps, base boards, plate and chair rails; simple stair building; winding stair building; elementary millwork.

ELECTRICAL WORKERS.—Equipment: 6 electric motors, 2 generators, 2 arc lights, 1 telephone exchange board, 1 volt meter and ammeter, workbenches and a full equipment of small tools and appliances.

Practice: Chipping, filing, bending, squaring, drilling, countersinking, surfacing, polishing; making pulley supports and guides, conduit and pipe straps, girder clamps and bench stops; sheet metal work, making zinc plates for wet cells, window plant boxes, cut-out boxes, waste and ash cans, motor hoods, tap and die work, soldering and reenforcing; making of wet, crowfoot, chloride, and dry cells; telephone and telegraph instruments; wiring, stripping, and splicing of wires, splicing clamps; tapping of joints and splicing with rubber and friction tape; wiring of the following systems and circuits: Series, parallel, shunt, series parallel and parallel series, open and closed circuits, grounded circuits, and installing and testing of bells, annunciators, buzzers, fire alarms, door openers, telephones, telegraph instruments, messenger call boxes, gas lights, etc., and their circuits. Installation of lighting circuits: Knob, cleat, molding work, conduit work, two and three wire circuits, direct and alternating circuits, single and double pole, 3-way and 4-way switches, panel boards and cabinets, fixtures, balancing of circuits, carbon and metal filament lights, Tantalum and Tungsten lights, arc lights and meters. Power work: Installing, repairing, testing and care of direct current, series shunt, compound wound generators and motors, shop tests. Power consumption and efficiency tests: Indicated and brake horsepower tests; voltage and speed tests; disassembling and reassembling of all the above machines and apparatus; the winding of fields and armatures; gas engines practice and tests; power and efficiency, disassembling and reassembling of parts of engine, care of engine, etc.; installing, repairing, testing and care of alternating current generators and rotary converters; single, two and three phase types; induction and synchronous motors with their starting devices; installing of transformers and oil switches. Alternating current: Comparison of alternating and direct currents, frequency, phase, course of current, pressure, self induction, lag of alternating current, application of Ohm's Law, testing, heating, and chemical effects of alternating current, power and power factor, effective current and pressures; design and manufacture of synchronous motors, induction motors, rotary converters, arcs, and incandescents and electric power plants.

PLUMBING.—Equipment: 1 pumping engine, 3 gas melting furnaces, 4 pipe cutters, workbenches and full equipment of small tools.

Practice: Cutting and threading pipes; cutting iron and soil pipes; yarning, pouring, and calking joints; operation of plumber's furnace and blowpipe; tinning of soldering irons; preparing and making the following joints: Butt seam, bend or V seam, lap seam, cup joint, overcast joint; wiping joints; horizontal round, upright round, horizontal and upright branch, floor flange and soldering nipple; wiping joint on 2-inch lead and brass ferrule and on 4-inch 2-bend and brass ferrule; setting up and connecting a kitchen sink; installing a complete drainage, ventilation, and hot and cold water system, including the setting up and connecting of laundry trays, sink, refrigerator, closet, bath, and lavatory; applying the water, air, smoke, and peppermint tests; the changing of hot-water circulation and tank pressure to a circulating system with tank pressure and leave connections for furnace and instantaneous water heater; setting up shower bath, sitz bath, urinal, antifreezing closets, slop sinks, pantry sinks, drinking fountains, gas logs, instantaneous water heaters, pitcher, spoon and force pumps, water lifts, and pumping engines.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—**PUBLIC SCHOOLS**—Continued.

NEW YORK—Concluded.

ROCHESTER—SHOP SCHOOL (WASHINGTON SCHOOL—DAY SCHOOL).

WOODWORKING.—Equipment: Similar to that in Lexington Avenue School.
Practice: Not reported.

SYRACUSE—SYRACUSE TECHNICAL HIGH SCHOOL (DAY SCHOOL).

MACHINE-SHOP PRACTICE, PATTERN MAKING, WOOD TURNING, CABINETMAKING, AND JOINERY.—Equipment: 1 circular saw, 1 band saw, 1 grindstone, 1 emery grinder, 1 drill press, 13 lathes, 1 shaper, 1 gas melting furnace, 1 5-horsepower motor (electric), 6 sewing machines, 30 workbenches, and a full equipment of tools, etc., used in cabinetmaking, pattern making, wood turning, and carpentry.
Practice, for woodworking trades: *First year.*—Making simple joints, by hand and by machinery; making furniture for the use of the school. *Second year.*—Simple exercises in wood turning; simple exercises in pattern making and molding; milling machine work. *Third year.*—Working metal, by hand and by machinery; exercises in chipping and filing lathe work; simple turning and screw making; practice work on the shaper.

YONKERS—TRADE SCHOOL OF YONKERS (DAY SCHOOL).

MACHINE-SHOP PRACTICE AND FORGING.—Equipment: 12 down-draft forges, anvils, and a full equipment of blacksmith's tools. Machine-shop equipment: 7 lathes, sensitive and upright drill, planer, shaper, 2 emery wheels, hack saw, and the ordinary tools of the trade.
Practice: Not reported.
PATTERN MAKING.—Equipment: 13 wood-turning lathes, 1 band saw, grindstone, and a full equipment of small tools.
Practice: Not reported.

YONKERS—YONKERS VOCATIONAL SCHOOL (DAY SCHOOL).

CARPENTRY.—Equipment: Workbenches and the ordinary tools of the trade.
PRACTICE: Not reported.
SEWING.—Equipment: Sewing machines, tables, and the requisite implements for sewing.
Practice: Not reported.

OHIO.

CLEVELAND—TECHNICAL HIGH SCHOOL (EVENING SCHOOL).

Uses the equipment of the Technical High (day) School.
CABINETMAKING.—Equipment: Not reported.
Practice: Making articles of furniture, such as tables, chairs, desks, and cabinets; finishing woodwork.
MILLINERY.—Equipment: Not reported.
Practice: Making frames; designing and trimming hats.
PATTERN MAKING.—Equipment: Not reported.
Practice: Making and finishing patterns for iron and brass; making patterns and molding castings in foundry.
SEWING.—Equipment: Not reported.
Practice: Plain sewing; machine sewing.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

OHIO—Concluded.

COLUMBUS—COLUMBUS TRADES SCHOOL.

DAY SCHOOL.

PRINTING.—Equipment: 2 power printing presses, type, and the ordinary appliances of the trade.

Practice: Lay of the case; simple composition; justification; removal of type from stick; tying up type; removing type from galley to stone; proof reading; distribution of type; tabular work; designing and making wood cuts and zinc etchings; presswork, making ready the tympan, overlaying, underlaying, printing billheads, noteheads, letterheads, statements, dodgers, circulars, cards, blank forms, tabular work; cutting and mitering rules.

WOODWORKING (including pattern making, wood turning, joinery, carpentry, cabinetmaking, and mill work).—Equipment: Lathes, benches, and all necessary hand tools.

Practice, pattern making: Making and finishing plain patterns; small rectangular patterns for solid and hollow castings, ribbed surface plates, built-up patterns, patterns involving auxiliary patterns, steam and gas engine parts, patterns for electrical machinery, for milling machine parts, and for various school apparatus. Practice, wood carving: Making straight and curved lines; carving small panels; flat and oblique surfaces, beads and rosettes cut with firmer and skew chisels; straight and curved lines cut with veining and parting tools, fluting and heading with gouges; geometrical designs cut in low relief on flat surfaces; conventionalized designs cut in high relief on both plane and curved surfaces. Practice, wood turning: Center turning; face plate work; fitting; chucking; polishing. Practice, wood working, joinery and cabinetmaking: a series of accurate joints.

EVENING SCHOOL.

PATTERN MAKING.—Equipment and practice: Same as for day course.

WOOD TURNING.—Equipment and practice: Same as for day course.

PENNSYLVANIA.

ALTOONA—HIGH SCHOOL (DAY SCHOOL).

INDUSTRIAL COURSE.—*First year.*—Cabinetmaking and machine-shop practice. *Second year.*—Pattern making and foundry work. *Third year.*—Blacksmithing. *Fourth year.*—Machine-shop practice.

Equipment, cabinetmaking: 1 wood trimmer with attachments, 4 miter machines, benches, vises, and a full equipment of carving and other hand tools, 1 surface planer, 1 universal saw bench with saws for ripping and cutting off, mitering, etc., 1 scroll saw with tilting table, 1 hand planer and jointer, 1 band saw, 10 lathes, 1 brazing lamp and forge. Equipment, pattern making: 18 speed lathes, 1 wood trimmer, 1 grindstone, 8 double benches, vises, and all pattern-making hand tools. Equipment, foundry work: 1 furnace, 1 core oven, 1 drying stove, core benches, molding benches, gate cutter, and all small tools. Equipment, forge shop: 24 draft forges, 1 power hammer, 1 grindstone, 1 steel plate housing exhauster, 1 blower, vises, racks, 1 mandrel, anvils, and a full equipment of small tools. Equipment, machine shop: 5 engine lathes with attachments, 1 milling machine with set of tools, 1 planer, 1 crank shaper, 1 upright drill press, 1 universal cutter and tool grinder with attachments, 1 wet tool grinder, benches, vises, racks, platform scales, and a full equipment of chucks, taps, dies, drills, and other small tools.

Practice: *First year.*—Making bench hooks, sawhorses, benches, book, specimen, and exhibit cases, tables, etc.; turning between centers, using the different cuts, turning on an arbor, face-plate work, etc., making a bench pin, file or chisel or gouge or awl handle, mallet, gavel, reel, stocking ball, rolling-pin, candlestick, stool and table legs, boxes, napkin and towel rings, goblets and cups, dumb-bells, Indian clubs,

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

ALTOONA—HIGH SCHOOL (DAY SCHOOL)—Concluded.

spheres, vase forms, mirror frame, etc. *Second year.*—Pattern making, green-sand molding and coring, hard core making and setting, facing and medallion work. *Third year.*—Forging, chipping, and filing, upsetting, drawing, shaping, bending, punching, welding, tempering, construction of scribers, chisels, punches, lathe and planer tools, drills, etc., chipping chamfers, flat and curved surfaces, keyways, filing, use of hack saw and fitting. *Fourth year.*—Turning, tapering, screw cutting, boring and fitting, drilling and tapping, shaping, planing, brazing, scraping, grinding, polishing, testing, using measuring tools, etc.

CARLISLE—UNITED STATES INDIAN SCHOOL (INDIAN—DAY SCHOOL).

BAKING.—Equipment: 1 rotary bake oven, 1 dough mixer, continuous-feed wire-cut cake machine, 1 safety dough brake.

Practice: Preparing all the breadstuffs and pastries needed in the school.

BLACKSMITHING.—Equipment: 1 force blower, 2 hand-drill presses, 1 emery wheel, 2 benches, 13 forges and anvils, vises, 1 emery wheel, 1 motor, 1 suction blower, 2 tire shrinkers, 1 trip hammer, 12 sets of hand tools.

Practice: Ironing wagons, horseshoeing, tempering, tire setting, tool making, welding.

BRICKLAYING AND PLASTERING.—Equipment: Mortar beds and boards, sand screens, door and window frames, frames and molds for cement work, hand tools of all kinds.

Practice: Screening sand, slaking lime, mixing mortar, building scaffolding, cleaning brick, spreading mortar, laying brick pavements and piers, building arches, erecting chimneys and stacks, setting door and window frames, trimming joints, placing headers; mixing mortar and hair, lathing, plastering, and finishing; laying pavements, making excavations, framework, grouting, mixing screened stone with cement and sand, leveling, marking, putting on top coat of cement and sand, finishing, building curb, removing frame, care of pavement until hardened, molding artificial stone, dressing stone, laying foundation, pointing, and practical building.

CARPENTRY AND CABINETMAKING.—Equipment: 1 mortiser, 1 tenoner, 1 jig saw, 1 grindstone, 1 jointer, 1 rip saw, 1 side molder, 1 surfacer, 3 turning lathes, 12 double cabinetwork benches, vises, tools.

Practice: Planing by hand, nailing and gluing, use of joints as half lap, lap, mortise and tenon, miter with mortise and tenon, double mortise and tenon, miter shouldered mortise and tenon, keyed mortise and tenon, shelf and jamb, single and double rabbeted corner, all kinds of dovetail, hanced corners, rail and mullion, dovetailed post and brace or tie, end lap and key, oblique shouldered mortise and tenon, box corner tongue and groove, sink corner dovetail, tongue and groove, keyed dovetail, construction and repair of buildings and school furniture.

CARRIAGE MAKING, TRIMMING, AND UPHOLSTERING.—Equipment: 1 glue heater, 1 grindstone, 1 spoke chuck, 16 workbenches, vises, and a full equipment of saws, bits, braces, and other hand tools.

Practice: Planing, squaring, marking, mortising, tenoning, framing, filling, priming, glazing, rubbing out, putting in color and varnish, striping, ornamenting and finishing; laying out cloth, filling, tufting, sewing and covering top and bows.

HARNESS MAKING.—Equipment: 9 workbenches, 9 sewing horses, and all tools required in the trade.

Practice: Preparing a wax end, stabbing holes with awl, cutting out and sewing parts, blackening edges, creasing, skiving laps, punching buckle holes, selecting and preparing loop leather, fitting and tacking parts, placing rings and buckles, dressing and finishing work, caring for and repairing harness.

LAUNDERING.—Equipment: 12 washtubs, 4 washers, 3 extractors, 1 iron heater, 15 drying racks, 1 collar ironer, 1 mangle, 1 shirt ironer, 1 starcher, 16 ironing boards.

Practice: Sorting and counting clothes; making starch; starching, sprinkling, and folding; washing by hand; operating washing machines; ironing.

PAINTING, HOUSE AND CARRIAGE.—Equipment: Ladders, swings, staging, and the ordinary equipment of the trade.

Practice: Paint mixing; inside and outside painting; graining, hardwood finish, varnishing, polishing, enameling, sizing, calcimining.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

CARLISLE—UNITED STATES INDIAN SCHOOL (INDIAN—DAY SCHOOL)—Concluded.

PLUMBING AND STEAM FITTING.—Equipment is that of a modern plumbing establishment.

Practice: Making nipples; cutting pipe; setting up and repairing steam gauges, pumps, traps, etc.; making joints; laying sewer pipes and traps; erecting soil stacks; fitting lavatories, bathtubs, and closets; placing boilers; repairing tanks, etc.; erection of line shafting; installation and repair of laundry, bakery, and farm machinery, and the care (and repairing) of 85 closets, 75 bathtubs, 20 stationary washstands, 17 sinks, 19 laundry tubs, and 18 kitchen tubs.

PRINTING.—Equipment: 4 presses, 1 folding machine, 1 stitcher, 1 cutting machine, 1 punching machine, 1 mitering machine, 1 proof press, 1 card cutter, 1 perforating machine, 1 lead and rule cutter, type, and all necessary printing material.

Practice: *First year.*—Make ready, feeding, running stitching machine, folding, compiling signatures, handling paper, perforating, punching, padding, feeding of platen press, cleaning type, locking up forms, operation of fountains and mailers, mailing, binding, register work, care of cuts, half-tone make ready. *Second year.*—Make ready on platen press, feeding cylinder press and feeding folding machine, lay of case, spacing, justification, composition, locking up galleys, cleaning type, imposition of type pages, laying out and locking of forms for cylinder, operation of paper-cutting machine, correction of proof, general job composition, correction and care of mailing lists, operation of cylinder press, making ready on cylinder press. *Third year.*—Composition of tabular matter and better kinds of book and job matter, make-up of a book, typographical designing, all job composition, proof reading, cutting stock, color and half-tone printing on platen press, intricate composition, mixing tints and body colors; planning and execution of jobs from rough copy. *Fourth year.*—Job and commercial printing. *Fifth year.*—Advanced cylinder presswork, three and four color work, mixing inks, overcoming pressroom troubles.

SEWING AND DRESSMAKING.—Equipment: 31 sewing machines, 10 tables, and all necessary appliances for drafting, cutting, and fitting.

Practice: Use of needle and thimble, darning, plain sewing; making towels, napkins, tablecloths, sheets, pillowcases, skirts; stitching on the machine; all kinds of repairing and mending; making shirts, aprons, gowns; cutting, fitting, and making school uniforms and work dresses; drafting patterns, tucking and shirring thin materials, fancy waists, and skirts.

SHOEMAKING.—Equipment: 1 channeling machine, 20 crispin jacks, 1 emery wheel, 1 eyelet machine, 1 grindstone, 2 heeling jacks, 1 hook machine, 1 sewer, 1 roller, 5 sewing machines, 2 skiving machines, 4 solidity jacks, and complete sets of hand tools.

Practice: Making wax ends; soling, heeling; cutting and fitting uppers; lasting; trimming; welt repairing and sewing in lining; measuring the feet and fitting.

STATIONARY ENGINEERS.—Equipment: Four 150-horsepower boilers with mechanical stokers, several steam engines, and several motors.

Practice: Care and management of boilers and steam engines; drawing and banking fires; regulating water supply and draft; controlling steam pressure; blowing flues.

TAILORING.—Equipment: Drafting and cutting instruments, sewing machines, pressing irons, and all necessary equipment.

Practice: Stitching, making buttonholes, using sewing machine, repairing, cleaning, pressing, cutting, and making uniform trousers and coats; taking measurements and drafting patterns for trousers, coats, and overcoats; making civilian clothes.

TINSMITHING.—Equipment: Folding machines, edging machines, forming machines, turning machines, setting-down machines, beading machines, tongs, seamers, snips, bench shears, stakes, and all necessary equipment.

Practice: Making cups, soap dishes, napkin rings, dippers, pans, buckets, stovepipes and elbows; putting together tin for roofs; laying roofs with valleys; putting up gutters and conductor pipes; repairing.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PHILADELPHIA—PHILADELPHIA TRADES SCHOOL (DAY SCHOOL).

CARPENTRY.—Equipment: Full set of hand tools, lathes, saws, planes.

Practice: Use and care of tools; sawing, planing, squaring, chiseling, and gouging exercises; building inside and outside doorframes; window frames, both double hung and casement; doors, sash, moldings, architraves, and all details of inside house finishing; cutting and setting joists; framing; laying floors; erecting partitions; setting roof rafters.

ELECTRICAL CONSTRUCTION.—Equipment: Hand tools; apparatus for installing, testing, and repairing electrical appliances; machines ranging from ½ to 8 horsepower for both alternating and direct currents.

Practice: *First year.*—Installing bells, annunciators, electric gaslighting, open and closed circuit burglar alarms, fire alarms, and telephones. *Second year.*—Installing arc and incandescent lights, shunt and compound wound motors; circuits to operate from single pole, double pole, three and four way switches; open, concealed, molding, and conduit work; experiments on fall of potential; resistance measurements; electromagnetic induction; armature and voltmeter calibration. *Third year.*—Installing direct and alternating current dynamos, singly and in parallel; induction motors and transformers on single and polyphase circuits; direct and alternating current integrating wattmeters; experiments on load and no-load characteristics of series, shunt and compound wound machines; efficiency test on machines and transformers; circuits with leading and lagging currents; overhead and underground construction; manufacture and selection of cables for various uses; joint wiping and cable splicing.

PATTERN MAKING.—Equipment: Full set of hand tools, lathes, saws, planes.

Practice: Use and care of tools; sawing, planing, squaring, chiseling, and gouging exercises; construction of large number of patterns from working drawings; core boxes, half, whole, and drop; fillets, boxed, leather and putty; shrinkage, iron, brass, and steel; engine parts, marine and architectural; sweep work.

PRINTING.—Equipment: Full line of book and job cases, galleys, and composing sticks, lead and slug racks, metal furniture, brass rule and borders, 2 Chandler & Price 10 by 15 Gordon presses, motor driven; 1 Chandler & Price galley proofpress, 1 Oswego 30-inch paper cutter, 1 Franklin perforating machine, Rouse mitering machine, American No. 2 lead and rule cutter, two sizes of stones, 1 stitching machine, complete outlay for job printing.

Practice: Job work; instruction in the case, stick, and gauge; setting straight matter; use of display letters; make-up of forms; study of type faces; point system; study of various kinds of paper—size, weight, price, selection for different kinds of work; harmony schemes in color; paper cutting and press work; printing notices, catalogues, school paper, programs.

PHILADELPHIA—EVENING TRADES SCHOOL NO. 1 (EVENING TRADES SCHOOLS OF PHILADELPHIA).

BRICKLAYING.—Equipment: Full set of hand tools.

Practice: Use of mortar board and trowel; taught to cut out a trowel of mortar; building of 4-inch wall, 8-inch wall, 12-inch wall.

CARPENTRY.—Equipment: Philadelphia Trades School equipment is used.

Practice: Follow same course as Philadelphia Trades School.

ELECTRICAL CONSTRUCTION.—Equipment: Philadelphia Trades School equipment is used.

Practice: Follow same course as Philadelphia Trades School.

PAINTING, HOUSE AND SIGN.—Equipment: Brushes, easels, rulers, drawing board, chalk, lead pencils.

Practice: Mixing of paints; outlining of letters in chalk; free-hand drawing; painting on small pieces of material; painting signs on large spaces.

PATTERN MAKING.—Equipment: Philadelphia Trades School equipment is used.

Practice: Follow same course as Philadelphia Trades School.

PLASTERING.—Equipment: Full set of hand tools; 8 booths for practice work; mixing troughs.

Practice: Mixing of plaster; putting plaster on laths; rough cast; smooth cast; ornamental work for ceilings and walls.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

PENNSYLVANIA—Continued.

PHILADELPHIA—EVENING TRADES SCHOOL NO. 1 (EVENING TRADES SCHOOLS OF PHILADELPHIA)—Concluded.

PLUMBING.—Equipment: Complete set of hand tools.

Practice: Plumbers' tools and their use; soil and wrought-iron pipes; fittings; calking; use of sheet lead; weights of lead for supply and waste pipes; solder (fine); solder (wiping); flux; soldering with copper bit; wiping joints; brass work; stop and waste cocks; valves; bath plug; soldering joints; tank seams (upright and horizontal); fitting up sink, bathtub, water-closet, washtub, washbasin; circulating boilers (single and double).

PRINTING.—Equipment: Philadelphia Trades School equipment is used.

Practice: Follow same course as Philadelphia Trades School.

SHEET-METAL WORKERS.—Equipment: Benches, shears (hand power), 18 soldering furnaces, lever, roller machine, hand tools, drawing boards.

Practice: Patterns executed from drawings; pupils bring drawing from their shops; taught to lay out and cut out work; soldering of sections together.

PHILADELPHIA—EVENING TRADES SCHOOL NO. 2 (EVENING TRADES SCHOOLS OF PHILADELPHIA).

The equipment available for use and the practice work in this school are practically like those of Evening Trades School No. 1.

SCOTLAND—SOLDIERS' ORPHANS' INDUSTRIAL SCHOOL (DAY SCHOOL).

BAKING.—Equipment: 1 continuous baker oven, 1 fruit steam kettle, 1 doughnut oven; all necessary appliances for general baking.

Practice: *First year.*—Cleaning and care of utensils. *Second year.*—Plain bread-dough mixing, management of oven, etc. *Third year.*—Bread molding and plain cake baking. *Fourth year.*—Fancy cake, pretzel, and pie baking.

COBBLING.—Equipment: 2 shoe-repairing sewing machines, 1 leather-splitting machine, 1 eyelet machine, 4 general repairing benches and outfit.

Practice: *First year.*—Removing old soles and nailing on rough work. *Second year.*—Nailing on soles, trimming and finishing same; coarse shoes. *Third year.*—Sewing seams, patching of uppers. *Fourth year.*—Stitching soles and fine shoe repairing.

DRESSMAKING.—Equipment: 8 sewing machines, 24 sewing tables, 2 dress forms, 2 electric pressing irons, and usual sewing equipment.

Practice: *First year.*—Repairing and darning. *Second year.*—Plain sewing and use of machines. *Third year.*—Skirts and underwear; machine work. *Fourth year.*—Cutting, fitting, and general dressmaking.

MACHINISTS.—Equipment: 1 planer, 1 shaper, 1 drill press, 1 universal milling machine, 1 cutter and tool grinder, 1 sensitive drill, 1 twist-drill grinder, 6 screw-cutting lathes, 10 vises, and all necessary small tools.

Practice: *First year.*—Use of hand tools, vise work, and drill press. *Second year.*—Lathe work, screw cutting, vise work, and fitting. *Third year.*—Milling machine work, gear cutting, vise work, and fitting. *Fourth year.*—Advanced machine work and fitting.

PRINTING.—Equipment: 3 presses, 1 mailing machine, 1 proof press, 1 paper cutter, type, and all necessary printing equipment.

Practice: *First year.*—Learning the case, typesetting. *Second year.*—General typesetting. *Third year.*—Presswork. *Fourth year.*—Job work—setting of forms and proof reading.

STATIONARY ENGINEERS.—Equipment: 4 return tubular boilers, 2 boiler feed pumps, 2 sewer pumps, 1 100-horsepower engine, 1 60-horsepower engine, 2 dynamos, 1 40-horsepower engine, 1 direct-current generator, necessary switchboard and appliances.

Practice: *First year.*—Firing boilers and general work in boiler room. *Second year.*—Practical use of steam for power purposes. *Third year.*—Practical management and care of engines, dynamos, etc. *Fourth year.*—Valve setting and power calculations.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

PENNSYLVANIA—Concluded.

SCOTLAND—SOLDIERS' ORPHANS' INDUSTRIAL SCHOOL (DAY SCHOOL)—Concluded.

TAILORING.—Equipment: 8 tailor's sewing machines, 1 buttonhole machine, 6 electric pressing irons, and general small equipment.

Practice: *First year.*—Use of needle and shears, plain sewing, and buttonhole making. *Second year.*—Uniform trouser making; machine work. *Third year.*—Military coat making; machine work. *Fourth year.*—General tailoring and fitting.

WOODWORKING.—Equipment: 1 jig saw, 1 mortise machine, 2 circular-saw tables, 1 jointer, 1 shaping machine, 4 wood-turning lathes, 16 woodworking benches, with full equipment of tools.

Practice: *First year.*—Use and care of hand tools; plain work in soft wood. *Second year.*—Plain carpentry; making tenons, mitering, mortising, etc. *Third year.*—Wood turning, plain pattern and cabinet making. *Fourth year.*—Pattern and cabinet making.

RHODE ISLAND.

PROVIDENCE—EVENING TECHNICAL SCHOOL (EVENING SCHOOL).

Uses equipment of the day technical high school.

BLACKSMITHING.—Equipment: 25 forges, anvils, vises, punches, drills, and all necessary small tools.

Practice: Changing iron from round to square; squaring and making square point; bending iron for circle and for reverse curves; making ring, hook, staple, meat hook, gate hook, timber hanger, fagot weld, bent eye, chain links, square and hexagonal bolts and spikes; flat-point drawing, bending; drawing point, drawing and bending square corner and twisting; bending and twisting; simple welding of several pieces; chain scarfing and welding; upsetting and forming head; upsetting, bending, drawing welded ring; upsetting, scarfing, welding, L weld, T weld. Steel work—drawing, forming, hardening, and tempering; making flat chisels, nail set, small punch, prick punch, and screwdriver; twisting, drawing, tempering; making machinist's scratcher; hardening and tempering lathe tools; making thread tool, cutting-off tool, side tool, diamond-point tool; iron and steel weld; making reamer; steel and iron weld; making blacksmith's tongs, hot and cold chisels, hand hammers, and blacksmith's tools; special chisels, special lathe and planer tools; ornamental wrought-iron work; forming sand C scrolls, making lantern and bracket, andirons and fire set; working out original ideas in wrought iron from drawings.

DRESSMAKING AND MILLINERY.—Equipment: Sewing machines, tables, and all necessary appliances.

Practice: Stitches; drafting undergarments; making shirt waists; drafting shirt-waist and skirt patterns; making one garment, dress or wool skirt; making several garments giving practice in hand and machine work; renovation of material for millinery; making a winter hat; frame making.

ELECTRICAL WIRING.—Equipment: Insulated wire, tubing, porcelain insulators, rheostats, transformers, and all necessary appliances.

Practice: Actual wiring; installing motors; making the spark coil, rheostat or transformer; wiring for some of the simple machines.

JEWELRY MAKING.—Equipment: Not reported.

Practice: Making a buckle, brooch, comb, button, emblem, stickpin, a small oak leaf, a wild-rose leaf, a cluster of daisies, the fleur de lis, from design for jewelry.

MACHINISTS.—Equipment: 25-horsepower stationary engine, 8 electric motors, 22 lathes, 1 screw machine, 1 hack saw, 2 planers, 1 screw cutter, 1 die cutter, 1 milling machine, 3 upright drills, 1 grinding stone, work benches, vises, files, drills, punches, dies, and a full equipment of machinists' tools.

Practice: Grinding; centering; removing scale; turning; thread-tool grinding; tap drill grinding; counterbores and countersinks; cap screws and screw cutting; milling; machine work; hand tooling and filing; boring and inside thread cutting; planing, shaping, surface filing, square-thread cutting, hand tooling; top making; taper turning; twist-drill cutting; small tool making; mill and gear cutting.

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Continued.

B.—PUBLIC SCHOOLS—Continued.

RHODE ISLAND—Concluded.

PROVIDENCE—EVENING TECHNICAL SCHOOL (EVENING SCHOOL)—Concluded.

PATTERN MAKING.—Equipment: 26 wood-turning lathes, 2 electric motor lathes, 2 circular saws, 1 jig saw, 2 buzz planers, 1 band saw, 2 trimming machines, benches, vises, and all necessary woodworking tools.

Practice: Location of points; laying out board for measurement and for samples, and mounting the same; shellacking, sawing; laying out centers and boring; dressing working face and squaring narrow face; squaring to definite width with working face; laying out ends for planing; length sawing and planing; planing of large piece square and true to width and thickness; squaring end, sawing off square ends to half line; boring without rough edges or splitting; sandpapering, rounding corners, and nailing; locating and nailing; finishing surface; laying out and sawing half lap joint; sawing, boring, and chiseling for closed mortise and tenon; simple rectangular patterns; roughing; smoothing cylinder; cutting to length; smooth and true end cut; stop cylinder; taper cylinders for hollows and rounds; bevel cuts, rounds, hollows; beads; preparation of chucks; turning and truing chuck; chucking.

PLUMBING.—Equipment: 2 retorts, 24 furnaces, 24 work benches, and plumber's tools.

Practice: Filing and tinning a plumber's soldering iron; working sheet lead; soldering lead seams flat and 2-inch overcast joints; wiping joints.

SILVERSMITHING.—Equipment: Rolls, 1 power punch, 1 drop press, 1 foot press, 1 die cutter, 1 man lathe, 4 speed lathes, 1 upright drill, work benches, vises, punches, dies, and all necessary small tools.

Practice: Making a cup, bowl, vase, tobacco jar, percolator, from practical design; hammering, raising, saw piercing, filing, and hard-soldering; making a loving cup, fish tray, sewing tray, metal lantern, lampshade, cigar box; metal turning; mounting; flat hammering and repoussé; riveting; polishing and coloring.

STEAM ENGINEERS.—Equipment: The steam and electric power plant of school.

Practice: Actual practice in the care, use, setting, and proper position of the various parts of the steam engine, the steam guage, steam pump and boiler, and in the economical use of coal; the management and care of fire for steam boilers, etc.

WISCONSIN.

MILWAUKEE—MILWAUKEE SCHOOL OF TRADES FOR BOYS.

DAY SCHOOL.

CARPENTRY AND WOODWORKING.—Equipment: 1 single surfacer with sectional roll, 1 jointer, 1 shaper, 1 band saw with ripping fence, 1 universal saw table with all attachments, 5 wood-turning lathes, 1 molder, 1 tenoner, 1 boring machine, 1 mortiser, 1 jig saw with tilting table, 1 knife grinder with all attachments, 1 grindstone frame with truing device and grindstone, 1 knife scales, 51 complete sets of carpenter tools, including vises, saws, planes, bits, etc.

Practice: Lap jointing; mortising and tenoning; gaining; dovetailing; fluting and reeding, straight, circle and segment; chamfering, plain relief carving, making plank frames, box window frames, vestibule entrance frames, side-light frames, porch and cornice work, exterior decoration, store fronts, interior finish, doors, wainscoting, china closets, and balloon, timber, rafter, and truss framing, making timber joints, laying joist and framing headers, setting of partitions; making cabinets, bank fixtures, hardwood mantels, veneering, inlaid work; stair building, laying out winders, circular and elliptical stairs, kerfing stringers, laminating stringers, risers and other bent work; use of machines, setting up and caring for same.

MACHINISTS AND TOOL MAKING.—Equipment: 21 lathes with attachments, 2 universal milling machines, 1 gear cutter, 2 shapers, 1 die slotter, 2 grinders, 2 planers, 1 sensitive drill, 2 drill presses, 1 dry emery grinder, 1 wet grinder, 1 drill grinder, 1 cutting-off saw, 1 gas tempering furnace, 1 arbor press, 1 surface table, 1 25-horsepower motor, work benches, vises, and all necessary small tools and accessory supplies.

Practice: Plain cylindrical turning and boring, taper turning and boring, thread cutting, chucking and face-plate work, boring with boring bar, mandrel work, running,

TABLE V.—SHOP EQUIPMENT AND SHOP PRACTICE—Concluded.

B.—PUBLIC SCHOOLS—Concluded.

WISCONSIN—Concluded.

MILWAUKEE—MILWAUKEE SCHOOL OF TRADES FOR BOYS—Concluded.

DAY SCHOOL—concluded.

shrinking and pressing fits; guiding drills, drilling within desired circle, countersinking and counterboring, laying out work; planing surfaces at varying angles, curved surfaces and dovetails and ways of lathes, special planer work; cutting keyways and to a shoulder; clamping and chucking work; milling operations, cutting speeds and feeds, indexing, spiral work, gear work; cutting bevel gears, worm wheels and worms; preparing gear blanks; grinding; surface, external, and internal chipping, filing, scraping, fitting, assembling; making taps, dies, cutters, reamers, counterborers, twist drills, milling cutters, special tools, dies and punches, jigs, gauges.

PATTERN MAKING.—Equipment: 1 single surfacer, 1 jointer, 1 universal saw bench with all attachments, 1 band saw, 7 lathes, 8 universal trimmers, 1 grindstone frame with truing device and grindstone, 1 band-saw filer, 1 band-saw setter, 1 complete molding outfit with pot and furnace for melting metal, 1 glue heater, 25 workbenches, vises, and a complete outfit of pattern-making tools.

Practice: Making rectangular patterns for solid and hollow castings, ribbed surface plates, built-up patterns, pipe fittings, valves, patterns involving auxiliary patterns, steam and gas engine patterns and core boxes, patterns for electrical machinery, steam pumps, spur, bevel, and worm gears, flywheel and pulley patterns, sweeps for loam work; miscellaneous patterns and core boxes, making molds from the patterns.

PLUMBING AND GAS FITTING.—Equipment: 25 combination gas furnaces and solder pots; 2 paste benches complete; vises; 50 sets of shop tools, and a full equipment of general tools.

Practice: Sheet lead seams; overcast joints; cup joints; round, branch, horizontal, and vertical joints; calking and making joints on cast-iron soil and drain pipe, stopcock, soldering nipples, ferrules, bath plugs, floor flange, wall flanges, quarter bends, S and half-S traps, plain bibb vertical branches, short bend with ferrule, 4-inch drum trap, tank seams, horizontal and upright; setting up and connecting sinks, lavatories, boilers, tanks, laundry trays, laundry stoves and heaters, urinals, closets, bathtubs, hydraulic rams, kitchen ranges, automatic cellar drainers, pitcher pumps, wall and horizontal force pumps, hydrants, instantaneous water heaters, galvanized iron boilers; installation of plumbers fixtures.

EVENING SCHOOL.

CARPENTRY AND WOODWORKING.—Day school equipment is used.
Practice: Same as for day school.
MACHINISTS AND TOOL MAKING.—Day school equipment is used.
Practice: Same as for day school.
PATTERN MAKING.—Day school equipment is used.
Practice: Same as for day school.
PLUMBING AND GAS FITTING.—Day school equipment is used.
Practice: Same as for day school.

PLATTEVILLE—WISCONSIN STATE MINING TRADE SCHOOL (DAY SCHOOL).

MINING.—Equipment: 2 return tubular steam boilers with pressure and water gauges, 2 feed pumps, 2 vertical air pumps, 2 water heaters, centrifugal fan, 1 25-horsepower automatic steam engine, 1 air compressor, 1 generator with switchboard and all necessary appliances, 1 gasoline engine, several types of percussion air rock drills, stone pier, calorimeters, pyrometers, steam-testing appliances, 1 wood lathe, 8 forges, transits, levels, sextants, and other surveying instruments, woodworking and ironworking tools.

Practice: Framing mine timbers, joinery, forging, tool sharpening, dissection and operation of rock drills, boilers, engines, pumps, compressors, dynamos, calorimetry, pyrometry, and tests of efficiency, analysis of metals and coals, gravimetric, volumetric, qualitative and blowpipe analysis, assaying, surveying, and practical work in the mines during the summer.

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