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BUREAU OF LABOR STATISTICS
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APPRENTICESHIP
IN
BUILDING CONSTRUCTION

APRIL, 1928

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BULLETIN OF THE
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NO. 459 WASHINGTON APRIL, 1928

APPRENTICESHIP IN BUILDING CONSTRUCTION

The recent building activity throughout the country has emphasized some unwholesome and unprofitable conditions in the building industry growing out of the war-time practice of making mechanics overnight, and has led to a renewed interest in the subject of apprentice training. To determine to what extent apprenticeship is a factor in the industry, and what effect the agitation for a revival of the apprentice system is having, the Bureau of Labor Statistics of the United States Department of Labor has made an investigation in 19 cities which are considered representative. Some of these cities were known to have organized movements for training apprentices in accordance with provisions of the Federal vocational education law, and these were studied to determine the operation of the system and the effect of the movement on the supply of mechanics. The other cities were visited to determine whether or not anything was being done in the way of apprentice training by any of the parties at interest.

SCOPE OF INVESTIGATION

The bureau limited its study to actual apprenticeship; that is, actual contract or some equivalent obligation extending over a stipulated period of years, by which a boy is to learn and his employer is to teach one of the building crafts. Helpers, who are hired and dismissed according to the needs at the time, were not considered, even when they were boys of apprentice age who might eventually become journeymen.

Sources on which the bureau drew for information were local building trades unions, trade associations of employers, builders' exchanges, school authorities, and representative individual employers. Among the individual employers visited were union and open-shop men, and contractors who do and those who do not employ apprentices.

The following table shows the crafts and all but one of the cities covered in the investigation, and the number of apprentices formally indentured, registered with the unions, or bound in some manner, for each city and each craft. The letter E signifies that evening-school work is provided, and theoretically at least, required. The letters PT mean that part-time school training is an integral part of the apprenticeship. The expression "part time" as used in this report always signifies compulsory day-school work on paid-for time.

NUMBER OF APPRENTICES REPORTED, AND SCHOOL WORK REQUIRED IN CONNECTION WITH TRAINING, BY TRADE AND BY CITY

[E = Evening school attendance required. PT = Part-time day school attendance required and paid for]

City	Asbestos work	Brick, stone, and marble masonry	Carpentry	Electrical work	Lathing	Painting and decorating	Plastering	Plumbing	Roofing	Sheet-metal work	Steam fitting	Tile setting	Total
Atlanta		E [a] 43	2				[b]	12				[b]	57
Baltimore		150	38	22		8		PT 23		50			291
Birmingham		E [c] 52	50	30		4	8	E 22		12		[b]	178
Boston		300	425			22	90	225		58		21	1,141
Buffalo		E 120	24				PT 24	PT 45		18			234
Chicago	E 60	E 900	PT 600	PT 650	26	PT 260	400	PT 600	26	PT 75	PT 425	45	4,067
Cleveland		PT 227	PT 218	PT 109	38	PT 86	64	PT 143	6	PT 75			966
Detroit		PT 176		PT 243	PT 12		PT 65	PT [1] 80			PT [1] 18	28	[10] 622
Memphis		28		75			12	60			27	2	204
Milwaukee		PT 88	PT 10	4		30	PT 46	PT 204		PT 24		17	423
Minneapolis		48					24					[d] 10	82
Newark, N. J		[e] 400	[2] 1,300	[2] 200		[2] 80	[b]	[2] 275		[2] 115			[c] 2,370
New Orleans				100			40	E 30					170
New York		E [1] 1,690	E [2] 1,400	E [1] 1,600	100	E 366	577	E 94		E 300			[11] 6,127
Niagara Falls		E, PT 16	E, PT 25			8	E, PT 13	E 27		E 25			114
Philadelphia		230		210		PT 24	PT 80			E 30		40	614
Pittsburgh		PT 190	E 200	110	PT 25	12	150	PT 145		PT 60		12	904
St. Louis		E 180	160	[1] 150	12	90	62	E 125		E 60		16	[12] 855
Total	60	[3] 4,838	[4] 4,452	[5] 3,503	213	[6] 990	1,655	[7] 2,110	32	[8] 902	[9] 470	191	[13] 19,416

[1] Not indentured.
[2] Night school students not indentured, see p. 69.
[3] Including 2,090 not indentured.
[4] Including 2,700 not indentured.
[5] Including 1,950 not indentured.
[6] Including 80 not indentured.
[7] Including 355 not indentured.
[8] Including 115 not indentured.
[9] Including 18 not indentured.
[10] Including 98 not indentured.
[11] Including 4,690 not indentured.
[12] Including 150 not indentured.
[13] Including 7,308 not indentured.
[a] Includes also plasterers and tile setters.
[b] Included under "Brick, stone, and marble masonry."
[c] Includes also tile setters.
[d] Minneapolis and St. Paul.
[e] Includes also plasterers. Night school students not indentured, see p. 69.

The table thus presents graphically the scope of the investigation and what it developed. Taking bricklaying for illustration, it is shown that bricklayer apprentices were found in every city given in the table except New Orleans, that evening classes to which they may go or may be required to go are maintained in Atlanta, Birmingham, Buffalo, Chicago, Niagara Falls, and New York, and that compulsory part-time school work constitutes part of the training in Cleveland, Detroit, Milwaukee, Niagara Falls, and Pittsburgh. Again, the column headed "steam fitting" develops the fact that apprenticeship in steam fitting is found in only three cities, Chicago, Detroit, and Memphis, in one of which there is no indenture, and that part-time school work is required in two. To note the situation in a given city, Cleveland for example, with a highly developed system in most crafts, has no apprentices in asbestos work, steam fitting, or tile setting. Some apprenticeship exists in all the trades listed in Chicago. Charleston, S. C. (see p. 33), has no real apprenticeship in any trade.

Two other crafts, structural-iron work and elevator construction, were included in the study, but nothing therein was found in any city which could be considered as coming within the bureau's definition of apprenticeship.

The primary purpose of the investigation was to find out what is the present trend in producing new mechanics for the building industry, what machinery for training apprentices exists, and how it functions. Systematic school training was encountered in several localities, since to a marked degree the Federal vocational education law has been the stimulus for renewed interest in craft training and has indicated the course which training is following. The bureau did not, however, attempt a detailed study of school work. Material covering courses of study, specimen lesson sheets, and the like was readily available in some cases, and, as it is suggestive of the type of work the apprentice schools are doing, it is presented as appendixes to the report. School instruction must, in the nature of the problem, be wholly individual, since apprentice classes are made up of boys with varying degrees of basic education, the boys varying frequently from recent immigrants—who must be sent to the Americanization classes to learn English in addition to their trade-school work—to high-school graduates and perhaps to technical-school graduates.

The apprentice problem is a local one, and the methods of meeting it vary widely not only as between cities but also as between different crafts in the same city. Even in cities where the problem is treated from the standpoint of the industry as a whole, as in Cleveland, certain crafts in the industry may be acting independent of the general plan or may be doing nothing whatever. Any attempt to generalize must be complicated with exceptions and variations. Each city covered in the bureau's survey has its own problems and its own ways of meeting them, or, perhaps, of letting them alone. Because each city is a story in itself this report will present separately and in detail the situation as it was found in each of the localities visited, summarizing only such systems and such training programs as have a definite bearing on the subject of apprenticeship in general.

ORGANIZED SYSTEMS IN OPERATION

While apprenticeship by formal indenture between employer and boy is not widely practiced, there is coming into use a system which amounts to the same thing. That is the joint apprenticeship committee system. These committees are composed of representatives of employers and of journeymen and, in some cases, of the city school boards. Apprentices are under agreement with the committee to serve their full time and to abide by the laws of the committee, which on its part takes the responsibility of seeing that the boy has employment and proper opportunities for training throughout his apprenticeship.

Where joint committees do not operate, the union may serve the same purpose, the apprentice being in effect indentured to the local union and governed by the terms of the working agreement between the union and the employers, with the union acting as placement agent to keep the boy employed.

Apprentice training has more vitality, is more closely organized, and is affecting the building situation more definitely in those centers in which the division of vocational education of the local school board, usually acting under the Smith-Hughes law, is cooperating than in the cities in which the contractors or the unions are trying to work out the problem alone.

Probably this condition is not primarily the result of the actual number of hours spent by the boys in the apprentice classes, since that is only four hours a week as a rule. More likely it is the result of the organization and cooperation of the employers and the journeymen, which is the machinery demanded by the school boards through which training shall be carried on. The joint apprentice committee plan, says Prof. Arthur B. Mays in a recent book on industrial education—

> has many desirable features, but it is feasible only where there are genuine interest and enthusiasm for apprenticeship, and real, whole-hearted cooperation among the three elements represented. Under such a plan the employer is relieved of any suspicion of exploitation, labor has a legitimate measure of control of the numbers entering its ranks as well as of the qualifications of the entrants, and the school is able to perform for the young people entering the trades the work it is fitted to do and should do as the educational agent of society. The apprenticeship committee is the nearest approach thus far made to a complete reproduction of the medieval master mechanic in his relation to apprenticeship, yet it is essentially modern in its characteristics and is fully in keeping with the requirements of modern production methods. This plan, or some other much like it, seems to be the only way in which the problem of training apprentices in the building trades can be effectively developed.[1]

The various organized systems for promoting and controlling apprenticeship are set forth in the detailed reports by cities, but a comparative analysis of the different types may serve to show strength and weakness in the systems followed. It must be emphasized, however, that the following analysis is intended as a comparison of plans and methods, not as an appraisal of results under those methods. There are instances of indifferent results and definite failures under the most favorable plans, but they can usually be traced to factors other than the plan itself.

[1] Mays, Arthur B.: The Problem of Industrial Education. New York, The Century Co., 1927, pp. 246, 247.

Apprenticeship systems designed and organized to encompass the entire building industry are found only in four cities: Cleveland, Detroit, New York City, and Niagara Falls. In none of them does the plan actually include all of the building crafts, but the organization is such that it can be expanded to cover any additional craft when the craft itself takes the necessary steps. Joint apprentice committees for individual trades are effective agents in several cities, where they operate successfully without any centralized machinery. Cleveland is the outstanding instance of successful operation under the former plan, while Chicago illustrates the method of uncorrelated craft actions.

Because the Cleveland method contains all the elements of systematic apprentice training which the bureau's investigation has found in any city visited, it will, for purposes of analysis and comparison, be treated as a standard, deviations from which in other cities will be pointed out. As already noted, Cleveland has a system structurally so devised as to cover the building industry, but the foundation of the system is the separate crafts, each functioning through a joint committee of organized workers and organized employers. Cooperating with these committees, but not actually members of them, are the trade teachers and officials of the division of vocational education of the Cleveland public-school system. These joint apprentice committees are active working bodies, which meet regularly, monthly or oftener, and which are the controlling agency of their respective crafts in all matters pertaining to apprenticeship.

Upon action by the committee a formal indenture is made which binds employer and apprentice for the full term of apprenticeship. After the expiration of a probationary period an employer may not discharge an apprentice and a boy may not change employers without the consent of the committee after a hearing.

One of the fundamental doctrines of the system is continuous employment throughout the apprentice period, in order to keep the boy in the trade. If the contractor to whom a boy is indentured runs so short of work that he can not keep him busy, a transfer to another contractor is effected through the trade committee until such time as the original employer can resume his obligation. Responsibility for carrying the boy through his apprenticeship remains with the original employer.

To facilitate transfer from an idle to a busy contractor when necessary to insure continuity of employment, the Building Trades Employers' Association, which is a federation of various craft organizations of contractors, employs a director of apprentices. Additional duties of the director, who gives his full time to the work, are to act as truant officer for the contractors, to keep informed of all building operations, and, on behalf of the contractors, to assist in many ways in the orderly working out of the apprentice program.

An important factor in that program is part-time school work. All apprentices in the trades coming under the Cleveland system must attend school four hours one day a week, or one day of eight hours every other week, at the time set by the division of vocational education. Cleveland is the only city studied by the bureau which has an apprentice school; that is, an institution distinctively for apprentices as such. In other cities apprentice classes are held in the

continuation or manual training schools, or apprentices attend the regular night schools.

While the division of vocational education is only one component element in the organized apprentice training system in Cleveland, it enforces certain regulations which are in fact the principal cohesive factor in holding the entire scheme together, and it is largely instrumental in keeping the "real, whole-hearted cooperation" which Doctor Mays refers to as being the prime essential in any successful system.

Niagara Falls and Detroit are the only other cities covered which show the same correlation between the public schools and the industry in the training of apprentices. In each of these cities the director of vocational education is a member of each trade committee and is in effect the head of the apprentice system. The plan used in Niagara Falls is very much the same as Cleveland's, the only important difference, beside the one just mentioned, being the amount of time spent in school. First and second year boys must attend school eight hours a week—four hours in evening school on their own time and four hours Saturday morning on the employer's time; but pay for day-school work is contingent upon night-school attendance. Third and fourth year boys must attend night school four hours a week.

The system in both Cleveland and Niagara Falls depends for successful operation upon the cooperation of unions and employers and upon the active participation of the joint apprentice committees. A Cleveland school official declared in a recent address that none of the results that have so far been accomplished under the Cleveland plan "would have been possible without the untiring efforts of the members of the joint apprentice committee." In Detroit the trade committees are neither so active nor so interested, and formal indenture is made in only a few trades.

Apprenticeship in the building trades in Chicago depends solely on the initiative and diligence of the craft committees representing organized workers and organized employers. The school system is a receptive, not an active, agent in apprentice training. Contact between the apprentice classes and the trade is chiefly through coordinators employed by the committees and through the trade teachers. Formal indenture is practiced in all cases and in most trades control and regulation of apprenticeship through joint committees are provided for in the joint working agreements and include compulsory part-time school work. In most trades uniform control is assured by the provision that only those contractors who are members of their trade associations, and hence parties to the joint agreements, may have apprentices. This is not true of carpentry, in which trade there is neither a trade agreement nor a joint apprentice committee. In the plastering trade a once active apprentice committee has become moribund and part-time school training for plastering apprentices has been discontinued because of general lack of interest.

Under the systems thus far discussed, when a craft participates at all it does so wholly. That is to say, all the apprentices in a given trade, with possibly an occasional exception in an open shop, are included in and regulated by whatever system is followed by that

trade. Only a small percentage of the contractors may be involved, but such apprenticeship as exists comes under the unified control of the organized agency.

This situation does not exist in New York City, in which an apprenticeship commission, founded and fostered by the New York Building Congress, is the medium for promoting apprenticeship in the industry. The commission is composed of representatives of the Building Congress, the Building Trades Employers' Association, and those building trades unions which are identified with it. Participation in the work of the commission on the part of the unions is, however, determined by each local union of each craft. No craft in the city is identified with the commission plan to the extent of having all its local unions cooperating. The Painters' District Council of Manhattan and the Bronx, for example, is cooperating and observing the regulations of the commission with regard to the apprentices under its control. On the other hand, other local unions of painters in Greater New York, while having apprentices duly indentured, have no connection with the commission.

Structurally the New York Apprenticeship Commission is composed of apprentice committees of the component trades. Functionally the trade committees are weak and inactive, and the vital agency is not the craft organization but the superstructure representing the industry. The commission has no power and the trade committees exercise none. There is no formal indenture except in painting, no provision for continuous employment and no machinery for assuring it, and no part-time school training. The commission is the point of contact between the school system and those apprentices coming under the jurisdiction of the commission who are attending the night-school classes provided, either voluntarily or because of whatever pressure may be brought to bear upon them. Further than that, and its efforts to promote and encourage apprenticeship, the organized machinery in New York does not go.

One craft which is not a part of the apprenticeship commission has a joint apprenticeship committee composed of two representatives of the union and two of the contractors' association and exercises complete control over apprenticeship in the trade, that of sheet-metal work. Apprentices are formally indentured, continuous employment is assured, and attendance at night school four hours a week is compulsory.

The New York Apprenticeship Commission system furnished the pattern on which the Boston Building Congress built its joint apprenticeship commission in 1923. As in New York, the sheet-metal trade remained outside and regulated its own apprentice system through its joint trade committee under its working agreement.

The Boston commission depended upon craft committees for all activities relating to apprentice regulations and control, including the enforcement of school attendance, while it undertook to secure continuity of employment and school training. Indenture was not stressed. The tendency of the craft committees, however, was to become increasingly less active and to place more and more of the burden of carrying out the program on the officers of the commission. Founded as it was on craft support, when the craft support was completely withdrawn the superstructure collapsed and the

Boston Apprenticeship Commission passed out of existence four years after its establishment. Apprentice classes in the city trade school have since been discontinued for want of pupils, since no compulsion has ever been exercised.

Joint apprentice committees composed of representatives of organized employers and organized journeymen are effectively controlling apprenticeship in some trades in cities in which real apprenticeship is perhaps not followed in any other trade. The steam-fitting trade in Memphis, Tenn., is a case in point. The plumbing trade in Pittsburgh is another illustration of successful prosecution of an apprentice system by a committee composed not alone of employers and journeymen but also of materialmen and the school board—again the "three elements" which, according to Doctor Mays, are essential to any feasible plan of apprentice training.

Apprenticeship in Milwaukee is controlled by law and regulated by the apprentice department of the Wisconsin Industrial Commission. Newark, N. J., has an educational movement under the Smith-Hughes law which involves trade training but which is not actual apprenticeship in an industrial sense. It seems, nevertheless, to be working out to essentially the same ends, although it is extremely doubtful if the large number of boys reported by the various crafts as being in training both on the job and in school will complete their training and be absorbed into the industry.

Elsewhere in the field covered by the bureau nothing was found which could be considered a definite organization working toward a definite end.

SUPPLY OF TRAINEES

The cry that "boys won't go into the trades" is not borne out by the investigation. On the contrary, it is quite apparent that the dearth of apprentices in the building trades is not due to a dearth of boys interested in entering those trades. The unions everywhere reported long waiting lists of applicants for apprenticeships, and joint committees agree that the problem does not lie in finding material to train.

The experience of the commission on apprenticeship in one large city illustrates this vividly. In an effort to arouse interest among contractors and the general public in the program and the work of the commission, its secretary broadcast an address through a local radio station. "The results," he said, "were illuminating and disappointing. We were flooded with requests from boys and parents for more information, and with applications for apprenticeships, but not one contractor came forward with a request either for the details of the system or for an apprentice."

Because of the limited opportunities for placing boys with contractors as apprentices, some unions, where they are sufficiently in control, make a practice of confining apprenticeships to the sons and other relatives of the men in the trade. This is especially true in bricklaying and plastering. It is frequently asserted that a boy has no chance to become a bricklayer unless his father is in the trade either as contractor or journeyman, and in a number of cases that is quite true. It has been true also in plumbing in some local-

ities. The Chicago master plumbers have broken up the practice, followed there for years, of granting apprenticeships only to sons of the men in the trade. The apprenticeship agreement in Chicago stipulates that the master plumbers shall make their own selection of boys to become apprentices, and the union therefore no longer serves as the recruiting agency. In Pittsburgh the working agreement in the electrical trade provides that the employer shall select the apprentice one year and the union the next year, and it is tacitly understood that the union may select sons of journeymen if it chooses to do so.

The building trades unions in St. Louis have a very definite policy of "keeping the trade in the family" and enforce it to such an extent that one contractor declared that "a boy has as good a chance to get into West Point as into the building trades unless his father or his uncle is a building craftsman." An officer of a local union in St. Louis reported that the name of his 14-year-old son has already been placed on the union's apprentice waiting list, and that it quite certainly would not be reached before the boy becomes of apprentice age.

APPRENTICE QUOTAS

In practical application, union regulations governing the ratio of apprentices to journeymen prove to be far less a deterring factor in apprentice training than is commonly assumed. Where the highly developed systems prevail union regulations are apt to be abrogated entirely and the whole question of quota is handled by the joint committee on the basis of the number of apprentices the trade can support in continuous employment.

Where the method is more desultory the union quota is not an issue for the reason that relatively few contractors have any apprentices at all, and certainly have no disposition to take on more than the union agreement permits.

If union regulations were in fact responsible for restricting opportunities for apprentices, one would expect to find greater development in open-shop centers. Actually, however, it is much harder to find an apprentice in an open than in a closed shop. Only three open-shop contractors were encountered in the course of the investigation who had more apprentices than they would have been granted under union agreement.

ATTITUDE OF CONTRACTORS

Those most closely in touch with the situation—school authorities, members of apprenticeship committees, and contractors who are cooperating in the effort to the limit of their ability—do not hesitate to declare that the individual contractor is chiefly responsible for the shortage of apprentices and the absence of a training system. Shortsightedness, indifference, and selfishness are the charges brought against their colleagues by the contractors who are carrying the load of apprentice training for the industry.

It is conceded that the provision for continuous employment, the one element which is vitally necessary to keep the boy, is the greatest

stumblingblock in the path of the contractor doing a small, or even a moderately large, business. Accordingly it is the opinion of some of the men in the industry that the problem of seasonal building will have to be met before an effective apprentice system can be evolved.

ATTITUDE OF UNIONS

As a rule trade organizations, both of employers and of journeymen, have at least an appreciation of the needs of their respective trades in regard to apprentice training, even though they may be doing nothing constructive to promote it. And while there are exceptions, taken as a whole it is where union organization is strongest that apprentice systems function most effectively. Local unions were found here and there which definitely oppose apprenticeship, but more instances occur in which the unions are doing all that is being done to provide new mechanics. In one "closed-shop" center, on the other hand, not only strict limitations as to the number of apprentices, but dictation as to who may become apprenticed are enforced by unions strong enough to impose them upon employers. Instances of wage scales so high that few contractors can afford to pay them to learners suggest restriction by a method more indirect and probably more effective than the ratio system.

Speaking of the attitude of both contractors and unions on the question, a prominent architect of New York who was instrumental in establishing the apprenticeship commission of the New York Building Congress, said:

> Recriminations flew thick and fast between the contractors and the labor men when we first tried to get together on a program, each side blaming the other for conditions. But that isn't going to solve the apprentice problem, and so far as I can see into the situation, both sides are tarred with the same stick.

TRAINING ON THE JOB

While it is generally admitted that an apprentice is at best a financial liability for the first year, and often longer than that, it is not that phase of the problem which is objected to so much as it is the added difficulties on the job when an apprentice is taken on. The expression most frequently used by contractors is that they "can't be bothered with boys." Rapid building makes training on the job not only unprofitable but well-nigh impossible. Employers and journeymen agree that it is simply not possible to carry out any real program of teaching on the job. To this school authorities and lay opinion, equally interested but not so directly involved, add that whether possible or not, there certainly is no training on the job. The boy merely "rubs off" what he can while he is working with journeymen, and where school work is part of his training the school is expected to supply, in a few hours a week, the technical and mechanical knowledge which the job can not, or at any rate does not, provide. One authority made the unequivocal declaration that "there simply is no such thing as training apprentices on the building." Professor Mays explains that:

> The character of construction work discourages the use of inexperienced labor for skilled operations. The building mechanic does not make a small part of the whole which later will be placed in the finished product, as does the

factory tradesman, but his work is performed, in the first instance, on the building itself. If a plasterer's apprentice or a tile setter's apprentice makes a mistake, it is made on the finished product and can be corrected only by the expensive process of tearing out materials from the building. This characteristic of building work makes teaching on the job a very expensive procedure and explains, in part, the reluctance of contractors to employ any but journeymen mechanics.[2]

NATIONAL PROGRAMS

As already stated, apprentice problems and methods of dealing with them vary widely in different localities and crafts, and in the various crafts in the same locality. At the same time a few craft organizations have definite national programs which are of fairly wide application.

TILE SETTING

The most thoroughly organized machinery for apprentice training in the entire building industry is that of the tile trade. A concerted program with fixed rules has been drawn up, and in all the cities visited in which apprentices are being trained for the trade, that program is followed, except in the jurisdiction of the New York tile setters' union.

A national agreement between the Tile and Mantel Contractors' Association and the Bricklayers, Masons, and Plasterers' International Union covers "general rules and regulations governing the employment, training, and instruction of apprentices for the tile and mantel industry," and provides machinery for carrying out the terms of the agreement through the joint arbitration boards of the local contractors' associations and the local unions.

A formal indenture is drawn up in quadruplicate. The apprentice and his employer each keep one copy, while the other two are filed with the two national organizations. Certificates are issued jointly by the two trade organizations to each apprentice at the completion of his term.

One of the requirements of the contract is that "apprentices shall be given a thorough training in all work" classified in the national trade agreement. The St. Louis joint arbitration board has adopted an effective method of insuring experience in the various classified processes.

Besides urging at least a minimum of technical school training for all apprentices, and providing for six months' credit on the apprenticeship term for three months' intensive trade school work, the industry supports its own trade school. The National School for Tile Setters, at Dunwoody Industrial Institute in Minneapolis, is operated jointly by the Tile and Mantel Contractors' Association and the Associated Tile Manufacturers.

The course of study has been worked out by representatives of the two associations and the teachers, both of whom are practical craftsmen, with the help of an educational adviser. An intensive course of 13 weeks' duration covers "all basic operations in tile setting," and related work in blue-print reading, drawing, and mathematics.

[2] Mays, Arthur B.: The Problem of Industrial Education. New York, The Century Co., 1927, p. 244.

Classes are limited to 20 students in each 13-week term. Students are apprenticed tile setters who are sent to the school by their employers. All of the operating expenses of the school, transportation of the students to and from Minneapolis, and an allowance of $6 weekly to each boy, are paid by the Associated Tile Manufacturers and the Tile and Mantel Contractors' Association. Living expenses in addition to the $6 allowance are generally met by the employer to whom the boy is indentured.

In this manner 80 tile setter apprentices each year, from all parts of the country, are given intensive training as a basis for training on the job. It is emphatically stated that the course "does not pretend to prepare journeymen." But, to quote the sponsors of the movement, the boy "starts work for his employer as an economic asset. He earns his way from the start."

Whether or not a contractor makes use of the school is left to his own discretion. The school is recognized and indorsed by the officers of the international union, and under the national agreement the three months' course at Dunwoody counts for six months on the apprentice term. Some local unions, however, notably the Chicago local, do not recognize the school nor grant the dispensation on the apprentice term. Hence Chicago contractors make no effort to send boys to Dunwoody.

In addition to the national school, tile-setting classes are in operation in the public schools in Milwaukee and Newark. In Pittsburgh a short-term winter course is provided jointly by the union and the contractors. School work is on paid-for time in Milwaukee and in evening classes in the other cities.

The director of Dunwoody Industrial Institute says: "In my opinion the tile-setting program is the most effective apprenticeship system yet worked out."

MARBLE SETTING

Apprenticeship in marble setting follows substantially the same system as that in tile setting, under a national agreement between the National Association of Marble Dealers and the Bricklayers, Masons and Plasterers' International Union. The marble dealers operate a school in Knoxville, Tenn., which gives a three months' intensive preliminary course of training similar to that at Dunwoody.

PLUMBING

The National Association of Master Plumbers has an apprentice committee which is the medium for active propaganda for the establishment of a uniform apprentice system in the heating and plumbing trades. "The problem of creating trained workers," the association declares, "is essentially an employer's problem. The training of apprentices is a duty no employer can conscientiously escape." The objective of the committee is declared in its slogan, "At least one apprentice in each shop."

This is entirely a movement of master plumbers, in which the journeymen plumbers' union as a national organization has taken no part. Locally, the plumbers' union is cooperating in some cases and

opposing the program in others. However, the plumbers' union is exclusively a journeyman organization, attempting no control of apprenticeship beyond a fixed training period and the number of boys allowed in union shops. Hence the master plumbers have a fairly free hand in formulating an apprentice program. As a matter of fact, the employment and training of apprentices are more apt to be the practice in open shops than in union shops, and it frequently happens that the master plumbers who are most active in promoting the program advocated by the national association are the open-shop men. St. Louis and Birmingham are cases in point. Except in Chicago, Cleveland, and Pittsburgh the school-training program is promoted wholly by the master plumbers without cooperation from the union. In some instances master plumbers are running the apprentice classes without help from either the unions or the local school boards. In Birmingham they meet all the expenses of their plumbing school, and in St. Louis they pay the boys' tuition in a private trade school.

In addition to its promotion activities, the apprenticeship committee of the National Association of Master Plumbers conducts a correspondence school for apprentices for whom classroom work is not available. The association also gives annually to sons of master plumbers five scholarships at Carnegie Institute of Technology in Pittsburgh. That effort is, of course, directed toward creating sanitary engineers for the contracting side of the business rather than mechanics.

In most of the cities visited the master plumbers are making some effort to promote an apprentice system and to produce qualified mechanics. This does not apply to Atlanta, New York City, Niagara Falls, or Minneapolis. In New York and Niagara Falls what little is being done to encourage apprenticeship and school training is the work of the unions and not of the employers. Master plumbers of Minneapolis started an ambitious program a few years ago but it was short-lived.

Systems in which organized plumbing employers, organized journeymen, and the school boards are cooperating are in force in Chicago, Cleveland, and Pittsburgh, and are among the really effective apprentice plans in present operation. Part-time day-school courses on paid-for time, either for all or for part of the apprentice term, are found in Baltimore, Buffalo, Detroit, and Milwaukee, as well as in the three cities just mentioned.

Three cities, by joint action of employers and journeymen, have substituted a well-developed apprenticeship for the "helper" system in steam fitting. In Chicago and Detroit part-time school training is given. In Memphis, while night-school work is available, it does not constitute part of the apprentice-training program, as in the other two cities. Elsewhere the custom of one helper to a fitter is practiced, although some effort is being made in Philadelphia and St. Louis to institute apprenticeship.

BRICKLAYING

The bricklaying trade presents a contrast to the plumbing trade, in which it is the employers who are interested and active in promoting apprenticeship and the unions which, on the whole, are in-

different or openly hostile. The indenture of apprentices is the policy and the practice of the Bricklayers, Masons, and Plasterers' International Union, a practice in which contractors, by and large, merely acquiesce. Recognizing it as "impossible for the international union to formulate and maintain a general apprentice law within its jurisdiction," the international office "grants to each subordinate union the power to regulate its own apprentice laws," subject to definite restrictions imposed by the constitution of the international. Nevertheless practices are quite uniform, and apprenticeship of bricklayers by indenture exists in some degree in nearly every city visited. In fact, the opinion was freely expressed in several cities, not only by union officials but by representatives of building-trades employers' associations and by individual contractors, that apprenticing to the bricklaying trade is being decidedly overdone. Apprentice bricklayers are in the majority of cases sons of journeyman bricklayers. Often, instead of being indentured to contractors in the customary way, they are apprenticed to their fathers by formal contract with the union, and move with them from job to job. That practice is prohibited in some cities but is the custom in others. Where it is the custom, as in New York, the complaint of overcrowding is most apt to be heard. At the same time, the employment of apprentices by contractors is more general in masonry than in any other craft.

National control is felt most effectively in the matter of keeping apprentices in the trade and compelling the observance of indenture contracts and the completion of apprenticeship. Every bricklayer apprentice is registered by the international union and is under certain obligations to it. Violation of an apprentice contract in any jurisdiction is punished by withdrawal of registration by the international office. By what might be called a blackballing process an apprentice who willfully breaks his indenture is debarred by the international from becoming a union bricklayer in any local jurisdiction.

Indentures are practically uniform, a printed form furnished by the international office being frequently used. School training is a national policy and is nearly always mentioned in the apprentice contract. In nine cities[a] school attendance in bricklaying classes, either on paid-for time or at night school, is required under the indenture, either for the entire term or for some part of it. The unions in two other cities[b] require night-school courses in blue-print reading, drawing, and mathematics, although this provision is not always rigidly enforced. The Chicago union operates a school of its own for apprentices.

Local control is in all cases exercised through a joint apprenticeship committee or the joint arbitration board acting as an apprentice committee.

ELECTRICAL WORK

While the International Brotherhood of Electrical Workers has no apprentice program, apprenticing boys to the local union is a practice which is followed in nearly every instance in which any

[a] Atlanta, Boston, Buffalo, Cleveland, Detroit, Milwaukee, New York, Niagara Falls, and Pittsburgh.
[b] Birmingham and St. Louis.

organized effort is being made to train mechanics. In inside wiring, as in bricklaying, the machinery is in the hands of the unions, and the contractors are rarely actively a part of the system. Variations and differences are too many and wide to discuss briefly, but the various plans are treated in detail in the reports on the separate cities. Basically, however, the plan is to make the apprentice a member of the organization and to assign him to one contractor for the first year. During that year he is required to remain in the same shop, acting as stock clerk or "locker boy," in order to become familiar with materials and tools. After that his obligation is to the union, which serves as placement agent to keep him employed throughout the remainder of his term. In this way his training and experience can be made so diversified as to cover the entire field. From the contractors' point of view these trainees are helpers, with whom they have no contractual relations except, perhaps, through a working agreement. The union, on the other hand, attempts responsibility for continuous training and fairly continuous employment. The boys are classified as first, second, third, and fourth year helpers and are sent out on jobs calling for their respective degrees of advancement.

Supervision over the work of apprentices and actual teaching on the job are carried out better in the electrical trade than in others, especially in localities where the union, in its working agreement, guarantees the work of its members. Periodic examinations are given by some unions, and all of them give a final examination for admission to journeyman membership. It was asserted in several instances that these examinations are more difficult and comprehensive than those given for city licenses, where such are required.

School work on paid-for time was found only in Chicago and Cleveland, and for the first-year apprentices in Pittsburgh. Evening school work is obligatory for the advanced apprentices in Pittsburgh, and is "required" or "encouraged" in New Orleans, New York, and Philadelphia.

Various disciplinary devices are undertaken by the unions, but, owing to the popularity of the trade, they are not particularly needed. Some unions insure completion of apprenticeship by requiring in advance annual installments on the initiation fee, the money to be forfeited if the boy leaves the trade. In spite of the lack of contract or obligation on the part of employers to keep an apprentice, the record of completed terms is as high in the electrical trade as in any of the building crafts.

SHEET-METAL WORK

The National Association of Sheet-Metal Contractors has drawn up an apprentice training plan following closely that of the National Association of Master Plumbers. It includes a detailed course of study in shop work and related subjects. This is so far merely a plan and has no active promotion behind it. The Sheet Metal Workers' International Association declares in its constitution that it "favors the adoption of a sound system of apprenticeship which will give the fullest opportunity to apprentices to learn the trade of

sheet-metal worker in the various branches of the industry in a thorough manner."

However, very little real apprentice training exists in the trade. It seems to be the least popular of all the building trades, with the possible exception of painting. It attracts fewer entrants and loses a far larger percentage of those who do enter than does any of the crafts with a more widely practiced apprentice plan.

In 13 of the 19 cities visited sheet-metal apprenticeship is planless and haphazard even where some attempt is made to do more than follow the helper system. On the other hand, well-developed training methods, operating through joint committees and including formal indenture and school work, obtain in Boston, Chicago, Cleveland, New York, Pittsburgh, and St. Louis. The Pittsburgh method is the plan of the national association in actual operation and includes school work on paid-for time at Carnegie Institute. The Chicago and Cleveland plans also embrace school work on the employer's time. In all three cases school courses cover shop practice and related work in pattern drawing and mathematics. Compulsory attendance at evening schools for courses in pattern drawing, mathematics, and applied physics is the practice in the other three cities.

In New York and Boston joint apprentice committees of unions and employers' associations are working bodies definitely controlling all phases of apprenticeship in the sheet-metal craft. The system is less closely coordinated in Chicago, Pittsburgh, and St. Louis, although there, too, control is by joint action of unions and organized contractors under an apprentice agreement. In Cleveland the sheet-metal trade has only very recently become identified with the general program of apprentice training followed by the building industry of that city.

TRADES HAVING NO APPRENTICESHIP POLICY

Thus far only the positive side of the picture of apprenticeship in building construction and what actually is being done have been presented. There remains the negative side, the story, as it developed during the survey, of what is not being done. That story, too, is a local one, but just as the trades already discussed show trends toward the development of fairly uniform apprentice systems, others show a definite tendency, as crafts, to disregard the whole matter of apprenticeship and trade training. Always admitting the exceptional isolated cases found in the reports by cities, the three remaining important organized trades in building construction—carpentry, plastering, and painting and decorating—have no apprentice policy and no apparent interest.

PLASTERING

The attitude of the plasterers' unions is often frankly one of restriction of apprenticeship, and the practice of apprenticing only sons of journeyman plasterers is quite general. On the other hand, the seasonal nature of the work encourages the "hire and fire" method on the part of contractors, who feel that continuous employment under an apprentice contract is impractical in their line. They deplore, however, the scarcity of skilled men in ornamental work,

for which there is a rapidly increasing demand. It was frequently reported that the average age of plasterers in the different cities was 40 and over, and that the number of young men in the trade even as helpers was inadequate to keep the ranks filled with men competent to do ordinary plastering. Apprentices as a rule are being trained in ornamental work, but the ratio of apprentices to journeymen is very low, even in cities where systematic training is undertaken.

CARPENTRY

Several elements seem to enter into the apprentice situation in the carpentry trade which make any definite development difficult. One is the changing character of the work itself and the pronounced tendency toward specialization, a change in which substitution of materials in large building operations plays a considerable part. Another is the fact that there is no serious need for apprentices in the trade, since it is so readily recruited from semiskilled laborers, helpers, and "handy men" who have had enough experience to do much of the work required in ordinary building. Still another phase, noticeable in many of the cities visited, is the absence of contact between the union and the contractors through a working agreement. It was a common occurrence throughout the investigation to find general contractors who keep bricklayer apprentices as a matter of course but never have a carpenter apprentice.

Formal indenture is rare in the carpentry trade outside a few cities, and no policy of continuous employment is undertaken. The apprentice is not required to serve his full time with one employer and there is no control of his wage scale, so he shifts from job to job and frequently is receiving journeyman's pay long before his four years' apprenticeship has expired.

PAINTING AND DECORATING

Conditions in the painting and decorating trade with regard to apprenticeship are chaotic. In the opinion of various old established contractors the chief difficulty is the instability of the trade. Both employers and workers, they say, are largely floaters. On the contracting side, men with no capital set up small shops, get a few contracts, operate for a short while, and then go out of business, to be followed shortly by other small operators who, in turn, probably never gain any footing in the trade. The employees of men operating in that manner are also, as a rule, floaters with very indifferent ability. An organization of that nature, it is pointed out, has neither room nor time for an apprentice, and even if it had, the boy himself would have no chance to become a skilled worker. Another objection raised by contractors is to a long term of apprenticeship in a trade in which, except in high-class decorating, a long learning period is not necessary. Where carefully regulated apprentice training is found it is largely confined to the decorating branch of the work, in which skill is required and there is a demand for workers. On the whole, the supply of painters is such that no real need of new material is felt.

Another important deterrent in apprenticing to the painting trade is its unpopularity among boys. It is difficult to interest boys in the work, and even more difficult, apparently, to hold the small number who take it up. This is as true where there is organized machinery and school work as it is of cities in which the whole trade is haphazard.

REPORTS, BY CITIES

The bureau's study of apprenticeship in the building trades was begun in June, 1926. From June to December, inclusive, nine cities were covered—Baltimore, Boston, Buffalo, Cleveland, Detroit Milwaukee, Newark, Niagara Falls, and Philadelphia. Other work then intervened and the study was postponed until July, 1927, between which time and October 15 the other cities—Atlanta, Birmingham, Charleston, S. C., Chicago, Memphis, Minneapolis, New Orleans, New York, Pittsburgh, and St. Louis—were investigated. The report for each city is of conditions as they were found at the time the bureau's representative visited it. In the case of Boston revision was necessary, as the system on which the original report was based collapsed three months later. An expansion of the system in Cleveland has taken place recently and is incorporated in the report. Enrollment figures must of necessity change constantly, as daily some apprenticeships are begun and others are ended.

ATLANTA

Actual apprenticeship is not practiced in Atlanta except in the work controlled by the Bricklayers, Masons, and Plasterers' International Union. Other trades follow the helper system, and while in the plumbing, carpentry, and electrical trades some of these helpers are called apprentices, they are not such in fact.

ELECTRICAL WORK

The practice of indenturing boys to the electrical workers' union, which is frequently found in other centers, is not followed in Atlanta. Twelve boys were reported as being electrical apprentices, but they are free lances so far as concerns any obligation either to the union or to their employers. They change jobs as they see fit, and the union does not attempt to find new jobs for them. It was reported that less than 5 per cent of the boys undertaking to learn inside electrical work finish the required term and qualify as journeymen.

PLUMBING

The plumbers' union reported 12 apprentices working, with a much larger number who had entered the trade idle because of slackness in the industry. No contract or indenture system obtains in the plumbing trade, and it was stated that the boys in question are in fact helpers who are allowed to handle tools. Admission to membership in the union as journeymen is by examination and demonstration of practical working knowledge of the trade.

According to union officials, there is always an adequate supply of boys interested in the plumbing trade, and because of the laxity

in requirements for journeymanship the market is flooded. After taking up the trade the tendency is to remain in it in spite of dull seasons and lack of work, and accordingly, 90 per cent of those entering fulfill the union conditions of five years in the trade. By passing the union examination they qualify as journeymen, regardless of the amount of actual time put in on the job during their probationary years.

CARPENTRY

The carpenters' union reported only two apprentices, in both cases the boys being related to foremen and to some extent apprenticed to them. It is a personal relationship in which the union is only indirectly involved. The local as such has no apprentice policy or system, and is not in a position to control such a system, even if it were interested in the subject.

BRICKLAYING, ETC.

The policy of the Bricklayers, Masons, and Plasterers' International Union regarding apprenticeship is practiced by the Atlanta local. The local covers all four of the trades in the international jurisdiction—bricklaying, stone masonry, plastering, and tile setting. In all four crafts there are reported 43 apprentices indentured through the union to contractors. Practically all of the master masons employ apprentices, a maximum of three to a contractor being permitted under union rules.

Apprentices are required to attend evening classes at the Georgia School of Technology. Courses consist of blue-print reading, architectural drawing, arithmetic, and estimating, and some manual work in high grade and special masonry and ornamental plastering. The instructor is a practical mechanic and the term is 16 weeks in each of the four years covered by the indenture.

At least 90 per cent of the boys entering the trade complete their apprenticeship, it was stated.

OTHER CRAFTS

Organization among the other building crafts in Atlanta is negligible. The operative plasterers have a local composed almost entirely of negroes, with a varying membership. The painters' union is weak and the sheet-metal workers are not organized. Nothing that can be called an apprentice system exists in any of these trades.

EMPLOYERS

Building-trades employers in Atlanta are not organized to any extent. There is a builders' exchange, and the Atlanta branch of the Associated General Contractors is now trying to promote active organization and cooperation among both the general contractors and the subcontractors.

Neither organization, however, has any policy or program with regard to apprentice training. Most contractors run open shops, in which the helper system is practiced entirely. In the union shops the matter of apprentices and their training is left in the hands of the local union and the contractor knows very little about it.

The subject does not appear to be one of vital interest to the contractors, as the supply of skilled mechanics seems to meet actual needs, and the helper and laborer ranks are readily filled with negro workers when needed. At the time of the investigation there was very little building going on, a condition which, it was reported, had existed since the first of the year, with consequent unemployment in the building trades.

Evening classes under the Federal vocational education act were started in the technical high school a few years ago, but they were not successful and the movement died out. Both employers and union officials said that they "did not know what was the matter, but the idea didn't seem to take hold at all."

BALTIMORE

The building industry in Baltimore is made up of an unusually large number of small contractors in the various crafts and a few general contractors who operate on a large scale. Three of the large general contractors run strictly union shops; the small concerns are probably fairly evenly divided into open and closed shops. Such apprenticeship as exists in any of them is haphazard, and in most of the crafts no program or system is attempted.

From all that could be learned through interviews with union officials and building-trades employers, both union and nonunion, the entry of a boy into the building industry in Baltimore is chiefly the concern of the boy himself. The only requirement he is called upon to meet is the age limit of 16 imposed by State law. If he takes up carpentry or electrical work he must be 17 before he can register with the union as an apprentice. He finds his own job with a contractor willing to hire him as an apprentice. If the contractor is working under agreement with the union, he sends the boy to union headquarters to register formally.

The bricklayers' union requires that an agreement be entered into between the employer and the apprentice, with the consent of the boy's parents or guardian, covering the full term of three years. Electrical workers include apprentice regulations in their working agreement with employers. In other crafts, except plumbing, there is no contractual relation of any kind between the boy and his employer, and he is free to go or stay as he pleases. Employers interviewed did not know what year of training their apprentices were serving—their only record was the length of time the boys had been in their employ. Union records show only the date on which the boy entered his name as being apprenticed to his first employer. There is no program of training and no agency whose duty it is to insure competent instruction. As an officer of one of the large contracting concerns expressed it, "There is wholesome disregard of anything that could be called systematic training."

In carpentry and painting the boy is not required to remain with one employer. An apprenticed bricklayer or stonemason, on the other hand, must serve his full term with the employer to whom he is indentured. Exceptions to this rule may be made by action of the union. Many of the apprenticed bricklayers in Baltimore are indentured to their fathers. If a father is not able to complete the full

training, the union undertakes to insure completion by placing the boy wherever it can for the remainder of his term. It may not be possible always to achieve this through the same employer, so that not infrequently even the bricklayer apprentice receives his training from various employers.

The term of apprenticeship for electrical workers is only one year, which must be served with one employer. Thereafter the boy becomes a helper, in which capacity he serves three years before he becomes a journeyman. As a helper he is a free agent, and may change employers and kind of work as he chooses.

The sheet-metal workers' union does not register apprentices until they have reached their third year of training. The union has no control over and very little knowledge of the boy during his first two years. It is not stringent in its requirement that the boy remain with one employer during his third and fourth years. Accordingly, the sheet-metal worker's training also is largely on the "catch as catch can" principle.

In two crafts, bricklaying and sheet-metal work, an apprentice is admitted to journeyman membership in the union upon the certification of two members under whom he has worked that he is a competent mechanic. If his competency is later questioned by an employer, the union subjects him to a test of fitness. If the demonstration supports the employer's contention of poor work, the boy is ordered by the union to serve an additional year as an "improver."

Carpenter, plumber, and electrical apprentices must pass a satisfactory examination before a committee of the union to become journeymen. The painters' union admits to journeyman membership without examination or formality of any kind after three years in the trade.

The sheet-metal workers' union was the only one which reported any material dropping off during the term of apprenticeship. Since it does not register the boys who enter, it has no figures showing how many take up the trade or how many of the entrants remain. The business agent of the union believes the turnover to be great during the first two years. In the last few years, during which the boys in the union shops have been registered by the union, about 50 per cent remain and become journeymen.

The carpenters' union had no definite figures of entrants who become journeymen, but the union officials interviewed stated that most of them complete their training. The percentage of bricklayer and electrical apprentices who complete their training was reported as 100; of plumber apprentices, 98; and of painter apprentices, 85. Present enrollment of apprentices registered with their respective unions is: Bricklayers, 150; carpenters, 48; electrical workers, 22; painters and paper hangers, 8; sheet-metal workers, 50.

All union contractors employing apprentices are required, under the terms of their agreements with the union, to keep the boys on the pay roll and during dull seasons to endeavor to keep them busy at something in line with their training. In nonunion shops the boys, while not laid off in the same sense as the journeymen, are not paid for idle time.

Except in the plumbing trade, scant attention is paid to technical training or to school work. Some of the union officials said that

they try to "encourage" the boys to take drawing and arithmetic at night school or by correspondence, and some of the registered apprentices are enrolled in the night classes at the Polytechnical Institute. Other union representatives were definitely opposed to the trade school idea.

A clause in the apprentice agreement of the bricklayers and masons' union reads that the "employer, in conjunction with (father or guardian) also agrees to require the said apprentice to attend a technical school so that he may become proficient in handling and understanding drawings." In this connection the official of the large contracting firm already quoted said: "If any attention is paid to that provision by any of the parties to the agreement, I never heard of it."

One nonunion contractor had not had an apprentice "for a couple of years," but "might take one on this year," and the head of another nonunion concern, general contractors specializing in painting, did not know what was meant by the word "apprentice."

In contrast to the attitude of indifference toward apprenticeship and a steady supply of skilled mechanics shown by the building industry as a whole is the present policy of the Master Plumbers' Association of Baltimore City. Through their association the plumbers have inaugurated a program of apprentice training on the job and in school which is promising to prove a successful venture and to fill what the more progressive of the master plumbers have considered an acute need.

Adopting as completely as possible the apprenticeship program of the national trade extension bureau of the National Association of Master Plumbers, the Baltimore organization began by securing the cooperation of the city board of education and equipping a workshop. The training school is now part of the vocational division of the city school system, and is under the supervision of an advisory committee composed of master plumbers, journeyman plumbers, and supply manufacturers and dealers. Technical studies are taught by a vocational teacher of the city staff, and shop practice work by a journeyman plumber. The technical and academic subjects are mechanical drawing, mathematics, and applied science. Shopwork covers installations and repair jobs, and the different forms of pipe work and joint wiping. Equipment is adequate. Lack of space has been a handicap, but the school will soon move to better quarters.

The reported enrollment in the part-time school is 23, and all students are formally indentured to registered master plumbers, who are under obligation to furnish regular employment at stated rates per week for a four-year period. One full day each week is spent in school. Work on the job follows as closely as is practicable an outline prepared by the trade-school teacher.

This is chiefly a movement of certain master plumbers. It is fostered and supported by the association, but is followed by less than 10 per cent of the member contractors. It is, however, the only effort that is being made in part-time school training for apprentices in the city of Baltimore.

Although the supply of boys who could be apprenticed and trained in the building trades seems to be ample, most of the people interviewed on the subject feel that more adequate and systematic train-

ing is needed. This is more a desultory opinion than a conviction, however, and there seems to be no disposition to take any active steps to develop apprenticeship. Employers are not organized to any extent, and except among the plumbers the apprentice question is receiving no attention from contractors. Judging from the attitude of both contractors and journeymen it is not a matter of either concern or interest.

BIRMINGHAM

Apprenticeship by indenture is fairly well developed and quite generally followed in the bricklaying and carpentry trades in Birmingham. These two trades are well organized, most of the established contractors running union shops, and there seems to be friendly relations between the unions and the employers which make possible a workable apprentice policy. Nonunion contractors interviewed reported no apprentices and no policy of apprentice training. Helpers are taken on when needed and dropped when a job is completed.

BRICKLAYERS

The local union of bricklayers follows the policy and regulations of the international union with regard to apprenticeship in most respects. Boys are under formal indenture to their employers, and may change employment only with the consent and under the direction of the joint arbitration board. The jurisdiction of the local covers bricklaying, stone masonry, and tile and marble setting, and apprentices work at any or all branches of the craft.

The enrollment of apprentices was 52, which in a membership of 450 was considered too heavy. Accordingly, at the July, 1927, meeting of the union a resolution barring further indentures for one year was adopted. It was explained in this connection that practically all of the union contractors were carrying their full quota of two apprentices, and the amount of building being done by the established general contractors was not extensive enough to insure employment for the boys already in the trade.

This position was supported by the president of the Birmingham branch of the Associated General Contractors, who said:

> Just at present Birmingham is in the hands of the speculative builders. We are pretty well built up in office and industrial buildings, as a result of the building boom of the last several years, and the real estate crowd has all the residential work. All that is, of course, nonunion, and there is no time for apprentice training in that game. The old-line contractor, whose interest it is to train boys, is keeping his apprentices if he can. The association stands squarely for a policy and program of real apprentice training, and the responsible and farseeing contractor recognizes it as a duty and does his share. Just now, however, he is lucky if he breaks even, and he can't load himself down with an ironclad obligation to apprentices, who, after all, are a liability to a very large extent.

School training for bricklayer apprentices is provided by the night schools, consisting of blue-print reading, estimating, and architectural drawing; and by classes in manual and technical work sponsored by the contractors' association outside the public-school system. This work is in the experimental stage, but has "met with a good response." Boys are expected but not required to attend the

public-school classes, and for those who do attend the apprentice term is shortened from four to three years. No supervision of school work or attendance is undertaken by the union, however, and it seems to be left to the boy himself whether or not any advantage is taken of such academic opportunity as is available.

On the job, the boy is under the supervision of the journeyman to whom he is assigned, the shop steward, and the foreman, and is subject to discipline by the joint arbitration board.

CARPENTERS

Practically the same system is practiced by the carpenters. Essential differences are, first, the number of apprentices allowed under union regulations; and, second, no school training enters into the program in the case of the carpenter apprentices. Under the rules of the bricklayers' union no contractor may have more than two apprentices; the carpenters' union grants one apprentice to every seven journeymen, with no fixed maximum to a shop. In practice, however, this difference is slight, since few contractors have more than two carpenter apprentices, irrespective of the size of their force. Most contractors, however, have one and many have two.

An apprenticeship committee of the carpenters' district council has control and general supervision over the indentured apprentices but, according to a union official, this committee "is not as active as it should be." Continuous employment is secured by contract with the employers, but where adjustments are necessary for any reason the business agent of the union undertakes to place boys in other jobs so that their training will not be interrupted.

The district council reported 50 apprentices under contract, and stated that about 75 per cent of the boys who enter the trade complete their terms. Admission to journeyman membership in the union is by examination and demonstration of practical ability in the trade.

PLASTERERS

There are few white plasterers in Birmingham. The white local, however, represents the most highly skilled men in the trade. With a membership of only 54, and a theoretical ratio of 1 apprentice to every 10 journeymen, there are 8 apprentices in the local. Three of these boys are employed by one firm which is extensively engaged in ornamental work.

Continuity of employment and training is secured by formal indenture. The largest contractors are carrying practically a full quota of apprentices, and the feeling is general that apprenticeship is being rather overdone in the union shops. However, the union does not attempt to maintain a wage scale for trainees. While this is resulting in some dissatisfaction among the advanced apprentices who are doing essentially journeyman work at much less than the union scale, it seems not to affect materially the record as to completion of apprenticeship, which is given as "90 per cent or better."

Apprentices now in the trade are largely sons of union plasterers. Plastering work outside the shops controlled by the union is chiefly unskilled work. Negro plasterers are organized into a separate local,

but are doing nothing in apprentice training, due to the kind of work and the usual uncertainty of colored labor.

OTHER TRADES

Apprenticeship by contract or indenture is not found in any of the other building trades in Birmingham. Systems which operate to essentially the same end, however, obtain in plumbing and electrical and sheet-metal work.

PLUMBING

An active interest in apprentice training in the plumbing trade seems to be resulting from differences between the union and the master plumbers. Up to a few years ago the union definitely opposed apprenticeship and according to a union official "there hadn't been a plumber apprentice in Birmingham for 27 years, until last year."

In 1926 the master plumbers' association, composed of both union and nonunion employers, undertook to put into operation the apprentice program of the National Association of Master Plumbers. To that end the local association required each of its members to take on an apprentice. It then started a school, for which the Boys' Club of Birmingham gave a classroom, and instituted training in both practice and theory, under the courses furnished by the trade extension bureau of the national association. Fifteen apprentices, some employed by men not members of the master plumbers' association, attended these classes throughout the school year. Not all the master plumbers in the association, on the other hand, sent their boys to the school. Some of the large employers have several apprentices.

In the meantime the plumbers' union reversed its policy and instituted an apprentice system for the union shops, granting an apprentice to a shop in which two journeymen are steadily employed, and two apprentices where seven or more journeymen are steadily employed. Boys are not permitted to change jobs except with the consent of the business agent.

There are at present seven apprentices under the control of the union. Owing to union opposition they are not attending the plumbing school.

The system is too new, of course, to show results or to indicate to what extent the boys now in training will remain and qualify. According to both factions, however, the number of boys anxious for the opportunity is great enough so that "we won't need to bother with triflers."

ELECTRICAL WORK

A modified helper system by which the union undertakes control of the beginner in electrical work, and at the same time undertakes to keep him employed at various branches of the trade, takes the place of actual apprenticeship in inside electrical work in Birmingham. The boy is in effect indentured to the union, since he can not secure a transfer or clearance card until he has served his full term under the jurisdiction of the Birmingham local.

After six months' probation he is eligible to examination as a "junior journeyman." If successful therein, he becomes practically a free lance so far as his work is concerned, the union acting as placement agent by which he is kept in employment and is given opportunity to learn the various kinds of work.

This is essentially a program of the union, with which the employers have no connection. From the employer's point of view these boys are helpers, hired and discharged according to his own needs. Hence it is difficult to secure for the boys the preliminary six months training which will put them in the "junior journeyman" class. A few of the contractors can be depended upon to give this opportunity to a limited number of boys, and the union makes a point of taking on only as many as can be kept busy throughout the four-year term.

The record of completed terms is almost a perfect one, according to the business agent of the union, only two boys in five years having failed to complete their time. Journeyman membership is attained by examination.

SHEET-METAL WORK

Twelve sheet-metal workers are registered with the local union as apprentices. All of the union shops in the city employ apprentices, and the boys are required under union regulations to serve their full time in one shop, although there is no formal contract. The term is four years as an apprentice with a fifth year as "advanced apprentice." The shop steward is responsible for the training and opportunity for advancement which the boy receives. Frequently the most promising among the helpers is given first choice when selecting new apprentices. At least 90 per cent of the trainees complete their training and qualify as journeymen, it was stated. An examining board passes upon the qualification of the apprentice for journeymanship at the end of his term. No schooling is provided, but in accordance with the law of the international union any apprentice who can not read and write English must attend the elementary night-school classes. The helper system alone is followed in the non-union sheet-metal shops.

PAINTING

Because of lack of demand for apprentices on the part of the painting contractors, the painters' union has no system or policy. It reported four apprentices in the union, indentured to decorating firms, chiefly through personal relationship. The union makes a point of complying with any requests for apprentices, but such requests are extremely rare.

The attitude of the employers is that, except in the decorating line, the trade does not call for any extended learning period and that, owing to the tendency of workers in the craft to drift from job to job, the keeping of a staff large enough to make an apprentice practicable under union rules is out of the question. Moreover, there is little organization in the craft, and the "hire and fire" helper system prevails.

BOSTON

As the result of efforts put forth by the Boston Building Congress to stimulate apprentice training and to correlate such systems as were

being practiced at the time, a commission on apprenticeship for the building industry was established in Boston in 1923. Nine men constituted the commission, the Building Trades Employers' Association, the United Building Trades Council, and the Boston Building Congress each having three representatives. The commission "was designed to be a general steering committee to stimulate and direct along consistent lines the efforts of the joint craft committees in each craft," and "to cooperate with the public-school authorities for the development of the necessary theoretical and other related instruction required by the apprentice system of each craft."

As originally contemplated, the commission was to have furnished machinery by which craft committees could establish contact with the industry and with the school system, and by which apprentice training could be assumed by the industry rather than by individual contractors. It was intended that the joint committee composed of representatives of employers and unions in each craft would remain the active agent in immediate control of apprenticeship in that craft. Such committees were provided for in working agreements, and, as the commission declared, the commission "existed to help the craft committees, not to supplant them."

Nevertheless the craft committees soon became moribund, and the work of carrying out the plan devised by the various representative bodies in the industry devolved more and more upon the commission, through a paid executive and an assistant field worker.

Six trades were incorporated in the commission system—bricklaying, carpentry, marble and stone masonry, tile setting, and cement finishing. Apprentices were not indentured to employers. Subject to craft regulations, apprentices were placed with contractors through the commission office, and each contractor who was cooperating in the movement agreed to keep his boys busy so long as he had work. When he ran out of work the commission was obligated to place his apprentices with other contractors to assure continuous employment so far as possible. The commission maintained the theory that apprentice training was the problem of the craft and not of individuals in the craft, and in the matter of continuous employment it "recognized that the apprentice should not be entirely protected against the effects on the building industry of the major swings of the general business situation."

Evening-school work was established through the city school system. The commission was chiefly instrumental in securing teachers and formulating the course of study. Class work dealt only with related subjects—mathematics, blue-print reading, drawing, applied science, and English—except in bricklaying, in which a practical course in manipulative work was given in the first six months, and special instruction in ornamental work and specialized processes during the closing months of the apprentice term.

The regulations of the commission called for compulsory school attendance four hours each week, two evenings of two hours each. Craft committees were expected to take measures to enforce that ruling.

In November, 1926, when the bureau representative visited Boston, the system was in active operation for the six crafts mentioned, and

classes were held at Boston Trade School for all except the cement finishers. Practically all of the union marble and stone master masons and the tile contractors were cooperating and employing apprentices, and an estimated 70 per cent of the bricklaying contractors were also participating in the program. On the other hand, carpenter contractors were indifferent and took but a very small part in the effort. Craft committees, not really active in promoting any phase of apprenticeship, were especially lax with regard to requiring the boys to attend school, and no discipline in the matter was attempted. The paid representatives of the commission acted as attendance officers and were almost wholly responsible for the degree of morale maintained in the apprentice classes. The school enrollment on a given day in November, 1926, was: Bricklayers, 213; carpenters, 344; marble and stone masons, 33; tile setters, 21.

From its inception the commission on apprenticeship met not only indifference and apathy from craft committees and employers, but hostility and active opposition on the part of some of the leaders in the organizations of both employers and journeymen. Dissension grew to the point of withholding funds to continue the work and the commission on apprenticeship went out of existence on March 1, 1927.

The passing of the machinery for unified control in the industry threw apprenticeship regulation back onto the craft organizations. Nine months later the bureau agent again visited Boston to ascertain the effects on apprentice training of the collapse of the commission.

The result to date is that the craft committees remain inactive, although in the masonry trades labor representatives assert that it is the intention of the committees to assume active control and to require school attendance of the boys who are now indentured. Very few new indentures have been made, as it is generally held that more boys entered the trade under the commission plan than could be properly cared for. Building is much less active than in the preceding few years, and the present effort is directed toward enabling the apprentices already indentured to finish their time.

However, nothing positive is being done in either bricklaying or carpentry, and school work has been entirely discontinued. Officials of the Boston Trade School report that a few survivors of last year's apprentice classes enrolled in the night school this fall, but personal interest and ambition are the motives in each case. Apprentice classes as such have passed out of existence, so far as the school is concerned, and doubt of their revival was expressed by the school men.

The number of apprentices reported in November, 1926, and in November, 1927, does not differ materially; but while in 1926 the figure was a definite one, in 1927 there was no accurate information available from any source, there being no definite check on the boys or their whereabouts. The bricklayers' union has indentured the boys who had entered the trade, so far as that has been possible, but the carpenters' union has not attempted to do so.

The commission on apprenticeship, in its formal statement that it had ceased to function, declared:

> Responsibility for carrying on a system of apprenticeship in each craft, according to trade agreements now in force, lies wholly with the joint craft committees which the trade agreements provide for. The responsibility will remain with them in the future, as in the past.

The commission plan was undertaken because the craft committees were inactive and indifferent. It has failed, apparently for the same reason. Organized apprentice training in the building industry in Boston ends just where it began four years ago, but according to the president of the commission the net gain has been the interest of the boys themselves in systematized school training. It is hoped that pressure from them will result in some form of organization within the crafts that will bring about what the commission tried to accomplish.

SHEET-METAL WORK

A system of cooperation between the employers and the local union through the medium of a joint committee of two members from each side controls apprenticeship in the sheet-metal trade. The committee meets monthly and attends to all matters pertaining to the apprentice system as a whole and to individual cases which may require attention.

The sheet-metal trade never identified itself with the commission on apprenticeship for the industry, as the men in the trade felt that they had a more efficient system, through closer cooperation, at considerably less expense than that involving paid agents and an office staff.

Indenture is through the joint committee. When apprentices are assigned to the contractors "it is with the understanding that the apprentice shall be steadily employed for the full term or balance thereof" and "no apprentice shall be permitted to leave the shop at which he is employed or accept employment in another shop without the consent of the apprenticeship committee."[3]

The apprentice term is five years, at least 24 months of which must be given to shopwork. The usual practice is to alternate shopwork and erection, giving six months at a time to inside and to outside work.

School attendance is compulsory and apprenticeships are canceled for failure to abide by that rule. Classes are held two nights a week, two hours a session, at both Boston Trade School and Wentworth Institute, and are devoted principally to mathematics, drawing, blueprint reading, and applied physics.

There are 58 apprentices reported in the sheet-metal trade, and probably 65 per cent of the contractors are engaged in their training. Some of the large concerns carry their full quota of four. All of the persons interviewed reported that boys invariably complete their apprentice terms and become journeymen.

PLASTERING

The joint arbitration board of plasterers, representing the employing plasterers' association and the two local unions of the Operative Plasterers and Cement Finishers of Greater Boston, controls apprenticeship in their trade. The working agreement calls for formal indenture and continuous employment over a period of four years. The joint board determines the number of apprentices allotted to a contractor, within the maximum of four fixed by the agreement.

[3] Articles of apprenticeship.

However, only the largest concerns keep a full quota of apprentices and many of the leading contractors have none at all. The president of the employers' association finds them "too much bother," even while he deplores the lack of interest in the problem displayed by the contractors. It is generally conceded that there is an acute need for better trained men, and an actual shortage of skilled men in ornamental work. There is no school training provided for the apprentice plasterers, of whom there are 90 indentured through the joint arbitration board.

ELECTRICAL WORK

The electrical trade in Boston is now in a period of transition from the helper to the apprentice method. An apprentice system had been incorporated in the current working agreement between the Electric Contractors' Association and the local union, but it had attained no vitality up to the time of the bureau's study. An apprentice committee is to be created consisting of three contractors and three journeymen, the duties of which are "to make rules governing the eligibility of apprentices" and "to keep records and to examine them from time to time as to their progress and fitness." School work is not mentioned in the printed rules and regulations, but the application form stipulates that "all apprentices must have a high-school education or its equivalent, or agree to go to school during apprenticeship. The school attended, however, must meet with the approval of the commission."

There is no suggestion of indenture or assured employment in the agreement. In practice, it will amount merely to a supervised helper system, and, as already noted, it has not yet been applied.

Several electrical contractors were visited, no one of whom had an apprentice. Only one indicated a friendly attitude toward an apprentice system. The feeling was that the trade does not require actual apprenticeship, as the helper system is generally found more economical and efficient, while attaining the same end in the long run. Some of the shops in Cambridge engage the part-time services of the boys in the trade school. These boys are not in any sense apprentices. They are schoolboys whose shop and laboratory work is done in the shops of the contractors who offer them the opportunity of practical work on the job. This practice, needless to say, is vigorously opposed by the union, and it is only in the open shops that it is followed.

PLUMBING

Practically all of the master plumbers of Boston and Cambridge employ apprentices under a modified indenture that implies rather than states an obligation on the part of the employer to keep the boy throughout his term and on the part of the boy to remain with the same employer. Specifically, the provision covering that point reads: "It is agreed that any master plumber may, during the first 12 months of an apprenticeship, discharge without question any apprentice, and upon request shall then be entitled to another apprentice." But "it is hereby agreed that an apprentice who has served more than 12 months of his apprenticeship in any shop shall not be discharged except for good and sufficient reasons as determined by the joint conference board."

Moreover, it is mutually agreed among the master plumbers that they will not reemploy as an apprentice "a boy who has been an apprentice to a master plumber unless he can show a proper discharge from his last employer or a recommendation from the joint conference board."

Except for these provisions and the regulations governing the number allotted (1 apprentice to a shop, 2 apprentices to 4 journeymen, 3 apprentices to 6 journeymen, and a maximum of 4 to a shop), regulation and training are the province of the individual employers, and no real program prevails. The union does not favor school training, but makes no active opposition. Whether or not the apprentices attend the night classes in plumbing held at the Boston Trade School and Wentworth Institute seems to depend chiefly on the attitude of the employer. One of the important contractors of Cambridge does not keep an apprentice who does not go to school. His position is that there is so much technical and scientific knowledge required of a first-class plumber which can not be taught or "rubbed off" on the job that he can not afford to permit a boy to pass into journeyman ranks, whether he afterwards keeps him himself or sends him out as having been trained in his shop, unless he has at least the technical knowledge available to any Boston or Cambridge boy who cares to make the effort to get it. The union has no control over apprentice wages, so the contractor in question makes wage rates and advancement on the job contingent on school attendance and standing in both school and shop.

The apprenticeship term for plumbers is five years. The trade is almost entirely organized and the union reported 225 apprentices in training. That is even more than the nominal ratio called for in the agreement and bears out the statement that practically all of the master plumbers keep up their apprentice quotas. The union official gave 75 per cent as the average record of completed terms; individual contractors place the figure much higher, so far as their personal experience goes.

OTHER TRADES

In the remaining crafts in the building industry in Boston, apprenticeship is either very haphazard or does not exist at all. The painters' district council is on record as opposing the system followed by the commission on apprenticeship, although it has no policy or program of its own. Such system as is followed in the painting trade is governed through the working agreement. Under that agreement an employer must keep an apprentice for the three-year term, the union refusing the contractor permission to take on a boy unless his business is such as to make continuous employment possible. Only 22 apprentices in the union were reported, and with two or three exceptions they were found in four large shops doing, chiefly, interior decorating. Most of the contractors show no interest in the question of training boys for the trade.

On the other hand the wall-paper dealers' association is the motive power behind such efforts as are being made to train paper hangers. This organization reports a need for trained men in the craft so acute as to amount to distress. It has a committee which is cooperating with a committee of wall-paper manufacturers to stimulate interest

in a training system. The committee of the wall-paper dealers' association supervises the paper-hanging class work at Boston Trade School and Wentworth Institute and tries to encourage apprenticeship in the craft. But it has no definite program, and no indenture system is followed. About 30 boys were attending the night classes in paper hanging, but the employers have no definite hold on them and it was generally reported that an inconsiderable percentage of the boys continue in the trade after being induced to take it up.

Steam fitters, elevator constructors, and ironworkers follow the helper system entirely.

BUFFALO

Formal apprenticeship exists in only three of the building trades in Buffalo—plumbing, bricklaying, and plastering. In all three trades, however, there is a well-developed system with which practically all of the responsible contractors are identified. The joint apprenticeship committee plan, with written indenture and school training, is followed in all three trades.

PLUMBING

The allotment of apprentices to contractors in the plumbing trade is one to a shop and one additional to every three men employed, but not more than three to any one shop. Practically all of the master plumbers "doing a substantial business" keep their quota full or nearly so. Interchange of apprentices among employers is resorted to if necessary to insure continuous employment.

First-year apprentices attend school four hours a week during working hours on the employer's time, and attendance is compulsory for the full term of 45 weeks. Classes are held at McKinley Vocational School.

Second and third year apprentices attend night classes. The required class work is a minimum of 96 hours a year. School work is not demanded of fourth-year apprentices.

BRICKLAYING

It was reported that there is an apprentice on the force of every mason contractor in Buffalo who is entitled under union regulations to an apprentice. Not more than two are allowed to a contractor. One hundred boys are indentured through the joint arbitration committee of the union and the employers, as well as through individual contract. The working agreement and the contract call for continuous employment. As a rule the employers manage to keep the boys occupied on work coming within the terms of the agreement, but if lost time is unavoidable it is paid for at the regular apprentice rate.

School training is available through the evening classes at McKinley Vocational School three nights a week. Practical and technical work are not correlated in the apprentice classes. The first two years are given to manual work; the last two to technical studies and drawing.

According to the union representative, school attendance is required of all indentured apprentices. Some of the contractors visited,

however, reported that so far as they know their boys are not in school, and so far as they are concerned there is no such requirement.

An official of the building contractors' association made the statement that the most important work in apprentice training in the masonry line was being done by the open-shop contractors, who are not restricted by the limitation of two apprentices to a contractor imposed by the union agreement. The bureau agent visited the two leading open-shop mason contractors. One has no apprentices, employing helpers as needed and dropping them when he is through with them. The other concern has a well-worked-out apprentice policy and program, and reports 13 bricklayer apprentices at the present time. The boys are kept on the pay roll and kept busy all the year round, and are under the supervision and training of a member of the firm who is especially interested in producing skilled mechanics for the firm and the trade as a whole. Ninety per cent of their apprentices complete their terms and continue in the trade.

PLASTERING

The 24 apprentices reported by the operative plasterers' union have only just been brought under the control of the joint apprenticeship committee, under a recent agreement. The agreement calls for formal indenture and employment at least nine months a year for the four-year apprentice term. School training is made available through the McKinley Vocational School, and attendance will be compulsory. Thus far all of the contractors are cooperating in the new movement.

OTHER TRADES

The helper system prevails in all other building work in Buffalo. The sheet-metal workers' union reported 18 apprentices, and the carpenters 24, but their status does not differ from that of helper, since there is no obligation anywhere either to teach the trade or to serve or furnish employment for a definite term.

CHARLESTON (S. C.)

The building industry is exceedingly inactive in Charleston, and actual apprenticeship does not exist. Residential building is almost entirely remodeling of old houses. New work is chiefly piers, warehouses, and the like, largely in concrete. There are half a dozen general contractors in the city, but in every case they reported that they keep only a skeleton organization of skilled men, taking on helpers and laborers wherever they can find them when they have a large contract. The principal mason contractor has only negro bricklayers and plasterers, and the most skilled and reliable carpenters are also negroes.

The building-trades unions are not very well organized. The plumbers have a fairly powerful union, but there is only one union plumbing shop. There are two so-called apprentices in this shop, but they are not indentured, and all boys learning the plumbing trade are free to change employers at any time. To some extent they are apprenticed to the union, at least for the third, fourth, and fifth

years of training. After the third year the union controls their rates and gives examinations for promotion from grade to grade.

While there is an industrial school under the Charleston school system, it teaches none of the building trades.

CHICAGO

Apprenticeship through formal indenture, and in most cases under the direction and control of joint apprentice committees composed of representatives of the organized employers and the unions, prevails in practically all of the building trades in Chicago. There is, however, no medium through which the industry as a whole acts. Each craft follows its own plan and makes its own regulations, although in a general way the systems are identical.

Only those employers who are members of their trade associations and parties to the agreements are permitted to take on apprentices. In other words, unless an employer is subject to the regulations of the joint apprentice committees with reference to apprentices, the unions will not place a boy with him. The underlying principle of cooperative action between the two groups is joint control, requiring both the boy and the employer to live up to all the rules and regulations governing apprenticeship. The union is the medium of discipline and control of the boy, and it demands that similar control be kept over the employer by the association. This is, however, not true in those trades in which there is no joint agreement and no apprentice committee.

Except in the trowel trades, part-time day-school training, operating under the Smith-Hughes Act, constitutes part of the apprenticeship in the most important crafts. Two unions, the bricklayers' and the asbestos workers', are conducting their own apprentice classes, furnishing quarters and paying the expense of teachers for evening instruction. The public schools are used for the day classes in the trades which are following the paid-for part-time system.

The closest cooperation between the unions and the associations of employers, and hence the most effective system of apprentice training, is found in the pipe trades. In addition to joint committees in both plumbing and steam fitting, each trade employs a coordinator who gives his entire time to furthering the interests and progress of the apprentices both in school and on the job.

Other building trades in which the employers and the unions are cooperating in apprentice training under the part-time school plan are sheet metal work, electrical work, painting and decorating, and carpentry. Only in sheet-metal work, however, is there a joint apprentice agreement operating through a joint board such as is found in the pipe trades. While there is a joint working agreement between the master electrical contractors' association and the electrical workers' local union, the apprentice provisions are general in their terms, and actual control of apprenticeship matters lies with the executive board of the union. A contractor desiring an apprentice makes formal application to the executive board of the local and agrees in writing to keep him employed throughout his apprenticeship, leaving it to the union "to see that the apprentice does not leave my employment and go to work for another contractor unless

it is proved that the apprentice was compelled to leave my employment because of unjust treatment."

In the painting and decorating line and in carpentry all agreements between unions and employers are individual, and although the painters' union employs a coordinator to look after the apprentices' interests there is no unified control in either craft.

It is interesting, perhaps significant, to note that in the crafts in which apprenticeship and training are actively promoted through joint agreement and joint boards, whatever the quota, the number of apprentices averages approximately 10 per cent of the number of journeymen in the union—which, in Chicago, is tantamount to saying the number of men in the craft. Even in so frankly restrictive a trade as tile setting, the ratio is precisely 1 to 10. On the other hand, where there is no active apprentice policy to which employers as well as the unions are committed, we find conditions such as developed in both carpentry and painting, with 1 apprentice to 60 journeymen in the first-mentioned trade, and 1 to 70 in the second.

Business agents, coordinators, and school officials agree that there is no scarcity of boys anxious to learn the building trades, and that trainable material will always be available to meet any reasonable demand. Union records show, furthermore, that trainees almost without exception become journeymen. There is of course some turnover during the probationary period, but that is merely a wholesome elimination of misfits upon whom it would be poor judgment to expend time, effort, and public funds.

Criticism has been directed against the apprentice school because of its policy of accepting only registered apprentices, which means, in actual practice, union apprentices. Experience with free-lance apprentices, responsible to no one but their employers and perhaps not even indentured to them, soon proved, however, that with no definite agency whose business it was to keep both boy and boss in line with a concerted policy, school time and per capita cost were merely being thrown away. The school takes the position that it is immaterial to it as a public institution what the coordinating medium may be, but it must insist on having some assurance that it is spending public funds and employing the time of city teachers to some purpose, an assurance which can not be successfully undertaken by other than an organized agency of some sort.

PIPE TRADES

STEAM FITTING

The apprentice agreement between the Chicago Master Steam Fitters' Association and the steam fitters' union calls for continuous employment by the party to whom the apprentice is indentured for a period of five years. After 60 days' probationary period both employer and apprentice sign articles agreeing to all the regulations of the joint arbitration board covering apprenticeship. All applications are handled by the joint board, which passes on the qualifications and acceptibility of applicants, and makes assignments to such members of the master steam fitters' association as fulfill the requirements of the agreement. Apportionment is 1 apprentice if 2 journeymen are regularly employed, 2 to shops employing 4 journeymen for

at least 10 months in the year, and so on up to 5 apprentices to shops employing 13 or more journeymen. Arrangements can be made for the temporary or permanent transfer of an apprentice to an employer other than the one to whom he was originally assigned, but it was reported that such transfer is rarely made.

Actual records kept by the coordinator over a period of seven years show less than 2 per cent elimination after the brief probationary period. Even during that period there is little turnover, it was said. The board has complete discretion in accepting the application of a candidate, and hence is in a position to select the most promising material. While there is no educational requirement for applicants, most of them have some high-school education, and a considerable number are college and technical-school students. The reported enrollment is 425, with practically all eligible contractors carrying their full quota.

After the first six months, during which the apprentice does not attend school, attendance at school one full day every other week is compulsory. This time is paid for at the same rate as time on the job. Failure to attend class and tardiness are penalized. All lost time must be made up. If the employer fails to release the boy on his regular school day, he must send him on another day and pay him for that time. If the boy misses class he must make up the work on his own time.

Washburne Continuation School is used for the steam fitting classes. The staff is composed of four men, and the course covers four subjects, each with two-hour sessions—drawing, mathematics, physics, and laboratory. English is taught only indirectly, as an incident to the physics and related science courses.

The shops are elaborately equipped with a wide variety of material which has been donated by manufacturers of heating, refrigerating, and power equipment. The shops are chiefly laboratories, the equipment being used for demonstration and experiment. Very little actual manipulative work in connection with practical steam fitting is done in school.

By arrangement between the various employers and the coordinator, apprentices are taken on at stated intervals throughout the year, and they start school as a group. Classes are divided according to period of training, thus making group instruction possible throughout the course. The complete course is 4½ years of 25 weeks each, 8 hours a week, making a total of 900 school hours.

Full school credits and a satisfactory school record are necessary before an apprentice may take his final examination for journeymanship. This examination is given by the joint arbitration board and is the last of the annual examinations given. If an apprentice fails in the final examination, he is continued as an apprentice until he makes a satisfactory grade.

During his first year as a steam fitter the graduate apprentice remains under the jurisdiction and supervision of the joint arbitration board, which has full power to act if the "conduct or ability" of the new journeyman is questioned.

The initiation fee of the journeyman is paid in annual payments during apprenticeship, and the wage scale of the apprentices is fixed by the agreement.

PLUMBING

The apprentice agreement between the plumbing contractors' association and the journeyman plumbers' association is essentially the same as that in the steam fitting trade. An important difference is that in the plumbing trade the controlling committee is devoted to apprentice matters entirely, while in steam fitting the joint arbitration board acts as an apprentice committee. The plumbers' apprentice committee meets monthly, and the instructor of the apprentice classes is ex officio a member of the committee and refers to it matters dealing with school training. Apprentices are registered and given working permits by the union, but are not members of the organization during apprenticeship, and while all applications are passed upon by the committee, employers "shall select their own apprentices." That provision, it is said, has broken up the former practice of limiting opportunities to learn the trade to relatives of the journeymen, and has made possible careful selection on the part of the contractors from the plentiful supply of applicants. School records show that 60 per cent of the apprentices are high-school graduates or have had some high-school education, and that the number who have not completed grammar school is negligible.

Any master plumber who is a member of the association and who employs two or more journeymen may take an apprentice. Large shops employing 12 or more men may have two apprentices. After the eligibility of the boy is passed upon by the committee the employer must keep him for the entire five years. Disagreements or difficulties are brought before the committee for adjustment, and reassignments can be made through the committee if necessary to insure proper training and opportunity for the boy. If an employer is found guilty of violation of the apprentice agreement he may be refused an apprentice.

This system has been in operation since 1911. For several years past an average of 150 new journeymen has been produced annually under the agreement. Less than 1 per cent of the trainees fail to complete their time. Practically all of the master plumbers coming under the agreement are contributing to the apprentices' training. The agreement covers nearly all the employing plumbers in the city, as the association includes all the master plumbers except the one-man shops and the jobbers. It was stated that association members "employ 95 per cent of the journeymen and do 90 per cent of the business."

School work is required of the plumbing apprentices during the first three years of their training. They attend one day a week. Because plumbing classes are held at Lane Technical High School instead of at the continuation school, they are in session only 6 hours a day and 40 weeks in the year. The aggregate time which a plumbing apprentice spends in school is 90 eight-hour days.

The school day is divided into three periods of two hours each, covering drawing, shop, and mathematics and applied science. Shop time is devoted entirely to work which the boy does not get on the job, consisting chiefly of leadwork—lead soldering and joint wiping. It was explained that practically no leadwork is done in Chicago, but because some knowledge of that branch of the work is necessary,

if for no other reason than to pass the State board examinations for licensed plumbers, the school must furnish the opportunity which the job does not afford.

The head of the plumbing staff is a practical plumber, and the technical work is given by trained teachers. Material is furnished by the union. A quarterly report upon attendance, progress, and deportment is made by the teachers to the joint apprentice committee, and the committee visits the school at least twice a year. All questions of attendance and school discipline are handled by the coordinator. The master plumbers' association awards an annual prize to the apprentice making the best school record.

GAS FITTING

Gas fitters are organized into a separate local union in Chicago, and are just beginning to work toward the establishment of a definite system in apprentice training. It has not yet developed materially, owing chiefly, it was said, to the instability of the trade. There is no effort to indenture a boy to an employer. That system would be a detriment, it is believed, because continuous employment under a contract would be impracticable. Under the present arrangement the boy is apprenticed to the union rather than to an employer, and the union makes itself responsible for continuous training and employment, acting as placement agent and making the journeymen and the business agent the supervising agency in training. Only 14 apprentices were reported as in training, each contractor being allowed one with the exception of the two largest concerns, each of which has two.

SHEET-METAL WORK

The joint arbitration board is nominally the agency controlling apprenticeship in the sheet-metal trade. Indentures are made through the board with individual contractors, and the working agreement provides that apprentices "shall be subject to the control of the joint arbitration board." In actual practice, however, it does not appear that the board is an active agency. The indenture, not the working agreement, imposes the terms of apprenticeship and provides for school training on paid-for time. The extent to which the terms of the indenture are observed seems to be largely the individual concern of the contractor.

While the record of completed terms is as high as in any of the crafts, there is not the same degree of coordinated effort which distinguishes some. The business agent of the union receives reports on school attendance and progress from the trade-school instructor and fulfills the duties performed by the coordinator in other trades.

Sheet-metal apprentices attend school one day each week. Classes are held at Washburne Continuation School, where the school day consists of 8 hours and the school year of 50 weeks. The reported enrollment is 106, of whom about 75 are engaged in construction and the rest in manufacturing. Classes include apprentices in both lines, and are made up of boys in all periods of training. Since the contractors send the boys on any day they choose, it is not possible to form classes corresponding to the specific year of training, as is

done in other crafts. Hence a class may be composed of beginners and fourth-year apprentices. The instruction must therefore be wholly individual.

There is only one instructor in sheet-metal work. The school day is divided into three periods ,giving three hours to drawing and three to shop work, while the remaining two hours are divided among English, mathematics, and applied science. Drawing and shopwork are closely related, the boy drawing the pattern first and then making the article afterwards in the shop. Lesson sheets are used in mathematics, and English, which is class work, is taught by a staff English teacher. The building does not afford opportunity for practice work in erection, but it is felt that the job provides sufficient training in that line.

ELECTRICAL WORK

The ratio of apprentices to journeymen provided for in the joint working agreement in the electrical trade is one to five or less, and one additional apprentice for each five additional journeymen, with a maximum of five apprentices to any one contractor. While few contractors have the maximum quota, the employment of apprentices under written agreement is a general practice. Contractors select their own apprentices, and because of popular interest in the trade and the high wage scale, it is reported that apprenticeship in electrical work is attracting a very desirable type of applicant. Most of those now in training have some high-school education, and high-school boys are given preference.

Apprentices attend classes at Washburne Continuation School one full day every other week. Under the agreement the employer is to pay "at least the sum of $1 for attendance at school, provided the apprentice furnishes satisfactory evidence of such attendance to the contractor." It was stated by an official of the contractors' association that all but a very few employers are paying the regular apprentice rate for time spent in school. "Satisfactory evidence" is furnished by means of attendance cards which are signed by the head of the department.

Classes in electrical work are divided according to the year of training and previous academic education, a plan made possible because classes are spread over a two-week period. First-year apprentices attend school on Monday, second year on Tuesday, third year on Wednesday, and fourth year on Thursday. One week classes are composed of the apprentices who are high-school boys or advanced academic pupils; the following week the group consists of apprentices with less than first year high-school education. Friday classes are made up of pupils from the other groups who can not keep up with the class work and who need individual and rudimentary instruction.

The school day is divided into four periods of two hours each, covering mathematics, electrical layout, laboratory work, and English. Layout work includes drawing, with estimating for the advanced classes. The laboratory is adequately equipped with apparatus, and is used only for demonstration and experimental work. No manipulative work of any kind is done in school, except an occasional installation of new apparatus, or when a practical demonstration is

necessary in connection with theory. As the head of the department said, "The school does not attempt to teach anything that can be taught better by the journeyman on the job."

The instructors agree that the system is attracting and keeping a fine type of workers, and they are enthusiastic about the method and the results obtained.

PAINTING AND DECORATING

Chicago is no exception in the general indifference to apprentice training in the painting trade, an indifference shared equally, apparently, by contractors and boys. However, the part-time school system, introduced into the trade two years ago, is taking hold and is resulting in a steady increase of indentures. The number of indentured apprentices has increased from 152, when the school opened, to 260. Even that number represents only one apprentice to every 12½ contractors eligible, under union rules, to an apprentice. Union regulations provide that a contractor, to be entitled to an apprentice, must employ at least five men for at least six months in the year. No contractor may have more than two apprentices, and then only if he employes 20 or more men. Most of the big decorating firms have two. The indenture calls for continuous employment with the same employer for three years, any idle time to be paid for "the same as though the apprentice had been regularly employed," and obligates the employer "to see that said apprentice attends the trade school." Working agreements in the painting trade are individual only, and do not provide any medium for joint control in apprentice matters. The contractor is supposed to choose his apprentice from the register of the painters' district council and to take him on 30 days' probation, after which, if agreeable to both parties, the indenture is executed. "No boy will be allowed a trial with more than two contractors, or a contractor with more than two boys consecutively." It was reported that only a small percentage of trainees are sons of journeyman painters. An official of the union who is also a teacher in the school acts as coordinator and disciplinarian for the school.

School attendance one day in the week is compulsory. Four subjects, of 2-hour periods each, are taught, and classes are divided according to the year of apprenticeship and subdivided according to previous academic training. The subjects are painting, which includes preparation of walls; paint and color mixing; paper hanging; decorative art and designing; and an academic course in English and related mathematics. The decorative art course has just been inaugurated. The unions opposed it, but it has been started at the insistence of the interior decorating contractors. It has not been operating long enough yet to prove its value, but the boys are interested. Paper-hanging is of course wholly manipulative work, the boys working in twos, one at the bench and one on the wall alternately. For ordinary practice work the paper is torn off at the end of the period, but each advanced class decorates some part of the school building each year, either with wall paper or designing. All wall paper and paste used in practice work is donated by wall paper manufacturers.

CARPENTRY

The carpenters' district council inaugurated a formal apprentice system in 1923. Prior to that there had been no control of any sort over learners for many years. Now the system is dependent upon the cooperation of individual employers, as there is no joint action on the part of the contractors. Moreover, the various local unions comprising the district council, of which there are 12, act more or less independently in the matter of control and discipline of the apprentices coming within their jurisdiction. While the secretary of the district council is the head of the apprentice system, absence of correlation between the council and the separate locals makes unified control extremely difficult. It was admitted that frequently an apprentice is taken on by a contractor in the jurisdiction of one local union at a time when perhaps half a dozen indentured apprentices in other jurisdictions are out of work. The indenture requires that the apprentice be paid full time even if he is not working, but that provision can not be enforced, according to the secretary of the council. The result is that the large contractors are carrying a disproportionate share of the burden of apprentice training by taking on the boys whom other contractors have to drop for lack of work. While under the rules of the union no employer may have more than two apprentices, as a matter of fact some of the large operators have four or five.

The carpentry classes are the largest in the apprentice department of Washburne School. While numerically the enrollment of electrical apprentices is as large, they come only every other week, while the apprenticed carpenters attend school weekly. Seven instructors make up the carpentry department and the subjects taught are drawing, both free hand and mechanical; mathematics, including some estimating in advanced classes; shopwork; and English. Practical work in the shops is all done in miniature, both for want of space and because the appropriation under which the department operates does not provide for sufficient lumber for full size operations.

About 125 new mechanics a year have been trained under the new plan, and at least 95 per cent of the apprentices, it is said, complete their time and become journeymen. No system of progressive training on the job has been undertaken, and except for reliance on the journeymen there is very little check upon the boy on the job. "We never know anything about that end of it unless there is a formal complaint brought before the council by the boy or the employer," the secretary of the council said. "The business agents give the matter what attention they can, but that is very little." There is no coordinator in carpentry, and reports of school attendance and work go to the secretaries of the local unions, who enforce the penalty of extended time for failure to attend school or not as they see fit.

The reported enrollment of carpenter apprentices is 600, some of whom are in shops and mills.

TROWEL TRADES

Control of apprenticeship in all the trowel trades is vested in the respective joint arbitration boards, under joint agreements between

the unions and the organized employers. While functioning in practically the same way, the results and the proportionate numbers of journeymen produced show considerable variation.

BRICK AND STONE MASONRY

The use of apprentices is a generally accepted practice among mason contractors, and while it was reported that probably not more than half of the legitimate contractors in Chicago carry their quota of apprentices, it was also stated that the practice is growing to a point where they are training all the trade can absorb. In fact, in the opinion of the secretary of the associated builders, "Chicago has altogether too many bricklayer apprentices."

The training period is three years, and for several years an average of 300 mechanics annually has been added by the apprenticeship route. Contractors who are party to the joint agreement between the union and the associated builders may take on one apprentice each year. There is a provision in the agreement allowing for transfer of a boy from an idle to a busy contractor, but according to the secretary of the association, that problem has never come up within his knowledge, for "the contractor who carries his full quota of apprentices is not the kind who runs out of work, and even the little fellows can keep one boy going."

The bricklayers' union operates its own apprentice school. It employs six instructors and holds classes in its own hall. Apprentices residing in Chicago are required to attend one night each week for two hours during the school term, from October 1 to March 31. The reported enrollment is about 200. That is less than one-fourth of the total number of indentured apprentices, but it was explained that since the jurisdiction of the union covers Cook County, a large proportion of the boys live and work at points too far from the city to make compulsory attendance at the union's night school practicable. They are "supposed" to go to school in their own neighborhood, but quite apparently that matter is not pressed. The courses taught at the union's school are blue-print reading, drawing, and mathematics, with estimating in the third year. The union opposes teaching practical bricklaying "on the school floor" with the assertion that "the place to learn bricklaying is on the wall."

An apprentice secretary is employed by the joint arbitration board to look after the boys, their interests and training, and all disputed points are brought before the board for adjustment. Fully 95 per cent of the trainees become journeymen.

TILE SETTING

Apprenticeship in tile setting is regulated by hard and fast rules embodied in a joint agreement and administered by the joint arbitration board of the union and the associated dealers. Only members of the tile dealers and contractors' association are granted apprentices. This means, in practical application, that 70 per cent of the contractors are training apprentices for the industry, and, moreover, that the large shops which carry the full quota of three are doing a considerable part of that training.

All apprentices are taken from the tile setters' helpers. Fairly wide latitude is given in choosing which helpers are to be given opportunity to become apprentices, and a helper must have 18 months' experience before he becomes eligible to an apprenticeship. He then serves two years. This system really works better, in the opinion of the chairman of the joint arbitration board, than taking wholly inexperienced boys as apprentices, because in 18 months a good helper can pick up much valuable experience, and "he comes to us with the rough edges pretty well worn down. Of course, it would be very much to our advantage if we had more voice in the selection of helpers, but as it is we get fairly promising material."

The union regulations allow one apprentice to five journeymen, two apprentices to seven journeymen, and not more than three apprentices to a shop. All of the contractors in the association and covered by the agreement carry their full quota. According to the chairman of the joint board and other tile contractors, the quota is entirely too small to meet the demands of a rapidly increasing business. "There are never enough mechanics," one contractor stated. "In serious emergencies 'permit men' are taken from the helpers' union. At the present rate of training it will take at least six years to create a sufficient number of mechanics to meet the demand."

Union quota, however, is only one restrictive element, an official of the tile dealers' association pointed out:

> The dealers who are not members of the association are holding down the number of mechanics as effectively as does the union limitation. The ruling that only parties to the agreement may have apprentices can be defended on the ground that only in that way can control be exercised, but it certainly lets the nonmembers out of any obligation or responsibility. And they have the same chance to hire the new mechanics after they are trained as the employer who trained them has.

The joint apprentice plan has been in operation three years and has turned out 150 new mechanics in that time. There were 45 apprentices in training when reported. There is no school work connected with tile-setter apprentice training. Dunwoody Institute is not recognized by the Chicago union and the contractors make no effort to use it. As technical work is not regarded as an essential in tile setting, apprentice training is confined to actual work on the job during the 18 months' preliminary experience as a helper and two years as an indentured apprentice. Trainees invariably complete their time and become journeymen.

MARBLE SETTING

Except that the demand is not so great, the situation in marble setting is very much the same as in tile setting. Very few apprentices are taken on, and most of them are sons or other relatives of men in the trade. The reported enrollment of trainees is 13, which is one apprentice to every 20 journeymen in the union.

The only school work available is that provided by the National Association of Marble Dealers at Knoxville, Tenn. Ten of the 13 indentured apprentices have taken a three months' intensive course at the school, at the expense of the employers.

The apprenticeship term is three years as an apprentice and one year as junior journeyman with the same contractor. The record of completion is given as 100 per cent.

PLASTERING

Apprentice regulations are incorporated in the joint working agreement of the contracting plasterers' association and the local union of operative plasterers, and provide for formal indenture and control by the joint arbitration board. Any plastering contractor covered by the agreement may have two apprentices irrespective of the number of journeymen employed, but he must provide continuous employment over a four-year period.

While there are many apprentices indentured, and contractors as a rule have at least one at all times, the organized system which obtained a few years ago has collapsed, apparently through lack of interest on the part of all concerned. The joint arbitration board does not function actively in apprentice matters, and, judging from report, the present administration in the union is not interested in the subject.

A part-time school system was in effect in the plastering trade for several years, plastering being one of the first trades to take advantage of public-school cooperation. But through laxity and waning interest the plan has been abandoned entirely. "Everybody had a hand in killing it," an official of the contractors' association said. "The contractors found it inconvenient to let the boys off, the boys were perfectly willing not to go, and the union did not press the matter."

There is some talk now of reviving school work and providing for workable penalties such as the other crafts use for noncompliance, but, as one man put it, "Some one who really means business will have to take it in hand if it is to be put over properly." It was stated that most of the apprentices now in training—the last survivors of the active movement of several years ago—have about finished their time, and that new ones are not coming up to take their places.

CEMENT FINISHING

The statement of the cement finishers' union with regard to apprentices was—

> We have a good apprenticeship clause in our agreement, but no apprentices. It seems impossible to find any young fellows nowadays to take up the work—it's too hard work.

MISCELLANEOUS TRADES

Two other trades have joint agreements with contractors' associations already discussed. These are the lathers, with whom the contracting plasterers' association has a contract, the apprentice terms of which are practically identical with the agreement covering plastering except in the matter of quota; and the roofers, with whom the sheet-metal employers' association has an agreement. Neither indenture nor continuous employment is provided for in either case, however. In roofing the agreement stipulates the nature of the work that may be performed by first, second, and third year apprentices,

and the business agent of the union places them on jobs calling for their respective stages of advancement. Helpers are promoted to apprenticeships as needed. Twenty-six are serving as apprentices at the present time.

Asbestos worker apprentices are not under formal indenture, but serve their full time generally with the same employer. The working agreement calls for one apprentice to each five journeymen, and this quota is always kept. The joint arbitration board directs the training of the boys both on the job and in the school which is operated jointly by the employers' association and the union. This school is an evening class in blue-print reading, drawing, and mathematics, held one night each week during the fall and winter months, which apprentices are required to attend. It was reported that there are always more applicants for apprenticeships than can possibly be accepted, and that the boys all finish their time and become journeymen.

Structural-iron workers, elevator constructors, and hoisting engineers follow the helper system entirely, the helpers becoming journeymen or not as conditions determine.

CLEVELAND

One of the most highly developed apprentice systems in present operation is that of certain of the building trades in Cleveland, Ohio. Cleveland is a "closed shop" city in building construction. Except for a negligible amount of repair and remodeling work handled by small shops, all building in Cleveland is done by union labor. The statement was made by representatives of employers' associations and by large contractors that the erection of new buildings, even on the smallest scale, by nonunion men would be impossible. Contractors in the various building lines are also pretty well organized in trade associations. Hence there existed sufficient organization to provide the machinery through which a program could be worked out and launched. Owing to the degree of organization also, the system adopted is of fairly wide application, so that a report on the apprentice situation in Cleveland can be made with fewer of the exceptions and modifications and reservations which confuse the issue in other communities.

Not all the building crafts are identified with the system, however. Thus far it is confined to bricklaying, carpentry, electrical work, painting, paper hanging, and decorating, plumbing, and sheet-metal work.

MACHINERY OF SYSTEM

The Cleveland apprentice system operates through committees of contractors and workers cooperating with each other and with the department of vocational education of the Cleveland public schools. Each craft has its own trade apprentice committee, which is the administrative agency for that craft. Two members from each trade committee, one chosen by the employers and one by the union, and two representatives of the general Building Trades Employers' Association, form the "General Advisory Committee on Apprentice Training in the Building Trades." Seated on this general committee

also are two members representing the department of vocational education of the city board of education, which is identified with the State and the Federal boards for vocational education.

OPERATION OF SYSTEM

The guiding tenet of the system in operation is to "establish a training program in response to the demand of those in a position to guarantee continuity of employment for those receiving the training," [4] and to guarantee continuity of employment. To that end one of the chief functions of the trade committees is to determine the extent of the demand and the number of apprentices which the trade can support.

In practical operation the plan works thus: The contractor and the candidates for apprenticeship make written application to the apprentice committee of the trade in which they are interested; in the first instance for a boy to place, in the second, for placement. Tentative selection of candidates is attempted through interviews and the enforcement of certain requirements which boys applying for apprenticeship must meet. The age limit varies somewhat for different trades, the minimum of 18 set by the State compensation law being the influencing factor in bricklaying. The regulations imposed by the department of vocational education, which include a grammar school education or its equivalent and a satisfactory physical examination, also act as an eliminating agent. Only those contractors who fulfill certain requirements of the committee in the matter of length of time in business, reliability, and so on, are granted apprentices.

Placement of the boy desiring training with the contractor applying for an apprentice follows acceptance of the applications by the committee. Then comes a probationary period of from one to six months, during which either side is free to end the relation. At the conclusion of a satisfactory probation, however, an agreement is entered into between the employer and the boy, the parent or guardian of the boy acting as "the party of the third part." This agreement is for the full term of apprenticeship, dating from the beginning of the probationary period. In plumbing the apprentice agreement is governed by the joint agreement between the associated plumbing contractors and the journeyman plumbers' union and the rules of the joint apprentice committee instead of by contract between the employer and the apprentice. In bricklaying, carpentry, painting and decorating, and sheet-metal work an individual contract is made.

In general, these agreements cover wage rates for the term of the indenture, and bind the boy to "serve his employer faithfully and honestly," to "remain faithfully in the employ of the party of the second part," and "to attend the apprentice school" during his term of apprenticeship. The employer is obligated to pay the wage rates specified, "to permit attendance of the party of the first part at the apprentice school," to "pay said first party for such designated hours as he attends school at his established rate per hour," and "to provide party of the first part with employment at his trade during his term of apprenticeship if possible, or to make an effort to secure employ-

[4] Cleveland Board of Education. Division of Vocational and Practical Arts Education. Cleveland Plan for Apprentice Training, Cleveland [1926?]. p. 1.

ment for said party of the first part with some other bona fide contractor" at the trade. All parties "agree to comply with all the rules and regulations formulated now or hereafter by the apprentice committee."

JOINT APPRENTICE COMMITTEES

The apprentice committees are working bodies responsible for the apprentices and the successful administration of the apprenticeship agreements. They meet regularly and act on all matters pertaining to the apprentice system. They are the trial board and the means of disciplining both boys and bosses for infractions or violations of the apprentice rules and agreements.

An employer can not discharge a boy indentured to him except with the consent of the committee after a hearing before the committee. If a boy leaves the employer to whom he is indentured he is brought before the trial board and discipline is determined on the merits of the case. Generally, through the cooperation of the union, a boy who willfully breaks his contract is denied any further opportunity to get into the trade.

All disagreements and difficulties on the job are adjusted by the committees and occasionally the school instructors bring cases before them for discipline.

The committees act as the placement medium when it is necessary to transfer apprentices from their employers to other contractors on account of lack of work. Sometimes a committee is called upon to effect transfers of apprentices between contractors when prejudice or incompatibility is jeopardizing a boy's chances for success.

DIRECTOR OF APPRENTICES

Because continuity of employment is absolutely necessary to hold the boy and hence to the success of the movement, the matter of transfer from idle to busy contractors is a vital one. For this reason the number of trainees is kept at a figure which in the opinion of the trade committee and of the school authorities is justified by the building outlook. To facilitate necessary transfers and to keep close track of building operations and of the boys themselves, the building trades employers' association employs a director of apprentices. This official acts as a placement officer and recruiting agent (recruiting contractors, however, rather than apprentices), and as a truant officer for the employers. His is a full-time job devoted to the progress of the boys on the job and the orderly working out of the whole plan. His work parallels somewhat, on behalf of the employers, the work of the coordinator representing the school. In addition to these two full-time officials, the carpenters' district council employs an extra business agent whose sole duty is the supervision of the apprentice carpenters on the job and the enforcement of all the rules and regulations governing them.

CLEVELAND APPRENTICE SCHOOL

All apprentices indentured to the carpentry, bricklaying, electrical, painting and decorating, plumbing, and sheet-metal trades must attend the apprentice classes of the department of vocational education of the public-school system at the time set by the department.

The apprentice goes to school during working hours and is paid by his employer for this time in school just as if he were on the job. Carpenter and bricklayer apprentices attend school four hours each week. The complete course is four years of 48 weeks each—768 hours. Painter apprentices attend school a full 8-hour day every other week, 48 weeks in the year, for 3 years. Plumbing, sheet metal, and electrical classes are also 8 hours every other week, with a four-year term of 48 weeks a year.

The vocational teachers are and, under the rules of the board of education must be, practical craftsmen in recognized standing in their trades. In addition they are required to take the professional teacher-training courses under the Cleveland Board of Education as provided in the Federal vocational education program through the Smith-Hughes Act.

Following a trade analysis by representatives of the trade working with the shop teacher and the teacher trainer, a course of study is established. The teaching method is chiefly by instruction sheets and demonstration and close supervision of actual operations.

> Every effort is made in the school to duplicate actual working conditions Mathematics, blue-print reading, etc., are not taught as separate subjects, but are definitely tied up to the trade operations upon which the pupil is receiving instruction.[5]

In September, 1926, the apprentice school moved to new quarters, affording more room with improved facilities and equipment. Instructors expressed themselves as being generally well satisfied with equipment and materials for class work, although some of the expensive equipment necessary in the plumbing and electrical shops "comes slowly" through school-board channels. Much of the equipment has been contributed by dealers and contractors, and the materials used in the carpentry, painting, paper hanging, and decorating classes are donated by the material dealers and the trade associations.

Coordination between class work and the job is undertaken through the services of the coordinator employed by the department of vocational education. There is difference of opinion as to how far correlation of the two forms of training is either practiced or possible. Some contractors say that correlation is not possible, that the only practical course is for the boy to go along with the journeyman on the job, doing whatever is required of him, regardless of previously acquired experience, and leave to the school the technical and theoretical work which can not be acquired on the job. Others take the position that the only way they can realize any return on the investment of paid-for time in school is to confine the boy to applying successively on the job the technical knowledge and practical experience acquired in school. This point of view seems to be more applicable in painting and decorating than in other lines.

Both apprentices and employers are responsible for school attendance. Lost time must be made up. If the absence is chargeable to the boy he must make up the work on his own time. If the employer is to blame—through failure or refusal to release him from work to attend class—he must pay the boy his regular scale while he is making up the lost class work. Some of the unions have fines and other disciplinary devices in addition to extended time.

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[5] Cleveland Board of Education. Division of Vocational and Practical Arts Education. Cleveland Plan for Apprentice Training, Cleveland (1926?), p. 5.

Attendance, however, is remarkably good, according to the instructors. Their most difficult problem, they say, is that of dealing as a group with the diversity of material presented by boys some of whom are high-school graduates and others of whom must be sent to night school to learn to read and write English.

Pupils of the apprentice classes are graduated upon the completion of their terms, just as are the pupils of the other departments of the public schools. Their diplomas are a prerequisite to becoming journeymen.

ELECTRICAL WORK

The electrical trade presents a number of differences from the general plan. The system is newer and not so well organized, and a depression in the trade since its inauguration in 1925 has prevented its successful development.

So far apprentice contracts such as are used in the other trades have not been drawn up for the electrical apprentices. The boys are in effect indentured to the union. During their first year they are assigned to stock room and warehouse work, learning the various kinds of apparatus and its uses and care, and ordinarily remain with the same contractor for that year. After the first year, when they are put on construction work, the union becomes the placement medium, the contractors applying to the union for the apprentices needed on a certain job and releasing them when the work is finished. Allotment is made on a basis determined by the joint committee.

Two recent strikes in Cleveland, first the strike of the building laborers and later that of the painters, have delayed construction and dislocated electrical work materially. In consequence apprentice training has been interrupted and steady employment difficult to maintain. As a result of this uncertainty, the joint apprentice committee has closed the trade entirely to beginners for the present.

SHEET-METAL WORK

The sheet-metal trade is the latest to become identified with the Cleveland system. School work in this craft was begun as recently as February, 1927. Prior to that time there was no real apprentice system, and what little training there was seemed to be the result of the interest and efforts of a few men in the trade. A persistent effort to inaugurate a system was made by some of the officials of the contractors' association, and in spite of opposition and lack of sympathy from some of the members they have succeeded to the point of securing a committee and an agreement and starting school training. It is reported that probably 85 per cent of the sheet-metal contractors are now actively participating in the training program.

School work is of course not so well developed as in the older classes. A tentative course of study has been prepared and is being tried out. At present the school period of one full day of eight hours every other week is being divided equally between shop work and related subjects. The intention, however, is to spend more time in the shop than on related work. The shop includes in its excellent equipment the unusual feature of an oxyacetylene apparatus.

EXTENT OF APPLICATION

Cooperation with the apprentice system on the part of the building contractors in Cleveland is quite general. Comparative figures showing what proportion of all the contractors in a trade employ apprentices would not be significant because a fair percentage of the total number are small operators who under union rules would not be entitled to apprentices and who could not qualify under the building-trades employers' association requirements of stability and business standing. The general contractors (carpenter and mason contractors, chiefly) are about equally divided between those who do and those who do not employ apprentices. But the group employing apprentices represent at least 80 per cent of the reputable, established contractors, and do about 80 per cent of the business. Most of the painting and decorating contractors come within the system in normal times, but at the time of the investigation the painting trade was seriously disrupted by a prolonged strike. The largest plumbing contractors are strong supporters of the system, but probably a smaller percentage of eligible master plumbers are participating than contractors in other trades. The master plumbers' association embraces about one-third of the master plumbers of Cleveland, and about one-half of its members employ apprentices under the system. Members of the electrical contractors' association are required by the rules of the organization to employ apprentices and to assist in their training. While the membership of the association is not large, it includes the important contractors handling the big jobs. All sheet-metal contractors running union shops are now employing apprentices under the new plan.

The latest reported enrollment figures in the six trades under discussion are given as follows: Bricklaying, 227; carpentry, 218; electrical work, 109; painting, paper hanging, and decorating, 86; plumbing, 143; sheet-metal work, 75. These figures are as of a given day. The number varies, of course, as apprenticeship terms are ended and begun.

As already suggested, the basis for determining the number of apprentices to be taken into the respective trades is not a theoretical or arbitrary ratio of apprentices to journeymen as set forth by union rules. Rather it is the number which the trade can absorb and support and, of equal importance, the number which the school can care for properly with its present facilities of equipment and staff. In fact, the department of vocational education is largely the determining factor with respect to the number of trainees taken on. It insists upon continuous employment, and also upon keeping the number down to the actual requirements of the trade, as nearly as that can be determined. As the director expressed it:

> The city of Cleveland can not afford to put a boy through four years of training for a trade, and at the end of it find him running a delivery truck because he can't get work at the trade for which the city has trained him.

Indifference to the system on the part of the carpenter, brick mason, and decorating and electrical contractors is being rapidly overcome and many of them carry the full quota of apprentices allowed them by the rules of the union and the committee. This

is not so true of the master plumbers. Two of the largest operators commented thus on the situation in the plumbing trade:

If every contractor in the city would keep his quota filled we could train plenty of plumbers to take care of new business and fill vacancies left by death and other causes, even as fast as business is increasing in Cleveland. There should be 225 apprentices instead of 120 as at present. That many could be absorbed and trained adequately. The union is doing its part—the fault lies with shortsighted contractors who are afraid of losing money. Under the present system an employer is practically assured of the boy's services for four years at learners' wages. Maybe he does lose money the first year, possibly even the second, but he is not losing anything after that.

The union regulations as to the ratio of journeymen to apprentices is fair and would keep the journeyman ranks filled if contractors would do their share. The union has always been liberal in the matter of letting an apprentice remain with the employer after his journeymen have fallen below the required number, if the falling off was due to trade conditions and the boy himself was getting a square deal. The real difficulty is with the contractor, who can't see any advantage in using apprentices—which in most cases means he can't see any profit in using them.

One contractor gave this as his reason for not employing apprentices in his large plumbing business:

The men don't like to work with apprentices, and we find it pays us much better to defer to them.

On the other hand, in other trades there was some criticism of the limitations imposed by unions and apprentice committees on the number of trainees. One general contractor, employing on an average, 40 masons and 75 carpenters, said that he was allowed only two bricklayer and two carpenter apprentices, although he could use eight. Just at present he has two extra bricklayer apprentices, "borrowed" from another contractor.

Dissatisfaction is strongest among electrical contractors, especially the small operators who under the present arrangement can not have a first-year apprentice at all. Under the agreement a first-year apprentice is permitted only in shops employing an average of 10 men during the year. This rule, of course, means that only the largest contractors can put a boy in their shops and stock rooms. While it is defended by the committee as being necessary at present, it will mean, the contractors contend, that after the present large class of senior apprentices graduate into journeymen, there will be for several years practically no apprentices in the city. The committee replies that the rule can be changed and new classes started at any time a real need arises.

RECORD OF COMPLETION OF APPRENTICESHIP

After the preliminary weeding out of misfit, dissatisfied, and incompetent entrants during the probationary period and the first few months following indenture, practically 100 per cent of the apprentices complete their terms and become journeymen. On this point some of the unions reported 95 and some 98 per cent completion. The electrical workers claimed 100 per cent in their trade. School records are more exact than those of the unions and support the statement of union officials that there is very little dropping out during apprenticeship.

The carpentry instructor has an elaborate record of four years' experience with the apprentices, which shows less than 5 per cent elimination over an indenture period. More than half of those who left before their time was up did so because their families left Cleveland—in most cases going to Florida. All of these boys took apprentice clearance cards with them, expecting to complete their terms in their new homes. Three others went into the Navy, and ill health forced out another three. Only two simply "cut" classes and broke their contracts.

Contractors make similar reports, most of them saying that in their own shops they "don't remember a case where a boy has just dropped out. Once in a great while they find they are physically not qualified, and sometimes conditions at home make it necessary, but most of them stay." Employers told of cases where boys have returned to complete their terms after long absences for illness, and not infrequently after adventuring in fields offering far more money at the time.

The bureau representative had an opportunity to find out something of the effect on the system of a serious trade dislocation. At the time of the investigation a strike of the painters had been in progress for 20 weeks. Enrollment in the painting school before the strike was called was 88. Most of the apprentices were called out with the men, although several were left in shops where they worked only in the shops and no outside work was attempted. School attendance fell off, but to just what extent seemed to be a matter of considerable dispute. Fifty-six of the 88 were in school, and the union officials stated that they were insisting that the boys attend class as usual. The director of apprentices for the building trades employers' association reported that a considerable number had taken other jobs. Whether or not they would return to the trade after the strike was settled remained to be seen. It was generally felt, however, that there would be no serious disruption in the long run.

CONTRACTORS' OPINIONS OF PLAN

Enthusiasm over the practicability of the system and the definite good accomplished was universal among the contractors interviewed. School training, they feel, is bridging a gap between practical and technical knowledge which can not be crossed in any other way, and is, moreover, proving a means of discipline and assimilation which the employer can not maintain; while the indenture system is producing a stability that is going far toward insuring a steady supply of good labor. Many contractors said that the best mechanics on their force were the apprentices who had been trained under the Cleveland system, and a number of them said, substantially, that "apprentice training by the Cleveland method is not only making better mechanics, it is making first-class foremen, who in their turn will know how to train the apprentices under them."

Even the contractors who do not employ apprentices made no criticism of the system and its results. They merely do not see the necessity or the value to them individually of cooperation with the movement.

Some contractors and one of the teachers feel that better material could be obtained and better results achieved with a raising of the age limits. Their position is that boys of 16 and 17 are too immature and irresponsible to be expected or required to take on the obligations of apprenticeship. As the teacher put it:

> The boys of 16 and 17 come to school and drift through the first two years. About the third year, at 18 or 19, they wake up, and then they are all eagerness to learn the things they should have been learning all along. So it all has to be done over again. If they were older when they begin they would get more out of it.

APPRENTICE SYSTEMS IN OTHER BUILDING TRADES

There is no system of apprentice training and no definite organization governing apprenticeship in any of the other building trades in Cleveland. In fact, conditions are more or less chaotic.

PLASTERING

As related by the secretary of the operative plasterers' local union, a few years ago there were no plasterer apprentices in Cleveland, and complaint was general that union restrictions were practically closing the field at a time when workers were seriously needed, particularly in ornamental work. The union accordingly removed all restrictions and permitted contractors to register and indenture as many boys as they felt they could keep in employment and absorb into the trade. There were at the time of the investigation 64 registered plasterer apprentices, and, according to the men, the contractors were experiencing considerable difficulty in providing steady work. One contractor with a big job on hand was providing employment for boys apprenticed to two other contractors in addition to his own. There were 160 plastering contractors on the union's "fair list."

To meet an urgent need for training, especially in the ornamental line, the contractors founded their own school, sending their apprentices one day a week for class instruction. The school ran for nine months, but the expense was prohibitive and it was given up.

The plastering contractors' association which, its secretary states, "represents 20 per cent of the contractors and controls 80 per cent of the work," requires its members to employ one or more apprentices. The use of ornamental plaster is growing enormously, and the need for skilled operatives is acute. A committee of the association has been studying methods and results in plastering schools elsewhere, preliminary to going on with their program of school training in the Cleveland apprentice school. To date, however, the trade has not become part of the system.

LATHING

Union regulations governing apprentices to the lathing trade allow 1 apprentice to the local union and 1 to each 10 members of the local. Apprentices are indentured to the union, and allocation to contractors is controlled by the joint conference board of journeymen and employers. The usual practice is to allow one apprentice to a contractor, but by transfer through the board contractors with large

jobs frequently take over the boys who are not kept busy by their own employers.

At the time of the investigation the number of apprentices (38) in the Cleveland local exceeded its normal quota. The explanation given was that it is the practice for apprentices to pay their initiation fees in installments out of their earnings, and that as the past season had been a very poor one there were seven or eight boys who had completed their time but had not met the financial requirements for journeyman membership. They were therefore still carried on the rolls as apprentices, although as a matter of fact they were at the time not working at all. It was reported that many of the apprentices were idle.

The executive board of the local union is the governing body in all matters pertaining to apprentices. The only contractual relation between the apprentice and his employer is through the working agreement of the union. The shop steward is responsible to the executive board for the training and progress of the boys, and the boys themselves appear before the executive board once every three months throughout their term for rating on competency and adjustment of their wage scales. Competency is determined by vouchers from the journeymen under whom the boy is working. The apprenticeship term is two years for wood lathers and three for metal lathers, but metal lathers must spend the first six months working in wood. The secretary of the union stated that all of its apprentices finish their terms and become journeymen. He also said that there is a long list of applicants awaiting openings.

OTHER CRAFTS

Roofing apprentices were found only in the slate and tile branch, and even there they were confined to two or three large operators, only six apprentices being listed by the union. The union has no apprenticeship policy or program of training. Evidently such apprenticeship as exists grows out of the desire of individual helpers in the craft to become journeymen. In composition roofing no apprentice system is followed, and the local union is, in fact, opposed to any system. It is a limited-membership organization. When more men are needed to meet an emergency of rush work the union gives temporary permits to the "handy men" among the roofers' helpers or in the building laborers' union.

Elevator constructors employ the helper system instead of the apprentice system, because, it was stated, the work is too heavy for boys and not difficult to learn. Practically the same situation exists among the structural and ornamental iron workers, whose union reported 12 apprentices, principally in ornamental work. The system is so casual as scarcely to justify calling it apprenticeship, however, and not more than half of those who enter serve the required two years.

DETROIT

Detroit has an apprentice school under the Smith-Hughes Vocational Education Act, in which six building trades are participating—bricklaying, plastering, metal-lath erection, plumbing, steam fitting, and electrical work. With the exception of plastering, class work is

given one-half day (four hours) weekly. Plastering apprentices attend school one full day of eight hours every other week.

Joint apprentice committees composed of representatives of the employers and of the journeymen are the controlling agency in all trade matters, while a representative of the board of education is an ex officio member of all committees.

The instructors are employed by the school board after being selected by the joint apprentice committee of each trade. They must be skilled craftsmen at the trade they are engaged to teach and must attend the teacher-training classes outlined by the State university under the State supervisor of vocational education.

No formal courses of study for the apprentice classes are prepared or followed. Textbooks are used to some extent in bricklaying, but instruction is chiefly in manual work. Drawing, mathematics, and other technical subjects are taken up in their relation to the practical work, not as separate subjects.

A boy desiring to become apprenticed to one of the trades mentioned, who meets the school board's requirement of ability to speak, read, and write English and one year's residence in Detroit, may appear before the joint apprentice committee of the trade he elects to follow. After a satisfactory interview he is registered by the committee and given permission to find a job with an employer willing to apprentice him. If successful, he appears again before the committee and is put on one month's probation. The school subjects him to a physical and mental examination "if obviously needed." At the end of the month he becomes a regularly indentured apprentice under the rules of the committee and the school.

In bricklaying and plastering the boy is formally indentured to his employer under a contract which binds him to remain with the employer for the entire apprenticeship term at a specified scale of wages and to attend the apprentice school as required by the regulations; while the employer agrees to keep the boy for the entire term, pay him the specified wages, send him to school during working hours, and pay him his regular scale for his time in school.

The joint apprentice committee for each trade is the administrative body in all matters pertaining to apprenticeship and the enforcement of agreements, and is a trial board for disciplining violations of rules and regulations on the part of either apprentices or employers. Contractors can not discharge boys indentured to them except with the consent of the committee after a hearing of both sides to the dispute. Similarly, the committees have been successful in bringing sufficient pressure to bear, through the unions and the boy's family, to force boys who break their contracts to return to their employers, even to the extent of bringing back to Detroit boys who had run away to other cities.

Theoretically this system applies to all building contractors and is open to all of them. Actually its use is confined largely to union contractors, and the representatives of the workers on the joint apprentice committees are union officials. The system is most highly developed and perfected in bricklaying and plastering, in which lines the school has been operating since March, 1924. Union organization is also strongest in these crafts.

BRICKLAYING

There are three trade associations of mason contractors in Detroit, the smallest of which, the General Builders' Association, is composed of contractors who may also hold membership in one of the other two. The membership of the other associations includes union and open-shop contractors, the division being one of race, not of economic policy. The Master Masons' Association is composed of Jewish contractors; the Mason Contractors' Association, of Gentiles. It is stated that 80 per cent of the reputable, established contractors are represented in the two associations. The master masons report that all of the member contractors employ apprentices under the joint committee plan, and "a large majority" of the members of the Mason Contractors' Association are also identified with the system.

Nevertheless there is general complaint that the number of bricklayer apprentices is insufficient. Union regulations allow one apprentice to each five journeymen, with a maximum allowance of five to any one contractor. Average enrollment for the school year ending in 1926 was 239 apprentices. The number in training was substantially smaller in the fall of 1927, when 176 were reported, indicating that new boys are not being taken on as the older ones are graduated.

The secretary of the Mason Contractors' Association expressed the opinion that there should be twice as many in training, and that eventually, as more contractors become interested in the movement, there will be. A strict construction of the union ratio of 1 to 5 would allow for well over 500, he pointed out.

Only one contracting firm among those visited employs the maximum of five apprentices. An official of that company said:

> It isn't a question of union restrictions at all. We have never yet reached the point where the demand for apprentices on the part of the contractors approximates the number the union is willing to grant.

The largest open-shop construction concern in Detroit employs no apprentices. Contractors operating on a smaller scale than the one previously referred to point to the requirement of continuous employment as their reason for not filling their quota. They take on as many as they can keep permanently employed, and they feel they are doing their share when in addition to keeping that many they occasionally take onto their own force boys whose employers are temporarily idle.

Dissatisfied with the small increase in the number of journeyman bricklayers by the long apprenticeship method, and faced with an actual shortage, the General Builders' Association established its own bricklaying school in 1922. It is an intensive six-month trade course, not an apprentice school. It was started chiefly as a protest against the maximum age limit of 21 imposed by the bricklayers' union. Men of any age or any calling are admitted. Day and night classes are held and a large proportion of the students are factory workers who desire to get into the trade. Tuition is, of course, charged. It is admittedly chiefly a "feeder" for the open-shop contractors, although it was reported that while the association makes no attempt to place its graduates directly with Detroit contractors, they work back into the trade in Detroit after acquiring some experience in small towns throughout the State.

PLASTERING

The Detroit plastering apprentice class is regarded by contractors generally as following an excellent system and producing excellent results. It is one of the models chosen for study by apprentice committees in other localities. As expressed by a union member of the allied apprentice council, the program "aims at making every apprentice not only a good practical man but a skilled ornamental plasterer as well."

An acute shortage a few years ago, especially in the ornamental and molding line, compelled the adoption of a recruiting and training program. Since the school was started, in 1924, about 50 apprentices have been graduated and there are now 65 in training. That is not enough, according to both union and trade association officials. While the supply of applicants for training is more than ample, not more than half the contractors are cooperating in the movement. As is the case everywhere, a small percentage of the large operators are carrying the heaviest part of the burden, keeping their quota full and keeping the boys in school and employed throughout their terms, and frequently relieving contractors who may be unable to keep their own apprentices busy. Several of the important contractors operating under union agreements have not yet been induced to take apprentices, although they admit the need of more skilled men, particularly in ornamental work.

LATHING

Classes in metal-lath erection have been added recently to the Detroit Apprentice School, apparently at the insistence of the plastering contractors. The present enrollment is 12, an average of four a year having been graduated since the class opened. The unions, of which there are two, are not enthusiastic about apprenticeship in the trade. According to officials of both locals, the trade is already flooded, is not a skilled trade at all, and in Detroit is not well enough organized to control trade conditions.

PLUMBING AND STEAM FITTING

Organized apprentice training in plumbing and steam fitting is still in the formative and experimental stage. Classes were started in the apprentice school in February, 1926, through a joint apprentice committee composed of representatives of the unions and of the Heating and Piping Contractors' Association. The system is still tentative, and although the matter has been the subject of repeated conferences between the unions and the organized employers, no definite system of indenture or trade training has been adopted.

The heating and piping contractors' association, it was stated, contains most of the big contractors, employing about 50 per cent of the journeyman plumbers and steam fitters, and includes both union and open-shop employers. A second association of master plumbers, the Detroit Association of Sanitary and Heating Contractors, is the plumbing section of the American Plan Association. It embraces and is spokesman for the open-shop employers. To some extent, the two associations cover the same membership, and both state that "most of the big contractors" are members. A third

association is composed of Jewish master plumbers. Through the medium of the board of education each of these three associations has appointed an apprentice committee to cooperate with the school in an apprentice-training program. The plan is for the committees to take the responsibility for the progress and training of the apprentices employed by the member contractors.

The reported enrollment is 80 in the plumbing classes and 18 in steam fitting. School work is confined almost wholly to theory and to related subjects.

As nearly as could be developed in the investigation, the use of apprentices is more general, and more nearly a policy, in the open shops than in the union shops. The apprenticeship period is, however, materially shorter, as the open-shop contractors recognize as a mechanic "a man having two and one-half years' experience at the trade," and generally give apprentices a journeyman rating after three years' apprenticeship.

The head of a large plumbing and heating concern employing only union men said:

> Skilled mechanics are scarce, very scarce. But our experience with apprentices as a solution has been disastrous. We used to try to train boys in our shop, but we always found that labor costs ran too high when we put an apprentice on the job, and we decided they were a liability instead of an asset. Now we follow a policy of keeping a staff sufficient to handle our work, pay enough to keep them with us all year round, and depend upon the union to do the best it can for us when we need extra men for rush work.

One open-shop employer, a small jobber who was a union member when a journeyman, was found who sends his apprentice to the apprentice school. "I can easily afford to do it," he remarked. "He is practically out of his time, and I'm getting a good mechanic for $30 a week."

ELECTRICAL WORK

Beginning in March, 1927, the inside electrical trade in Detroit adopted an apprenticeship program embracing formal indenture and part-time school work. Required class work is one-half day each week and covers both theory and practice. Shop equipment is very good.

The reported enrollment is 243. The apprentice term is four years, but provision is made for shortening it in certain cases. If, at the end of his third year, and upon recommendation of his employer, a boy can successfully pass the examination for journeymanship, his apprenticeship is terminated. If he attempts the examination and fails to pass he may not try again until he has served four months of his fourth year.

TILE SETTING

Tile setting is a thoroughly organized craft in Detroit, and the union and the tile and mantel contractors' association are cooperating, through their joint arbitration board, in the training of apprentices to the number of 1 to each 10 journeymen, with a maximum of 3 to a contractor. Two contractors contended that the allowance is too low, inasmuch as shortage of skilled tile setters is serious

throughout the country. At the same time they agreed that it was true that three were as many as they individually could keep steadily employed.

There are 28 indentured tile-setter apprentices in Detroit. It is the custom to choose apprentices from the helpers, selecting the most promising and ambitious for training, thus having the advantage of semiskilled workers at the start.

For several years classes were held at the apprentice school for tile-setter apprentices, who attended one-half day a week on the employer's time. Last year it was decided to use the national tile school at Dunwoody Institute for all tile-setter apprentices in Detroit, giving them the 13 weeks' intensive training instead of carrying school work throughout the three-year term. The local tile setting classes have been discontinued and contractors are required by the rules of their association to send their boys to Dunwoody.

Judging from reports, contractors in this line in Detroit practice systematic training on the job to an extent not ordinarily found. Two firms reported that apprentice training is a hobby of their superintendents, and they make it their special business to insure intelligent, progressive training under their most skilled mechanics. The first year's training is usually on minor operations such as ordinary floor jobs, the apprentice serving more or less as helper to the mechanic. In his second year the apprentice is given a helper and works under the direction of a mechanic on higher grade floors and walls. During his third year he is still under the direction of the journeyman in highly specialized work and in installation of expensive materials, such as mantels, but works independently on the ordinary run of work.

Both the union officials and individual employers report that apprenticeship terms are invariably completed.

PAINTING

The business agent of the painters' district council reported 150 apprentices registered in the council. Investigation, however, failed to locate any indentured apprentices employed in any of the large union shops. On the contrary, many contractors are definitely opposed to the employment of apprentices.

A committee of the master painters' association, which is composed largely of open-shop employers, has been at work on a training program. While it has met with much apathy, it has developed its plans to a point where classes are being enrolled in the Detroit Apprentice School and school training will shortly be conducted in painting in the same manner as in the other crafts.

An official of the association, an open-shop employer who makes a practice of keeping two or three apprentices, says that the trade is suffering from lack of properly trained workers.

The contractors are apathetic and indifferent, and it is almost impossible to interest Detroit boys in a trade requiring long training at learners' wages because of the competition with manufacturers paying high wages.

SHEET-METAL WORK

Apprenticeship in the sheet-metal trade is methodless and indifferently followed. The union contemplates establishing classes in the apprentice school but has made little progress toward that end. Most of the shops are small one-man affairs. One large sheet-metal and roofing contractor employing as high as 50 tinners and 30 roofers at a time stated that in both lines the work is too seasonal to keep boys busy or interested, and that the workers are almost entirely floaters. The roofing trade is unorganized and one employer said that "so far as I know there isn't a roofing apprentice in Detroit."

CARPENTRY

The statement of the secretary of the carpenters' district council was:

> Detroit carpenters are too poorly organized and too weak economically to attempt an apprentice policy or program. We have no regulations and we couldn't enforce them if we had them. There isn't a carpenter apprentice in the union. The bosses take boys on as handy men and helpers, pay them so much per hour, increasing the amount when the boys begin to learn something about the work and ask for more money.

It was said that apprentices were employed on some building operations, but that Cleveland contractors had the jobs and had brought the boys from Cleveland.

MEMPHIS

While an apprentice system by formal indenture and a definite program is found only in steam fitting and the trowel trades in Memphis, some other trades are following a plan of cooperation between the union and the employers which is serving practically the same purpose as a formal contract. Night-school work is available in the city technical high school for all of the crafts. These classes are not exclusively apprentice classes, of course, but offer technical and practical work to such of the building tradesmen and apprentices as care to take the courses offered. From the reports made by union officials, the unions do not stress school attendance—in fact, in some cases they are indifferent, if not actually unfriendly. School attendance thus becomes a matter to be determined by the boy himself.

Unfortunately, school authorities could not be interviewed, as Memphis was covered during the summer vacation, and all of the trade-school staff were out of town. Figures of enrollment and an estimate of the popularity of evening class work among building trades apprentices can not therefore be given.

PIPE TRADES

The steam fitters, by joint agreement with the heating and piping contractors' association, have abolished the helper system entirely and substituted an apprentice system under the direct control of a joint apprentice committee.

Applications both for apprentices and apprenticeships are acted upon by the committee and assignments are made through the committee. A boy is given a probationary period of six months, after which the employer, if he keeps the boy, must sign an agreement to keep him for the entire four-year term. Similarly the boy agrees to serve the employer throughout his apprenticeship.

All questions of discipline, disagreements between the boy and his employer, and difficulties of any nature, are handled by the committee, and in case it becomes necessary, through lack of work or other legitimate cause, to transfer an apprentice from one shop to another, the committee acts as placement agent.

School attendance is not provided for in the agreement. Night-school work is available in the city technical high school, but the union is apparently not greatly in sympathy with the movement, and is doing nothing to encourage attendance. It was reported that the heating classes are "not popular or well attended."

The reported enrollment of apprentices under the joint agreement, which covers all the shops doing a substantial business, is 27. The large contractors on commercial, or "downtown," work carry their full quota of 3.

It is reported that fully 98 per cent of the trainees finish their time and qualify as journeymen. Journeymanship is attained after four years' apprenticeship by passing successfully the examination given by the joint apprentice committee. The fifth year is served as junior journeyman before the full union wage is paid.

Cooperation between the union and the employers is not so close in the plumbing trade as in steam fitting, and there is no actual indenture of apprentices. The master plumbers' association indorses the plan and program of the National Association of Master Plumbers with regard to apprentices, and is endeavoring to put it completely into effect in Memphis.

In plumbing the initiative in acquiring and training apprentices is always taken by the employer. The union is strictly a journeyman's organization and attempts no control over apprentices beyond regulation of the number that may be employed in a union shop. The secretary of the Memphis Master Plumbers' Association stated that practically all of the employing plumbers doing a business large enough to justify keeping an apprentice are doing their share toward the training of new men and are making every effort to produce good mechanics. As a rule a boy stays for his entire term with one employer, a system which the masters plumbers' association is trying to make obligatory. Both the association and the union encourage school attendance. Evening school work is under the direction of a master plumber and the course as outlined by the trade extension bureau of the National Association of Master Plumbers is used.

School enrollment was not obtained. Neither, in fact, is there an exact figure of the number of apprentices now in training. The union reports 44 in the union shops; the association gives 36 as the number employed by member firms. Of course a considerable number of this 36 is included in the 44 reported by the union. Both organizations agree that 60 is probably a very close estimate of the total number.

A few of the large union shops are carrying their full quota; two, at least, of the shops entitled to a maximum of five apprentices are keeping that number in steady employment. The apprentice committee of the master plumbers endeavors to see to it that the open shops do not take on more boys than they keep in continuous employment, and to prevent boys from changing from shop to shop. Fully 95 per cent of the trainees complete their time, it is stated.

TROWEL TRADES

The plasterers' union reported 12 apprentices indentured to contractors by formal agreement signed by the employer, the union, and the apprentice and his legal guardian. This agreement calls for continuous employment over a four-year term. Contractors who can live up to the terms of the agreement are permitted to take on two apprentices if desired. A few of the leading contractors have two. The union reported that while it "encourages" attendance at night school on the part of the apprentices, it does nothing definite in promoting school work. It was stated that apprentices invariably complete their terms.

In open shops a casual "hire and fire" system is the rule, with no obligation on either side. One exception was found, in which an open-shop contractor had trained an apprentice in ornamental work. He was in his third year, but had never been indentured nor obligated in any manner, being held rather through mutual advantage.

The bricklayers' union reports 30 apprentices in training, two of whom are tile-setter apprentices. Under the rules of the union a contractor is granted an apprentice every two years. However, it is generally conceded that the trade has reached saturation point for the present, and the apprentice rolls have been closed until some of those now in training finish their time, or until increased building justifies further expansion. Both the union and the contractors stated that the trade is oversupplied in view of the "continuous employment" provision in the agreement. Practically all the master masons have their quota of apprentices and as building has slowed down materially from the high peak of the past few years, they anticipate difficulty in continuing their training.

Part-time school training was in effect for two years, contractors sending the boys to school on Saturday morning on paid-for time, and the boys on their part attending one evening session during the week. This plan has collapsed, apparently through a general lack of interest, and no attention is now being paid to school work save by a few individual apprentices who take advantage of night work at the technical high school on their own initiative.

ELECTRICAL WORK

The working agreement between the electrical workers' union and the electrical contractors allows one apprentice for each journeyman. Present conditions in the trade, however, do not permit carrying the full quota, and apprentices are not now being taken on. Seventy-five are reported as in training, which is about 25 less than the full allotment. These apprentices are not under contract, and while it is

the desire of the union to have apprenticeships served under one employer, there is no requirement to that effect. The union takes the responsibility of furnishing continuous employment, and the business agent undertakes a general supervision over the training and the opportunities for diversified work which the boys receive. About 80 per cent, according to his figures, complete their training.

Journeyman status is acquired after four years' apprenticeship by passing successfully a technical examination which is said to be more comprehensive and difficult than the examination for city license, which is also necessary. The union is considering starting an evening school in theory and applied science for both journeymen and apprentices.

OTHER TRADES

Other crafts in the building industry in Memphis, whether organized or not, have no apprentice systems and apparently no program toward that end.

In sheet-metal work the workers are pretty well organized, the contractors not at all. The union reported "five or six" apprentices, but they are not under any sort of contract, and are in fact skilled helpers who have remained in the trade long enough to acquire some stability. The union does not take a helper into membership "until he can earn $5 a day." According to the contractors the process of arriving at that status is to jump from job to job and from shop to shop until a smattering of the trade is picked up.

One of the leading contractors said:

> It is a question of a very short time until there won't be a mechanic left in the tinning business. Contractors are too busy underbidding each other to get together on a program, and they don't seem to realize where the present situation is going to put all of us if something isn't done.

The painting trade seems to be in about the same situation. Contractors "don't want to be bothered with boys" and on their part boys are not interested in the painting trade. According to the business agent of the painters' union, apprentices are needed, particularly in paper hanging and the more highly skilled interior decorating lines, but there is no interest in developing the trade among either the contractors or the boys.

The carpenters' union reported that it put on apprentices wherever it could, but that there is slight demand for them by contractors, and no assurance of work when they are taken on. Boys are used on the big jobs, but they are helpers in reality, not apprentices. The union has no control over their wage scale, and very little over the kind of work performed.

Apprentice training is not a pressing problem in Memphis, in the opinion of the seceretary of the associated general contractors. The supply of mechanics is ample, he believes, to meet the normal needs of the city. The rapid growth of the past few years in building was handled adequately, with no scarcity except in common labor. Should that condition change "we can work out an apprentice system to meet the condition. What Memphis needs worse than education of mechanics is education of its contractors. A building can be put up cheaper in Memphis than anywhere else in the coun-

try, according to the bids on big jobs. But contractors can't keep on indefinitely building beautiful monuments to their business careers."

MILWAUKEE

Formal apprenticeship in Milwaukee is governed by the State apprenticeship law, which requires: First, an indenture signed by the boy and his parent or guardian, the employer, and the State acting through the Wisconsin Industrial Commission; and, second, part-time school instruction during working hours for the first two years of the indenture, time to be paid for at the regular rates.

Administration of the law is through the apprenticeship department of the industrial commission, which "supervises the training, arbitrates differences arising between the apprentice and the employer, passes upon schedules of training, assures proper instruction in the part-time school, determines what is good cause of annulment of contract, and enforces all indenture."[6] The policy of the department "is not so much to make great numbers of journeyman mechanics, but rather to develop better trained men and good citizens," and its aim is "to insure a square deal both to the apprentice and to the employer."[7]

Trade training is founded upon standard trade schedules "drafted by trade committees composed of representatives of employers and journeymen of the particular craft." The Milwaukee Continuation School, a very fine new trade school efficiently equipped, is the medium through which class instruction is given the apprentices. There is no hard and fast rule requiring instructors to be craftsmen. Professional training of trade teachers is carried on through the Department of Vocational Teacher Training of the Milwaukee Vocational School.

The apprenticeship department of the industrial commission is the principal recruiting and placement medium. Boys interested in a given trade, perhaps through the prevocational work in the grade schools, or through the promotion activities of the apprenticeship department, enroll with the department and are guided and assisted in finding work.

In its practical application to the building trades, however, the plan is not encouraging apprenticeship or materially affecting the supply of trained mechanics, except, perhaps, in the plumbing and bricklaying trades. The attitude of the contractors is that it works a hardship on them in its requirement of steady employment and pay for school time; that it makes no allowance for trade conditions; and that it is superimposed and does not provide for the reciprocal features that are the backbone of cooperative apprentice systems which are succeeding elsewhere. The unions reported that it was about equally difficult to sign up boys and contractors. The wages stipulated in the agreements are low as a rule. The State minimum wage laws specifically do not apply to apprentices, "on the theory that the apprentice is receiving part of his compensation in instruction."[8] This exemption, according to some union officials, creates the

[6] Wisconsin Industrial Commission. The Apprentice Law, with Explanations. [Madison], 1921, p. 2.
[7] Idem, p. 10.
[8] Idem, p. 7.

impression in the mind of the boy that he is placed at a disadvantage by becoming an indentured apprentice—is, in fact, penalized for learning the trade—and he refuses to sign up. Boys over 18 are not subject to the compulsory continuation school law, and hence are more desirable as employees, from the contractor's point of view, than boys of apprentice age. The result is that the helper system and not the apprentice system is the prevailing practice in the building trades in Milwaukee.

There are two exceptions to that general statement. Plumbing and mason contractors are to a large extent cooperating with the State apprentice system and executing formal indentures. Bricklaying and tile and marble setting are the only building trades in Milwaukee with a sufficiently powerful organization to control trade conditions successfully. Union officials and contractors are working together under the State plan to encourage apprentice training. The union reported 54 bricklayers, 17 tile setters, and 11 marble setters under indenture. The school reported 80 bricklayers, 7 tile setters, and 8 marble setters. The discrepancy in the first instance is probably due to enrollment in the training classes of boys apprenticed to nonunion employers. In the second instance the difference in length of training—two years in the school and four in the trade—probably accounts for the difference in enrollment. These apprentices attend school for a full day every school day during January and February, thus taking advantage of the idle season for intensive training, instead of breaking into the working-day during the building season.

The situation is quite different in the plumbing trade, in which it is almost entirely the open-shop employers who are using the system. The union reported 65 apprentices enrolled under the State system and attending school, and 57 not indentured. Enrollment in the plumbing school was given as 204. That means that about 140 boys are indentured to open-shop employers. One nonunion plumbing contractor visited had 23 apprentices, 18 helpers, and 6 journeymen. Most of the union plumbing shops visited had no apprentices at all.

Union officials, the secretary of the master plumbers' association, and others conversant with the situation, agree that the saturation point is rapidly being reached in apprenticing to the plumbing trade in Milwaukee, as there is another avenue to journeymanship which is also producing a large supply. That is the State law which permits a plumber's helper, after two years' experience, to take the examination for State license under the State board of health. The trade has become overzealous, the secretary of the master plumbers' association thinks, as the result of a serious shortage five and six years ago.

In painting and plastering union officials declared it to be exceedingly difficult to secure indenture of apprentices under the State law. Painting apprentices, of whom the union reports 30, are found almost exclusively in the high-grade interior decorating shops. Most of the contractors in ordinary painting and paper-hanging work visited by the bureau representative employ only journeymen.

The plasterers' union has 46 registered apprentices, allowing one to a contractor and rather insisting on preference being given plasterers' sons. The contracting plasterers' association regards the allowance as insufficient to insure a supply of skilled men. The

association is largely composed of union contractors and "most of them are operating under the State apprentice law." The employing plasterers are, however, dissatisfied with the school instruction. The plastering classes are held in the bricklaying shop and taught by the bricklaying instructor. They want their own classroom and a skilled craftsman better qualified to teach ornamental work.

Officials of both the carpenters' district council and the master carpenters agree that "the trade is seriously handicapped for want of apprentices, but it is equally difficult to interest boys and contractors in the present scheme." The Master Carpenters' Association of Milwaukee and the Master Builders' Association of Wisconsin are vitally interested in the formation of a workable program, but they feel that "the State law is a hindrance rather than a help." It is contended that the trade can not stand the financial burden of carrying boys on the pay roll under any and all circumstances for the full four years. To get around that obstacle they simply hire helpers as they need them and lay them off when work is slack. The union is not strong enough to influence the situation in the slightest. It reports only 10 apprentices.

Officials of the unions in the sheet-metal, steam-fitting, electrical, and structural-iron trades report that so far as union shops are concerned apprenticeship is negligible and the helper system is followed.

One large sheet-metal shop run on an open-shop basis reported five apprentices indentured under State law. Not only are these boys attending the sheet-metal class at the continuation school four hours weekly but the foreman is holding classes one-half hour each day in drafting and arithmetic and explaining points raised in the course of the day's work. The shop works nine hours, during eight of which the apprentices are actually employed. One half of the ninth hour is given to the class work just mentioned, and during the other half the boys are free to make anything they choose out of shop materials.

The following table gives the number of apprentices to the different crafts registered in the unions and in the industrial commission:

Trade	Union	Industrial commission
Bricklayers	54	80
Carpenters	10	10
Electricians	(9)	[10] 4
Marble setters	11	8
Painters, paper hangers, and decorators	30	10
Plasterers	46	12
Plumbers	122	204
Sheet-metal workers	(9)	[10] 24
Tile setters	17	7

MINNEAPOLIS AND ST. PAUL

"As dead as King Tut" was the characterization given formal apprenticeship in the Twin Cities by one in close touch with the situation in the building industry. Except for a few indentures in the trowel trades, so few in fact as scarcely to affect the situation, and operating largely because of the attitude and needs of individual

[9] Helper system. [10] Chiefly from open shops.

contractors, the helper system on a "hire and fire" basis governs wholly in building construction.

Minneapolis and St. Paul are both open-shop centers and the unions are weak. There is not a union trade agreement in the jurisdiction, and the unions are not in a position to enforce apprentice contracts even where they exist. Apprentice wage scales are not controlled by the unions, and the provision for continuous employment, where indenture exists, is unenforceable.

A pronounced reduction in building activity since the beginning of 1927 has resulted naturally in indifference to the problem of creating new mechanics since there is no present need. A few years ago, however, there was an active apprentice movement in some of the trades. For a couple of years prior to 1920 the associated builders and the bricklayers' union were working under a joint agreement containing a definite apprentice system with part-time school work at Dunwoody Institute in Minneapolis, one of the important trade schools of the country.

In 1920 the building trades of the Twin Cities called an unsuccessful general strike for a 44-hour week, and in the resulting collapse of union strength the apprentice systems then operating, including that of bricklaying, went down completely. The organized general contractors of both cities then started a short-course school of their own, which was discontinued in April, 1926.

In 1923 the master plumbers instituted a formal indenture system with part-time training at Dunwoody, and contributed the material to equip the shops. This movement died for lack of support and concerted observance of the terms of the agreement, and now "there probably isn't an indentured plumbing apprentice in the State."

In the opinion of the builders' organization spokesman, the building season in Minnesota is too short to make apprenticeship by indenture, with its requirement of continuous employment, a possible undertaking.

Some work, both active and passive, is however being done in the line of encouraging better workmanship. Day classes in bricklaying, painting, and paper hanging are held at Dunwoody Institute during the winter months, when most building-trades men are idle. Courses are given in both related technical work and practical operations. The Builders' Exchange of Minneapolis has adopted a policy of urging its member contractors to do all in their power to "encourage" attendance at these day classes by both journeymen and beginners during the dull season. Evening classes are held throughout the year in practically all of the building crafts except plastering.

Participation in the work offered by Dunwoody is at the present time determined by the initiative of the individual craftsmen. While the classes are large and school authorities feel that it is in its very limited field offsetting to some degree the lack of training by the apprenticeship method, there is no concerted movement anywhere toward an organized training system. It is only a makeshift at best, the director of the school thinks, since "there is no substitute for real apprenticeship administered jointly by organized workers and organized employers."

Dunwoody Institute has, of course, definite apprentice work in its tile-setting department, but that is a national institution in which the industry locally has no part at present, although it has up to this year been identified with it.

In addition to the day and evening classes at Dunwoody, two groups of associated contractors in St. Paul have endeavored to produce a higher degree of skill among their workmen by holding evening-trade classes. These groups are the master painters and the master plasterers. Both these associations financed the undertakings themselves, and classes are attended frequently by contractors as well as by journeymen and helpers. Class work in painting and paper hanging has been provided during the winter months by the master painters, and while the painting work was to be discontinued in the winter of 1927 because no longer needed, the paper-hanging classes were to be held. The plastering school has specialized in ornamental plastering.

TROWEL TRADES

Only in the trowel trades is there any effort to indenture apprentices, and as already stated, the indenture agreements are indifferently observed except in tile setting.

The tile dealers and contractors' association of both cities subscribe to the apprentice program of their national association, and they are carrying their full quota. Ten apprentices were reported as indentured and in training in the two cities, and it was stated by both union officials and contractors that the quota was sufficient to keep a normal balance. Apprentices are taken only from the ranks of the helpers.

The plasterers' union of Minneapolis has 24 apprentices working under a form of indenture which obligates the employer to keep the boy for four years, the union on its part undertaking to keep the boy at the trade. A contractor may have only one apprentice. There is a conspicuous lack of interest or enthusiasm on the part of both union and contractors concerning apprenticeship, the union frankly declaring that "there are plenty of plasterers now."

In St. Paul only two plastering apprentices were reported, and in this case the personal interest of the contractor in training his own men seems to be the occasion for there being any at all.

In bricklaying, the Minneapolis local reports 48 and the St. Paul local 20 indentured apprentices. Their training and status are uncertain, as the whole system is rather haphazard. The Minneapolis local reported that of the 48, only 8 were working at the time of the last meeting.

Considerable divergence of opinion developed as to whether the local situation really demands systematic training of new material. Some contractors were as sure that more and better-trained men are needed as others were that Minneapolis and St. Paul have as good workmen as can be found, and are adequately equipped to meet local needs. All agreed that building is too inactive now to worry about the need of mechanics. In any case, there is not the organized machinery on either side to prosecute a successful training system.

NEWARK

Apprentice training in Newark revolves about the Essex County vocational schools, and seems to be a community educational movement rather than an industrial program. The indenture system is not followed and continuous employment is maintained through trade committees "in so far as it is possible to do so and trade conditions permit."

Apprentice courses in carpentry, masonry, plastering, and electrical and sheet-metal work are given in the evening at the Boys' Vocational School in Newark. Classes meet twice a week for two-hour sessions. Attendance is required of boys who are termed apprentices. The unions "shall exclude from membership" and employers "may discontinue the employment of" a boy "who does not fulfill his obligation in so far as school attendance is concerned."

The number of registered apprentices in each trade as given by representatives of the unions is: Carpenters, 1,300; bricklayers, masons, and plasterers, 400; electrical workers, 200; sheet-metal workers, 115.

Plumbing apprentices are required to go to school only in their fourth and fifth years. One two-hour session each week is given to shop practice and one to technical and related work. Two hundred and seventy-five apprentice students were reported as being in the last two years of training. No record was available of the number in first, second, and third years. It was stated that of those who reach their fourth year of apprenticeship, 95 per cent complete their terms and become plumbers, but there was no record of mortality up to the fourth year.

The percentage of elimination in the various trades was difficult to determine, as union officials frankly "guessed" in answer to questions on that point. The carpenters' union estimated 50 per cent elimination; in sheet-metal work "about 80 per cent" finish their time; while in masonry and electrical work 95 to 98 per cent was the estimate of completed terms.

The painters' union has a register of 80 apprentices, for whom classes are now being organized. As in the other trades, these boys are not indentured and are practically free lances.

Tile setters have no apprentice system. They do, however, promote to journeymanship as needed the helpers who complete the two-year apprentice course for tile setters' helpers given by the Essex County vocational schools.

NEW ORLEANS

Except in cases in which the terms of apprenticeship are incorporated in working agreements between employers and unions, apprenticeship by contract or indenture does not exist in New Orleans. Two trades, electrical work and plastering, have such agreements.

ELECTRICAL WORK

Apprentices in electrical work are under the control of the union, being in effect indentured to the union for four years. The ratio is 1 apprentice to 2 mechanics, and this quota is kept full at all times. Apprentices hold full membership in the union, and the union

makes itself responsible for their training and for continuous employment. The full term is not served in one shop, the policy of the organization being to change from shop to shop to secure the greatest possible diversity of training.

A wide latitude is allowed in the matter of age at admission, 30 years being the maximum. Available material is more than ample, according to a union official, who said, "I could find a hundred boys to-morrow who would go into the trade if there was room for them." He estimates that between 82 and 85 per cent of the trainees complete their terms and qualify as journeymen. Promotion to journeymanship at the end of the four-year apprentice period is by examination.

The union controls the apprentice wage scale, and all matters pertaining to the regulation and discipline of apprentices are handled by the joint governing board composed of journeymen and employers.

Apprentices are "encouraged" and "expected" to attend night trade-school classes. This is in effect a requirement, and practically all boys do attend trade school two evenings a week. The union pays the cost of textbooks and incidental expenses.

PLASTERING

Terms of apprenticeship are incorporated in the working agreement of the operative plasterers' union, allowing one apprentice to a contractor. According to the most reliable information available, however, that is largely a paper provision. Only plasterers' sons are taken on as apprentices, and, while the contractor is obligated to furnish continuous employment over a four-year period, there is no equivalent obligation on the boy's part to serve four years.

The general feeling among contractors is that apprenticeship as applied to the trowel trades is a misnomer, as there is no definite system or obligation, and the worker who is called an apprentice is in reality a semiskilled helper. The trowel trades are exclusively negro in New Orleans. No school work is available.

PLUMBING

Practically all of the master plumbers doing a business of any proportion have apprentices. Open shops often have three and four. Here again there is no contractual relation, and both boys and employers are free to continue or to end the relation at will. This is equally true in the union shops, as the union has no control over apprentices. It registers them in the union and has a restrictive ratio in its agreements, but it does not control wages or terms of apprenticeship.

Plumber apprentices in most instances attend night classes at the Delgado Trade School. In addition to large night-school classes, the regular day classes in plumbing have about 100 pupils. In the opinion of the secretary of the local master plumbers' association, there are enough plumbers in the making in New Orleans to swamp the trade in the next few years.

OTHER TRADES

Trade training in the other building crafts is haphazard and planless. There is nothing that can be called an apprentice system.

The carpenter's union has no apprentices, and none of the open-shop contractors visited reported having a carpenter apprentice. Painting is poorly organized, and the "hire and fire" policy prevails. While in all lines, and particularly in sheet-metal work, an occasional contractor may make a practice of training an apprentice or apprentices, he trains them in specialized lines from which the industry as a whole derives no benefit.

DELGADO TRADE SCHOOL

New Orleans has one of the finest trade schools in the country, the Isaac Delgado Trade School. Buildings and equipment were donated to the city by Isaac Delgado; maintenance is by appropriation by the city of New Orleans and from the Smith-Hughes fund. It is essentially a trade school for boys of high-school age, but it has evening classes for boys and men of all ages both within and without the trade.

Of the building crafts, only plumbing and electrical work are now being taught in the night school. Sheet-metal work has been given, but has been discontinued for want of pupils.

In the opinion of the director of the school, part-time trade school training to supplement training on the job will have to be the next development to meet the requirements of a rapidly expanding community which is changing from a solely commercial one to one industrial as well. As it is now the trade school is meeting the need for trained mechanics, in so far as it is being met, at no expense to industry. The cost of training, he believes, will have to be equalized through an apprentice program which will require the industry to carry that part of the training which bears directly on the industry, leaving to the schools the technical and related work.

So far the building industry in New Orleans has been able to meet the demands made upon it by postwar expansion. It is the general opinion that that condition will not hold true five years from now. Building tradesmen of to-day are past middle age, and there is little influx of a permanent nature of younger men. Hence, as the leading contractors see it, New Orleans will have to find some means of training its own boys in the industry, or face a serious shortage when it most needs help. However, they have no program, and the tendency is to let the public schools take the responsibility. One contractor even suggested that it was "Uncle Sam's duty" to interest boys in the trades.

Apparently there is less disposition among boys in New Orleans to go into the building crafts than is usually found in other communities.

NEW YORK CITY

Machinery for dealing with the problem of training mechanics for the building industry in New York was established in 1922, when, through the medium of the New York Building Congress, the joint apprenticeship commission was organized. The commission is composed of representatives of the various elements associated with building—architects, engineers, and material dealers as well as contractors and journeymen. The executive director of the commission is also

employed by the board of education as director of apprentice training. In its relation with the various trades the commission works through joint apprenticeship committees maintained by those trades which are part of the system.

The sheet-metal trade has a thoroughly organized apprentice system which has been in successful operation for nine years, but which is distinct from that of the building congress.

Building trades now cooperating with and coming under the direction of the joint apprenticeship commission are: Bricklaying, carpentry, electrical work, granite cutting, painting and decorating, plastering, and plumbing. That does not mean that all the apprentices in all those crafts are under the control of the commission. That is far from the case.

To begin with, there is no formal apprenticeship in the sense of contracts obligating boys and employers for a definite number of years in any trade except painting. In this trade a formal agreement has just been introduced by which the contractor covenants with the union to keep and train the boy, but there is no equivalent obligation on the boy's part to stay. Rather, the union undertakes to keep the boy in the trade in the employ of the original contractor. This system has been introduced so recently that no conclusions as to continuous employment under the agreement can be reached. The other trades coming within the jurisdiction of the commission have no policy of indenture or continuous employment. In carpentry, bricklaying, and plastering the status of the apprentice is practically that of a helper who is hired and laid off according to the demands of the industry. A beginner in electrical work is required to stay in one shop for the first year, after which he is free to change his job either immediately or at any subsequent time in the four succeeding years, during which time he is known as a helper. In plumbing, the helper system is followed and designated as such except in one local union in Queens Borough, which selects certain of the helpers to train for journeymanship under a form of apprenticeship.

The joint apprenticeship commission concerns itself solely with training in school. It is the medium through which apprentice classes are established in the public night schools; it helps to secure teachers, keeps attendance and work records of the pupils, and has formulated courses of study for the various crafts. None of the other aspects of apprenticeship—recruiting, indenture, continuity of employment, or relations between employer and boy—comes within its province. Moreover, it can not compel school attendance, but must depend upon the local unions for discipline. As each component local union is largely a law unto itself in its relation to apprentices and the schools, and as there is no coordinating medium anywhere, the commission serves, in effect, as an agency through which to secure effective school training for those boys in the building industry who attend school, either voluntarily or through pressure from the union or the employer.

The following statement gives the number of apprentices registered with the respective trade organizations and the number enrolled in the apprentice classes under the direction of the commission at the close of the school year, April, 1927. It must be borne in mind,

however, that the number registered includes boys who are not in any way bound to the trade or sure of a continuous opportunity to learn the trade.

Trade	Number registered	School attendance
Bricklayers	1,690	[11] 793
Carpenters	1,400	498
Electricians	1,600	[12] 340
Painters	[13] 260	150
Plasterers	577	162
Plumbers [14]	94	81
Granite cutters	54	51

The joint apprenticeship commission is authority for the statement that "taking the building industry as a whole, not 10 per cent of the contractors employ apprentices."

SCHOOL TRAINING

About 75 apprentice classes, exclusive of the sheet-metal classes, are held in 12 of the city night schools located at various points throughout greater New York. The boy attends the school located most conveniently for him.

Two weekly sessions of two hours each, for a term of 30 weeks, constitute the year's work. The course of study in bricklaying, granite cutting, and plastering is related work only—drawing, mathematics, and whatever applied science may be required. In carpentry and painting the work is manipulative, related instruction being applied directly to shop work. In plumbing one session is given to theory and the sanitary code, and one to practical bench work.

Some of the schools are inadequate makeshifts. In one case an abandoned school building was reopened for trade work. In other instances apprentice classes are held in the well-equipped manual training school buildings. On the whole, equipment seems to be inadequate. One instructor in joinery reported that as he can not have the proper tools for shop work he frequently borrows from dealers and friends in the trade the machinery and tools he needs for demonstration, and keeps them until he feels that the boys are familiar with them and their use.

The course of study in electrical work is part theory, part related work, and part practical installations. House wiring is taught by the use of a skeleton structure representing a 16-room house, in which all of the operations in inside wiring are carried out.

Painting and decorating apprentices are taught paint and color mixing, treatment of walls and floors, paper hanging, designing, and decorating. Small booths partitioned off the classroom afford wall space for practice work.

TRADES IN THE COMMISSION SYSTEM

Always excepting the sheet-metal trade, no statement of the apprentice situation even within the commission's jurisdiction can be

[11] Not all in public schools.
[12] Fourth-year helpers do not go to school.
[13] Manhattan and Bronx locals only. Brooklyn, with 106 apprentices, not yet identified with system.
[14] One local only; others have no apprentices.

made applicable to an entire craft, because the commission deals only with local unions, and in no trade are all the locals cooperating with the commission, while several crafts are not identified with the movement in any way.

PAINTING

Probably the most effective system among the crafts operating through the commission is that of the painters and decorators of Manhattan and the Bronx. Apprentice matters are delegated to the district council, which is represented on the joint apprentice committee for the trade.

Apprentices are recruited only through the employers, who send to the district council for registration any boys whom they may select. After a probationary period of two weeks the employer enters into a formal agreement with the district council covering terms and conditions of employment of the apprentice. The boy himself is not a party to the agreement. Only 1 apprentice is allowed unless a contractor employs more than 10 men steadily, and in any case not more than 2 apprentices may be employed at one time.

The agreement does not specifically require an employer to keep the boy throughout his entire term. Instead "it shall be the duty and responsibility of the joint apprenticeship committee to provide continuous employment," which may be done by interchange through the medium of the committee. The system was inaugurated in January, 1926, and no positive information is yet available as to the extent to which interchange is necessary, or as to the record of completed terms.

School attendance is compulsory and is checked by means of an attendance card which must be signed by the instructor at each session. The monthly working card must show a clear school record before a new one is issued, and the employer "agrees to discontinue the employment of any apprentice who does not fulfill his obligations so far as school attendance is concerned."

The agreement provides that "the employer shall allow the apprentice one-half the regular hourly wage rate in addition to his time at work for time spent in school." It was reported that while the union does not attempt to enforce that provision, probably half the employers are paying their apprentices for their school time. Disputes and violations are adjusted by the joint committee, and the district council offers cash prizes for superior work in school.

It was reported by the district council that about 60 per cent of the eligible contractors are employing apprentices and cooperating in the work in an encouraging manner. An employer member of the committee, when asked if boys were available for the work, replied:

> There are plenty of boys. The shoe is on the other foot now and the real trouble is to induce the reliable established contractors who are a fixture in the business to do their share toward training new men. The "mushroom" operators are always ready to take on boys, but that isn't what we want. We want to stabilize both the employing and the working ends of the business and do away with both the incompetent contractor and the incompetent mechanics. Results so far are gratifying, but, of course, we've just started.

The Painters' District Council, of Brooklyn, covering the Long Island jurisdiction, has the same apprentice rules as the New York

council, and reports 106 apprentices. Employers sign an agreement with the council. School work, under the direction of the joint apprenticeship commission, is contemplated for the winter school term. So far nothing is being done in school training.

ELECTRICAL WORK

Another trade which has very recently readjusted its apprentice policy and is tightening up its school requirements is the electrical trade. While the system used in that line in New York is not apprenticeship it is nevertheless an organized effort to train mechanics. During the trainee's first year in the trade the union has no control. In order to be registered as a recognized helper the first year must be spent under one employer, the boy acting as warehouse or stock clerk in order to become familiar with materials and tools. At the end of the year, at the discretion of the employer, the boy is registered as a helper, in which capacity he must serve for four years before becoming eligible for examination for journeymanship. During his four years he is subject to the same conditions governing employment as those affecting journeymen, shifting from job to job and experiencing lost time according to the run of work.

School work under the joint apprenticeship commission was begun in 1926, but during that year it met with very indifferent success. The next year the joint board of the various local unions began a concerted effort to make school work a positive factor in trade training. To that end a coordinator has been employed, who has drafted a course of study, systematized the registration records of helpers, and who is now working in the office of the commission. It is intended to demand a minimum of school attendance before issuing working cards of all except the fourth-year helpers. The various local unions have agreed to enforce that provision.

PLUMBING

A beginning has been made in one locality toward getting away from the helper system in the plumbing trade. The Queens locals, while not actually abolishing the helper system, are selecting certain of the helpers, apprenticing them by agreement between the local and the employer, and sending them to school. This practice had obtained for two years, during which 15 apprentices had been graduated. They were really a picked group of boys, and the results created much enthusiasm among the supporters of the plan.

School work is designed to supply necessary training which can not be had on the job, and deals almost wholly with applied science and the sanitary code, and lead work. At each graduation three prizes are awarded to the best pupils, the awards being dispensations of $100, $50, and $25, respectively, on the new journeyman's initiation fee.

Plumbing is taught in several of the evening trade schools throughout the city. Classes are attended by journeymen, helpers, and men outside the craft, and are reported to be among the most popular in the system. One school reported that it always has many more applicants for the plumbing classes than it can accommodate.

PLASTERING

Working rules in the plastering trade require that the entire four years of apprenticeship be served under one employer. The employer agrees, in a letter to the local union, to keep the boy whom he hires as an apprentice throughout his term. While it is customary for the contractor to do so the rule is not strictly enforced. Sometimes boys are transferred from one contractor to another, and at times they may be altogether idle through a dull season. There is no hard and fast rule governing the number of apprentices a contractor may have, but relatively few have any at all.

Both the contractors' association and the unions are working on a plan for a day school on paid-for time for the plastering apprentices. The school board has agreed to make provision for these classes if a teacher can be obtained. Rapid building in the city has produced mechanics who confine themselves to a specialized field, and it is felt that some plan must be adopted to afford more general training for the boys coming into the trade. Day school is expected to meet this need.

BRICKLAYING AND CARPENTRY

Applying the strict definition of apprenticeship which this report has followed, neither the bricklaying nor the carpentry trade in New York has an apprentice system. There is no continuous employment except in the case of large operators who prefer to keep and train their own men. One of the very large contractors doing business on a national scale reported that he had to resort to a bonus plan to keep boys throughout their term. More than two-thirds of the bricklayer apprentices are indentured to their fathers and move with them from job to job.

Control of the trainees, both at work and in school, varies with the attitude of the individual local unions. Some are wholly indifferent, and others, notably some of the carpenter unions, are trying to enforce school attendance, although no policy of continuous employment is undertaken.

Apprentices in both crafts are almost entirely relatives of journeymen, and there is no stipulation as to the number of boys allowed to a contractor or a job. Officials of both unions and employers' association in both lines assert that the industry is overrun with boys and that there is no real training. Practically all of the boys who go into the trade serve the four years, but control over them is negligible and they are little more than helpers.

TRADES NOT UNDER THE COMMISSION SYSTEM

TILE SETTING

Apprenticeship in tile setting, which in other centers investigated is generally very strictly regulated, is handled quite differently in New York. The term "improver" is used, an improver being a helper selected for special training. Helpers may also become mechanics after a certain period of time, and it was said that in practice the only advantage which an improver has over a helper is the assurance of continuous employment "as long as one journey-

man is employed," and a slightly higher wage scale. The high wage scale militates against the use of apprentices by contractors, as mechanics can be hired for very little more.

No school work is provided for tile-setter apprentices except in Newark, N. J., which is included in the New York jurisdiction.

METAL LATHING

Apprentices in metal lathing, to the number of 100, are indentured to the union and distributed by the union among the various contractors desiring them. Under the agreement an employer taking an apprentice must keep him for the two-year term, and the boy must stay or leave the trade. In this case the boy is a party to the agreement. Trainees are generally related to the men in the trade, and, according to report, they always complete their time and become journeymen. It was said that the number in training, which is kept fairly constant, is all that the trade can absorb.

SHEET-METAL WORK

Since 1918 an organized apprentice system has been in operation in the sheet-metal trade in New York City. A joint apprentice committee composed of two members of the union and two of the contractors' association has complete control. The active agency through which the committee works is a subcommittee composed of the secretaries of the two organizations. All matters pertaining to apprenticeship—the registration of boys, working conditions, adjustment of disputes, transfer when necessary, issuance of periodic apprentice cards, school attendance, and school work—are handled by the committee.

To become a registered apprentice a boy must first be selected and employed by a contractor who agrees to keep him in continuous employment for the four-year term. He is then registered by the joint committee and becomes subject to its rules and control. He has no membership nor standing in the union. Every six months he appears before the committee and his term and rating are advanced to the next higher grade, with a corresponding increase in wage scale. Working cards are issued for each period of employment, for which a fee increasing from $3.50 for the first period to $8 for the eighth, or last, is charged. This money is used to defray the expenses of the committee. Before a card is issued for the ensuing six-month period, the card for the current period must show attendance at 90 per cent or more of the school sessions during that period. Where attendance has fallen below the required minimum, lost time must be made up, even though the boy may have been temporarily employed out of the city. An apprentice is dropped if he fails to conform to the school regulations.

School sessions are two evenings each week, two hours per session, with a total of 120 school hours each year. Classes are held in six public schools throughout Greater New York, and work is so unified that the courses are practically identical in all of them. Thus a boy can change schools if necessary without interrupting his school course. Equipment in the various classroom shops varies from makeshift and inadequato to excellent, but the same teaching standard is maintained

throughout. The teachers are craftsmen with long experience in teaching.

Shopwork in sheet-metal cutting and fabrication with pattern drawing and mathematics applied directly to practical problems comprise the method followed in teaching.

About 75 per cent of the reported enrollment of 400 are in building construction, while the remainder are in manufacturing, chiefly in the institutional kitchen equipment line.

According to the secretary of the employers' association about 60 per cent of the reliable contractors in the trade are employing apprentices and cooperating actively in the training program. Included in the other 40 per cent are some of the large operators who refuse to "bother" with boys. The allotment is one apprentice to each five mechanics. The reported enrollment is considerably less than that ratio, however, and the chairman of the committee stated that the full quota would produce more mechanics than the trade can use. The average number of apprentices graduated at the annual school commencement is 75.

During the nine years ending December 31, 1926, 898 apprentices were registered and 311 cards were canceled, either because the boy had dropped out of the trade of his own accord or because of insubordination. Actual records, then, show 35 per cent elimination, but afford no details as to causes. School-attendance records show perfect attendance for approximately 80 per cent of the pupils.

Graduation is a notable event for the industry, it was reported. Prizes and medals are awarded by the contractors' association for superior work, and diplomas are presented to all completing the four years' work. A school diploma is a prerequisite to journeymanship and membership in the union.

Differences and disputes between employer and boy must be brought before the apprentice committee, and both sides must abide by its decision. If the employer refuses to accept an adverse decision the boy is taken out of his shop. A refractory boy may be transferred to another employer and given another chance to make good, failing which he is removed from the trade.

The most serious defect in the machinery of the system, the chairman of the committee feels, is the lack of a coordinator or some full-time official whose sole business would be to look after the boys both in school and on the job. "When we get that," he said, "I think we will have come about as close as is possible in New York to an intelligent and efficient apprentice system."

NIAGARA FALLS

CARPENTRY AND TROWEL TRADES

Apprentice training in carpentry and the trowel trades in Niagara Falls is carried on through a cooperative tripartite movement embracing the employers, the unions, and the division of vocational education of the city schools. It is essentially the same system as that in Cleveland, operating, as does the Cleveland system, through active working committees of employers and journeymen.

The two systems differ in some details. In Niagara Falls the trade committees are composed of one employer and one journeyman in the trade and the director of vocational education. Thus the school representative is the third member of all committees, and is in effect the head of the system.

All matters pertaining to the system—relations between boy and employer, the boy's record in school and on the job, and the course of study in school—are regulated and controlled by the trade committees.

Apprentices are indentured under a written agreement binding upon the employer, the boy, and his parent or guardian. Apprenticeship is for four years. During the first two years boys are required to attend the vocational school eight hours each week—four hours at evening school and the other four on Saturday morning. Saturday morning school work is on paid-for time, but pay is conditioned upon having attended the two 2-hour sessions of evening school during the week. Third and fourth year apprentices are required to attend night school four hours a week.

The reported enrollment is 16 bricklayers, 25 carpenters, and 13 plasterers. At the time of the bureau's study, December, 1926, the system was in its third year, during which time only two indentures had been canceled for incorrigibility and less than 10 per cent of the beginners had dropped out.

Commenting on the effectiveness of the system a union official said:

> Before the present plan was adopted we had about half as many apprentices as we have now, and less than 50 per cent of them finished their time. Now, the boys, the union, and the employers are getting along much better and the whole scheme is working out to everyone's satisfaction.

Criticism of the system by one of the leading contractors, who is one of its strongest supporters, was directed against two phases, more or less related. He believes that the insistence of the unions on placing sons and other relatives of members is hampering.

> The field ought to be a wide open one to get the best material available. As it is now the contractor has to take pretty nearly just what he can get. Needless to say it isn't all good material. The poor material is a small minority to be sure, but it has to be accepted. Exactly the same amount of time, effort, and money is put into training this small minority of poor material as is expended on the boys who are making first-class mechanics. And the grade of work that these mediocre boys are equipped to do even after four years of training can be taught in six months.

His other objection, which he insisted also applied only to a small minority, is that with a fairly high wage rate and the assurance of a job for four years "the boys are getting too much for too little effort. They feel that they are fixed for four years and will have a good trade at the end of that time, no matter what they do."

He believed, however, that that attitude has undergone considerable change since the inception of the system and that school attendance and general application to business show marked improvement. Disciplinary measures directed the year before against a fourth-year bricklayer apprentice who had practically finished his time and was receiving journeyman's wages, but who was laid off for several months for insubordination, had had a steadying effect on the boys, it was said.

PLUMBING AND SHEET-METAL WORK

Apprentice evening classes are held four hours a week for plumbers and sheet-metal workers, but in these two trades only the unions and the school authorities are directly concerned. The employers are not a part of the system as in the trades just discussed, and the boys are not under contract. School attendance is accordingly encouraged by the unions as a benefit to the individual, rather than required by both union and employer as part of the job.

School enrollment in these trades is 27 in plumbing and 25 in sheet-metal work. So far as their jobs are concerned, however, these workers are free agents, and efforts to commit their employers to an indenture system have not been successful.

PAINTING

There are eight apprentice painters in Niagara Falls. They would like to have a course installed in the trade school for them, but owing to the small number and the absence of indenture that has not been done. The director of vocational education stated that whenever enough contractors could be interested in the movement to afford a sufficient number of boys, a painting class would be organized.

Speaking of building-trades employers as a whole and not of any particular craft, the director said:

> The principal difficulty in carrying out an apprentice-training program is not in getting boys to train, or in getting the cooperation of the unions. It is in getting the contractors interested in the problem and in persuading them to take on apprentices. We never reach the quota the unions agree to because so many contractors won't use apprentices at all.

It was conceded that the requirement of steady employment complicates the issue in Niagara Falls, because interchange between idle and busy contractors is not so readily effected as in the large cities. There is a tacit understanding among the contractors who are part of the organized system that "the apprentice will be kept as long as one journeyman is employed." There is in fact no serious loss of time by the number who are now serving their time. The secretary of the joint apprenticeship committee stated that as a rule the boys had 11 months' work a year.

In Niagara Falls, as elsewhere, there are plenty of boys available and ready to take up building trades apprenticeships, both the bricklayers and the carpenters reporting "a desk full" of applications. "There is no difficulty about getting our boys interested," the director of vocational education said, "and we are getting an increasingly better grade of boys—frequently high-school graduates."

PHILADELPHIA

The Building Trades Employers' Association of Philadelphia has recently undertaken active agitation for the establishment of an organized program for the training of building-trades apprentices in that city. The statement was made that "the need for apprentices and sound training is acute. Philadelphia does not get good workmen, but it is only just beginnning to move toward the development of a system that will secure and train its own boys for the build-

ing trades." Efforts so far put forth are characterized as pioneer work. Emphasis has been placed on plumbing and the trowel trades, outside of which little has been accomplished.

INDENTURED APPRENTICES

The indenture system is practiced in bricklaying, stone masonry, tile setting, and plastering controlled by the local unions of the Bricklayers, Masons, and Plasterers' International Union. Stonemason and tile-setter apprentices are under individual contract to their employers; bricklayer and plasterer apprentices are indentured through the working agreement between the union and the contractors.

The unions reported apprentices to the number of 204 in bricklaying and plastering, 40 in tile setting, and 26 in stone laying. Most of the established contractors in these lines employ apprentices. Except in tile setting the unions do not maintain a fixed ratio of apprentices to journeymen. Allotment is made instead by the joint boards on the basis of the number of apprentices each contractor can train properly and keep in continuous employment for the entire apprenticeship period. The term is four years for bricklayers and three for the other two trades.

In the fall of 1926, by agreement between the bricklayers' union and the employing masons, and in cooperation with the division of school extension of the Philadelphia Board of Education, night classes for bricklayer apprentices were begun, with an enrollment of 82. The movement was too new at the time of the bureau's investigation to admit of a report, but compulsory attendance is contemplated by the conference board, which is planning the class work. Previous to this time the more progressive of the contractors had encouraged their apprentices to attend night classes at the various trade schools and had paid tuition for the more ambitious boys who had taken advantage of the courses offered by Drexel Institute, Spring Garden Institute, and the Y. M. C. A.

One of the leading mason contractors, who has seven bricklayer apprentices, reported that his own experience has been that there is a plentiful supply of pretty fair material and that less than 2 per cent of the boys who enter fail to complete their terms.

School training is not required of the stonemason and tile-setter apprentices, and none is provided.

TRADE-EXTENSION CLASSES

The industrial-education program of the division of school extension in the city schools includes courses in bricklaying, carpentry, electricity, painting, plastering, plumbing, and sheet-metal work. Classes are held at night, three 2-hour sessions a week, and are trade-extension classes open to both apprentices and journeymen.

A start has been made in what can be more accurately considered apprentice classes. At the beginning of the fall term, 1926, day classes in painting, paper hanging, and plastering were opened for the apprentices in those trades. Classes are from 8.15 to 12.15 Saturday mornings, two hours being given to manipulative work and two to theory and to related subjects.

PLASTERING

Both of the international unions holding jurisdiction over plastering have locals in Philadelphia. The apprentice situation as obtaining in the local of the Bricklayers, Masons, and Plasterers' International Union has already been discussed. The operative plasterers' local union has an apprentice system which, while not actually an indenture system, operates essentially the same way.

There are 80 apprentices registered by the local union of the operative plasterers. They are not under contract to their employers, but by transfer among the various contractors, with the union acting as the placement agent, practically continuous employment is maintained. Plasterer apprentices in shops controlled by the Operative Plasterers and Cement Finishers' International Union attend school Saturday mornings on the employer's time, and forfeit a full day's pay for unexcused absence. The apprentice school course covers only two of the four years of apprenticeship, and three months are deducted from the term for satisfactory completion of the school course. Sixty of the 80 apprentices are enrolled in the Saturday morning trade school.

Union officials stated that in normal times 90 to 95 per cent of the boys who become apprentices finish their time satisfactorily. However, activity in building at that time, especially the enormous amount of plastering work required in building the Sesquicentennial Exposition, had resulted in an oversupply of apprentices. These boys had not finished their terms and the union and the contractors were experiencing considerable difficulty in finding work enough to hold them in the trade until they have completed their apprenticeships.

PAINTING AND PAPER HANGING

Only one session of day school for painter and paper-hanger apprentices had been held when the bureau agent visited Philadelphia. Enrollment was 24 in painting and 20 in paper hanging.

Unlike that in the trowel trades, this movement comes solely from the master painters through the building trades employers' association, and the unions are not cooperating. The unions reported no apprentices, and probably most of the boys attending the school come from open shops. They are not under contract to the employer, and the employer is under no obligation to keep a boy after he starts to work. The master painters cooperating in the effort just started have agreed to pay the boys for Saturday and to send them to school Saturday morning. Failure to attend school in the morning means the loss of a day's pay, a provision by which it is presumed the boys can be disciplined sufficiently to assure the successful operation of the school.

This effort has grown out of a need for trained men which had become so acute as to demand some concerted action on the part of the contractors. An apprentice committee of the master painters had been working for two years to organize a system and launch a workable program, and the new day-school course is the immediate result of its efforts. The former chairman of the committee was interviewed and stated that while some progress had been made toward arousing the contractors to a realization of the need for a

definite program the larger part of the problem, that of attracting boys to the trade and keeping them in it, had yet to be met. He estimated that not 5 per cent of the boys who enter training for the trade ever qualify for journeymanship.

PLUMBING

Apprenticeship by indenture or agreement does not exist in the plumbing trade in Philadelphia. The union reports that the helper system is used exclusively in the union shops. There is, however, a very large enrollment in the plumbing classes in the city night schools, and many of the students are boys who are learning the trade in the open shops. An official of the master plumbers' association said:

> Philadelphia is training all the plumber apprentices it can absorb. The master plumbers' association believes that better results can be obtained through the night-school system than through continuation classes on paid-for time. The tendency of the boys is to "play hookey" from the trade school, just as they did from grammar school. When advancement in the trade is made conditional on their own ambition it is only the earnest, capable ones who make the effort to attend night school. For that reason we get more reliable material to train and are making better mechanics in the long run.

The master plumber quoted runs an open shop and has three apprentices, to whom he gives his personal attention in the matter of training on the job. There is no indenture, but the boys are kept busy and paid during their entire apprenticeship period if they remain. He states that about half the boys taken on complete their training.

ELECTRICAL WORK

Apprenticeship in the electrical trade in Philadelphia, as elsewhere, is a compromise between the indenture system and the helper system. The boys are, in effect, apprenticed to the union for the first year of training and are practically obligated under the union agreement to serve one employer. After that year, while still under the supervision and subject to the discipline of the union, they are free to choose their own jobs and to come and go as they see fit. They are really helpers rather than apprentices, and are allotted to the contractors as called for on a basis of two to each five journeymen employed on the job. They are subject to periodic examination by the executive board and are admitted to journeyman membership upon passing a final examination at the end of four years. Attendance at one of the city trade or private technical schools is advocated but not required.

There were 210 apprentice members reported in Philadelphia, and the usual percentage of completed apprenticeships is 85.

The open shops visited by the bureau representative employ only helpers. One large open-shop employer stated that he had tried in the past to apprentice boys and to train them in his shop, but the venture was never successful:

> There is no way to hold the boys. You get no help from their parents in keeping them in a job where they get only learner's wages, and they quit as soon as they think they have learned enough to get more pay elsewhere. In electrical work mistakes and bad workmanship cost money, and it is the contractor who tries to take on beginners who has to pay for mistakes, and he

finds that after all he is only paying for breaking in a boy for some other employer to get after the rough edges have been worn off at his expense. Now we employ only helpers with some experience and make journeymen of them the best we can.

SHEET-METAL WORK

The system practiced by the sheet-metal workers is similar to that of the plasterers, except that school work is taken at night instead of on the employer's time. The boys are not indentured but are responsible to the union and report to the executive board of the union every six months. The union in turn is responsible for keeping the boys at work and serves as the placement medium through which continuous employment is maintained if possible. School work in the trade extension course is six hours a week, three of which are given to shop practice and the other three to drawing and to related work. For poor attendance apprentices are disciplined in various ways by the executive board. Added time is imposed if necessary and in extreme cases the working permit is revoked.

The apprentice ratio in sheet-metal work is one to every three journeymen. In a membership of 500 engaged in building construction, however, there are only 30 apprentices. The union official stated that "probably most of them finish their time," but he had no actual figures on which to base an accurate statement.

CARPENTRY

The secretary of the carpenter's district council, after reporting that helpers and not apprentices are the rule in Philadelphia, said: "We are urging the contractors to help us build up an apprentice system, but they have not been willing to cooperate with us to that end, and we can't do it alone." A few of the important building contractors try to encourage apprenticeship, frequently taking sons of their employees into training, but there is no formality and no program, and the number of boys who actually serve an apprenticeship in carpentry is negligible. Most of the contractors refuse to "bother" with raw material, preferring to take on as helpers unskilled men with some experience who can be dropped when no longer needed.

OTHER TRADES

The steam fitters' and the asbestos workers' unions are attempting to introduce an apprentice system into their next working agreements to replace the helper system at present in vogue in both trades. Officials were not hopeful of success.

The bridge, structural, and ornamental iron workers' union has what is called an apprentice system, but it is so loosely constructed as not to differ materially from the helper method.

PITTSBURGH

Like most "closed-shop" cities, Pittsburgh has a well developed apprentice system, except in a few crafts. The exceptions are painting and decorating and steam fitting. In steam fitting the old practice of one helper to a fitter is still followed; and in painting, while

all agree that trade training is a serious need of the craft, no system and no agency for developing a system exist at present. The very few apprentices now in training—12, as reported by the painters' district council—are employed by contractors who have a personal interest in the boys or a policy of training their own men in their own shops.

Elsewhere the joint apprentice committee system, with formal indenture for a definite term, controls apprenticeship in Pittsburgh. While the distribution of apprentices and allotment to shops follow various rules and plans, the ratio of apprentices to the number of men in the trade is 1 to 6 in plastering, electrical work, and plumbing; 1 to 8 in bricklaying, tile setting, cement finishing, and sheet-metal work; 1 to 10 in lathing; and 1 to 27 in carpentry.

The general opinion and experience of contractors indicate that these ratios are satisfactorily maintaining the labor supply, except in tile setting, in which craft Pittsburgh, in common with all large centers, complains of scarcity of men. Apprentice regulations are part of the working agreements, and these agreements cover the entire trade except in electrical work, where individual agreements are signed with the local union. Contractors' associations in all crafts except electrical and sheet-metal work reported that practically all of the contractors entitled under the agreements to employ apprentices are doing so, and in a considerable number of instances the full quota is carried.

The most interesting phase of apprentice training in Pittsburgh is the development of school work. Beginning with the plumbers a decade ago, each local union has fought consistently and determinedly for school training for its apprentices, first in night school and then in part-time day school, until now some day-school work is found in every trade except carpentry; and as an official of the school system remarked, "the carpenter contractors will fall in line, just as the master masons have finally done."

The journeyman plumbers' union established a night school for its apprentices in 1917, furnishing the equipment and material and paying the teacher. Later this school became part of the city night-school system, and was attended by journeymen as well as apprentices. Still later, in 1924, the three-year joint agreement between the plumbers' union and the master plumbers established part-time school training on paid-for time. The Pittsburgh Industrial Commission for the Training of Plumbing Apprentices, which is composed of representatives of the manufacturers and jobbers, of the plumbing contractors' association, of the journeyman plumbers' union, and of the board of public education, sponsored the movement and established the school. Equipment was acquired through a contribution of $5,000 from the trade organizations, and the furnishing of materials and teachers and the maintenance of equipment were undertaken by the school board, under the provisions of the Smith-Hughes law. Apprentices attended school one-half day each week.

Under the 1927 agreement school time has been extended to one full day a week on paid-for time for first, second, and third year apprentices. Boys in fourth and fifth years must attend school in the same way, but are not paid for that day.

School attendance and discipline of both apprentices and employers for infractions of the regulations are taken care of by the business agent of the union and the secretary of the master plumbers' association.

Related work—theory and applied science, sanitary code, drawing and mathematics—occupies six of the eight hours' school work, the remaining two hours being spent on shop work. That program is not necessarily a fixed one, as on occasions, and with certain groups, more time is spent on shop work than on related subjects, and shop mathematics is taken up in relation to practical work as well as academically.

A roughed-in frame structure representing a three-story building is used for installations, which begin with soil pipes in the "basement" and are carried up through the building with all the various equipment connected with fitting up a dwelling. One part of the structure is made to represent an office building, with appropriate equipment. This work is done and redone repeatedly throughout the year. After each installation the work is formally inspected by a city plumbing inspector and criticized exactly as if it were a real operation, and all corrections must be made and passed upon by the city official.

Enthusiastic support of the Pittsburgh program was found throughout the trade, and real cooperation is producing a smoothly working plan, which has advanced gradually but logically from the initial undertaking of the union to a school operating 8 hours a day 48 weeks in the year. The secretary of the master plumbers' association reports that there are not enough journeyman plumbers in the city, but that, he said, "is due to mistakes and short-sightedness in the past. We are training to-day all we can handle successfully, and we are making good mechanics of them." Of the school program he said, "We weren't getting anywhere with night-school work. The day plan was then tried and made good. But the half-day system allowed loopholes for evasions and excuses by both employers and boys. Probably the full-day plan will prove as much better as the half-day plan was better than night school." The teacher agrees that the full day was "the next forward step in a real training system." The night school for journeymen continues in operation.

SHEET-METAL WORK

Only one other trade gives apprentices a full day a week in school on pay—the sheet-metal trade. The apprenticeship period for sheet-metal workers is five years, for the first year of which no school work is required. This provision is designed to take care of the problem of elimination, which is always greater in this craft than in any other. After the first year the boy is required to attend school one 6-hour day a week for a term of 25 weeks. In this case, it is not the public schools but Carnegie Institute that is furnishing the training, the teachers, and the equipment, and the boy pays his own tuition of $32 a year. The course of study used is that outlined by the National Association of Sheet-Metal Contractors. Mathematics, which covers elementary arithmetic, applied shop mathematics, and algebra, is taught by academic staff teachers and occupies two of the

six hours. Four hours are given to sheet-metal pattern drawing and actual construction in the shop under a practical craftsman. When a pupil or a group has finished the prescribed course in mathematics all remaining time is spent in the shop.

This system was inaugurated in 1922. During the first five years about 50 mechanics were turned out. Detailed reports of school attendance and progress are made to the joint apprentice committee, through which all apprentice questions are handled. While a considerable number of sheet-metal contractors do not employ apprentices at all, those who do are carrying out fairly the requirement of paid-for time in school, and are cooperating with the teacher and the committee. Occasionally an employer who is indifferent to school training will reply to complaints against his boy's attendance or record with the statement that he finds the boy entirely satisfactory on the job and hence sees no occasion for bringing pressure upon him, but such cases are the exception.

ELECTRICAL WORK

The electrical trade followed plumbing in the establishment of part-time school training in the city schools. In the negotiation of the 1925 agreement the union and some of the contractors tried to institute an apprentice system patterned after that of the plumbers. They met with very limited success, however. Apprentices were already attending night school under compulsion of the union. The only step away from school on the apprentice's time which has so far been taken in the electrical trade is a provision in the 1925 agreement for one 4-hour session weekly on paid-for time for the first year of apprenticeship. Second, third, and fourth year boys are still required to attend night school for two 2-hour sessions each week.

Theory and applied science, mathematics, and laboratory work make up the course of study. The equipment is elaborate and complete, as classes are held in one of the trade schools, and apprentices have the use of the equipment provided for the day pupils.

It was generally believed that the tendency would be toward a more liberal attitude on the part of the contractors in the matter of paid-for time in school. That it is unquestionably an advantage to the employer is the position taken by some of the contractors. One of the employers interviewed made the statement that his school-trained apprentices, even in their second year, know more about the work that is required of them than any of his old journeymen. "They may lack the practical experience, but they know what it is all about—which is exactly what the old line mechanic does not know."

The principal difficulty in the way of an effective apprentice system, in the opinion of some in the trade, is the fact that the field is overcrowded already.

After the first year of apprenticeship the boy is not required to remain with the same employer, although it is customary for him to do so. Apprentices are chosen alternately by the employer and the union.

BRICKLAYING.

Night-school work has been required of bricklaying apprentices by the union for several years. Until 1927 the union had been unable to interest the contractors in part-time school work, but beginning in September of that year the master masons agreed to part-time school training, one-half day each week, for the first and second year boys. Class work in the day school will be chiefly manipulative, the attitude of the employer being apparently quite utilitarian and expectant of immediate returns on his investment of paid-for school time. Third and fourth year boys are still required to attend night school. The course of study for the older boys is largely related work, plan reading, drawing, and estimating, with shop instruction in the finer or specialized points in the craft which seldom come in an apprentice's experience. Shopwork of that character covers fire-brick work and fireplace and mantel erection.

Development of the part-time system will, of course, depend upon the success of this experiment, but school authorities and some of the men in the trade feel that it will move along the course already traveled by the plumbing trade.

LATHING

Carnegie Institute offers a course in metal-lath erection which lathing apprentices are required to take. This work is both evening and day school work, and apprentices attend one evening class during the week and a four-hour session on Saturday morning. The morning work is not on paid-for time, since the trade works only a five-day week.

This is also in the experimental stage. The school term had not opened at the time of the investigation in Pittsburgh and definite information about school work and the success of the plan was not available.

CARPENTRY

School work for carpenter apprentices is entirely night work, two evenings a week during the school year for the entire four-year apprenticeship period. Attendance is compulsory and the regulations are rigid, involving fines and withheld pay for unexcused absences. Forfeit of pay, of course, depends upon the employer, and some of the contractors are not so closely in sympathy with the school idea as to make any effort to enforce discipline to that extent, but they are in the minority.

The carpenters' district council jurisdiction covers Allegheny County and even extends beyond it. Accordingly there are apprentices subject to its rules who live a considerable distance from Pittsburgh, but the requirement of school attendance applies also to them. A school official reported that—

> There are many boys in the carpentry apprentice department who travel 20 miles each way twice a week after their day's work is done. That is a real hardship. I think if the compulsion were removed about three-fourths of our carpenter apprentices would drop out. But they are coming now, and after they get here are interested and attentive and are making good. The contractors will line up eventually with the part-time program—it is bound to come.

Now of course they are getting the advantage of technical training for their boys without contributing one thing to the method which, they admit, is producing better mechanics.

Plan reading, drawing, mathematics, and theory make up the major courses in carpentry, with some shop work, and estimating for the advanced pupils.

TILE SETTING

The remaining trade which has any school work at all for its apprentices is tile setting, in which classes are held in the evening during the winter months. This school is maintained by the craft itself, the dealers furnishing the material and the union the teacher.

Only members of the tile dealers and contractors' association, of whom there are 12, are granted apprentices, and each of them has one. As apprentices are taken from the helpers, the apprentice term is only two years. Selection of helpers to become apprentices is on a competitive basis.

OTHER TROWEL TRADES

In both the building trades not previously mentioned, plastering and cement finishing, a strict indenture system obtains and quotas are reported as being practically full.

The movement toward school training for plastering apprentices has been gathering strength and a committee has been at work making plans for a class at Carnegie. The plan contemplates Saturday morning classes, which, because of the five-day week in the trade, will be somewhat of a compromise between night school and paid-for time. While at the time of the investigation nothing had been definitely accomplished, both employers and the union were interested in the movement and it was thought that classes could be started during that winter semester.

OTHER FORMS OF TRAINING

Nonunion building tradesmen in Pittsburgh are confined, except in isolated individual instances, to the maintenance and repair departments of the large manufacturing plants and the transportation companies. Some of the concerns of this character are training boys in a number of crafts, including building, in the city trade schools through the cooperative part-time system of two weeks in school and two weeks on the job alternately. School officials report that included in this group of trainees are some building-trades apprentices, principally plumbing and electrical, but that the number is very small and that, so far as the industry is concerned, while they are bona fide apprentices, they are in maintenance work and not in construction.

The contract has just been let for the erection of a $1,100,000 trade school for the city of Pittsburgh, to be ready in January, 1929. With the opening of this institution, school men look for a decided expansion both in apprentice training and in cooperative part-time work, as well as in prevocational trade education.

The director of the College of Industries of Carnegie Institute of Technology reported that of 3,600 night-school students at this insti-

tution, 1,500 are enrolled in the building trades. These students are journeymen, contractors, and men not connected, in their major activities, with the building industry.

ST. LOUIS

The building trades in St. Louis are thoroughly organized, and except in the plumbing line all operations outside the speculative building field employ union labor. Associations of contractors are found in several trades, representing chiefly the large employers, who, with few exceptions, run union shops.

Apprentice systems in varying degrees of effectiveness are found in all the important crafts. In most of them the practice is to limit contractors to one apprentice in each craft, and to a very large extent St. Louis contractors are employing and training apprentices. Indenture or some form of obligation is required by some unions, but an informal understanding or agreement takes the place of actual indenture in most cases.

Two crafts, sheet-metal work and tile setting, have definitely organized apprentice systems operating through joint apprentice committees of employers and journeymen.

School work is required of apprentices in sheet-metal work and plumbing and is available for apprentices in some other crafts. With the exception of the two trades mentioned, school work is only such as is given in response to popular demand in the city night schools. Classes are open to journeymen, apprentices, helpers, and persons not employed in the trade, and are subject to discontinuance at any time if the attendance falls below a fixed minimum. There is no school training on paid-for time for apprentices in any of the building trades in St. Louis.

These night-school classes teach only technical subjects—drawing, blue-print reading, mathematics, estimating, and the like. Practical work is not available for any of the building crafts, with the exception of painting and paper hanging. The class in that trade was not a success, however, and may not reopen. Some unions, particularly those in the trowel trades, require their apprentices to attend night school for work in mechanical drawing and blue-print reading for the first two years of apprenticeship. In other crafts the unions are indifferent or are opposed to trade school work.

The most highly organized apprentice systems are found in sheet-metal work and tile setting.

SHEET-METAL WORK

An apprentice committee composed of three members of the sheet-metal workers' union and three members of the sheet-metal contractors' association control apprenticeship in that trade. After six months' probation, during which both boy and employer are free to end their association, an agreement is signed by both sides through the medium of the committee. The agreement obligates both apprentice and employer for four years and fixes the wage scale and other working conditions, all the terms of which are enforced by the committee.

One provision of the agreement is that "apprentices must attend evening classes" at a school designated by the committee "during their entire term of apprenticeship."

By arrangement with the board of education classes in sheet-metal pattern drawing and mathematics are held four nights a week in one of the city high schools. These classes are attended by the registered apprentices from the union shops, apprentices and helpers from open shops, and some journeymen. Attendance of the registered apprentices, which nominally is compulsory, is very good on the whole, according to the instructor. "There are some chronic absentees," he reported. "In nearly every case, however, the boys are indentured to employers who are not cooperating with the committee, and who refuse to bring any pressure to bear on the boy or even to encourage his attendance at school."

The school makes monthly reports of attendance, progress, and general attitude and aptitude of each boy to the apprentice committee. Every six months these reports, together with a written report from the employer and the shop steward, are used by the committee in passing the apprentice into the next higher term, carrying with it a substantial wage increase. Apprentices are not advanced to the next higher grade except through the committee. Advancement is withheld as a disciplinary medium, the committee sometimes adding a few weeks to the current term as a penalty for nonattendance at school, poor work, or other irregularities.

The school course is 4 years of 37 weeks each, 4 hours a week, divided thus: For first-year apprentices, 4 hours of sheet-metal pattern drawing; second year, 2 hours drawing, 2 hours mathematics; third year, 4 hours drawing; fourth year, 2 hours drawing and blueprint reading, 2 hours heating and ventilating theory and mathematics. Instruction is wholly individual, the lesson-sheet plan being used entirely, so that each pupil progresses as rapidly as his own capacity permits. Practical shop work in school has not been undertaken so far, but is being considered and will probably be introduced on a part-time basis as soon as facilities are made available through the vocational school.

The ratio of apprentices to journeymen under the union agreement is 1 to a shop, 2 where 5 to 7 men are employed, with a maximum of 3 to any one shop. Sixty apprentices in union shops were reported. Several of the large shops keep their maximum quota filled. According to the chairman of the apprentice committee, "practically all union shops use apprentices and, generally speaking, employers are carrying out association and committee regulations faithfully."

While there is considerable elimination during the six months' probation, there is very little among the entrants who finish their probation and sign the agreement. Boys who have been in the business as helpers are frequently given preference for apprenticeships.

In the opinion of the chairman of the committee, "the present system is working successfully and is giving good training to as many mechanics as the trade can absorb—probably more—as the industry is a disappearing one in building operation."

Open-shop apprentices are not under any form of agreement with their employers and may change jobs at will. While some of them attend the evening school, attendance is not required, and is usually determined by the interest and ambition of the individual boy.

TILE SETTING

The training of mechanics in tile setting is a national policy of the National Tile Dealers' Association, and in St. Louis the local branch of that association has the full cooperation of the tile setters' union in carrying out the policy. The system works through a joint board composed of three representatives from each organization. This is an active working committee which meets twice a month and deals with all matters pertaining to apprentices and their training.

A contractor is allowed 1 apprentice if employing 5 tile setters, 2 if employing 7 setters, and 3 if employing more than 7. No contractor may have more than 3 apprentices. While the maximum of 3 is seldom carried, contractors who are members of the association are required under its rules to keep 1 apprentice at all times. An officer of the association made this comment on that ruling:

> We had to fight several years ago to make the union recognize apprenticeship and put on boys. Having forced the issue, consistency demanded that the contractors also be required to do their part toward training the mechanics the trade so seriously needed.

While the association is small, it represents most of the business. Boys who are beginning the trade as apprentices must be grammar-school graduates and be or become American citizens. They serve a three-year term. When tile setter helpers are taken on as apprentices, a practice followed by some contractors and permitted under the rules of the committee, half the apprentice period is allowed for previous training. Three years as a helper must be served before a helper can become an apprentice.

Because of the advantage of making apprentices of the helpers, the maximum age limit of 25 is not strictly adhered to.

School work in connection with training on the job is left to the discretion of the individual contractor. Some of them send their boys to Dunwoody Institute in Minneapolis for three months' intensive training. This course counts for six months' credit on the full apprentice term. The expenses of the student are paid by his employer and the National Tile Dealers' Association.

Contractors who do not avail themselves of the intensive training at Dunwoody may send their apprentices to night school, either the city high schools or Washington University, for architectural drawing and mathematics. In some cases no attention is paid to school work by either the employer or the apprentice.

Training on the job, while not following any progressive plan, is assured by a system of checking the various kinds of work on which the apprentice has been engaged during the month. A score card is used, on which is listed all the different operations involved in tile setting. The apprentice checks daily the operations on which he has been engaged. This card is presented to the apprentice committee once a month. If it shows that the apprentice is being kept too closely on one line of work the matter is taken up with his employer.

Apprentices must meet with the joint board once a month to answer roll call and to present their cards. Any grievances on the part of employers or boys are considered at these meetings. Failure to attend meetings is penalized by an extension of time.

The system has been in operation since 1923 and in the first four years 45 mechanics were graduated. According to the chairman of the board, this number—an average of about 10 a year—will keep up a supply of tile setters sufficient to meet the normal demand in St. Louis. In 1926 tile setters were brought in from all over the country, but that was a peak period. In 1927 some members of the local union were idle because of a decided slowing down in building since the first of the year.

Even under those conditions, the chairman of the joint board thinks that 10 new mechanics yearly will not create a surplus "if we can judge by our experience last year. Five of our men died and two were incapacitated, so that we are not materially ahead of the normal number now. And even now it is the mediocre setters who are out of work. The better trained men are busy enough."

The number of trainees who fail to complete the term is negligible. Registered tile setter apprentices reported numbered 14, with 2 more to be taken on at the beginning of the next term at Dunwoody Institute.

BRICK AND STONE MASONRY

Apprenticeship in bricklaying and stone setting is by agreement and custom rather than formal indenture. The trowel trades are quite thoroughly under union control, however, and when a contractor takes on an apprentice the arrangement has all the force of a contract.

Brick contractors are allowed one apprentice every two years; stone contractors one every four years. They are required to keep their apprentices for the full four-year term and to keep them continuously employed. Occasionally there is an interchange of apprentices by transfer from an idle to a busy contractor, but this practice is not encouraged by the union.

The joint arbitration board of the bricklayers' union and the mason contractors' association acts as a joint apprentice committee on all matters affecting apprenticeship, and apprentice problems figure largely in the monthly board meetings. Permission to become and to employ an apprentice is given by the board in regular sessions after formal action upon the applications.

While apprentice bricklayers are expected to attend night school for work in mechanical drawing, blue-print reading, and estimating for the first two years of their apprenticeship, the matter is not stressed by the union and the contractors showed no especial interest in school work. One, in fact, was definitely opposed to the idea of school training.

It was reported that all members of the mason contractors' association who under union regulations are entitled to an apprentice employ one, and many of the large contractors keep their quota of two at all times. The reported enrollment of apprentice bricklayers is 168, approximately one to every seven journeymen. In stone masonry the ratio of apprentices to journeymen is much lower, being

about 1 to 25. Only 12 apprentices were reported by the stone masons' union, less than half of the active stone contractors employing them.

Considerable dissatisfaction was expressed by general contractors and master masons at the restrictive regulations of the trowel unions, not because of the number of apprentices allowed, but because of the policy of "keeping the trade in the family." The opinion is generally held that while the allotment of one, and at most two, apprentices in the trowel trades appears restrictive, in actual operation it does not prove so because enough contractors make a practice of training apprentices to make the supply of new mechanics ample for normal needs. But contractors do object to having their choice of boys limited to the relatives of the men in the craft. Contractors may, of course, apprentice their own sons, but beyond that they have to take boys from the union lists, to which only relatives of journeymen are eligible.

PLASTERING

The contracting plasterers' association has no part in apprentice training and no policy with regard to it. However, most of the responsible contractors keep one apprentice, which is all the union grants. The 62 apprentices on the union roster represent approximately 1 to every 8 union journeymen. There is little nonunion plastering except in speculative residential work.

Opinions varied as to the adequacy of the number of trainees, one large contractor contending that, at least for the big operators in the ornamental line, one apprentice every four years is absurdly low. Others felt that with every contractor doing his share, the supply of new mechanics would easily take care of mortality and increased business in the trade, and, as one of the leading contractors remarked, "there are always plenty of floaters to take care of peak periods, and we don't have to worry about them when the peak is passed."

Very little dropping out of trainees was reported, either by the union or by the employers. Apprentices are supposed to attend night school, but the business agent of the union said that "we don't have much success in keeping them in school."

CARPENTRY

With an allowance of 1 apprentice to a contractor and 160 boys in training, the carpenters' district council reports that all contractors who are entitled to an apprentice are employing one, and they are training all the trade will support at present. Carpenter apprentices are under indenture, the agreement calling for employment as steadily "as work will warrant." While there seems to be considerable lost time for carpenter apprentices, it does not materially affect the completion of training. According to a union official, 90 per cent or more of the entrants complete their time. As in the trowel trades, carpenter apprenticeships go almost without exception to the sons or other relatives of the men in the craft, both journeymen and contractors.

No school training is provided, and so far as could be determined no particularly definite or effective system designed to create qualified mechanics is followed.

LATHING

Still another trade which limits contractors to one apprentice and gives preference to sons of members is lathing, in which 12 apprentices are indentured. Apprentices are under the direction and control of the executive board of the union, which examines and rates the boys every six months. Attendance at the night-school classes in mechanical drawing and blue-print reading is nominally compulsory for six months of the two-year apprentice period. As lathing is a piecework trade requiring speed rather than mechanical skill, apprenticeship is really a device for keeping the boy at the trade. Wage rates are adjusted at the end of each six months' period. After two years' apprenticeship in wood lathing, any boy desiring it may have an additional year as an apprentice in metal lathing. Two of the 12 boys reported are working on metal-lath erection. Ninety-five per cent of the entrants complete their training, the union reports.

PIPE TRADES

Plumbing work in St. Louis is about evenly divided between union and open shops. The master plumbers' association includes both union and open-shop men, and while its membership covers less than half the total number of registered master plumbers in the city, most of those outside the association are one-man shops and small repair shops.

The national program of apprentice training promulgated by the National Association of Master Plumbers is the basis of the system which the local association is trying to carry out. This program contemplates an apprentice in each plumbing shop, continuously employed for the full period of five years, and trained in technical as well as manipulative work.

There is no actual contract or indenture between an apprentice plumber and his employer. The union employers have an informal agreement to keep their apprentices for five years, and as the secretary of the master plumbers put it, "we expect the employer to keep the boy and make a mechanic of him."

The union insists upon limiting the shops to one apprentice. In the large open shops two or three are generally found, and one open-shop contractor doing an extensive business outside of St. Louis has five. Apprentices were found in practically all the plumbing shops visited, the exceptions being small jobbing shops, generally nonunion and run by a father and son. Several union employers contend that the restrictive policy of one to a shop is unfair and unwise, but that view is not a general one.

For two of the five years trainees are required to attend evening classes at Ranken Trade School. This is a private school, and tuition is paid by the employers.

The course is four hours a week—two evenings of two hours each. The well-equipped shop rooms of the regular day school are used for the apprentice class work. Equipment includes, besides well-fitted benches, a two-story-and-basement skeleton structure which is used for roughing-in, soil pipe work, and installation of fixtures in wide variety. Bench work covers all forms of pipe work and joint wiping. Shop lectures on technical and related subjects occupy

about one-fourth of the total time, the rest being given entirely to manipulative work under individual instruction.

While the provision that apprentices are "required" to attend school becomes are "supposed" to attend school in actual practice, still attendance is satisfactory on the whole, according to a school official. About 80 registered apprentices were enrolled in the evening plumbing classes in the school year reported. The number of plumber apprentices in both union and open shops in the city was given as 125. Not all of this number would be in school, of course, as the school period covers only two years of the apprentice term. On the other hand, not all employers are conforming to the school program.

The percentage of completed terms was given as 70 by the union, and variously from 85 to 100 by the individual employers interviewed.

The local organizations of steam fitters and heating and piping contractors are negotiating an agreement establishing an apprentice system to operate through their joint arbitration board. The terms provide for continuous employment with the same employer for the full five-year period, and for school work.

At present, however, the helper system is used in pipe fitting. Classes in applied science and mathematics are available in the city night schools for both journeymen and helpers. The secretary of the union, a heating engineer, is the head instructor.

ELECTRICAL WORK

While there is no formal indenture of apprentices by the electrical contractors, the local union reports 150 helpers who are assured more or less continuous employment until they have completed their training, and it was reported that 95 per cent of the boys finish the four-year term and become mechanics.

A large percentage of the helpers registered are sons or nephews of union members. The business agent says that the union makes every effort to train its own mechanics adequately, and that "we'd rather make our own men in our own shops than go outside for them; we have less trouble that way." The quota is one apprentice to four journeymen, which, it was said, is all the business justifies at present.

There is a long waiting list and boys are registered years in advance. Even though there is no formal contract, the employer understands that he is to keep the helper until his training is completed, and new working rules now being drawn up make continous employment compulsory.

School work is optional, but a considerable number of boys are taking night-school courses in theory and applied mathematics.

PAINTING AND PAPER HANGING

Apprenticeship in the painting and decorating craft, while under formal agreement where it exists at all, is rather casual in actual operation. An employer who takes on an apprentice is required, under the working agreement between the master painters and the union, to keep him for the full term. Few contractors take on any at all, and while continuous employment is guaranteed to the apprentice

in the union shops, the record indicates that boys do not stay in the trade to complete their terms. Open-shop contractors almost without exception report that boys will not stay in the business. As one of them said, "Apparently the work itself does not interest young fellows any more so that they want to stay in it and learn it, and the business doesn't warrant paying wages that will hold them."

It is generally felt that more apprentices and a more effective method of training are needed in the trade, but no concerted effort is being made to meet the need. A school has been started, but it was not very successful and it is uncertain whether or not it will be continued.

The 90 apprentices reported by the painters' district council are employed by only about 35 per cent of the union contractors of the city. Several large union shops visited reported having none at all, for various reasons—"don't want to bother with them," chiefly, and in one case the point was made that the grade of boys available through the union is so unsatisfactory that it is not worth while to try to train them. Another contractor, in interior decorating, while deploring the lack of a training system, insisted that it was altogether impractical to put untrained boys in his line of work, which is work in private homes mostly and calls for a high degree of skill. No open shop visited had any apprentices, and two was the largest number found in any union shop visited.

APPENDIXES

The material presented as appendixes to this report on apprenticeship in building construction is in no way exhaustive. It aims merely to supplement the report with specimen material on subjects referred to in the text which could not be treated in detail.

APPENDIX A.—COURSES OF STUDY FOR APPRENTICES

Outlines of the courses of study followed in the Cleveland Apprentice School and in the carpentry apprentice classes in Niagara Falls are here given.

PART-TIME COURSES IN CLEVELAND APPRENTICE SCHOOL

BRICKLAYING

Plan for training.—The bricklayers' apprentice school was organized in 1921 through the joint efforts of the local bricklayers' union, the mason contractors' association, the building-trades employers' association, and the Cleveland Board of Education. Representatives of these bodies meet biweekly to determine policies and handle details concerning apprenticeship.

The school year extends over a 48-week period. Each student attends one-half day (four hours) each week, for which time he is paid his regular salary by the contractor. After a four-year training, combining work on the job with instruction in the school, the apprentice becomes a journeyman bricklayer and receives a diploma.

Entrance requirements.—Any youth regularly employed who is working as an apprentice bricklayer may enroll subject to the policies set up by the school.

Aims of course.—1. To assist in training competent bricklayers by pointing out the best practices in the trade. Technique is emphasized so that the student may develop proper skill on the job.

2. The school aims to teach the related knowledge necessary in bricklaying; that is, science, blue-print reading and sketching, mathematics, etc., as well as continuously to point out artistic and æsthetic values.

3. To develop a proper social and economic realization of the importance of bricklaying and to point out its relationship to building trades and progress in general. This training is fundamental for citizenship.

Course content

First-year jobs—bonds:

1. Spreading mortar.
2. Building a 4-inch wall.
3. Building an 8-inch wall.
4. Building an 8-inch wall with 4-inch pilaster.
5. Building a 13-inch wall with 8-inch pilaster.
6. Building a 13-inch common bond corner.
7. Building a 13-inch common bond wall with Flemish header.
8. Building a 13-inch Flemish bond corner.
9. Building a 13-inch Flemish bond wall with 8-inch pilaster.
10. Building a 13-inch English bond corner.
11. Building a 13-inch English bond wall with 8-inch pilaster.
12. Building a 13-inch English cross bond corner.
13. Building a 13-inch English cross bond wall with 8-inch pilaster.
14. Building a 13-inch Dutch bond corner.
15. Building a 13-inch Dutch bond wall with 8-inch pilaster.
16. Building a 13-inch diamond bond corner.
17. Building a 13-inch diamond bond wall with 8-inch pilaster.
18. Building a 13-inch garden wall bond.

Second-year jobs—special applications of bonds:
1. Building all-rolok walls, 8-inch and 13-inch.
2. Building face brick walls with rolok backup.
3. Building interlocking tile walls, 8-inch and 13-inch.
4. Building brick sills.
5. Building brick piers, common bond.
6. Building brick piers, Flemish bond.
7. Building brick piers, battered bond.
8. Cutting bull's-nose brick.
9. Cutting bull's-nose mitered corners.
10. Underpinning, heavy walls.
11. Underpinning, steel structure walls.
12. Laying up belt courses, soldiers.
13. Laying up belt courses, water tables.
14. Building weathering or intake patterns.
15. Building octagon corners, special and pigeonhole.
16. Building fireplaces, openings and throat.
17. Building fireplaces, damper and flue.

Third-year jobs—arches, special jobs:
1. Building arches, segment.
2. Building arches, releaving.
3. Building arches, semicircle.
4. Building arches, bull's-eye.
5. Building arches, camber.
6. Building arches, Gothic (modified and lancet).
7. Building arches, ellipse (true method).
8. Building arches, ellipse (Gothic).
9. Building arches, groined.
10. Building circular walls, cisterns.
11. Building circular walls, manholes.
12. Building disposal plants, incinerators.
13. Building disposal plants, septic tanks.
14. Constructing fireplaces and flues, firebrick.
15. Fireproofing, floors.
16. Fireproofing, partitions.
17. Terra-cotta work, building jambs and lintels.
18. Terra-cotta work, building cornices.

Fourth-year jobs—ornamental panels, special jobs:
1. Building ornamental panels, running bond.
2. Building ornamental panels, diagonal bond.
3. Building ornamental panels, herringbone bond, 45°.
4. Building ornamental panels, herringbone bond, 90°.
5. Building ornamental panels, diaper bond.
6. Building ornamental panels, basket bond.
7. Buttering face brick.
8. Building porch and entrance step.
9. Stone, wall bonds (discussions).
10. Marble, walls and floors (discussion of varieties).
11. Building windows, jambs, casement.
12. Building windows, jambs, basement.
13. Building windows, jambs, double hung.
14. Building windows, jambs, steel sash.
15. Special layout work.
16. Simple floor plans and elevations.

CARPENTRY

Plan for training.—This work was organized October, 1923, through the joint efforts of the carpenter contractors' association, the carpenters' district council, the building trades employers' association, and the vocational department of the public schools. Representatives of these groups compose the joint apprenticeship committee. The school year covers a period of 48 weeks, each apprentice in Cleveland attending four hours, or one-half day each week. The apprentice is paid his regular wage during the period of attendance and receives a diploma at the completion of the four-year course. This training, together

with the four-year apprenticeship, is considered by the carpenters' district council as fulfilling the requirements in training for journeyman standing.

Entrance requirements.—Any individual who is regularly employed as an apprentice in carpentry is eligible for enrollment, subject to the regulations of the school.

Aims of course.—The committee responsible for establishing the school had in mind the following objectives:

1. Training of competent, skilled journeymen well qualified to perform the various jobs in the trade through a study of the most efficient methods of workmanship.
2. Developing an essential knowledge of tools, materials, and related subject matter which is necessary for a complete mastery of the trade.
3. Promotion of an economic and social appreciation of carpentry and allied trades in order to develop the highest type of craftsman and citizen.

Course content.—The job method is used in organizing instruction content. Special ways of doing work are pointed out in order to develop the best technique in practice. Much of the shopwork is carried out with full-size materials. Some work is done with models to develop ability in planning and laying out work. Where models are built, all cuts are transferred to full-size stock. This provides for the double advantage of planning and laying out cuts on full-size stock and at a great saving in materials. These jobs were selected not because they represent the major part of the work in carpentry, but rather because they form a suitable basis for teaching the fundamental operations and related knowledge necessary to develop competent, skilled craftsmen.

First-year jobs—framing floors and walls:

1. Laying a simple wall plate.
2. Framing and placing a solid beam.
3. Building up and placing a built-up beam.
4. Setting joist.
5. Framing and setting plain studs.
6. Setting studs where shoe rests on joist.
7. Setting studs directly on wall plate.
8. Building up corner posts.
9. Setting corner posts.
10. Nailing on the plate.
11. Cutting and placing bridging.
12. Framing an opening in a floor.
13. Framing a door opening.
14. Framing a window opening.
15. Laying horizontal subfloor.
16. Laying diagonal subfloor.
17. Applying horizontal sheathing.
18. Applying diagonal sheathing.
19. Framing a plain interior partition.
20. Framing special interior partitions.
21. Applying furring.
22. Applying grounds.
23. Setting columns.

Second-year jobs—framing roofs (jobs 1 to 18 refer to square-cornered buildings):

1. Making a plumb cut on a common rafter.
2. Correcting length of common rafter for the ridge board.
3. Laying out the rafter to length by the step system.
4. Making the seat cut on a common rafter.
5. Cutting a bird's mouth on a common rafter.
6. Erecting a roof framed with common rafters.
7. Making the plumb cut on a hip rafter.
8. Correcting length of hip rafter for the ridge board.
9. Making the cheek cut on a hip rafter.
10. Laying out the hip rafter to length by the step system.
11. Making the seat cut on the hip rafter.
12. Making the seat cut on a valley rafter.
13. Backing-off a hip rafter.
14. Framing a ridge board for a hip roof.
15. Making the plumb cut on a jack rafter.

16. Correcting length of jack rafter:
    (*a*) Hip jack.
    (*b*) Valley jack.
    (*c*) Cripple jack.
17. Making the cheek cut on a jack rafter.
18. Laying out the jack rafter to length by the step system.
19. Square-root methods of obtaining length of rafters.
20. Framing hips and valleys for uneven pitch roofs.
21. Framing jacks for uneven pitch roofs.
22. Framing a roof of any polygon.

Third-year jobs—timber framing, exterior finish:

1. Framing a solid sill with a half-lap joint.
2. Framing a solid post, using mortise and tenon joint.
3. Framing a brace, using:
    (*a*) Oblique butt joint.
    (*b*) Bridge or saddle joint.
4. Framing a splice in a beam:
    (*a*) Fished splice.
    (*b*) Halved splice.
    (*c*) Beveled splice.
    (*d*) Keyed splice.
5. Framing a trestle bent.
6. Framing a king truss.
7. Framing a queen truss.
8. Building a plank truss.
9. Shoring walls of buildings:
    (*a*) Dead shore.
    (*b*) Raking shore.
10. Constructing a scaffold.
11. Making an exterior door frame.
12. Setting an exterior door frame.
13. Making a window frame:
    (*a*) Single sash.
    (*b*) Double hung.
    (*c*) Casement.
14. Setting a window frame.
15. Applying corner boards.
16. Applying baseboards and belt courses.
17. Putting on novelty siding.
18. Putting on clapboard siding.
19. Applying roof sheathing.
20. Shingling a roof:
    (*a*) Plain roof.
    (*b*) Hips and valleys.
21. Shingling an outer wall.
22. Constructing open cornice:
    (*a*) Framing rafter ends.
    (*b*) Applying cornice to gable.
    (*c*) Cutting miters on raking moldings.
23. Constructing closed cornice:
    (*a*) Applying frieze board.
    (*b*) Applying lookouts and plancher.
    (*c*) Applying fascia and moldings.
24. Constructing a porch floor.
25. Building a porch roof and cornices.
26. Setting porch posts and rails.
27. Building lattice and trellises.
28. Building store fronts.

Fourth-year jobs—interior finish, building and setting stairs, concrete form work:

1. Laying flooring.
2. Insulating floors.
3. Putting on base.
4. Casing a door.
5. Casing a window.
6. Making and setting inside door jambs.

7. Applying moldings.
8. Making returns on moldings.
9. Applying interior cornice and beam ceilings.
10. Fitting and hanging windows.
11. Fitting and hanging doors.
12. Building kitchen cupboards.
13. Building a drawer.
14. Installing a mantelpiece.
15. Building a window seat.
16. Framing a stringer or horse in a straight flight basement stairs using cleats:
    (*a*) Determining the rise and run of a stairs.
    (*b*) Determining the width of treads and risers.
    (*c*) Laying out a stair string or horse.
17. Building a straight flight of stairs using housed stringers:
    (*a*) Framing the stringer.
    (*b*) Making the treads and risers.
    (*c*) Wedging and blocking.
18. Building a straight flight stairs with a cut stringer.
19. Fastening a stairs in a building.
20. Setting a newel post.
21. Making and placing the skirting board.
22. Splicing and erecting a handrail.
23. Locating and setting the balusters.
24. Laying out a platform or landing stairs
25. Laying out a winder.
26. Laying out a circular stairs.
27. Building and bracing concrete forms:
    (*a*) Block footing.
    (*b*) Wall footing.
    (*c*) Light wall.
    (*d*) Heavy wall.
28. Building and erecting forms for columns:
    (*a*) Regular.
    (*b*) Special.
29. Supporting forms:
    (*a*) For beams.
    (*b*) For arch decks.
    (*c*) For flat decks.

ELECTRICAL WORK

Plan for training.—In February, 1925, the school for electrical apprentices came into existence. The organization was perfected through the cooperation of the electrical contractors' association, Local Union No. 38, and the Cleveland Board of Education. The joint apprentice committee is composed of three members from each of the contractors' and union organizations, together with the coordinator and director of vocational education of the public schools. The instructor is an ex-officio member of the committee which meets once each month and outlines and plans the necessary details for carrying on the school. The apprentice attends a full day every other week for a school year of 48 weeks. At the end of four years a diploma is awarded for the successful completion of the school work. This, together with the satisfactory completion of the four years of apprenticeship which parallels the school work, entitles the apprentice to journeyman standing.

Entrance requirements.—Apprenticeship in the trade is necessary for enrollment in the school. The committee is perfecting plans so that in the near future only the highest type of student will be admitted for apprenticeship.

Aims of course.—The electrical work requires a very high degree of mental ability. Much of the work involves a comprehensive insight into modern science. For this reason much emphasis is placed on related knowledge.

The electrical course (1) enables the student to acquire the technique of trade practice through jobs carried on in the school; (2) establishes a basis for apprentices to receive a thorough grounding in the principles underlying the practices of their trade; (3) makes possible the rounding out of a full and com-

plete training in all related subject material necessary to establish in the mind of the apprentice the economic and social importance of his work and lays the foundation for efficient citizenship.

Course content

First-year jobs—simple circuit, signal and house wiring:

1. Making a primary cell.
2. Building a Lechanche cell.
3. Building a Daniel cell.
4. Rebuilding a storage battery.
5. Connecting cells in series, parallel and multiple series.
6. Rewinding the coils of bell or buzzer.
7. Rewiring an annunciator.
8. Wiring for open and closed circuit burglar alarms.
9. Wiring for return call bells.
10. Installing bell wiring in houses.
11. Wiring for simple station two-line phone.
12. Making, soldering, and taping joints.
13. Wiring two lights controlled from one, two, and three points.
14. Roughing in a knob and tube job.
15. Finishing a knob and tube job.
16. Installing meter boards and services.
17. Installation of wiring system in an old house.
18. Cutting and threading conduit.
19. Wiring of single and double garages.

Second-year jobs—apartment house and commercial wiring:

1. Bending conduit.
2. Wiring a suite in conduit.
3. Pulling and finishing wiring in a suite.
4. Wiring a suite in "B. X."
5. Laying out a meter board for an apartment.
6. Laying out of exit and public lights for an apartment.
7. Laying out a combination store and suite job, two story.
8. Making a factory layout.
9. Making a store layout.
10. Wiring a store in wire mold.
11. Wiring a store in concealed conduit.
12. Wiring a store in exposed conduit.
13. Making a feeder layout for 2 per cent drop on 110-volt, two-wire service.
14. Making a feeder layout for 2 per cent on three-wire Edison service.
15. Connecting lamp banks on three-wire system.
16. Layout and connection of four-suite to vestibule phone system.

Third-year jobs—direct-current motors, controls and power wiring:

1. Connecting and testing an induction coil.
2. Reassembling a simple magneto.
3. Winding a simple direct-current motor armature.
4. Winding field for direct-current motor and assembling complete.
5. Classify and differentiate types of direct-current motors.
6. Assemble a series motor.
7. Assemble and connect a series starter.
8. Assemble a shunt motor.
9. Tear down and assemble a three and four point starter.
10. Connecting a shunt motor and starter.
11. Assembling a compound motor.
12. Connecting a compound motor.
13. Installing a reversing switch on a motor.
14. Making a power feeder layout for a commercial job.
15. Layout of pull boxes and cabinets.
16. Inspection and testing of ammeters and voltmeters.
17. Inspection of recording watt-hour meters.
18. Connecting a direct-current generator complete.
19. Making efficiency tests on motors and generators.
20. Connecting a variable-speed motor.
21. Connecting a "Carpenter type" remote control.

Fourth-year jobs—alternating-current motors, controls, and power wiring:

1. Energize a bell transformer on alternating current and direct current.
2. Connect lamps in series with coil and condenser.
3. Connect and reverse a single-phase split phase motor.
4. Connect and reverse a single-phase repulsion motor.
5. Classifying three-phase motors.
6. Reassemble a squirrel cage induction motor.
7. Reassemble an auto starter or compensator.
8. Wiring for induction motor and compensator.
9. Reassemble a slip-ring motor.
10. Connect a slip-ring motor.
11. Connect a primary battery remote control.
12. Make a schematic diagram and study principles of synchronous motor.
13. Inspect alternating-current ammeter and voltmeter.
14. Inspect watt-hour meter.
15. Inspect power-factor meter.
16. Inspect balancing coil and transformer.
17. Wind a simple bell transformer.
18. Make a feeder layout for a three-phase power installation.

PAINTING

Plan for training.—The painters' apprentice school was organized in January, 1925. The Painters' District Council, No. 6, the Master Painters' Association, and the vocational department of the Cleveland public schools have provided a plan whereby every painter's apprentice attends school one full day every other week, for which time he is paid his regular wage by the contractor. The course covers a period of three years of 48 weeks each year.

The joint apprentice committee is composed of two members from each of the following organizations: The district council, the Master Painters' Association, the Builders' Exchange, and the board of education. The instructor is a member ex officio of the committee. All policies and questions concerning the school come up before this committee, which meets every week during the school year. All painters' apprentices in Greater Cleveland are in attendance at the school. Successful completion of the prescribed course entitles the apprentice to a diploma. This together with the satisfactory completion of the three years' work in the trade entitles the apprentice to journeyman standing.

Entrance requirements.—Anyone regularly employed as an apprentice painter is entitled to enter the school subject to the regulations of the school.

Aims of course.—The committee is aiming to accomplish the following objectives through the work in the school:

1. Produce better journeymen through emphasis on technique which will result in the development of correct methods and higher skill through practice on the job.
2. Round out the training of apprentices since present specialization makes it difficult for the employer to provide opportunity for experience in all phases of the craft.
3. Furnish the opportunity for a more thorough study of materials, equipment, and underlying reasons for present practices.
4. To develop a well-rounded craftsman through a study of the artistic, economic, social, and civic values represented by the trade and through this development round out the training for citizenship.

Course content

First-year jobs—exterior and interior painting:

1. Preparation of softwood exterior surface for priming.
2. Preparation of materials for exterior priming.
3. Priming a new wood exterior.
4. Preparation of interior woodwork for priming.
5. Sanding and puttying of primed woodwork.
6. Preparation of smooth walls for priming.
7. Sizing of smooth walls including killing of stains and hot spots.
8. Preparing and sizing of rough finish walls.
9. Putting on exterior finish coat.
10. Painting woodwork flat coat.

11. Painting smooth walls second coat.
12. Preparing and priming metal work.
13. Preparing and priming cement and brick walls.
14. Staining and dipping shingles.
15. Painting and stippling walls.
16. Tinting paint with colors.
17. Enameling walls and woodwork.

Second-year jobs—frescoing, stenciling, paper hanging, and hardwood finish:

1. Preparation and sizing of walls for frescoing.
2. Mixing water colors with binders.
3. Spreading colors on walls.
4. Washing surfaces for refrescoing.
5. Applying a stencil to a wall.
6. Running a two-plate stencil.
7. Laying out a stencil—locating keys and ties.
8. Cutting out a stencil.
9. Using the lace-curtain stencil.
10. Laying out a wall for diaper and spot stencils.
11. Shading and veining a stencil pattern.
12. Paneling with stencil patterns.
13. Preparation and sizing of walls for paper.
14. Cutting paper for ceiling and walls.
15. Making and applying paste to paper.
16. Trimming paper by different methods.
17. Hanging paper on different surfaces.
18. Preparing and hanging canvas.
19. Preparing and hanging sanitas.
20. Preparing and hanging velours and flocks.
21. Staining and filling of woods.
22. Surfacing of woods.
23. Rubbing and polishing a varnish finish.
24. Finishing surfaces with lacquers.
25. Waxing woodwork.

Third-year jobs—graining, gilding, plastic relief, and estimating:

1. Use of groundwork for graining.
2. Grouping and spacing of figures.
3. Overgraining.
4. Combing out in graining work.
5. Matching natural colors of woods with gylp.
6. Using the check roller.
7. Treating of surfaces for gilding, sizing, or priming for metal leaf.
8. Applying gold or metal leaf.
9. Lining bronzed or leafed surfaces.
10. Varnishing or lacquering gilded surfaces.
11. Preparation of walls for relief work—using pounce pattern.
12. Preparation of plaster for the bulb.
13. Using the relief bulb.
14. Sizing completed relief work.
15. Preparation, application, and decoration of prepared relief finishes.
16. Repainting and refinishing.
17. Measuring surfaces.
18. Gauging amount of materials required.
19. Figuring cost of materials needed.
20. Estimating cost of labor.
21. Determining costs of preparing materials and surfaces.
22. Figuring overhead expenses.
23. Cost accounting in job work.

PLUMBING

Plan for training.—The school for plumbers' apprentices was organized in 1918 through the efforts of the Journeymen Plumbers' Union and Associated Plumbing Contractors of Cleveland, who met with public-school officials and worked out a plan for establishing a part-time school. The school year covers a period of 48 weeks, each apprentice attending a full day every other week for four years. Graduation from this course together with the satisfactory com-

pletion of four years' practical work in the trade carries with it the rank of journeyman. The school is administered by a joint advisory board composed of the chairman of the joint apprenticeship committee and the director of vocational education of the public schools.

Entrance requirements.—Any individual who is employed as an apprentice in the trade may be enrolled in the course, subject to the regulations set up by the committee.

Aims of course.—The following are among the more important aims for which the course was established:

1. Training to increase proficiency in the manipulative processes of the plumbing trade through emphasizing the best methods in technique.
2. Acquiring necessary related knowledge for intelligent, thoughtful, and efficient workmanship.
3. Development of an economic and social appreciation of the importance of plumbing.
4. Promotion of an ethical appreciation of the industrial and applied arts through the teaching of plumbing and its relation to other fields of activity, thereby laying a better foundation for citizenship.

Course content.—The jobs have been arranged with two thoughts definitely in mind:

1. The order in which the apprentice will be required to assist in new jobs so that the instruction can be tied up with the work which the apprentice is doing on the job.
2. The learning order—each job contributing a knowledge of tools and processes necessary in the succeeding lessons.

The following is the grouping of jobs in the course of study by years:

First-year jobs—simple iron, brass, and lead pipe work, such as cutting off, threading, making connection, bending, measuring runs, etc.:

1. Constructing an all-wood pipe bench.
2. Cutting off iron pipe to length.
3. Cutting off brass pipe to length.
4. Cutting off O. D. tubing to length.
5. Reaming pipe.
6. Threading iron pipe.
7. Threading brass pipe.
8. Threading O. D. tubing.
9. Making a nipple holder.
10. Cutting a nipple.
11. Screwing fittings on iron pipe.
12. Screwing fittings on brass pipe.
13. Screwing fittings on O. D. tubing.
14. Screwing valves on pipe.
15. Measuring straight runs of pipe.
16. Cutting out pipe and screwing same together, using pipe diagram.
17. Making up right and left coupling connections.
18. Making up union connections.
19. Making up flanged union connections.
20. Making up long-screw connections.
21. Bending iron pipe.
22. Bending brass pipe.
23. Cutting soil pipe.
24. Preparing oakum and yarning a joint.
25. Filling and lighting a gasoline furnace and torch.
26. Repairing a gasoline furnace.
27. Pouring and calking vertical joints.
28. Pouring and calking inclined and horizontal joints.
29. Making a calked joint, using lead wool.
30. Cutting lead pipe to length.
31. Dressing lead pipe.
32. Cutting sheet lead to dimensions.
33. Dressing sheet lead.
34. Tinning and care of soldering iron.
35. Tinning brass ferrules and bushings.
36. Preparing and soldering a straight seam.
37. Making and preparing a lead cap.
38. Preparing pipe and soldering in lead cap.
39. Cutting sheet-iron pipe.
40. Cutting tile sewer pipe.

Second-year jobs—making up and hanging up all kinds of pipe, pouring and calking soil pipe, leadwork, including wiping of various joints:

1. Making up a 90° offset.
2. Making up a 45° offset.
3. Application of 45° ells to 90° change of direction.
4. Changing position of piping from a horizontal to a vertical center line.
5. Hanging up pipe with separate hangers.
6. Hanging up pipe with cradle.
7. Making a pipe railing.
8. Constructing a pipe frame for hot-water boiler installed vertically.
9. Constructing a pipe frame for hot-water boiler installed horizontally.
10. Constructing frames for laundry trays.
11. Pouring and calking horizontal runs of soil pipe.
12. Pouring and calking vertical runs of soil pipe.
13. Calking vertical runs of soil pipe in recess.
14. Making soil pipe offsetting.
15. Calking roof flashings in hub.
16. Calking in lead closet bend.
17. Calking joint near ceiling.
18. Inserting fittings in an old soil-pipe stack.
19. Relining closet tanks with sheet lead—
    (*a*) Laying out pattern.
    (*b*) Forming up lining.
    (*c*) Preparing and soldering seams.
20. Making a lead sleeve flashing.
21. Installing a lead sleeve flashing.
22. Making wiping cloths.
23. Conditioning of wiping solder.
24. Preparing a round joint for wiping (lead to lead).
25. Wiping a round joint (lead to lead).
26. Preparing a round joint for wiping (lead to brass).
27. Wiping a round joint (lead to brass).
28. Preparing flange joint for wiping.
29. Wiping a flange joint.
30. Preparing branch joints for wiping.
31. Wiping branch joints.
32. Bending lead pipe.
33. Supporting lead pipe.
34. Making a lead drum trap.

Third-year jobs—installation of cold and hot water supply, roughing-in, installation of boilers and connections, special installations:

1. Installing water supply from street main to building—
    (*a*) Connections from street main to curb.
    (*b*) Connections from curb to building.
2. Installing sewer from street main to inside of building—
    (*a*) Building connection.
    (*b*) Building sewer.
    (*c*) Building drain.
    (*d*) The main trap.
3. Roughing-in for fixtures—
    (*a*) Reading plans and specifications.
    (*b*) Roughing-in measurements.
    (*c*) Locating soil and waste stack.
    (*d*) Locating and spacing of fixtures.
    (*e*) Checking up material on job.
    (*f*) Installing soil and waste stacks.
    (*g*) Roughing-in for closets.
    (*h*) Roughing-in for urinals.
    (*i*) Roughing-in for lavatories.
    (*j*) Roughing-in for bathtubs.
    (*k*) Roughing-in for showers.
    (*l*) Roughing-in for kitchen sinks.
    (*m*) Roughing-in for wash trays.
4. Testing roughing-in—
    (*a*) Water test.
    (*b*) Smoke test.
    (*c*) Air test.

5. Installing water supply inside of building—
   (*a*) Connections for water meter.
   (*b*) Mains.
   (*c*) Branches from mains.
6. Installing hot-water supply—
   (*a*) Mains.
   (*b*) Circulating mains.
   (*c*) Branches from mains.
7. Installation of hot-water boilers and connections—
   (*a*) Vertical.
   (*b*) Horizontal.
8. Installing street washers and hydrants.
9. Installing lawn-sprinkling and irrigation systems.
10. Installing auto-washing apparatus.
11. Installing pumps and connections for boosting city water pressure.
12. Installing subsoil drains.
13. Installing subsoil drain sumps.
14. Installing catch basins—
   (*a*) Kitchen.
   (*b*) Yard.
   (*c*) Garage.
15. Methods of supplying water for country dwellings.
16. Methods of sewage disposal for country dwellings.

Fourth years jobs—installing, testing, and regulating fixtures, planning layouts for various buildings, special jobbing work:

1. Installing water-closet combinations—
   (*a*) With flush tank.
   (*b*) With flushometer.
2. Installing urinals—
   (*a*) Wall.
   (*b*) Pedestal.
3. Installing lavatories—
   (*a*) Wall.
   (*b*) Pedestal.
   (*c*) Pedestal leg.
4. Installing bathtubs—
   (*a*) Common with legs or base.
   (*b*) Built-in.
5. Installing showers—
   (*a*) As a separate unit.
   (*b*) Over bathtub.
6. Installing kitchen sink.
7. Installing laundry trays.
8. Testing and regulating finished fixtures.
9. Layout for single dwelling—
   (*a*) Basement piping plan.
   (*b*) Isometric elevation of stacks.
   (*c*) Plan and elevation of bathroom layout.
   (*d*) Listing material required for job.
10. Layout for apartment house—
   (*a*) Basement piping plan.
   (*b*) Isometric elevation of stacks.
   (*c*) Typical plan and elevation of bathroom layout.
   (*d*) Typical plan and elevation of kitchen sinks and connections.
   (*e*) Typical plan and elevation of refrigerator traps and connections.
   (*f*) Plan and elevation of hot-water tank, heater, and connections.
   (*g*) Plan and elevation of laundry trays and connections.
   (*h*) List of materials required for job.
11. Jobbing—
   (*a*) Repairing leaks in water pipes.
   (*b*) Thawing out pipes.
   (*c*) Removing stoppages in soil and waste pipes.
   (*d*) Repairing valves.
   (*e*) Repairing leaks in hot-water tank.
   (*f*) Cleaning and regulating coils and burners in hot-water heaters.

(*g*) Connecting gas appliances.
(*h*) Draining a plumbing system.
(*i*) Making out a time and material charge slip.

The jobs are carried out as nearly as possible to present plumbing practice.

COURSE FOR CARPENTERS' APPRENTICES IN NIAGARA FALLS

Construction.—First period, 6 months: Simple types of form construction, methods of framing and principles involved, scaffold construction, short cuts in cutting sills, joists, studding, and plates to dimensions.

Second and third periods, 12 months: Shingling, flashing, bridging, special reinforced concrete forms, framing openings, lay-out of rods, setting frames, lay-out and cutting simple rafters, fitting and hanging sash.

Fourth period, 6 months: Methods of construction and erection of exterior finish, preparation of walls for stucco, veranda construction, putting on interior finish.

Fifth and sixth periods, 12 months: Simple stair building and principles involved, hanging doors and putting on hardware, installing cabinetwork (china closets, mantels, bookcases, etc.), putting on moldings, laying fancy flooring.

Seventh and eighth periods, 12 months: Laying out and cutting jack, hip, and valley rafters involving the principles of the steel square. Truss construction and principles involved.

Mathematics.—Fundamental operations, square root, simple geometrical problems, problems of scaling, drawing, problems involving the use of the steel square, estimating quantities of material, mensuration problems, problems involving the use of builders' handbooks, use of builders' lever, use of formulas, builders' trigonometry, bills of materials.

Drawing.—Simple representation by means of two and three view sketches, interpretation of working drawings, builders' geometrical drawing, reading of house plans, detail sketching, full-size detail layout, rod layouts, making framing plans, estimating bills of materials from plans.

Tools and material.—Care, use, and condition of tools; protection and seasoning of lumber; kinds, uses, characteristics, and standard sizes of lumber; stock sizes of millwork; kinds and uses of builders' hardware roofing materials.

Safety, and accident prevention.—Occupational hygiene, trade hazards, and precautions.

Trade information.—Trade terms, relation of apprentice to fellow workers and employer, possibilities of the trade, State labor department regulations.

APPENDIX B.—LESSON SHEETS FOR APPRENTICES

Samples of lesson sheets used in different schools and crafts are presented, as being suggestive of the kind of instruction given apprentices in the part-time schools.

PLUMBING—JOB SHEETS: CLEVELAND

THREADING BRASS PIPE

The dies used for threading brass pipe are the same as those used for threading iron pipe. The method of holding brass pipe is shown in lesson 3, and also on the illustration sheet with this lesson. Some workmen do not use friction clamps for holding plain brass pipe because the surface is not finished. Friction clamps should be used for threading all brass pipe regardless of whether its surface is polished or not.

Do not allow the pipe to project through the vise any more than sufficient for easy working. The less projection the better. It makes the pipe stiffer in resisting the threading strains.

Good dies should be used because the threads are easily stripped, and the pipe is subject to splitting or twisting owing to the abnormal amount of force required to cut the thread. When good dies are used the chips are not torn up and snarled, but stay together and come out of the chip space in the form of spirals.

The finished thread should not extend through the face of the die. When such threaded pipe is screwed home in the fitting no threads will show. This practice should apply especially to finished work, such as polished and nickel-plated brass pipe.

Before slipping the guide over the pipe to be threaded—if the pipe is polished or nickel-plated brass—cover the surface of the pipe where the guide rotates with a tough piece of paper. This prevents the scratching or marring of the finished surface of the pipe, and presents good plumbing practice.

Some workmen use oil as a lubricant in threading, while others use none. Good threads can be cut on brass pipe without the use of oil, but it is advisable to use oil as it assists in cooling the dies.

Tools and Materials

1. Piece ¾ inch plain brass pipe.
2. Piece ½ inch nickel-plated brass pipe.
3. Armstrong stock and dies.
4. Small monkey wrench.
5. Small pliers.
6. Oil can.
7. Vise installed.
8. Pipe clamps as illustrated in job sheet No. 3.

Standard Practice Instructions

1. Insert one-half of friction clamp in bottom jaw of vise.
2. Sprinkle a little powdered rosin on the inner surface of clamp.
3. Insert the one-half inch nickel-plated pipe in the section of clamp.
4. Allow to project the proper distance for threading.
5. Sprinkle a little powdered rosin on the inner surface of the other half of clamp.
6. Place on top of pipe, directly over the lower half.
7. Close vise and tighten so that the pipe will not turn when threading.
8. Cover the surface of pipe where guide of stock rotates with tough Manila paper, and hold in place until the stock is slipped into position for threading.
9. Thread as instructed for threading iron pipe.
10. Run the dies on the pipe until its surface is just flush with the end of pipe.
11. Remove the dies as described in threading iron pipe.

When considerable brass pipe is to be threaded, a vise with jaws of special design for holding brass pipe is used. There are several designs on the market, any one of which is practical to use. If the pipe to be threaded is small, a canvas strap vise * * * is sometimes used. [A suggestive friction clamp is shown in the illustration sheet of this lesson.]

Questions to Think About

1. Why should good sharp dies be used for threading brass pipe?
2. Of what value is the use of oil for threading brass pipe?
3. What is liable to occur if the pipe projects too far out from the vise when threading?
4. How long should a thread be cut for brass pipe? Why?
5. Why should friction clamps be used for threading all brass pipe?
6. What is Manila paper? Rosin?
7. How can the rosin be removed from the surface of the pipe after threading?

Just a Few Words to Look Over

Manila	surface	holding	illustration
rosin	section	considerable	instructed
value	described	remove	practical
friction	special	design	tighten
rotates	powdered	sprinkle	sufficient
suggestive	lubricant	prevent	practice

CUTTING OFF O. D. TUBING

In lessons 2 and 3 we learned to cut off iron and brass pipes. These were standard pipes and were designated by their inside diameters.

There is another kind of pipe used to connect the fixtures with the rough-in. This does not need such heavy walls, for there is only the pressure of the flow of water in the pipe. This thin brass pipe is called O. D. tubing because it is measured by its outside diameter.

Since this pipe is very thin, much more care must be exercised in working with it or it will be crushed. The purpose of this lesson is to study special methods in cutting off this kind of pipe.

A wood clamp * * * is frequently used. When this method is followed it is necessary to have a flat-jaw vice. The pipe is inserted in the block and a small amount of powdered rosin sprinkled on the block where it engages the pipe to keep it from slipping. This lessens the amount of pressure necessary to keep the pipe from turning if it is threaded. If it is not threaded, rosin need not be used, for most O. D. tubing is cut off with the hack saw. There is no tendency for the pipe to turn when the hack saw is used to cut it off.

O. D. tubing may be held in a canvas-strap vice. * * * Care must be taken not to draw it too tight if the pipe is of light gauge. The use of the canvas-strap vise is recommended, because through its use marring and scratching are less liable. It is necessary to use powdered rosin on the strap if the pipe is to be threaded.

Some O. D. tubing is not threaded, and it is often cut by placing the end of the tube over the corner of the bench or any other convenient corner. * * *

The hack-saw blade used should have 32 teeth per inch. If a coarser blade is used the thin walls of the pipe will destroy the teeth of the blade. A fine file should be used to square the end and remove the sharp edge so that it will be in proper condition for installation.

Tools and Materials

1. Pieces of 1¼-inch and 1½-inch O. D. tubing.
2. Bench with canvas-strap vise and flat-jaw vise installed.
3. Wood clamp block.
4. Hack saw.
5. Fine flat file.
6. Can of powdered rosin.

Standard Practice Instructions

1. Open the hinged clamp block * * * and sprinkle a small amount of rosin on curved inner surface of ¼-inch opening. (Omit rosin if tubing is not to be threaded.)
2. Mark off ¼-inch from the end.
3. Place 1¼-inch O. D. tubing in the block and close the pieces of the block together. Allow tubing to project in order to cut off conveniently.
4. Place the block (with the tubing inserted) in the flat-jaw vise and tighten just enough to hold it firmly.
5. Saw off the same way as standard brass pipe in the preceding lesson.
6. If canvas-strap vise is to be used, open strap of vise and sprinkle rosin on inner surface if the pipe is to be threaded.
7. Tighten tubing so that it will be held firmly in the canvas grip of the vise.
8. If not using vise or clamp, place end of tubing over the corner of bench, holding the tubing firmly in the hand and at the same time pushing it toward the corner so that it will not slip off.

The earliest method of fixture installations was the inclosure in wood of all pipes. The connections from fixtures to waste pipes were made of lead and, being inclosed, the appearance of the pipe was unimportant, except to the plumber who took great pride in the neatness and exactness of the work. About 35 years ago, we changed our methods of installation and these pipes were not inclosed. The appearance then became an important item generally.

Plated brass tubing soon came into universal use. The lasting qualities of this tubing are very satisfactory and, being cheaper and of better appearance than lead, it has almost entirely replaced the use of lead pipe.

Tubing is made in various sizes, 1¼, 1½, and 2 inches being the sizes most commonly used in plumbing. It is measured entirely by its outside diameter. The thickness of the walls of the tubes vary, and State and city authorities have passed regulations called codes which specify the thickness of the material of which the tubing is made when used for any specific purpose.

The thickness is determined by its "gauge," the "American" or "Brown & Sharpe" gauge commonly known as the "B. & S. gauge," being the standard most commonly used for brass tubing. This is the standard used in designating the weight of sheet brass used for manufacture. Exposed waste pipes from traps to floor or wall 2 inches or smaller size outside diameter may be No. 14, B. & S. gauge. For flush pipes, ventilating pipes, and exposed inlet connections to traps No. 18, B. & S. gauge, may be used.

Most of the brass tubing is nickel plated to improve its appearance. This plating is very thin, from 0.0004 to 0.04 inch and is done by a process called electroplating. Some tubing is made from a white metal usually composed of copper, zinc, and nickel, or small quantities of other metals added to give it the desired qualities and color. This tubing does not need to be plated.

Tubing presents a sharp edge after being cut off. Many cases of blood poisoning have developed from cutting or scratching the hands on this sharp edge. Use precaution and avoid this danger.

1. Why are thinner tubes used for waste connections of fixtures to rough-in than for water supply?
2. Why is O. D. tubing measured by the outside diameter?
3. What is the advantage in using a hack saw with fine teeth for cutting off?
4. Why should a file for squaring and smoothing the ends be used? What kind of a file should be used? Why?
5. Is the wood clamp made of hardwood or softwood? Why?
6. Which is the most convenient for working, the wood clamp or canvas-strap vise?
7. Why did plumbers discontinue to inclose the connections from the fixtures to the waste pipes?
8. Would there be any advantage in making the walls of O. D. tubing heavier?
9. Why should the walls of O. D. tubing not be made still lighter?
10. One and one-quarter-inch seamless brass tubing (No. 12 gauge) weighs 1.08 pounds per foot. One and one-quarter-inch standard brass pipe (I. P. S.) weighs 2.577 pounds per foot. How much heavier is the standard brass pipe than the tubing?
11. If brass is worth 8 cents per pound, what is the saving per foot in material in manufacture of tubing instead of standard size?

NOTE THE FOLLOWING WORDS

tubing	waste	walls
clamp	lead	nickel
gauge	inclosed	electroplating
file	plated	metals
hinged	codes	regulations
fixture	sheet	heavier

Describe in detail the method of cutting off O. D. tubing.

SHEET-METAL WORK (WIRE EDGE)—DETAIL OPERATION SHEET: CLEVELAND APPRENTICE SCHOOL

One of the very common operations among sheet-metal workers is that of placing on various articles a wire edge.

To construct a good wire edge there are about three principal things to know: (1) How to make the necessary allowance for the wire; (2) how to set machines to turn the necessary edge; (3) how to work the wire in so as to make a nice piece of work.

In answer to the first need—there are two or three rules in common practice for this allowance—one is to use two times the diameter plus four times the thickness of the metal. This is probably the most accurate.

To apply this rule one must first know the diameter of the wire to be used, and second, he must know the thickness of the metal he is to work with. These measurements may be obtained from most any sheet-metal workers' handbook or any sheet-metal catalogue.

It may be well to call to students' attention that there are several steel-wire gauges and sheet-iron gauges for wire used. The "United States steel-wire gauge" for sheet-iron use, the "Standard United States gauge of sheet iron."

Following is a part of tables on wire and sheet-iron gauges, including the gauges most likely to be needed:

Gauge number	Wire (thickness)		Gauge number	Sheet iron (thickness)	
	Fraction of inch	Decimals		Fraction of inch	Decimal
6		0.1920	10	$\frac{9}{64}$	0.140625
7	$\frac{1}{16}$	.1875	12	$\frac{7}{64}$	.109375
		.1770	14	$\frac{5}{64}$	.078125
8		.1620	16	$\frac{1}{16}$	.0625
9	$\frac{5}{32}$	.15625	18	$\frac{1}{20}$	.05
		.1483	20	$\frac{3}{80}$	.0375
10		.1350	22	$\frac{1}{32}$	.03125
	$\frac{1}{8}$	.1250	24	$\frac{1}{40}$	.025
11		.1205	26	$\frac{1}{160}$	.01875
12		.1050	28	$\frac{1}{64}$	.015625
	$\frac{3}{32}$	.09375			
13		.0915			
14		.0800			
15		.0720			
16	$\frac{1}{16}$	.0625			

Rule.—2 × diameter of wire + 4 × thickness of metal.

The Lufkin Rule Co. manufactures a scale which has the standard wire gauge on one side and decimal equivalents on the other, which is very convenient to carry in a tool box.

The other rule in common use is to allow two and one-half times the diameter of the wire about three-fourths of the circumference of the wire. After edge has been determined this amount must be added to the pattern.

To set the bar folder to fold or turn edges it will be necessary to drop the folding bar down about the diameter of the wire to be used and set the gauge to take about two-thirds of the amount of material allowed for the wire edge. It is best to try the edge on a piece of metal before proceeding with your work.

After edges have been turned and wire cut to suit, the work should be placed on a stake or slab of iron and worked over carefully to secure the wire with a wooden mallet (do not use a steel hammer). After this the operation may be completed with the wiring machine or on small delicate work the burring machine may be used. In some cases it may be advisable to place the work back on the stake, finish with a mallet to care for any roundness that may be caused by the bar folder or wiring machine.

In cases where the edge, to receive the wire, is turned on the turning machine set the gauge back about two-thirds of the amount of material allowed for the wire edge. This machine must be used on rounded work, and when a perfectly straight surface is wanted on round articles—that is in case of the wire edge being turned after the article has been formed.

WASHBURNE SCHOOL, CHICAGO, APPRENTICE CLASSES

CARPENTRY

Board Measure

A board foot.—A foot in board measure, or a board foot, means a piece of lumber having an area of 1 square foot on its flat surface and a thickness of 1 inch or less.

Feet.—The term "feet" is generally used for "board feet," except in places where it is likely to be misunderstood, when "board feet," "square feet," "linear feet," etc., are designated.

Allowance for dressing; i. e., planing.—If lumber is dressed, it loses in size the amount taken off in shavings. Usually for stock 1½ inches or more in thickness the loss is about one-eighth inch on each surface planed. Hence a piece 8 inches wide and 2 inches thick when rough becomes 7¾ inches wide and 1¾ inches thick when dressed, if planed on all four surfaces.

For lumber less than 1½ inches thick the amount taken off in planing is usually about one-eighth inch for both surfaces. This varies, however, according to the size and nature of the stock.

In ordinary lumber the loss of size due to planing is not taken into consideration when the lumber is sold. The purchaser expects to lose the difference between the rough and dressed lumber, and orders enough to make up this loss.

Width of rough lumber.—In measuring the width of common rough lumber a fraction of an inch equal to or greater than one-half is counted as a whole inch, while a fraction less than one-half is neglected. For example, a board 6½ inches wide would be called 7 inches wide, a board 6⅝ inches wide would be called 7 inches wide, and one 6¼ inches wide would be called 6 inches wide.

Surfaced.—The term "surfaced" is usually applied to boards or planks that are planed on one or both sides.

Jointed.—The term "jointed" has reference to lumber planed on its edges. It is also used to designate pieces that are made straight on the edges

Allowance in cutting logs.—Logs are supposed to be cut a few inches longer than the length actually required to allow for bruising and other damage done to the ends in the lumbering operations. The amount allowed is usually sufficient to permit of squaring the ends of the lumber and still have the pieces long enough. However, it is well to make sure of the lengths when purchasing or to make a small allowance, when planning certain kinds of work, by reducing the dimensions a trifle.

Lumber.—The term "lumber" is generally applied to pieces not more than 4 inches the smaller way, usually thickness.

Timber.—The term "timber" is applied to pieces more than 4 inches the smaller way. It is also applied to trees standing in the forest, as "100 acres of timber." It is sometimes used in speaking of the quality of wood, as "a piece contains good timber."

Board and plank.—Any piece of lumber under 1½ inches thick is usually called a "board"; any piece from 1½ inches to 4 inches thick is called a "plank." The use of these terms differ, however, in various localities.

Rule for finding board feet.—To find board feet multiply length in feet by width in feet by thickness in inches.

Example: Find the number of board feet in a board 8 feet long, 10 inches wide, and 1½ inches thick.

$$\overset{2}{\cancel{8}} \times \frac{10}{\cancel{12}_{1}} \times \frac{\cancel{3}^{1}}{\cancel{2}_{1}} = 10 \text{ board feet}$$

Standard lengths of lumber.—In selecting lumber it should be borne in mind that in most sections the standard lengths are 10, 12, 14, 16, 18 feet, etc. If it is cut to a special length it always costs more.

In the Adirondacks one of the standard lengths of spruce is 13 feet.

Problems

1. How many board feet in a piece of lumber 1½ inches thick, 11 inches wide, and 16 feet long?
2. How many board feet of stock are required to construct a platform 8 feet 6 inches square if the stock is 1½ inches thick and we allow 3 board feet for waste in squaring up the ends of the boards?
3. How many board feet in a piece 18 inches long, 7¼ inches wide, and 1¼ inches thick?
4. A board ¾ inch thick, 8 inches at one end, 12 inches at the other, and 13½ feet long contains how many board feet?
5. A stack of lumber 7 feet 5 inches wide and 9 feet long is composed of 90 layers of boards 1 inch thick, placed edge to edge. How many feet does the stack contain?

6. A platform 12 feet wide and 36 feet long is constructed of 1¾ inch by 9¾ inch hemlock planks (dressed). If we add 1½ per cent for waste in squaring, how much lumber must we buy for the platform?
7. How many planks (dressed) are required to construct a solid girder 49 feet long, 9¾ inches deep, and 8¾ inches wide, if the planks are 1¾ inches thick, 9¾ inches wide, and 14 feet long, and are spiked together flatwise? How many board-feet does the girder require if we add 1 board foot to every 100 for squaring? (Use 2 by 10 inch rough stock.)
8. A covered box is constructed of 1-inch stock. Its outside dimensions are as follows: Height, 14 inches; width, 24 inches; length, 42 inches. At $70 per M what will be the cost of lumber for the box, allowing 1 square foot for waste in squaring?
9. How many feet of lumber will be required for every 12 feet of fencing constructed of 1-inch stock, the fence to be 7 feet high, allowing 2 posts 4 inches by 4 inches by 10 feet long, and 2 scantlings 2 inches by 4 inches by 12 feet long for each 12 feet?
10. The inside dimensions of a box without a cover are 9¾ inches deep, 2 feet 9½ inches wide, and 2 feet 10 inches long. State, first, what size of boards you would select; second, how many feet they would contain; third, how many feet of lumber the box would actually contain when finished, the lumber to be surfaced and to be ¾ inch thick?
11. A man wishes to build a picket fence on the side of his lot. The distance between the two ends of the fence, if measured on a level, is exactly 150 feet. Because of a hill in the middle of the lot over which the fence must pass he finds its length to be 204 feet. How much will the fence cost according to the following specifications? Pickets 3 inches wide and placed 3 inches apart (cost 5 cents each). Two rails on which to nail pickets, 2 by 4 inches (cost $24 per M). Two posts every 12 feet (at 25 cents each). Each picket to receive 4 nails (8d. wire; 95 nails in a pound, at 5 cents per pound). The rails to have 2 spikes in each post (20d. wire; 28 spikes in a pound, at 4 cents per pound). Labor to cost $12.

    As an aid to solving this problem, it is suggested that the student draw a diagram of a fence running over a hill, and also of one on the level between the same two points, and compare the number of pickets. Pickets are placed plumb.
12. A load of lumber consists of 1¼-inch boards 12 inches wide and 16 feet long, placed edge to edge. How many feet does the load contain if it is 36 inches wide and 30 inches high? (Use a short method.)
13. A class in manual-training makes 36 ink trays out of ash, each tray being constructed of two pieces, the base and the top. When finished the base is $\frac{1}{8}$-inch thick, 5¾-inches wide, and 8¾-inches long; and the top $\frac{5}{16}$-inch thick, 3¼-inches wide, and 5¾-inches long. Allowing 1 inch on the length and ¼ inch on the width of each piece for rough stock, how much will lumber for the trays cost at $80 per M for ⅞-inch stock and $50 per M for ⅜-inch stock?
14. The foundation of a house is 22 feet 4 inches by 40 feet 6 inches. How much ⅞-inch surfaced lumber will it take for the lower subfloor, if we cut out a place for the cellar stairs 3 feet 3 inches by 7 feet 7 inches, making no allowance for waste?
15. The distance from the bottom of the sill to the top of the plate on a cottage is 16 feet 10 inches. If the house is 25 feet 6 inches long and we deduct one-eighth for openings (windows and doors), what will be the cost of sheathing one side with ⅞-inch surfaced lumber at $45 per M?

Problems on Roof Framing

In calculating the amount of material for the roofs in the following problems, it is our purpose to correlate the mathematics with the problems the student is having in drawing and shop.

By working one or more problems of the various type roofs, we are endeavoring to avoid repetition yet give sufficient drill to enable the student to become thoroughly familiar with figuring the amount of lumber needed in any given roof.

Detail specifications will be given with each problem. However, for the sake of uniformity of work and to facilitate checking or marking, the student should

tabulate his results as shown below. Each problem is to be checked by the instructor.

Name of rafter	Number of rafter	Rafters needed	Run of rafter	Length of rafter	Length of stock
			Feet	*Ft. in.*	*Feet*
Common	No. 1	26	10	11 10	12
Jack	No. 2	4	8	8 4⅞	9
Do	No. 3	4	6		

After the length of the individual rafters are found, make out a list of material you would need to order from the lumber yard; also, for your own convenience, note what rafters can be cut from the various stock, as per example below:

Pieces	Size	Rafters cut therefrom	Lineal feet	Board feet
3	2 by 6 inches by 14 feet	No. 14, No. 5, No. 7	42	
34	2 by 6 inches by 12 feet	No. 1, No. 2, No. 13	408	
6	2 by 6 inches by 10 feet	No. 3, No. 6, No. 8, No. 9, No. 10, No. 11.	60	
	Total		510	510

ELECTRICAL WORK

Layout of 12-Story Hotel and Store Building, A. C. District, Corner Lot 100 Feet by 125 Feet

DATA

First floor of building consists of entrance hall, restaurant, office of building, and other stores; also receiving room.

Second floor shall consist of lounging room, lobby, and recreation room.

From third floor up to and including the eleventh floor shall consist of single rooms, bath, and toilet.

The top floor shall consist of ballroom, lounging room, check rooms, and toilets.

The basement shall be divided into the following spaces: Boiler room, meter room, coal bin, bowling alley, billiard and pool room.

Include the following appliances in your installation:

	Horsepower
1 fire pump	50
1 refrigeration plant for entire building	50
2 elevator motors at 15 horsepower each	30
1 water pump	7½
2 sewer pumps at 1 horsepower each	2
1 vacuum cleaner	1½
1 boiler return feed pump	½
Ventilating fans for bowling alley, billiard room, ballroom, and restaurant. Figure change of air every five minutes to get size of fans needed	

Make separate floor plans for basement, first floor, second floor, and top floor. Third to eleventh floors, inclusive, will be the same as third floor.

Indicate on drawing or specification sheet the following things:

1. Size of wire, conduit, fuses, and switch for power service.
2. Size of wire, conduit, fuses, and switch for lighting service.
3. Size of wire, conduit, fuses, and cut outs for motors and light.
4. Location of distribution center.
5. Locations of meters for stores and building proper.

You are to turn in to your instructor the following seven sheets:

1. Floor plan of basement.
2. First-floor plan.
3. Second-floor plan.

4. Third-floor plan.
5. Top-floor plan or riser plan.
6. Specification sheet.
7. Answers to the following questions.

QUESTIONS

1. What clearance on building must be maintained between service head and telephone bracket?
2. State total load in watts for entire building. Show figures used to get this load.
   (*a*) Will service be 110 or 220 volts on lighting?
   (*b*) State size of lighting service.
3. State power load in horsepower.
   (*a*) State size of power service.
4. What size ground on this lighting installation?
5. If any for power, state size.
6. Give size of service switch for power. Also lighting service switch.
   (*a*) Fuses for power.
   (*b*) Fuses for lighting.
7. Give size of fuses, wire, switch, and conduit for each motor installation.
8. Will current transformers be necessary on lighting and power? If so, why?
9. What lights shall the emergency system control? Where shall emergency lights be located? Mark these in your drawings.

STEAM FITTING

Heads

PROBLEMS

1. What is the weight of a column of water 1 inch square in cross section by 5 feet high? If a gauge is placed in the bottom or on the side at the bottom of a pipe or tank holding 5 feet of water, what pressure will it show?
2. What is the pressure on each radiator and on the boiler in the sketch shown [on lesson sheet]?
3. If city water pressure is 35 pounds per square inch, how high will water be delivered from a faucet?
4. At 10 feet to the story, how many stories high will water be delivered? Does your answer correspond to your experience? If not, where is the fallacy?
5. A tank holds water at no gauge pressure. If 15 pounds per square inch is exerted by a pump against the water in the tank, how high will the water rise in a pipe extending up from the tank?
6. A round tank 48 inches in diameter is filled with water and a pressure of 80 pounds per square inch is placed on the water. What is the total pressure on the heads of the tank?
7. Tank "A" is an air tank with air at a pressure of 50 pounds per square inch. Tank "B" is full of water and the pump at "C" pumps up a pressure of 75 pounds per square inch in tank "B." How high will the water rise in the pipe "D"? How high a pressure per square inch will be necessary to pump water into the tank "A" against the 50 pounds pressure? [Diagram shown on lesson sheet.]

Expansion

MATHEMATICS

Allowance for expansion and contraction is of great importance in running pipe lines, mains, branches, or risers. In mains, provision must be made by allowing sufficient clearance at ends of runs. Hangers of proper design are used and, if necessary, expansion joints or long-turn bends must be installed. In branches, the length should be sufficient to allow the pipe to spring the required amount or by use of swivel connections. In risers, the place and kind of anchorage and supports depend upon the amount of expansion and contraction in the line. The amount of expansion of an object depends upon the kind

of material, its length, and its change in temperature. Tables are prepared which give us the amount of expansion for different materials, per unit length, per degree change in temperature. These figures are called "Coefficients of linear expansion." For steel pipe this figure is 0.0000067, which means that 1 inch of pipe will increase 0.0000067 inch in length when heated 1° F., or 1 foot of pipe will increase 0.0000067 foot in length when heated 1° F. Thus, to find the amount of expansion for any length of pipe, multiply the length of pipe in inches or feet by 0.0000067 and the result by the number of degrees difference in temperature and the result will be, in inches or feet, the amount of expansion on the line.

Example.—A steam main is 125 feet long. It is erected in place at 60° F. and is to carry 150 pounds steam pressure. What will be its expansion or change in length? (Steam at 150 pounds is heated to 365°.)

Solution.—The expansion equals $125 \times 0.0000067 \times (365-60)$ which equals 0.2544 foot. To change this to inches multiply by 12 and the result will be 3.053 inches. (NOTE.—The usual rule of thumb is to allow 3 inches clearance for expansion for every 100 feet of pipe.)

PROBLEMS

1. The normal temperature of a basement is 60° F. at which temperature a 3-inch main is 50 feet long. With 15 pounds steam pressure in the system, what is its length? (15 pounds steam=250° F.)
2. A steam main and a return main are of the same length when erected at a temperature of 32° F., each being 140 feet long. What will be the difference in length under working conditions when the steam pressure is 15 pounds and the hot-water returns show 150°?
3. A riser 75 feet long is anchored at its middle point. How much of a drop will it cause in the steam main when 15 pounds of steam is being carried? The temperature of the building is 65° F.
4. A steam radiator is directly connected to a 45-foot riser anchored at the bottom. With 10 pounds of steam in the line how much will one end of the radiator rise? The radiator stands level at 65°. (10 pounds=240°.)
5. How much will an 18-foot boiler change in length in a change of temperature from 40° F. to 225 pounds steam? (225 pounds steam=397° F.)

APPENDIX C.—INDENTURES AND APPRENTICE CONTRACTS

Appendix C presents types of formal indentures, apprentice contracts, and agreements on the part of employers to engage a boy for a full apprentice term.

APPLICATIONS AND CONTRACTS—JOINT APPRENTICESHIP COMMITTEE SYSTEM

Indentures to which both employers' associations and unions are parties, through their joint apprentice committees, are similar to those used in the painting and decorating trade in Cleveland and bricklaying trade in Detroit, shown below. The provision for paid-for time in school in contracts is found only in places in which day-school work is recognized as part of the apprentice training. Where school work is confined to evening classes, some contracts mention it as a requirement in training, but make no binding provision, and other contracts do not refer to school work.

The three forms used in apprenticing to each of the building trades in Cleveland—the applications of contractor and apprentice to the apprenticeship committee, and the formal indenture covering the apprentice term—are essentially the same as those shown below, which are used in the painting trade.

APPRENTICE'S APPLICATION—PAINTING AND DECORATING, CLEVELAND

(Must be filled out in ink in applicant's own handwriting)

Name _____ Date _____
Address _____ Telephone No. _____
Place of birth _____ Date of birth _____
If you were not born in this country, how long have you been here? _____
How long in this country? _____ Parents' nationality: Mother _____ Father _____
Father or guardian's name _____
Address _____ Is he a citizen? _____
Have you completed the seventh grade of school, or its equivalent? _____

LAST THREE OCCUPATIONS

From (month and year)	To (month and year)	Employer	Employer's address	Employer's business	Your position

Present occupation _____
Schools attended:
Name of school _____ City _____
Number of years attended _____ Day or night school _____
Name of school _____ City _____
Number of years attended _____ Day or night school _____
Name of school _____ City _____
Number of years attended _____ Day or night school _____

RELATIVES ENGAGED IN CONTRACTING OR ANY BUILDING TRADE

Name	Relationship	Occupation	Address

	Name	Occupation	Address
Recommended by:			

Name of contractor who will give you a trial _____
Address _____
Do you understand that you will be on a 30-day trial, if your application is approved, and that after the 30-day trial, if you are satisfactory, this application will become part of your indenture contract? _____
Are you willing to work for the established wage scale for painting and decorating apprentices throughout your indentureship? _____
Have you ever worked at painting and decorating? _____
If so, when? _____ where? _____ from whom? _____
Will you obey all rules and instructions of the apprentice committee? _____
Are you willing to serve an apprenticeship of at least 156 weeks? _____
Will you place yourself under the jurisdiction of the apprentice committee? _____
Do you understand that it is compulsory for you to attend the apprentice school during the hours designated by the apprentice committee, and that you will be accountable to the teacher during that time? _____

TO BE SIGNED BY FORMER EMPLOYERS OR TEACHERS, OTHER THAN RELATIVES

I have known _____ for two years or more, and certify that he is of good character and habits.

PERSONAL SIGNATURES OF VOUCHERS

Name	Address	Business

CONTRACTOR'S APPLICATION FOR APPRENTICE—PAINTING AND DECORATING, CLEVELAND

(Must be filled out with ink)

Name of firm_____ Date_____
Address _____ Telephone No_____
Number of years in contracting business under the above name (immediately preceding this date)_____
Apprentice applicant's name _____
Address_____ Is he a relative_____
If so, what relationship_____ If not, how long have you known him____
Is he now in your employ _____ If so, how long _____
In what position_____
Average number of painters and decorators employed by you throughout the year _____
Number of painters and decorators now in your employ_____
Principal type of painting and decorating you do_____
List four jobs, each year. The last two years and location.

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

How long will your present jobs continue_____
Will you keep this apprentice in your employ as long as you have painting and decorating work of any kind_____
Do you understand that applicants are started with a thirty-day trial period_____
From whom do you buy material?
_____ Monthly average_____
_____ Monthly average_____
_____ Monthly average_____
Do you intend to interest yourself in the progress of this apprentice and comply with the rules and regulations of the apprentice committee_____
Are you willing to pay an apprentice the established rate of wage for time spent at school during the hours designated by the committee_____
Do you feel that you do sufficient work to keep an apprentice employed for at least 156 weeks _____
If this applicant is rejected, would you be willing to take another_____
Have you ever had a painting and decorating apprentice serve his time with you_____ How many_____
Has your application for a painting and decorating apprentice ever been denied_____
Have you previously appeared before this committee_____
Do you know that this application will become part of the indenture contract if the apprentice is satisfactory at the end of the 30-day trial period_____
(Signed)_____
(Must be signed by a member of firm)
Name of representative of the firm appearing before the committee_____
Date of appearance_____
Remarks:

(To be attached to apprentice application form and delivered by applicant to painting and decorating apprentice committee)

APPRENTICESHIP CONTRACT—PAINTING AND DECORATING, CLEVELAND

This indenture, made in triplicate this_____day of_____A. D., 192__, at Cleveland, Ohio, witnesseth that_____(apprentice) party of the first part, of_____in the county of Cuyahoga and State of Ohio, now the age of_____years, with the consent of_____(parent or guardian), party of the third part, his_____hereon indorsed, does of his own free will, bind himself to serve_____(contractor), party of the second part of_____in the County

of Cuyahoga and State of Ohio, as an apprentice in painting and decorating to said_____(contractor), party of the second part for the term of at least 156 weeks, to wit: From the date thereof until the_____day of _____, A. D., 192__, provided, however, that said apprenticeship shall not be concluded until said apprentice has completed the required apprentice school course of study and complied fully with all requirements of the apprentice committee, during all of which time the said apprentice shall serve his employer faithfully and honestly, and obey his lawful directions connected with said trade; that he will keep all the secret processes and protect and preserve the property and goods of the said contractor; and will not engage in said art or trade on his own account during the term of his apprenticeship, and will remain faithfully in the employ of said party of the second part for the purpose herein mentioned, unless sick or unable to work, and further agrees to attend the apprentice school at such times as the apprentice committee designates. Party of the first part voids this contract by his absence from his work or apprenticeship school for a period of 30 days, or if he fails to return to the employer to whom he is indentured within 10 days after due notification, if in the opinion of the apprentice committee said absence has been willful and unnecessary.

Party of the second part hereby agrees to pay said party of the first part no more and no less than the following sums of money for pay or wages:

	Per cent		Per cent
First 3 months	30	Eighth 3 months	65
Second 3 months	35	Ninth 3 months	70
Third 3 months	40	Tenth 3 months	75
Fourth 3 months	45	Eleventh 3 months	80
Fifth 3 months	50	Twelfth 3 months and to expiration of contract	85
Sixth 3 months	55		
Seventh 3 months	60		

These rates are based on journeyman painters' and decorators' rates per hour; any change in said rates will make a proportionate change in these rates.

Party of the second part further agrees to permit attendance of the party of the first part at the apprentice school during the hours designated by the apprentice committee, and to pay said first party for such designated hours as he attends school at his established rate per hour. Party of the second part also agrees to provide party of the first part with employment at his trade during his term of apprenticeship, when possible, or to make an effort to secure employment for said party of the first part with some other bona fide painting and decorating contractor at the trade herein mentioned.

If said party of the second part has not furnished said party of the first part with employment for a period of 30 days and if in the opinion of the apprentice committee said party of the second part has not made a determined effort to secure employment for said party of the first part, this contract may be declared null and void.

It is understood and agreed that the applications filled out by the parties of the first and second parts become a part of this indenture contract if the apprentice is satisfactory at the end of the 30-day trial period.

No transfer or release of an indentured apprentice will be made unless both contractors, parties to the change, the apprentice, and the parent or guardian appear jointly before the apprentice committee, and after proper hearing, the consent of all parties is obtained.

All parties further agree to comply with all the rules and regulations formulated now or hereafter by the apprentice committee.

All prior contracts of indentureship between the parties of the first, second, and third parts are hereby revoked and declared null and void.

In witness whereof, the parties hereto have set their hands and seals the day and year first above written.

_____
Contractor.

_____
Apprentice.

_____
Parent or Guardian.

Signed, sealed, and delivered in the presence of:

_____

APPRENTICESHIP CONTRACT—BRICKLAYING, DETROIT

This indenture, made this_____day of_____A. D. 192__, witnesseth that _____ (apprentice), party of the first part, of_____ in the County of Wayne and State of Michigan, now the age of_____ years, with the consent of_____(parent or guardian), party of the third part, his_____hereon indorsed, does of his own free will bind himself to serve_____(contractor), party of the second part, of_____in the County of Wayne and State of Michigan, as apprentice in bricklaying to said_____(contractor), party of the second part, for the term of_____years to wit: From the date thereof until the_____day of_____A. D. 192__, during all of which time the said apprentice shall serve his employer faithfully and honestly, and obey his lawful directions connected with said trade; and will not engage in said art or trade on his own account during the term of his apprenticeship, and will remain faithfully in the employ of said party of the second part for the purpose herein mentioned, unless sick or unable to work, and further agrees to attend the apprentice school at such times as the apprentice committee designates. Party of the first part voids this contract by his absence from his work for a period of 30 days, or if he fails to return to the employer to whom he is indentured within 10 days after due notification, if in the opinion of the apprentice committee said absence has been willful and unnecessary.

Now, therefore, that said party of the second part has agreed to accept said party of the first part as apprentice to learn the said trade of bricklaying upon the following terms and conditions, which are agreed to by said first and third parties, as follows:

(1) Party of the second part hereby agrees to pay said party of the first part compensation based on journeyman bricklayers' rates per hour. The percentage of journeymen's rates to be paid are as follows:

	Per cent		Per cent
First 6 months	32	Fifth 6 months	52
Second 6 months	36	Sixth 6 months	62
Third 6 months	42	Seventh 6 months	80
Fourth 6 months	48		

Party of the second part further agrees to permit attendance of the party of the first part at the apprentice school during the hours designated by the apprentice committee, and to pay said first party for such designated hours as he attends school at his established rate per hour. Party of the second part also agrees to provide party of the first part with employment at his trade during his term of apprenticeship, when possible, or to make an effort to secure employment for said party of the first part with some other bona fide mason contractor at the trade herein mentioned.

If said party of the second part has not furnished said party of the first part with employment for a period of 30 days, and if in the opinion of the apprentice committee said party of the second part has not made a determined effort to secure employment for said party of the first part, this contract may be declared null and void.

All parties further agree to comply with all the rules and regulations formulated now or hereafter by the apprentice committee.

In witness whereof, the parties hereto have set their hands and seals the day and year first above written.

_____
Contractor.

_____
Apprentice.

_____
Parent or Guardian.

Signed, sealed, and delivered in the presence of:

_____

APPRENTICE INDENTURE AND TEXT OF LAW, WISCONSIN

This is the legal form of indenture required by law in Wisconsin for all apprentices. Terms and conditions are enforced by the industrial commission, which administers the State apprenticeship law.

The indenture used by the joint apprenticeship committee of Niagara Falls is similarly worded, but is a voluntary agreement without the legal force which, nominally at least, attaches to that in use in Milwaukee.

APPRENTICE INDENTURE

This indenture, made in triplicate this _____ day of _____, 19__, between _____ (Address), hereafter called the first party, and _____, a minor born _____ (Date of birth), of _____ (Street and number), _____ (City), Wisconsin, and _____ (Name of parent or guardian), hereafter called the second parties:

Witnesseth, That the first party agrees to take the said minor into its employ and service as an apprentice to teach him the trade of_____, as per Exhibit A.[1]

That the said second parties agree that the said minor shall diligently and faithfully work for and serve the said first party during the full apprenticeship.

The apprenticeship shall begin on the _____ day of _____, 19__, and shall be for a period of _____ years. The length of year, the compensation for the term of apprenticeship, and the processes, methods, or plans to be taught shall be as per Exhibit A.

It is mutually agreed that the total number of hours' work in any one week shall not exceed 55, and that at least 4 of such hours or its equivalent[2] shall be devoted by said minor to school instruction. If the apprenticeship is for a period longer than two years, the total hours of instruction shall not be less than 400.

(This clause shall not be construed to prevent school instruction after the second year if both parties agree to the continuation of same)

Any indenture may be annulled by the Industrial Commission of Wisconsin upon application of either party and good cause shown.

At the completion of the apprenticeship the said minor shall receive a certificate stating the terms of his indenture.

In witness whereof the parties have caused this indenture to be signed as required by chapter 106 of the Laws of Wisconsin.[3]

_____ [SEAL.] _____
(Apprentice) (Name of firm or corporation)

_____ [SEAL.] _____ [SEAL.]
(Parent or guardian) (Employer)

_____ [SEAL.] By _____

EXHIBIT A

NOTICE.—No apprenticeship indenture will be legal which does not have this exhibit filled out as indicated below. (Section 106 of the Statutes)

Extent of period of apprenticeship.—(Here must be stated the length of time to be served, and, wherever the trade can determine, the exact length of each apprenticeship year.)

Schedule of processes to be worked.—(Here must be stated the processes, methods, or plans to be taught, and the approximate time to be spent at each process, method, or plan—to conform to the character of the individual trade.)

Compensation to be paid.—The apprentice shall receive in wages: _____

Special provisions.—These to be stated here or on following page.

TEXT OF LAW UNDER WHICH APPRENTICES SHALL BE INDENTURED

(Section 106 of the Statutes, as amended by the Laws of 1919 and 1923)

APPRENTICE DEFINED

SEC. 106. 1. The term "apprentice" shall mean any minor, 16 years of age or over, who shall enter into any contract of service, expressed or implied, whereby

[1] Exhibit A is to be filled out on page 3 of this form.
[2] To meet the peculiar requirements of certain trades, special arrangements for schooling may be made through the Industrial Commission of Wisconsin.
[3] A copy of the law forming the basis upon which this indenture is made and governing all matters not expressed in this contract is hereto attached.

he is to receive from or through his employer, in consideration for his services in whole or in part, instruction in any trade, craft, or business.

INDENTURE DEFINED

2. Every contract or agreement entered into by an apprentice with his employer shall be known as an indenture; such indenture shall be in writing and shall be executed in triplicate, one copy of which shall be delivered to the apprentice, one to be retained by the employer, and one to be filed with the Industrial Commission of Wisconsin at Madison.

WHO MAY BE INDENTURED

3. Any minor, 16 years of age or over, may, by the execution of an indenture, bind himself as hereinafter provided for a term of service not less than one year.

WHO MUST SIGN INDENTURE

4. 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 the residence of the minor, or by a member of the Industrial Commission of Wisconsin or a deputy thereof.
(6) By the employer.

CONTENTS OF INDENTURE

5. 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, craft, or business which 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. During the first two years of his apprenticeship his period of instruction shall be not less than four hours per week or the equivalent. If the apprenticeship is for a longer period than two years, the total hours of instruction shall be not less than four hundred hours. The total number of hours of instruction and service shall not exceed fifty-five per week; provided, that nothing in this paragraph shall be construed to forbid overtime work as provided in subsection 7 of this section.
(5) An agreement as to the process, methods, or plans to be taught, and the approximate time to be spent at each process, method, or plan.
(6) A statement of the compensation to be paid the apprentice.
(7) An agreement that a certificate shall be given the apprentice at the conclusion of his indenture, stating the terms of indenture.

PROVISION FOR SCHOOLING

6. The employer shall pay for the time the apprentice is receiving instruction at the same rate per hour as for services. Attendance at school shall be certified by the teacher in charge, and failure to attend school shall subject the apprentice to a penalty of loss of compensation for three hours for every hour such apprentice shall be absent without good cause.

OVERTIME

7. An apprentice over 18 years of age may be allowed to work overtime not to exceed thirty hours in any one month. Overtime shall be considered all time over ten hours in any one day, and in case the hours of labor are limited in the particular craft, industry, or business, and as to the particular employer, to less than ten hours, overtime shall be figured as all time in any one day in excess of such limitation. For overtime the apprentice shall receive one and one-half times the rate per hour provided in his contract for regular time.

PENALTY FOR VIOLATION OF CONTRACT

8. If either party to an indenture shall fail to perform any of the stipulations thereof, he shall forfeit not less than one dollar or more than one hundred dollars, such forfeiture to be collected on complaint of the Industrial Commission of Wisconsin and paid into the State treasury. Any indenture may be annulled by the Industrial Commission of Wisconsin upon application of either party and good cause shown.

ADMINISTRATION

9. It shall be the duty of the Industrial Commission of Wisconsin, and it shall have power, jurisdiction, and authority, to investigate, ascertain, determine, and fix such reasonable classifications and to issue rules and regulations and general or special orders as shall be necessary to carry out the intent and purpose of section 106 of the Statutes. Such investigations, classifications, and orders, and any action, proceeding, or suit to set aside, vacate, or amend any such order of said commission, or to enjoin the enforcement thereof, shall be made pursuant to the proceeding in sections 101.01 to 101.28,[1] inclusive, of the Statutes, which are hereby made a part hereof, so far as not inconsistent with the provisions of section 106 of the Statutes; and every order of the said Industrial Commission of Wisconsin shall have the same force and effect as the orders issued pursuant to sections 101.01 to 101.28,[1] inclusive, of the Statutes, and the penalties therein shall apply to and be imposed for any violations of section 106 of the Statutes, excepting as to the penalties provided in subsection 8 of section 106.

DETERMINATION OF INSTRUCTION

10. It shall be the duty of all school officers and public-school teachers to cooperate with the Industrial Commission of Wisconsin and employers of apprentices to furnish, in a public school or any school supported in whole or in part by public moneys, such instruction as may be required to be given apprentices.

LIMITS OF APPLICATION

11. The provisions of section 106 shall not be construed as invalidating any contract of apprenticeship entered into before July 1, 1915.

APPRENTICE INDENTURE FOR TILE SETTERS—NATIONAL SYSTEM

The following is the form universally used in apprenticing tile setters under a national agreement between the national association of contractors and the international union. The terms of the agreement, which constitute part of the indenture, will be found on page 126, while a discussion of the national system of apprentice training in the tile trade is given on page 11.

TILE AND MANTEL CONTRACTORS' ASSOCIATION OF AMERICA, APPRENTICE INDENTURE

This indenture, made this _____ day of _____, 192__, between _____, hereafter called the first party, and _____, of _____ (Street and number) _____ (City) _____ (State), hereafter called the second party.

Witnesseth, That the said first party agrees to employ said _____ as an apprentice and to provide him with the necessary training and instruction whereby he may learn the trade of tile and mantel setting.

That the said party of the second part agrees to diligently work for and faithfully serve the party of the first part during the full term of apprenticeship.

The apprenticeship shall begin on the _____ day of _____, 192__, and shall be for a period of _____ years. The length of, and the compensation for, the term of apprenticeship, and the methods of training and instruction

[1] Industrial commission law.

shall be as stipulated in the general rules and regulations printed on the reverse side hereof, said rules and regulations being hereby made a part of this agreement.

In witness whereof, the said parties of these presents have hereunto set their hands and seals the day and year first above written.

_____ [Seal.]	_____ [Seal.]
(Applicant)	(Employer)
_____ [Seal.]	By _____ [Seal.]
(Witness)	
_____	_____
(Address)	(Address)

This form must be filled out in ink or typewritten and must be made in quadruplicate. Copies to be delivered as stated in Article 7 of General Rules on reverse side.

APPRENTICE AGREEMENT—UNION PLAN

The individual agreement entered into between contractor and apprentice, through the union, is represented in the following form. This is the type of agreement generally found where apprenticeship is controlled either by the union alone, or through joint-working agreements, without provision for school work or participation in any way by school authorities or other agencies outside the craft itself. Frequently this kind of agreement is more detailed, including as part of its terms the apprentice regulations embodied in the trade agreement.

PLASTERING, PITTSBURGH

The following apprentice agreement made this_____day of_____, 19__, between _____ contracting plasterer of _____ and _____ a duly registered apprentice of Journeymen Plasterers' Union, Local No. 31, of Pittsburgh, Pa., shall be considered legal and binding by the above association on the contractor, and apprentice or his parent or guardian, during the life of this agreement, which shall not be nullified or set aside by parties hereto, for any reason, until brought before the proper joint committee of Contracting Plasterers' Association and Journeymen Plasterers' Union Local No. 31, for their consideration.

Employer's Agreement

1. I, _____ contracting plasterer, hereby agree to employ _____ as apprentice plasterer for a period of four consecutive years, or as may be mutually agreed upon by parties to this agreement, he, _____ to remain with me and to be under my supervision and instructions. For the faithful compliance of the requirements stated in the apprentice obligation as a part of this agreement, I will use all legitimate and honorable means to have him taught the trade of plastering, so that at the expiration of his apprenticeship he will be qualified as a mechanic to command the established scale of wages of this jurisdiction.

2. I will keep the said apprentice, _____, steadily employed during his apprenticeship, except in case of strike or lockout.

3. I agree to pay said apprentice, _____, wages at the following rate per day, figured on a basis of journeymen's wages; apprentice's wages to be raised or lowered in accordance with scale paid journeyman plasterers of Local No. 31.

	Per cent of journeymen's wages		Per cent of journeymen's wages
First 3 months	16	Fifth 6 months	44
Second 3 months	20	Sixth 6 months	56
Second 6 months	24	Seventh 6 months	68
Third 6 months	28	Eighth 6 months	80
Fourth 6 months	36		

Apprentice Obligation

1. I, _____ apprentice, hereby agree, with consent of my parent or guardian, as hereinafter named, to serve an apprenticeship at the trade of plastering with _____, contractor, and to remain with and be under

his supervision and instructions for a period of four consecutive years, or as may be mutually agreed upon by interested parties, including Journeymen Plasterers' Union, Local No. 31.

2. I shall be prompt in discharging the duties required of me while learning the trade of plastering. I will be faithful, industrious, and courteous in my conduct to those whom I may be associated with as an apprentice, so that the best interest of my employer may be served. I will not absent myself from my employer's work during working hours without permission, except in case of sickness, disability, or other valid reason.

3. I agree to accept as a minimum the scale of wages agreed to by Journeymen Plasterers' Union, Local No. 31, and Contracting Plasterers' Association, and to be bound by and comply with the laws, rules, and regulations of Journeymen Plasterers' Union, Local No. 31, of Pittsburgh, Pa., and will subject myself to the penalties provided therein for any violation of this apprentice agreement, or of said laws, rules, or regulations of Local No. 31.

PARENT'S OR GUARDIAN'S CONSENT

I, _____ (parent or guardian), on behalf of _____, a minor, consent to and approve of the binding of said _____ as an apprentice to _____ to learn the trade of plastering, the apprenticeship to be for a period of four years, or as may be mutually agreed upon by the interested parties.

In witness whereof we, the parties to the aforesaid agreement, have affixed our signatures and seals this _____ day of _____, 19__.

Witness for Local No. 31:

(Signed) _____
Contractor.

_____ (Signed) _____
Apprentice.

_____ (Signed) _____
Parent or Guardian.

Given under the charter and seal of Journeymen Plasterers' Union, Local No. 31, Pittsburgh, Pa., of the O. P. & C. F. I. A.

Executive board chairman:

_____

Secretary:

_____

Subscribed and sworn to before me this _____ day of _____, 19__.
My commission expires _____ day of _____, 19__.
[NOTARY SEAL.] _____
Notary.

LETTER OF AGREEMENT—UNION PLAN

Informal letters, such as the one here reproduced, are used in situations where the agreement covering the employment of an apprentice is between the employer and the union, a transaction in which the boy is not directly a party. This practice is widely followed in the electrical trade, in which the union rather than the employer takes the responsibility for keeping the boy in the trade. Letters of this type are used almost entirely in New York instead of formal indenture.

Name_____
Address_____

CHICAGO, ILL., _____, *192*__.

To the Executive Board, Local No. 134, International Brotherhood of Electrical Workers.

DEAR SIRS: I desire to employ _____ as a _____ year apprentice, and agree to employ him during the life of his apprenticeship, and a sufficient number of journeymen to justify employing the above-mentioned apprentice as pro rata of apprentices to journeymen, agreed on between the Electrical Contractors' Association, and Local Union 134, I. B. of E. W.

In consideration of the above, Local 134, I. B. of E. W., agrees to see that the above-mentioned apprentice does not leave my employment and go to work for another contractor who is working under the jurisdiction of Local 134, unless it is proven to the satisfaction of Local 134, I. B. of E. W., that the apprentice was compelled to leave my employment on account of unjust treatment.

APPENDIX D.—JOINT APPRENTICESHIP AGREEMENTS

Where apprenticeship is better developed, it is sometimes controlled by joint agreements negotiated and executed by agencies distinct from those which draw up general working agreements. Agreements of this character are few. As a rule, regulations controlling apprenticeship, where they exist at all, are incorporated in the general working agreements. Examples of the more important apprenticeship agreements are presented below. The first one, for the tile and mantel industry, is national in scope.

TILE AND MANTEL WORK

1. Applicants for apprenticeship must be at least 16 years of age and not over 21 and must be duly indentured. Applicants for apprenticeship shall be approved by the local joint arbitration board of the Bricklayers, Masons and Plasterer's International Union of America and the Tile and Mantel Contractors' Association of America and be registered at the Bricklayers, Masons and Plasterers' International Union of America headquarters.

2. Apprentices shall serve a term of three years of continuous employment at the tile trade, including school instruction if provided. The first three months of the apprenticeship term shall be recognized as a probationary period; during this period the apprenticeship indenture may be annulled by either party thereto.

3. (*a*) All apprenticeship terms shall, wherever possible, include technical school instruction of a minimum period of one month per year for the first two years of the apprenticeship, and the regulation of schooling may be optional; that is, either a continual period of one month per year or a certain period each week, aggregating the equivalent of at least one month per year.

(*b*) Graduates of fully accredited schools recognized by the Tile and Mantel Contractors' Association of America and the Bricklayers, Masons and Plasterers' International Union of America, either public or private, giving a three months' course of instruction and technical training, shall receive six months' credit for such schooling.

(*c*) Applicants for apprenticeship who have served some time in connection with the tile trade shall receive such credit as the joint arbitration board in any locality may determine.

4. Apprentices shall be given a thorough training in all work pertaining to the preparing for and setting of all work as is classified in Article II [of the national trade agreement].

5. The rate of wages shall be as follows: First year, 40 per cent of the mechanic's wage; second year, 60 per cent; third year, 75 per cent.

6. Supervision of apprentices and the enforcement of a faithful performance of the apprenticeship agreement by both parties hereto shall be as follows:

(*a*) In States and Provinces having laws pertaining to apprentices, by the laws of the State or Province.

(*b*) In cities having no State or provincial apprentice laws, the regulation of apprentices shall be by the joint arbitration board of the local tile contractor and the local union.

7. All indentures must be executed in quadruplicate, one copy delivered to the apprentice, one retained by the employer, the third to be filed with the party of the first part, and the fourth with the party of the second part of this agreement.

8. Apprentices upon completion of their term shall be furnished with a suitable certificate upon application for same to be issued by the Tile and Mantel Contractors' Association of America and the Bricklayers, Masons, and Plasterers' International Union of America, accompanied with recommendations and certifications of qualifications by the supervising boards.

9. Apprentices shall work with a mechanic for the first year of their apprenticeship. If they have graduated from a fully accredited school recognized by the Tile and Mantel Contractors' Association of America and the Bricklayers, Masons and Plasterers' International Union of America, they shall work with a mechanic for the first six months of their apprenticeship.

PLUMBING, CHICAGO

Under the agreement entered into between the Plumbing Contractors' Association of Chicago and the Chicago Journeymen Plumbers' Protective and Benevolent Association, a joint apprenticeship committee is provided for, composed of two representatives from each of the above-named organizations.

The joint apprenticeship committee will meet on the third Thursday of each month for the purpose of passing upon the qualifications of applicants for apprenticeship cards to learn the plumbing trade and to take up all matters relating to apprentices.

For the purpose of carrying out the object of the joint agreement, all registered apprentices now learning the trade will be required to be registered and obtain a new card.

All applications by master plumbers for a registered apprentice will be made on form provided by the joint committee.

Boys applying for apprenticeship cards shall prior to card being issued be required to make application on form provided and appear personally before the joint committee who will pass upon the applicant's eligibility to learn the trade, and if satisfactory will authorize the issuance of card.

A temporary or probationary card or permit may be issued for a period of one month to applicants for apprenticeship cards pending the meeting of the joint apprenticeship committee.

A list of boys now learning the trade to whom apprenticeship cards have been issued together with name of employer and date of apprenticeship expiration shall be kept by the joint committee and a copy of same furnished to each association.

Boys who have been registered by the joint committee shall remain in the first assignment until the end of their apprenticeship and no change from first assignment will be made except by mutual agreement between employer and apprentice.

Should a disagreement occur between employer and apprentice where the principles of the joint agreement have been violated, the same shall be referred to the joint committee whose decision shall be final and binding.

Apprentices shall be under the jurisdiction of their employer. They shall perform their duties faithfully and to the best of their ability and no apprentice shall be required to do work other than that legitimately connected with the trade.

All apprentices shall be subject to the rules and regulations of the joint committee. For the first three years of their apprenticeship apprentices will be required to attend the plumbing class one day each week at such school as may be designated by the joint committee.

Upon repeated failure to attend school or for such other cause as the joint committee may deem sufficient, apprentices may have their cards revoked.

The joint committee will visit the trade school at least once a semester.

It shall be the duty of each party to this agreement, namely, the Plumbing Contractors' Association and the Chicago Journeymen Plumbers' Protective and Benevolent Association, to encourage the employment of a sufficient number of apprentices to learn the plumbing trade.

Apprentices shall be subject to rules as hereinafter set forth of a joint committee of two from each association of which the respective presidents shall be members ex officio.

Within 10 days following the consummation of this agreement, and at least once a month thereafter, the joint apprenticeship committee shall meet to take up all matters relating to apprentices and enforce the provisions of this agreement, and shall visit the trade school once a semester.

Employers shall select apprentices and present their applications to the joint committee herein provided. A printed form shall be used for this purpose.

Any shop employing two or more journeymen shall be entitled to an apprentice. Shops continuously employing 12 journeymen shall be entitled to two apprentices. The quota of apprentices heretofore mentioned is subject to revision at any time by the joint arbitration committees.

The term of apprenticeship shall be five years, as follows:

Three years shall be under the supervision of journeymen. Fourth-year apprentices shall begin rendering service with the tools under supervision of the employer.

All apprentices are required to attend the regular trade-school classes one day each week during the school year, with full pay for such time for the first three years of his apprenticeship.

Student apprentices shall conform to school discipline, subject to expulsion by principal in charge, and they shall be amenable to the rules and regulations of this agreement, subject to decision of joint committee.

When an employer is assigned an apprentice he shall sign an agreement in conformity with these rules, copy of which shall be on file with both associations; and should there be any violations, he shall be denied the privilege of any apprentices when, in the opinion of the joint committee, same is justified.

The wages of apprentices shall be as follows:

First six months, $12 per week; next six months, $15 per week; second year, $18; third year, $20; fourth year, $30, and fifth year, $40 per week.

PLUMBING AND STEAM FITTING, MEMPHIS

AGREEMENT

ARTICLE 1. The joint arbitration board will act as the joint apprentice committee, which committee shall have complete and final control of all apprentices registered with it.

ART. 2. When an employing master fitter desires to employ an apprentice he shall make application upon the form furnished by the joint apprenticeship committee. Applications not so made shall not be accepted by the committee.

ART. 3. Each shop, party to this agreement, shall be entitled to one apprentice. Each shop shall be allowed two apprentices where the average of four steam fitters are employed throughout the year; and three apprentices where seven steam fitters are employed throughout the year.

ART. 4. The applicant, if accepted by the joint apprenticeship committee, shall receive from it a probationary permit card, which shall entitle him to work for the employing master fitter for six months from the date of issuance of such card.

ART. 5. Applicants, to be eligible to apprenticeship, must be at least 16 years and not over 25 years of age.

ART. 6. If, after the expiration of six months, the applicant proves satisfactory to the master fitter employing him, he shall receive an apprentice card bearing the date of the probationary card. The employer in such case shall cause the apprentice to appear before the joint apprentice committee, with application for apprenticeship card upon the form prescribed by the committee.

ART. 7. All apprentices shall be registered with the joint apprenticeship committee, and shall at all times be governed by the rules of the joint apprenticeship committee.

ART. 8. Each apprentice shall be furnished with an apprenticeship card setting forth (*a*) Apprentice's name and address; (*b*) by whom employed; (*c*) date of entering employment; (*d*) date of expiration of apprenticeship; and (*e*) transfers of employment, if any.

RULES

ARTICLE 1. Apprentices shall serve four years as apprentices. Beginning with the fifth year the apprentice shall have the privilege of working as a junior steam fitter, the wages of such juniors to be a matter to be decided upon between said junior and his employer. Said apprentice, when handling tools, must have a permit from Local 614. There will be no charge for this permit. There shall be only one junior steam fitter allowed to work in each shop and said junior fitter will no longer be considered as an apprentice.

ART. 2. After the apprentice has served three years, the joint apprentice committee may issue permit for said apprentice to work as a steam fitter, providing no fitters can be furnished by Local 614, and shall receive the wages of a journeyman steam fitter.

ART. 3. The apprentice's hours of employment shall be the same as those of the journeyman fitter.

ART. 4. An apprentice summoned to appear before the joint apprenticeship committee must answer such summons upon the date set. Failure to respond, without reasonable cause, to such summons, shall cause the apprentice's card to be revoked.

ART. 5. The apprenticeship rules hereby adopted shall supersede article 7, page 16, under helpers' rules in present agreement adopted August 1, 1923.

ART. 6. When the apprentice is not available the journeyman steam fitter will work without helper with the following exceptions: (1) Employer will have the right to furnish white laborers to help set boiler, place radiators, and on any pipe work larger than two inches; (2) the journeyman steam fitter will have the right to ask for labor on any work on which, in his judgment, he may need help.

STEAM FITTING, CHICAGO

SECTION 1. Each party to this agreement shall teach the trade to apprentices in the manner which will result in their becoming efficient journeymen and as hereinafter more clearly and definitely provided. The apprentice shall receive such instructions as hereinafter provided and be taught such subjects as may be deemed necessary in the opinion of the joint board and for such attendance at schools, classes, or lectures and general deportment, credit will be given apprentices upon their final examination for promotion to journeymen.

SEC. 2. Application for apprenticeship shall be filed in duplicate with the joint arbitration board on blanks furnished by them and applications must be filled out completely by applicant in his own handwriting and must be recommended by three acceptable individuals.

SEC. 3. Employer being entitled to and desiring an apprentice may make application for said apprentice to the joint arbitration board. The employer, however, shall have the option to accept or reject any and all apprentices offered him by said board.

SEC. 4. Apprentices during the entire period shall be under the jurisdiction and control of the joint arbitration board and the board has authority to protect their welfare and also to instruct, direct, and discipline them.

SEC. 5. An applicant for apprenticeship shall not be over 21 years of age at the time of making application, unless the applicant has good and sufficient reasons for acceptance, which may be considered by the joint arbitration board.

SEC. 6. Applicant, before assignment to employer, will copy the following obligation in his own handwriting and file it with the joint arbitration board:

I, the undersigned, having made application to be enrolled as an apprentice with the joint arbitration board, and having read the rules formulated by said board providing for training of apprentices, and understanding same and all conditions therein contained, do hereby agree to serve such time and perform such manual training and study such subjects as the board may deem necessary to become a journeyman steam fitter.

SEC. 7. Employer assigned an apprentice may take him on trial for 60 days but thereafter shall undertake to keep him at work at the trade for not less than 10 months in each year, except in case of strikes, lockouts, sickness, or other unavoidable causes, or by action of the joint arbitration board. Employer in discharging an apprentice during the 60-day trial period or at any time thereafter shall immediately notify the joint arbitration board in writing, giving the name of the apprentice and the reason for said discharge, and disposition of such apprentice shall be made by the board within 30 days of receipt of notice of discharge.

SEC. 8. The employer shall agree that the apprentice will be worked under such conditions as will result in normal advancement and endeavor to have him attend classes or do the requisite amount of study or manual-training work as prescribed by the joint arbitration board and, if required, shall submit proof to the board of such attendance to studies or lectures. Employer shall also agree that apprentice will not be employed in a manner that may be considered by the joint arbitration board as unfair to either party to this agreement.

SEC. 9. Arrangements shall be made by the joint arbitration board for the attendance of apprentices in classes where subjects will be taught or lectures given as deemed necessary to assist them in becoming proficient workmen.

The apprentice will not attend school during the probation period and for the four months thereafter, i. e., for the entire first six months from date of first assignment.

SEC. 10. The apprentice shall serve and complete his apprenticeship with the employer with whom he is apprenticed, except as herein provided.

SEC. 11. The joint arbitration board may issue a permit for apprentice to work either temporarily or permanently for another contractor party to this agreement than the one to whom he is apprenticed, in which case the employer to whom the apprentice is assigned will assume all the obligations of the original employer.

SEC. 12. The employment of apprentices shall be limited to regular members in good standing of the Chicago Master Steam Fitters' Association and such associate members as the Chicago Master Steam Fitters' Association may elect who employ at least 2 steam fitters for 10 months of the year. If 4 steam fitters are employed for the same time, the employer may have 2 apprentices; and if 7 steam fitters are employed for the same time the employer may have 3 apprentices; and if 10 steam fitters are employed for the same time, the employer may have 4 apprentices ;and if 13 steam fitters are employed for the same time, the employer may have 5 apprentices. The placing of apprentices to be employed by any one employer in excess of five will be a matter of distribution as decided by the joint arbitration board to the end that the total number of apprentices specified in the agreement will be properly proportioned among regular members of the Chicago Master Steam Fitters' Association and such associate members as the Chicago Master Steam Fitters' Association may select. Temporary disarrangement of the above schedule will be reported to the board by the employer and will not be considered a violation.

SEC. 13. The apprentice will be examined by the joint arbitration board at such times and periods as may be determined by said board, but not less than once each year. Said examination shall be for the purpose of determining whether apprentice is making proper progress in the trade and his studies. Failing to find apprentice progressing properly, the board may take such action as they consider necessary, to correct this condition, and their decision shall be final.

SEC. 14. An apprenticeship shall be for a period of five years, at the expiration of which his employer or employers during this period shall prepare a statement for consideration by the joint arbitration board, which statement shall set forth the deportment, experience, and general knowledge of trade that the apprentice has acquired. An apprentice will then be eligible as a journeyman, provided that he has received sufficient credit at such schools selected by the board, and provided his knowledge of the trade, after a final examination, is such as will satisfy the board that he is a good and efficient journeyman. If the apprentice should fail to pass the final examination, the board may order him to continue as an apprentice for such additional time as in the opinion of the board is necessary and at the end of such time another examination will be given him, and so on until he shall have passed the examination.

The joint arbitration board will hold final examinations of apprentices during the months of April, July, and October of each year. Meetings for final examination of apprentices at other times than herein provided shall be at the discretion of the joint arbitration board.

SEC. 15. The joint arbitration board having examined and passed an apprentice as journeyman, shall so certify in writing to the Steam Fitters' Protective Association, and on payment by said apprentice of initiation fee to the Steam Fitters' Protective Association, they will issue him a journeyman's card.

For one year after graduation from apprenticeship class to steam fitter, all apprentices are under the supervision of the joint arbitration board; if in this time his conduct and ability as a steam fitter should prove unsatisfactory to the board, they may take such action as they may deem advisable.

SEC. 16. The rate of wages for apprentices will be as follows: First year, 45 cents per hour; second year, 50 cents per hour; third year, 65 cents per hour; fourth year, 70 cents per hour; fifth year and all additional time, if any, 80 cents per hour, until apprentice has been passed and certified by said board to the Steam Fitters' Protective Association. This rate to go into effect January 1, 1927.

SEC. 17. Apprentices shall carry working card signed by the chairman of the joint arbitration board and the secretary of the Steam Fitters' Protective Association and this card shall designate the employer to whom the apprentice is assigned and the year of service. The apprentice shall pay for this card to the

Steam Fitters' Protective Association quarterly the dues provided for steam fitters in the constitution of the Steam Fitters' Protective Association for the five years or more of apprenticeship. During the 5-year period, the sum of $250 as an initiation fee to the Steam Fitters' Protective Association shall be paid at the rate of $50 per year. Apprentice shall have the same rights and benefits as a journeyman steam fitter, except that they will not be permitted to attend meetings or vote.

Where an apprentice is permanently disabled, causing his inability to continue at the steam-fitting trade, the joint arbitration board shall have power to direct the Steam Fitters' Protective Association, party of the second part, to return the initiation fee paid by him into the association.

SEC. 18. The joint arbitration board shall conduct its meetings and transact all the business in connection with the apprenticeship rules, in the same manner as provided for elsewhere in this agreement. Between meetings of the board, routine matters may be handled by the chairman and secretary of the joint arbitration board, acting jointly, and their action shall be subject to approval or revision by the joint board. In all cases affecting the apprentices in which there may be a tie vote of the joint arbitration board, the deciding vote will be cast by the umpire, as provided in this agreement, and the decision thus arrived at will be final.

SEC. 19. Expenses incurred by the joint arbitration board in carrying out the provisions of this agreement will be borne equally by the Chicago Master Steam Fitters' Association and the Steam Fitters' Protective Association.

SEC. 20. These apprentice rules shall not be amended, altered or suspended except by a two-thirds vote of the joint arbitration board, and then only upon 30 days' notice in writing to all members of the board of the proposed change.

LIST OF BULLETINS OF THE BUREAU OF LABOR STATISTICS

The following is a list of all bulletins of the Bureau of Labor Statistics published since July, 1912, except that in the case of bulletins giving the results of periodic surveys of the bureau only the latest bulletin on any one subject is here listed.

A complete list of the reports and bulletins issued prior to July, 1921, as well as the bulletins published since that date, will be furnished on application. Bulletins marked thus (*) are out of print.

Conciliation and Arbitration (including strikes and lockouts).

*No. 124. Conciliation and arbitration in the building trades of Greater New York. [1913.]
*No. 133. Report of the industrial council of the British Board of Trade in its inquiry into industrial agreements. [1913.]
*No. 139. Michigan copper district strike. [1914.]
*No. 144. Industrial court of the cloak, suit, and skirt industry of New York City. [1914.]
No. 145. Conciliation, arbitration, and sanitation in the dress and waist industry of New York City. [1914.]
*No. 191. Collective bargaining in the anthracite coal industry. [1916.]
*No. 198. Collective agreements in the men's clothing industry. [1916.]
No. 233. Operation of the industrial disputes investigation act of Canada. [1918.]
No. 255. Joint industrial councils in Great Britain. [1919.]
No. 283. History of the Shipbuilding Labor Adjustment Board, 1917 to 1919.
No. 287. National War Labor Board: History of its formation, activities, etc. [1921.]
No. 303. Use of Federal power in settlement of railway labor disputes. [1922.]
No. 341. Trade agreement in the silk-ribbon industry of New York City. [1923.]
No. 402. Collective bargaining by actors. [1926.]
No. 448. Trade agreements, 1926.

Cooperation.

No. 313. Consumers' cooperative societies in the United States in 1920.
No. 314. Cooperative credit societies in America and in foreign countries. [1922.]
No. 437. Cooperative movement in the United States in 1925 (other than agricultural).

Employment and Unemployment.

*No. 109. Statistics of unemployment and the work of employment offices in the United States. [1913.]
*No. 172. Unemployment in New York City, N. Y. [1915.]
*No. 183. Regularity of employment in the women's ready-to-wear garment industries. [1915.]
*No. 195. Unemployment in the United States. [1916.]
No. 196. Proceedings of the Employment Managers' Conference held at Minneapolis, Minn., January, 1916.
*No. 202. Proceedings of the conference of Employment Managers' Association of Boston, Mass., held May 10, 1916.
No. 206. The British system of labor exchanges. [1916.]
*No. 227. Proceedings of the Employment Managers' Conference, Philadelphia, Pa., April 2 and 3, 1917.
No. 235. Employment system of the Lake Carriers' Association. [1918.]
*No. 241. Public employment offices in the United States. [1918.]
No. 247. Proceedings of Employment Managers' Conference, Rochester, N. Y., May 9–11, 1918.
No. 310. Industrial unemployment: A statistical study of its extent and causes. [1922.]
No. 409. Unemployment in Columbus, Ohio, 1921 to 1925.

Foreign Labor Laws.

*No. 142. Administration of labor laws and factory inspection in certain European countries. [1914.]

Housing.

*No. 158. Government aid to home owning and housing of working people in foreign countries. [1914.]
No. 263. Housing by employers in the United States. [1920.]
No. 295. Building operations in representative cities in 1920.
No. 449. Building permits in the principal cities of the United States, 1926.

Industrial Accidents and Hygiene.

*No. 104. Lead poisoning in potteries, tile works, and porcelain enameled sanitary ware factories. [1912.]
No. 120. Hygiene of the painters' trade. [1912.]
*No. 127. Dangers to workers from dusts and fumes, and methods of protection. [1913.]
*No. 141. Lead poisoning in the smelting and refining of lead. [1914.]
*No. 157. Industrial accident statistics. [1915.]
*No. 165. Lead poisoning in the manufacture of storage batteries. [1914.]
*No. 179. Industrial poisons used in the rubber industry. [1915.]
No. 188. Report of British departmental committee on the danger in the use of lead in the painting of buildings. [1916.]
*No. 201. Report of committee on statistics and compensation-insurance cost of the International Association of Industrial Accident Boards and Commissions. [1916.]
*No. 207. Causes of death by occupation. [1917.]
*No. 209. Hygiene of the printing trades. [1917.]

Industrial Accidents and Hygiene—Continued.

No. 219. Industrial poisons used or produced in the manufacture of explosives. [1917.]
No. 221. Hours, fatigue, and health in British munition factories. [1917.]
No. 230. Industrial efficiency and fatigue in British munition factories. [1917.]
*No. 231. Mortality from respiratory diseases in dusty trades (inorganic dusts). [1918.]
No. 234. Safety movement in the iron and steel industry, 1907 to 1917.
*No. 236. Effect of the air hammer on the hands of stonecutters. [1918.]
No. 249. Industrial health and efficiency. Final report of British Health of Munitions Workers' Committee. [1919.]
*No. 251. Preventable death in the cotton-manufacturing industry. [1919.]
No. 256. Accidents and accident prevention in machine building. [1919.]
No. 267. Anthrax as an occupational disease. [1920.]
No. 276. Standardization of industrial-accident statistics. [1920.]
No. 280. Industrial poisoning in making coal-tar dyes and dye intermediates. [1921.]
No. 291. Carbon monoxide poisoning. [1921.]
No. 293. The problem of dust phthisis in the granite-stone industry. [1922.]
No. 298. Causes and prevention of accidents in the iron and steel industry, 1916 to 1919.
No. 306. Occupational hazards and diagnostic signs: A guide to impairments to be looked for in hazardous occupations. [1922.]
No. 339. Statistics of industrial accidents in the United States. [1923.]
No. 392. Survey of hygienic conditions in the printing trades. [1925.]
No. 405. Phosphorus necrosis in the manufacture of fireworks and in the preparation of phosphorus. [1926.]
No. 425. Record of industrial accidents in the United States to 1925.
No. 426. Deaths from lead poisoning. [1926.]
No. 427. Health survey of the printing trades, 1922 to 1925.
No. 428. Proceedings of the Industrial Accident Prevention Conference, held at Washington, D. C., July 14–16, 1926.

Industrial Relations and Labor Conditions.

No. 237. Industrial unrest in Great Britain. [1917.]
No. 340. Chinese migration with special reference to labor conditions. [1923.]
No. 349. Industrial relations in the west coast lumber industry. [1923.]
No. 361. Labor relations in the Fairmont (W. Va.) bituminous-coal field. [1924.]
No. 380. Postwar labor conditions in Germany. [1925.]
No. 383. Works council movement in Germany. [1925.]
No. 384. Labor conditions in the shoe industry in Massachusetts, 1920 to 1924.
No. 399. Labor relations in the lace and lace-curtain industries in the United States. [1925.]

Labor Laws of the United States (including decisions of courts relating to labor).

No. 211. Labor laws and their administration in the Pacific States. [1917.]
No. 229. Wage-payment legislation in the United States. [1917.]
No. 285. Minimum-wage legislation in the United States. [1921.]
No. 321. Labor laws that have been declared unconstitutional. [1922.]
No. 322. Kansas Court of Industrial Relations. [1923.]
No. 343. Laws providing for bureaus of labor statistics, etc. [1923.]
No. 370. Labor laws of the United States, with decisions of courts relating thereto. [1925.]
No. 408. Laws relating to payment of wages. [1926.]
No. 434. Labor legislation of 1926.
No. 444. Decisions of courts and opinions affecting labor. [1926.]

Proceedings of Annual Conventions of the Association of Governmental Labor Officials of the United States and Canada.

No. 266. Seventh, Seattle, Wash., July 12–15, 1920.
No. 307. Eighth, New Orleans, La., May 2–6, 1921.
*No. 323. Ninth, Harrisburg, Pa., May 22–26, 1922.
No. 352. Tenth, Richmond, Va., May 1–4, 1923.
No. 389. Eleventh, Chicago, Ill., May 19–23, 1924.
No. 411. Twelfth, Salt Lake City, Utah, August 13–15, 1925.
No. 429. Thirteenth, Columbus, Ohio, June 7–10, 1926.
No. 455. Fourteenth, Paterson, N. J., May 31–June 3, 1927.

Proceedings of Annual Meetings of the International Association of Industrial Accident Boards and Commissions.

*No. 210. Third, Columbus, Ohio, April 25–28, 1916.
No. 248. Fourth, Boston, Mass., August 21–25, 1917.
No. 264. Fifth, Madison, Wis., September 24–27, 1918.
*No. 273. Sixth, Toronto, Canada, September 23–26, 1919.
No. 281. Seventh, San Francisco, Calif., September 20–24, 1920.
No. 304. Eighth, Chicago, Ill., September 19–23, 1921.
No. 333. Ninth, Baltimore, Md., October 9–13, 1922.
No. 359. Tenth, St. Paul, Minn., September 24–26, 1923.
No. 385. Eleventh, Halifax, Nova Scotia, August 26–28, 1924.
No. 395. Index to proceedings, 1914–1924.
No. 406. Twelfth, Salt Lake City, Utah, August 17–20, 1925.
No. 432. Thirteenth, Hartford, Conn., September 14–17, 1926.
No. 456. Fourteenth, Atlanta, Ga., September 27–30, 1927.

Proceedings of Annual Meetings of International Association of Public Employment Services.

No. 192. First, Chicago, December 19 and 20, 1913; Second, Indianapolis, September 24 and 25, 1914; Third, Detroit, July 1 and 2, 1915.
No. 220. Fourth, Buffalo, N. Y., July 20 and 21, 1916.
No. 311. Ninth, Buffalo, N. Y., September 7–9, 1921.
No. 337. Tenth, Washington, D. C., September 11–13, 1922.

Proceedings of Annual Meetings of International Association of Public Employment Services—Continued.

No. 335. Eleventh, Toronto, Canada, September 4–7, 1923.
No. 400. Twelfth, Chicago, Ill., May 19–23, 1924.
No. 414. Thirteenth, Rochester, N. Y., September 15–17, 1925.

Productivity of Labor.

No. 356. Productivity costs in the common-brick industry. [1924.]
No. 360. Time and labor costs in manufacturing 100 pairs of shoes. [1924.]
No. 407. Labor cost of production, and wages and hours of labor in the paper box-board industry. [1925.]
No. 412. Wages, hours, and productivity in the pottery industry, 1925.
No. 441. Productivity of labor in the glass industry. [1927.]

Retail Prices and Cost of Living.

*No. 121. Sugar prices, from refiner to consumer. [1913.]
*No. 130. Wheat and flour prices, from farmer to consumer. [1914.]
*No. 164. Butter prices, from producer to consumer. [1914.]
No. 170. Foreign food prices as affected by the war. [1915.]
No. 357. Cost of living in the United States. [1924.]
No. 369. The use of cost-of-living figures in wage adjustments. [1925.]
No. 445. Retail prices, 1800 to 1926.

Safety Codes.

No. 331. Code of lighting factories, mills, and other work places.
No. 336. Safety code for the protection of industrial workers in foundries.
No. 338. Safety code for the use, care, and protection of abrasive wheels.
No. 350. Specifications of laboratory tests for approval of electric headlighting devices for motor vehicles.
No. 351. Safety code for the construction, care, and use of ladders.
No. 364. Safety code for the mechanical power-transmission apparatus.
No. 375. Safety code for laundry machinery and operation.
No. 378. Safety code for woodworking plants.
No. 382. Code of school lighting buildings.
No. 410. Safety code for paper and pulp mills.
No. 430. Safety code for power presses and foot and hand presses.
No. 433. Safety codes for the prevention of dust explosions.
No. 436. Safety code for the use, care, and protection of abrasive wheels.
No. 447. Safety code for rubber mills and calenders.
No. 451. Safety code for forging and hot-metal stamping.

Vocational and Workers' Education.

*No. 159. Short-unit courses for wage earners and a factory school experiment. [1915.]
*No. 162. Vocational education survey of Richmond, Va. [1915.]
No. 199. Vocational education survey of Minneapolis, Minn. [1916.]
No. 271. Adult working-class education in Great Britain and the United States. [1920.]

Wages and Hours of Labor.

*No. 146. Wages and regularity of employment and standardization of piece rates in the dress and waist industry of New York City. [1914.]
*No. 147. Wages and regularity of employment in the cloak, suit, and skirt industry. [1914.]
No. 161. Wages and hours of labor in the clothing and cigar industries, 1911 to 1913.
No. 163. Wages and hours of labor in the building and repairing of steam railroad cars, 1907 to 1913.
*No. 190. Wages and hours of labor in the cotton, woolen, and silk industries, 1907 to 1914.
No. 204. Street railway employment in the United States. [1917.]
No. 225. Wages and hours of labor in the lumber, millwork, and furniture industries, 1915.
No. 265. Industrial survey in selected industries in the United States, 1919.
No. 297. Wages and hours of labor in the petroleum industry, 1920.
No. 356. Productivity costs in the common-brick industry. [1924.]
No. 358. Wages and hours of labor in the automobile-tire industry, 1923.
No. 360. Time and labor costs in manufacturing 100 pairs of shoes. [1924.]
No. 365. Wages and hours of labor in the paper and pulp industry, 1923.
No. 394. Wages and hours of labor in metalliferous mines, 1924.
No. 407. Labor cost of production, and wages and hours of labor in the paper box-board industry. [1925.]
No. 412. Wages, hours, and productivity in the pottery industry, 1925.
No. 413. Wages and hours of labor in the lumber industry in the United States, 1925.
No. 416. Hours and earnings in anthracite and bituminous coal mining, 1922 and 1924.
No. 421. Wages and hours of labor in the slaughtering and meat-packing industry, 1925.
No. 422. Wages and hours of labor in foundries and machine shops, 1925.
No. 434. Wages and hours of labor in the men's clothing industry, 1911 to 1926.
No. 438. Wages and hours of labor in the motor-vehicle industry, 1925.
No. 442. Wages and hours of labor in the iron and steel industry, 1907 to 1925.
No. 443. Wages and hours of labor in woolen and worsted goods manufacturing, 1910 to 1926.
No. 446. Wages and hours of labor in cotton-goods manufacturing, 1926.
No. 450. Wages and hours of labor in the boot and shoe industry, 1906 to 1926.
No. 452. Wages and hours of labor in the hosiery and underwear industries, 1907 to 1926.
No. 454. Hours and earnings in bituminous-coal mining in 1922, 1924, and 1926.
No. 457. Union scale of wages and hours of labor, May 15, 1927.

Welfare Work.

*No. 123. Employers' welfare work. [1913.]
*No. 222. Welfare work in British munitions factories. [1917.]
*No. 250. Welfare work for employees in industrial establishments in the United States. [1919.]
No. 458. Health and recreation activities in industrial establishments, 1926. (In press.)

Wholesale Prices.

No. 284. Index numbers of wholesale prices in the United States and foreign countries. [1921.]
No. 440. Wholesale prices, 1890 to 1925.
No. 453. Revised index numbers of wholesale prices, 1923 to July, 1927.

Women and Children in Industry.

No. 116. Hours, earnings, and duration of employment of wage-earning women in selected industries in the District of Columbia. [1913.]
*No. 117. Prohibition of night work of young persons. [1913.]
*No. 118. Ten-hour maximum working-day for women and young persons. [1913.]
*No. 119. Working hours of women in the pea canneries of Wisconsin. [1913.]
*No. 122. Employment of women in power laundries in Milwaukee. [1913.]
No. 160. Hours, earnings, and conditions of labor of women in Indiana mercantile establishments and garment factories. [1914.]
*No. 167. Minimum-wage legislation in the United States and foreign countries. [1915.]
*No. 175. Summary of the report on conditions of woman and child wage earners in the United States. [1915.]
*No. 176. Effect of minimum-wage determination in Oregon. [1915.]
*No. 180. The boot and shoe industry in Massachusetts as a vocation for women. [1915.]
*No. 182. Unemployment among women in department and other retail stores of Boston, Mass. [1916.]
No. 193. Dressmaking as a trade for women in Massachusetts. [1916.]
No. 215. Industrial experience of trade-school girls in Massachusetts. [1917.]
*No. 217. Effect of workmen's compensation laws in diminishing the necessity of industrial employment of women and children. [1918.]
No. 223. Employment of women and juveniles in Great Britain during the war. [1917.]
No. 253. Women in lead industries. [1919.]

Workmen's Insurance and Compensation (including laws relating thereto).

*No. 101. Care of tuberculous wage earners in Germany. [1912.]
*No. 102. British national insurance act, 1911.
*No. 103. Sickness and accident insurance law of Switzerland. [1912.]
No. 107. Law relating to insurance of salaried employees in Germany. [1913.]
*No. 155. Compensation for accidents to employees of the United States. [1914.]
No. 212. Proceedings of the conference on social insurance called by the International Association of Industrial Accident Boards and Commissions, Washington, D. C., December 5–9, 1916.
No. 243. Workmen's compensation legislation in the United States and foreign countries, 1917 and 1918.
No. 301. Comparison of workmen's compensation insurance and administration. [1922.]
No. 312. National health insurance in Great Britain, 1911 to 1920.
No. 379. Comparison of workmen's compensation laws of the United States as of January 1, 1925.
No. 423. Workmen's compensation legislation of the United States and Canada. [1926.]

Miscellaneous Series.

*No. 174. Subject index of the publications of the United States Bureau of Labor Statistics up to May 1, 1915.
No. 208. Profit sharing in the United States. [1916.]
No. 242. Food situation in central Europe, 1917.
No. 254. International labor legislation and the society of nations. [1919.]
No. 268. Historical survey of international action affecting labor. [1920.]
No. 282. Mutual relief associations among Government employees in Washington, D. C. [1921.]
No. 299. Personnel research agencies. A guide to organized research in employment management, industrial relations, training, and working conditions. [1921.]
No. 319. The Bureau of Labor Statistics: Its history, activities, and organization.
No. 326. Methods of procuring and computing statistical information of the Bureau of Labor Statistics.
No. 342. International Seamen's Union of America: A study of its history and problems. [1923.]
No. 346. Humanity in government. [1923.]
No. 372. Convict labor in 1923.
No. 386. The cost of American almshouses. [1925.]
No. 398. Growth of legal-aid work in the United States. [1926.]
No. 401. Family allowances in foreign countries. [1926.]
No. 420. Handbook of American trade-unions. [1926.]
No. 439. Handbook of labor statistics, 1924–1926.