U. S. DEPARTMENT OF LABOR
W. B. WILSON, SECRETARY
WOMEN'S BUREAU
MARY ANDERSON, Director

BULLETIN OF THE WOMEN'S BUREAU, NO. 13

INDUSTRIAL OPPORTUNITIES AND TRAINING FOR WOMEN AND GIRLS

WASHINGTON
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1920

[PUBLIC—No. 259—66TH CONGRESS.]

[H. R. 13229.]

AN ACT To establish in the Department of Labor a bureau to be known as the Women's Bureau.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be established in the Department of Labor a bureau to be known as the Women's Bureau.

SEC. 2. That the said bureau shall be in charge of a director, a woman, to be appointed by the President, by and with the advice and consent of the Senate, who shall receive an annual compensation of $5,000. It shall be the duty of said bureau to formulate standards and policies which shall promote the welfare of wage-earning women, improve their working conditions, increase their efficiency, and advance their opportunities for profitable employment. The said bureau shall have authority to investigate and report to the said department upon all matters pertaining to the welfare of women in industry. The director of said bureau may from time to time publish the results of these investigations in such a manner and to such extent as the Secretary of Labor may prescribe.

SEC. 3. That there shall be in said bureau an assistant director, to be appointed by the Secretary of Labor, who shall receive an annual compensation of $3,500 and shall perform such duties as shall be prescribed by the director and approved by the Secretary of Labor.

SEC. 4. That there is hereby authorized to be employed by said bureau a chief clerk and such special agents, assistants, clerks, and other employees at such rates of compensation and in such numbers as Congress may from time to time provide by appropriations.

SEC. 5. That the Secretary of Labor is hereby directed to furnish sufficient quarters, office furniture, and equipment for the work of this bureau.

SEC. 6. That this act shall take effect and be in force from and after its passage.

Approved, June 5, 1920.

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LETTER OF TRANSMITTAL.

U. S. Department of Labor,
Women's Bureau,
Washington, July 6, 1920.

Sir: Herewith is transmitted a report giving the results of an investigation into the industrial opportunities and training for women and girls. This investigation was made and the report written by Miss Bertha M. Nienburg.

Respectfully submitted.

Mary Anderson, *Director.*

Hon. W. B. Wilson,
Secretary of Labor.

INDUSTRIAL OPPORTUNITIES AND TRAINING FOR WOMEN AND GIRLS.

INTRODUCTION.

As the social conscience has long regarded a measure of general education to be the right of every boy and girl without regard to rank of fortune or accident of birth; as the public mind has long required that this right shall be secured through the maintenance of schools publicly supported and especially equipped to impart the general instruction essential to good citizenship, so apparently have the social conscience and the public mind been moving slowly but surely toward the conviction that specific vocational training in line with the individual choice and capability of boy and girl is equally essential to the public welfare, and that as such it should be secured to the Nation's youth with the same disregard of fortune's unstable ranks and birth's uncontrollable accidents as now prevails in providing general primary instruction.

The year and a half of our participation in the World War sharpened the public's sense of the lack of specific vocational training as decades had not done before. For the war cry for trained men and trained women was answered in thousands of eager "offers of service" from untrained men and in thousands of full-hearted responses from untrained women. The Government had not only to promote and stimulate specialized training, but had to provide extensive facilities to meet the emergency. Yet most of the occupations for which the Nation needed trained minds and hands to win the war were occupations required in the performance of the Nation's daily work in times of peace.

As the need of equipping the Nation's youth with specialized training in chosen vocations has grown in the public mind and conscience, so has grown a conviction that this training must be secured through agencies especially equipped just as general education is imparted by especially equipped institutions; that vocational education can not take the place of general educational agencies, nor can agencies especially organized for general instruction take the place of or do the work of schools for specific vocations. This conviction resulted in the creation of a Federal Board for Vocational Education in 1917, with power to pay over to the States certain sums of

money for teaching vocational courses or for training teachers to give instruction in such courses. Naturally the creation of such a board has served to arouse every State to undertake vocational education.

In the present stage of development, however, there is still much disagreement concerning the best method of securing to the maturing generation this specific vocational training. The various systems are as yet in stages more or less experimental. Undoubtedly the policies framed by the Federal Board for Vocational Education on the basis of the organic act creating it have given impetus to experiments with certain types of vocational schools by limiting the kinds of schools that may receive Federal funds.

This survey was not concerned with comparing the relative merits of one theory or method of vocational training as against another. But it is particularly important that while the experiments in methods of vocational training are still under way and the various theories are still in a state of flux that due consideration shall be given to the war and after war time experience in the employment of woman labor. It would be most unfortunate at this time, when industrial as well as other forms of vocational education are in the process of development, to overlook the new position which the woman in industry made for herself during the war and which she has held since the close of the war, for it is a position which demands training opportunities commensurate with its possibilities.

Until the end of 1917 women were concentrated in so few lines of industrial endeavor that what little training was given them was largely centered on the sewing trades. Their latent abilities for trades other than those concerned with food and textile and kindred industries were not, therefore, uncovered or developed either by employer or vocational teacher. The pressing needs of the war alone forced a new recognition of the fact that ability varies not with sex but with the individual.

NEW POSITION OF WOMEN IN INDUSTRY.

The enforced concentration of industrial activity on the making of munitions and munition materials, on the manufacture of tools and machinery to make munitions during the war, called women in large numbers into machine shops and tool rooms for the first time in the history of the country. It extended their employment in foundries and introduced them in small numbers to steel and rolling mills; instrument and optical factories needed their deft hands; war-chemical, gas-mask, airplane, and munition-box makers used their services extensively. The drafting into military service and the introduction to war-product factories of men from peace-product fac-

tories, hitherto dependent largely on male labor, caused a labor vacuum also in these peace-product factories which women were sought to fill; sewing-machine and typewriter plants, utensil makers, commercial gas and chemical producers, rubber and leather, stone, clay, and glass manufacturers all called upon and to some extent obtained women to carry on work which had been done by men.[1] Other peace-product factories which were conspicuous as strongholds of woman labor before the war lost many women workers as well as men workers and were forced to operate at reduced capacity.

This enlargement in the field of woman's service has lasted in some industries beyond the war period in spite of the many changes involved in passing from war to peace manufacture.

The signing of the armistice restored the peace product to its normal position and reduced to comparative insignificance the munitions industry. Forces of women and men were dismissed from the one group of factories and taken on by the other group. But the peace-time readjustment finds woman retaining her war-time hold on the metal industries, losing a little in lumber industries, although still employed in this industry in numbers far in excess of prewar times, and falling back to the prewar status in the chemical and miscellaneous industries.[1] Undoubtedly these conditions are partly due to the present status of the industries and partly to the successes and failures of the war-working women in the occupations to which they were assigned in each industry.

Taking a bird's-eye view of industry after a year of peace, although the emphasis of manufacture has shifted from war to peace products, the metal industries, which were the backbone of war products, continue to be the backbone of peace products. On them almost all other industries depend for the machinery and tools with which to do their work. Two years' concentration on war products caused an acute shortage of peace-time implements of manufacture both in this country and abroad. Until this shortage is overcome other industries can not reach maximum production. For some time, therefore, although not under the strain of war demands, the iron and steel and the brass and copper industries will continue to need large forces of workers just to restore normal conditions in other industries. The stoppage of domestic and commercial building and construction work in 1917 and 1918 has resulted in a serious shortage of living and business quarters and has necessitated great activity in the lumber, sheet metal, and stone industries. This increase in domestic and commercial building carries with it a corresponding increase in the manufacture of household and office furni-

[1] See Bulletin No. 12, Woman's Part in American Industry During the World War, Women's Bureau, U. S. Department of Labor, 1920.

ture and equipment, manufactures also stimulated by the need to replenish supplies in established households and businesses after several years of doing without such supplies. Shutting down of many explosive factories and the lessening in production of war-time chemicals have caused chemical factories that had employed women to turn their attention to experimental work in new lines of manufacture. This experimental stage requires a preliminary research activity in which women as yet have not made for themselves a conspicuous place. Chemical plants are not, therefore, seeking many women workers, whereas the metal industries and lumber industries call urgently for service.

SHORTAGE OF MALE LABOR.

Prior to 1915 our growing industries counted largely upon the increase in our population through immigration to meet the need for additional workers. For the present, at least, manufacturers can not depend upon this source of labor supply to meet the labor demands of restored peace. The economic and political forces at work here and abroad that make for immigration and emigration are too uncertain at this time to give more than speculative value to discussions over the duration of curtailed immigration. However, the happenings of the first 11 months of 1919 are matters of record.[2] From January through November of that year—the first year after the armistice—this country admitted 209,445 aliens to take up permanent residence here; but during the same period 239,519 other aliens bade this country farewell, presumably forever. Through this one source alone, therefore, we suffered a loss of 30,074 persons, and this loss fell more heavily upon our manufacturing population than appears from these figures, for among our largest number of immigrants during this period were Mexicans, few of whom enter factories, whereas our heaviest emigration took place among the Italians, thousands of whom had worked in our factories. In view of the fact that the net increase in population during the last year of uninterrupted ocean travel prior to the war was 915,142 persons, the 1919 situation does not stamp immigration as a very hopeful source of additional workers for manufacturing establishments.

However, it is highly significant that, although our total emigration exceeded our immigration in 1919, during the first six months of that year (the latest period for which figures by sex were compiled) women immigrants to this country exceeded women emigrants by 16,748. The decreased man population of Europe will

[2] See Annual Report of the Commissioner of Immigration for 1919, pp. 154 and 155, and advance sheets on immigration from July to November, 1919, inclusive, issued by the Commissioner of Immigration.

undoubtedly tend toward a continued exodus of women from those countries where women even before the war outnumbered men to this country, where men still outnumber women.

The shortage of male labor, the uncertainty of the ebb and flow of aliens, the excess of women immigrants over women emigrants, and the increasing demands upon industry for production will unquestionably force a larger and more varied use of woman labor in this country as the years go by.

EXPERIENCE GAINED BY WOMEN WAGE EARNERS DURING WORLD WAR.

This situation makes the capabilities displayed by women for mechanical work during the war of much more than passing interest to industry, the public, and the educator. For the occupations in which woman has been shown to be a success are the occupations for which she needs to be educated. As stated earlier, the calls for woman labor emanating since the war from metal and wood working factories are based undoubtedly on the experience gained by such establishments in the employment of women during the war.

Throughout the war the largest number of women employed in the metal industries were assigned to the machine shops and tool rooms to cut, cast, or forge parts to proper sizes and shapes, or to make and repair tools, or to inspect parts and assemble them. They operated the lathe, the miller, the drill, the planer, the grinder, and other machine tools; they became proficient in handling the file, the wrench, the hammer, and other hand tools; they read blue prints and used micrometers, calipers, and gauges; they used rules and compasses to lay out work for machine cutters. Their employment in these capacities extended into every branch of machine-shop manufacture. Naturally the largest number went into factories manufacturing shells, pistols, guns, and cannon, but in these factories women operated and handled the same kinds of machines and tools as did the smaller, but yet appreciably large, group of women who made parts for engines and pumps; for machines and machinery; for automobiles, motor cycles, and airplanes; for agricultural implements; or who worked on tools, saws, hardware, electrical apparatus, instruments, and clocks.

The kind and extent of the experience secured by women in these shops differed greatly. In a few it was sufficiently varied to have in time made them "machinists" or persons able to use all machine tools in the making and repairing of machine parts and able successfully to assemble and dismantle machines and machinery. The expression "in time" is used advisedly, because the period which has elapsed since women were first employed in these shops has been too short to

have permitted them to obtain that experience on all classes of machine tools which is required to develop a full-fledged woman machinist. In the larger number of shops it was the policy to make "specialists" of women as it is of men. Such shops taught a woman the underlying principles and methods of setting up and operating just one machine, together with the varying characteristics of different metals and tools used in the shop in order to enable her to cut each piece of metal and grind each tool without waste of metal or tool. In other shops where the work was of a repetitive character—which was especially true in munition factories—time was not taken usually to give the women employees general instruction in machine-shop fundamentals. The woman was taught just enough to enable her to turn out, assemble, or inspect duplicated parts at great speed. This type of experience, except in one particular, made the woman worker little more than a machine operator or routine assembler or inspector, for although she became acquainted with a machine tool, with metal work and with the machine-shop atmosphere, her knowledge of metal work did not extend beyond the limits of the task set for her. The exception which redeemed this work from skill-killing monotony was the accuracy demanded in munition work; all workers had to learn how to read measuring instruments and to cut to very narrow limits. This training in itself removed these women from the class of unskilled workers.

In spite of the numbers of women employed at repetitive work the capabilities of women for skilled mechanical service were uncovered in the many factories whose product was such that they could not operate on a quantitative basis and could, therefore, only use women whose knowledge of machine tools was varied or extensive enough to meet the requirements of differing tasks. Naturally, the greater the degree of education and skill required in the work which women were called upon to do in machine shops during the war, the greater the percentage of failure, for until the war created the need for mechanically trained women practically no such training was given to women. But in spite of this handicap, the failures of women were always fewer than the successes.[a] In fact, about two-thirds of the firms reporting as to the relative output of men and women in the machine shops stated that women turned out as much or more work than men. The numbers of firms retaining women in the machine shop after the armistice would indicate the same approximate proportion of successes. In examining the accounts of failures of women, only one common characteristic of the work on which they failed is found, and that is excessive weight of the article worked on. Undoubtedly there is a weight below that recognized in factories

[a] See Bulletin No. 12, Woman's Part in American Industry During the World War, Woman's Bureau, U. S. Department of Labor, 1920.

as too heavy for men to lift at which objects become too heavy for the average woman to manipulate by her muscle alone without strain and consequent loss of time and efficiency. Some firms found that it was a saving of money to employ women on large parts, and to equip the shop with block and tackle to hold work, roller tables to carry work to and from machines, and to equip machines with compressed-air attachments whereby chucks to hold tools and materials were tightened. With these aids women machined and inspected heavy parts with as much success as light parts, but without them women could not compete with men on heavy work.

Turning from the machine shop and the tool room to the employment of women in sheet-metal industries, it was found that although women had been employed on various sheet-metal processes before the war, their employment was extended during this period in the old occupations and to new occupations on sheet iron, tin, aluminum, brass, and copper sheets. During the war they operated blanking, shearing, and drawing presses to cut or shape these sheets, they soldered and riveted, welded, and assembled; dipped, buffed, and finished. They worked on oil and gas stoves, hoods, radiators, tanks, and fenders of automobiles, on agricultural implements, on tin and aluminum containers and utensils, on brass and bronze fabrications, on cartridges, and on airplanes. The machines operated were largely automatic or required little skill to manipulate. Some women learned how to set up punch presses, but few set up automatic machines. When women could set up machines they usually were assigned to this work alone and did not operate them. The machine operators were, therefore, unskilled or at best semiskilled workers without the redeeming exception noted in connection with repetition workers in machine shops. Hand workers, however, acquired deftness in the use of hammers, snips, and shears, rivet sets, soldering and welding outfits. Their work on the whole required a higher type of ability than did that done by the machine operators.

A smaller number of women than were employed in the two foregoing groups of metal occupations went into the foundries of this country during 1917 and 1918. While a few were employed at molding and doing various jobs about the foundry such as sorting, grinding, and filing castings, and laboring, the larger number worked in the core-making branch of the industry, a branch in which women had been used for some years before the war. The recently employed women core makers were started on the easiest, lightest cores, and as they acquired deftness and speed were taught how to make more difficult pieces. But no attempt was made to instruct them in sand mixing, so their chance of advancement lay only in gaining speed and in being able to do more difficult work. The other occupations at which women worked in the foundries offered little

opportunity for learning anything but the task set—tasks easily learned in a short time. Although women have secured a firm grip on the occupation of core making, their chance for advancement in the foundries is still negligible. It will probably continue to be so, for outside of the core making and finishing rooms where advancement lies only in becoming forewomen, tasks requiring skill and knowledge are performed in heat and smoke laden rooms and usually involve lifting of weights heavier than can be handled by women efficiently.

Conditions in the pig iron and rolling mill works are similar to those in the foundry proper. With the exception of work for which scientific knowledge was a prerequisite, the tasks at which women were employed during the war demanded neither skill nor training. As a large part of the work done required muscular strength, the numbers of women retained when men could be secured were few.

In the metal industries, therefore, it is evident that women have gained a foothold in the machine shops and in the sheet-metal manufacture, but that blast furnaces and rolling mills and foundries (core making excepted) will continue to be the peculiar province of men whenever men are procurable.

In the instrument and optical industries women were employed not only on the metal parts of the instruments but in grinding and polishing lenses, mounting and inspecting, and in assembling the entire instrument. Women were peculiarly adapted to this work because of the smallness of the parts and the delicate fashioning required. While these industries do not seem to be employing a larger proportion of women than they did before the war, the growth of the industry during the time in which German instruments and optical glass were not obtainable was such that if our manufacturers are sustained in their efforts to hold their war-gained position many more women will be employed in these industries in future years than were employed prior to 1915.

Turning to the woodworking industries, the largest group of women substituted for men during 1917 and 1918 went into furniture and veneer factories, there to work on peace-time products or to make airplane parts or munition and tool boxes or wheels for artillery trucks. The work done varied, some women being employed at almost every process in the manufacture of veneer and furniture. However, less work was done on machines in cutting and shaping wood than was done in assembling the pieces and finishing the product. In assembling, women used hand tools and glues and operated a few machines; in finishing, they handled different stains and varnishes, fillers, polishing oils, and operated hand and machine sanders and polishers of different kinds. Much of this work was divided into

many parts, each woman learning only the part assigned her. This is particularly true of furniture assembling, for in order to build furniture in its entirety the assembler, or cabinetmaker as he is called, must know woods, understand a stock bill giving the dimensions of the finished parts, and be able to use and operate all kinds of woodworking machines and tools. Finishing requires a knowledge of wood grains, oils, stains, fillings, and varnishes. Consequently, more women attained the position of all-round finisher than that of cabinetmaker. Although orders for war products were canceled at the signing of the armistice, the employment of women was continued in veneer and furniture factories and in the woodworking departments of musical instrument plants.

In the chemical industries, exclusive of explosive manufacture, the tasks turned over to women were largely of a laboring character or involved the feeding or tending of automatic machines. Few factories had adjusted the plant arrangements for the permanent employment of women. When production fell off or men were available, these women were laid off.

The experiences in the employment of women in new occupations during the war make it apparent, therefore, that the greatest success and most promising future for craftswomen in these fields lies, in the order of importance, in—

(*a*) Machine shops where light parts are made.
(*b*) Wood-product factories where assembling and finishing are important processes.
(*c*) Optical and instruments factories.
(*d*) Sheet-metal shops.

INDUSTRIAL TRAINING RECEIVED BY WOMEN IN PUBLIC AND SEMIPUBLIC SCHOOLS.

Are women and girls being trained for these lines of endeavor?

To answer this a survey was made of industrial training schools in which women were enrolled throughout the United States. Except for the trade classes of the Young Women's Christian Association, privately endowed schools, open to the public free or charging but a small fee, were included with the public schools, for in some cities such schools offer more industrial courses than do public schools. The Bureau of Education furnished the list of trade schools and gave access to unpublished data indicating which of these had women enrolled in 1918. This list was checked against lists of vocational schools furnished for this survey by State boards of education. While the list thus secured is fairly complete, the changes occurring in the vocational field are so frequent as to limit the currency of all lists of this nature. Questionnaires concerning 1919–20 conditions

were sent to all schools which gave trade courses and in which women had been enrolled in 1918. The returns for many schools showed that while women were enrolled in the school they were not receiving instruction in trades but in home economics, general art, or commercial subjects. In a few schools industrial courses given for women during the war had been dropped in 1919.

In order to measure fully the extent to which the school system had responded to the present needs of women for industrial training, the widest latitude was used in construing the term "industrial." All schools of less than college standing affording practical instruction for positions in the manufacturing departments of factories or in the mechanical trades were included regardless of whether the course was termed a "trade course," a "technical course," or an "industrial art course." Schools giving industrial art courses without direct application to industrial needs were not included, however.

On the mailing list used, schools administered by the same official, whether the all-day, part-time, and evening classes were managed as one unit or as three units, were considered as one school. This use of the term "school" has been found to be misleading as a statistical unit of enumeration by the Federal Board for Vocational Education, because each community not only organizes its vocational school system differently, but varies its organization from year to year. To make statistical comparison possible from year to year, therefore, the Federal board has adopted as its unit of count the type of school—that is, each all-day, part-time, or evening school is counted as one school, whether administered separately or in groups.[3] This method of count has been used in this survey, as it seemed more to the purpose to give the same weight to courses offering equal opportunity for training to the community regardless of school organization.

Therefore, instead of stating that 75 school administration units reported the enrollment of women in industrial training courses, this survey shows that 104 schools had such an enrollment. Forty-eight of the latter were all-day schools or schools where women received instruction during the regular school day; evening schools numbered 44; part-time schools or schools attended for only a part of the school week numbered 12. These schools were conducted in 20 States, the number in each varying from one in Kentucky to 21 in Pennsylvania, as shown on Table 1.

[3] Third Annual Report of the Federal Board for Vocational Education, p. 191.

TABLE 1.—*Number and type of schools in which women were enrolled in industrial courses.*

State.	Number of schools.			
	All-day.	Part-time.	Evening.	Total.
North Atlantic:				
New Hampshire	1			1
Massachusetts	4		5	9
Rhode Island	1	1		2
Connecticut	2		1	3
New York	7		10	17
New Jersey	3		2	5
Pennsylvania	7	4	10	21
East Central:				
Ohio	3		2	5
Kentucky	1			1
Michigan	1		2	3
Indiana	3	1		4
Wisconsin	1	2	4	7
Illinois	3		2	5
Minnesota	2		1	3
Missouri	1			1
Pacific:				
Oregon	3		1	4
California	4	2	1	7
Southern:				
Virginia		1	1	2
Georgia	1		1	2
Texas		1	1	2
Total[1]	48	12	44	104

[1] Schedules from 3 all-day schools, 1 part-time school, and 2 evening schools were received too late to be incorporated in this report.

Table 2 shows the number of schools of each type that had women enrolled in courses intended as preparation for occupations in specific industries. It also names the subjects taught and the number of schools teaching each subject.

This table indicates very clearly that while much of the instruction given women in this year was along trade lines traditionally woman's, excursions into newer fields were being made. For, although 66 of the schools taught women some branch of clothing manufacture, 11 taught textile operations, and 47 taught trade millinery, there were 24 giving women instruction in subjects relating to iron and steel manufacture, 4 giving instruction in industrial chemistry, 2 in industrial electricity, and 2 were teaching courses for woodworking factories.

TABLE 2.—*Number of schools in which women were enrolled in specified industrial training courses from September, 1919, to May, 1920.*

Industrial training courses in which women were enrolled.	Number of schools giving such courses.			
	All-day.	Part-time.	Evening.	Total. number.
Clothing trades:				
Dressmaking	30	5	24	59
Power machine sewing	10	2	3	15
Sewing and garment making	2	1	2	5
Ladies' tailoring	1	.....	.....	1
Costume design	8	.....	7	15
Sewing machine repair	1	.....	1	2
Total [1]	32	7	27	66
Textile trades:				
Cotton yarn manufacturing and warp drawing	.....	.....	3	3
Cotton classing	.....	.....	1	1
Silk winding, warping, and twisting	1	.....	.....	1
Weave formation and fabric analysis	.....	1	1	2
Textile dyeing	2	.....	1	3
Textile design	5	.....	3	8
Total [1]	6	1	4	11
Millinery trades:				
Millinery	17	4	26	47
Machine straw hat making	2	.....	2	4
Artificial flower and feather making	1	.....	2	3
Total [1]	17	4	26	47
Glove making	2	.....	1	3
Printing and publishing trades:				
Printing	7	3	2	12
Bookbinding	1	1	1	3
Total [1]	8	3	3	14
Metal trades:				
Shop work	1	.....	1	2
Blacksmithing	1	.....	.....	1
Automobile mechanics	.....	1	2	3
Automobile repairs	1	1	1	3
Mechanical drawing [2]	2	.....	6	8
Mechanical drafting [2]	2	2	4	8
Total [1]	7	3	14	24
Woodworking trades:				
Cabinetmaking	.....	.....	1	1
Wood pattern making	.....	.....	1	1
Total [1]	.....	.....	2	2
Electrical trades:				
Electrical measurements and machines	.....	.....	2	2
Watchmaking and jewelry trades:				
Watch making	1	.....	1	2
Jewelry making and designing	4	.....	2	6
Total [1]	5	.....	3	8
Chemical trades:				
Industrial chemistry	.....	.....	2	2
Laboratory work in metal chemistry, general chemistry or bacteriology	1	.....	1	2
Pharmacy	1	.....	1	2
Total [1]	1	.....	3	4
Technical optics	1	.....	1	2

[1] Total schools is not total of columns because many schools gave more than 1 course.
[2] Included under mechanical drawing are courses given for shop purposes only. All courses preparatory to draftsmanship are included under mechanical drafting.

TABLE 2.—*Number of schools n which women were enrolled in specified industrial training courses from September, 1919, to May, 1920*—Continued.

Industrial training courses in which women were enrolled.	Number of schools giving such courses.			
	All-day.	Part-time.	Evening.	Total number.
Miscellaneous trades:				
Ship design and calculation			1	1
Heating and ventilating			1	1
Preparatory course for foremen's institute			1	1
Interior decorating	2	1	1	4
Scenic designing			1	1
Wall paper designing	2			2
Architectural drafting	1		2	3
Architectural drawing			1	1
Commercial lettering and sign painting	3		3	6
Lamp shades and novelties	1		1	2
Pottery making and design	2		1	3
Total[1]	9	1	7	17
Total all industries[1]	48	12	44	104

[1] Total schools is not total of columns because many schools gave more than 1 course.

A tendency is shown, however, to give more instruction to women in these new lines of endeavor in subjects intended for persons who are already acquainted with shop work than to prepare beginners for shop work in manufacturing establishments. Of the 24 schools having women enrolled in subjects relating to the metal trades, according to Table 2, 2 schools gave machine-shop instruction, 1 school taught women blacksmithing, 3 schools taught automobile mechanics and 3 taught repair, 8 aimed to turn out draftswomen, and 8 gave courses to women in mechanical drawing. There is no doubt concerning the immediate practicality for factory work of the two first-named courses. The knowledge gained in the courses in automobile mechanics concerning the construction of the several parts and the entire automobile and the experience received in taking down and reassembling a car must needs be a source of advancement to the girl working in automobile manufacture. While the advanced courses in mechanical drawing are similar in content to drafting courses and aim to make draftsmen rather than shopworkers, the elementary subject matter of these courses is of material assistance to the shopworker. These beginning courses give her sufficient knowledge of drawing to enable her to read and interpret blue prints and to do layout work. Out of the 24 schools, therefore, giving women instruction along metal working, 3 gave courses having definite trade content, 11 taught the students subjects which ought to serve for their advancement in the shop, and 11 prepared women not for the manufacturing shop but for the drafting room or repair shop. It is interesting to note that while two evening schools instructed women in the fundamentals of industrial chemistry, one

day and one night school aimed to make her an assistant in metallurgical laboratories, in chemical producing laboratories, or in bacteriological laboratories.

Only two schools had women enrolled in woodworking. In both of these the instruction had specific manufacturing value, for in one she learned to make wood patterns for foundrymen and in the other did practical cabinetwork.

In schools of optometry, although women had received instruction in mechanical optics during the war, in 1919 and 1920 they were enrolled in technical optics courses only.

Among the subjects taught for miscellaneous pursuits are several of marked interest. Along the more customary lines are courses in glove making and fancy novelty work; in the newer lines women are found enrolled in evening courses in heating and ventilating systems and in preparatory courses for industrial foremen.

How closely the distribution of courses for the several industries approaches the distribution of the approximate twenty-four hundred thousand [4] women engaged in manufacturing and mechanical pursuits in 1920 is not possible to determine until the 1920 census of manufactures and the 1920 census of occupations make their appearance. For at this time the only data available which would make possible comparison of the proportion of women in each trade and industry date back to 1910 for trades and 1914 for manufactures. Material gathered from a considerable number of firms in 1919 [5] indicates that women have increased in the iron and steel industry approximately 40 per cent since 1916, whereas automobile manufacturers showed over a 300 per cent increase in numbers of women, instrument manufacture over 200 per cent, and woodworking establishments over 100 per cent.

With such strong evidence of changes in the distribution of woman labor since 1916, the 1910 and 1914 figures can have no value for purposes of comparison of the distribution of women in all trades and industries. However, changes taking place in the last 10 years in dressmaking, factory clothing manufacture, the textiles, millinery, and hat industries are not such as to invalidate comparison between the distribution of courses given for these trades and industries and the numbers of women employed therein. A total of 142 courses were given for employment in these industries in 1919 and 1920. Of these, 65 were dressmaking, tailoring, or garment-making courses for custom trade, 15 taught power sewing-machine work for the clothing factory, 11 gave instruction in textile work, 47 in millinery, and

[4] Figure estimated for 1920 by applying increase of 10 years from 1900 to 1910 figures.

[5] See Bulletin No. 12, Woman's Part in American Industry During the World War, Women's Bureau, U. S. Department of Labor, 1920, Table 26.

4 in power sewing-machine operating on straw hats. As against this, 447,760 women gained a livelihood by dressmaking and garment making for the custom trade, 299,995 worked in clothing factories, 447,726 were employed in textile mills, 12,709 made straw, wool, or fur felt hats in factories, and 122,447 were milliners or millinery dealers.[6] Or, while dressmaking constituted over 45 per cent of all courses taken for fabric and garment and hat manufacture, only 33.7 per cent of the women gainfully employed in fabric and garment and hat manufacture were dressmakers. Ten and a half per cent of these courses were taken by women expecting to enter clothing factories, whereas 22.5 per cent of the women in these trades were employed in clothing factories. The discrepancy becomes greater in textiles, where the courses given form but 7.7 per cent, while textile workers constituted 33.6 per cent of the whole number of workers in fabric and garment and hat manufacture. In millinery the situation is reversed with only 9.2 per cent of the women employed therein, and yet 33 per cent of the courses are given in this trade. Had figures on the distribution of the other eleven hundred thousand women working at mechanical trades and in factories been available, the tendency to develop dressmaking and millinery courses to the exclusion of equally important courses for women in other occupations would doubtless appear still greater.

In this connection it should also be recalled that instruction, not for the trade but for personal use, is given in these subjects in the majority of home economics courses in publicly or privately supported or endowed schools. While these courses do not in any sense take the place of the dressmaking and millinery courses given for the trades, they eliminate any necessity for giving trade courses in these subjects to women who want the instruction only in order to make their own clothes and hats.[7]

Undoubtedly the important position assumed by dressmaking and millinery in the trade schools has been due partly to the fact that the long years of experience gained by a few schools in this type of instruction have developed excellent methods of teaching these trades. Newer schools find it easier to copy these methods than to act as pioneers in formulating courses for other equally important trades.

[6] For figures on dressmakers and milliners, see U. S. Census of Population, Vol. IV, pp. 91–92; for other figures, see Abstract of the Census of Manufactures, 1914, pp. 530 to 543.

[7] In 1919 the Federal Board for Vocational Education gave funds to 130 schools teaching dressmaking and sewing and 69 teaching millinery as a part of home economics courses.

NEED FOR INDUSTRIAL TRAINING IN NEW CRAFTS.

If women are to become skilled workers in the new as in a few of the older crafts, proper training facilities must be provided. Girls and boys and few women or men make articulate demands for training. We do not wait for the boy or the man to express his desires for practical instruction before providing training facilities for him. We study the industrial and educational needs of the community; we secure the assistance of employers and employees' organizations and civic and educational associations. When the trades for which courses are to be given are determined and the equipment and teachers have been secured a campaign of publicity is organized to enlist the interest of every boy and man in the community. For not until the opportunities offered in the trade schools are well known do even boys and men enroll in them in any numbers. Not until the school becomes a recognized force in the community do boys and men seek instruction in them without effort on the part of the school authorities, the trade-unionists, and the employers to arouse in them a desire for further knowledge.

More carefully organized and more thorough campaigns must be conducted to arouse the community and the employer, as well as the girls and women to the needs of trade training for women. The gap in the ranks of unskilled workers left by departing aliens, the attitude of skilled male workers toward the entrance of women into their trades, the thoughlessness of the young girl worker who hopes that her stay in the shop will be short, the timidity of the older woman who is afraid to venture on a new job, and the approval of many employers of the patient plugging of women workers at the same task year in and year out, raise a strong barrier against the war-created current of enthusiasm over women's availability and tend toward the restriction of women to the less skilled, less remunerative jobs, jobs which give her no trade and leave her capabilities and her self-reliance undeveloped. The war emergencies forced manufacturers to spend time and money in training a body of women to meet pressing war needs. This training was given in the interest of the prosecution of the war, not in the interest of the woman worker. With the war incentive removed, expenditure by private concerns of moneys for the training of unskilled women became less urgent. The obligation on the part of our training institutions to preserve and increase the availability of woman labor as developed by war conditions is correspondingly increased.

The emphasis, however, of such training must obviously be in the interest of the worker and must be developed in such a manner as to make the woman worker available for the greater variety of indus-

tries developed in peace time. The need of women to earn their living and their right to earn it in occupations at which they are most proficient and at which they can earn the largest amount create an obligation to direct the new woman wage earner with the same close reference to her capabilities that is now given to the boy wage earner as he leaves school. The inescapable fact that women can render as good service in the machine shops as in clothing factories—and can do it with no more impairment to health—make it a public responsibility to offer girls training in these new occupations as well as in the old occupations. It constitutes a strong claim for the cordial admission of women already trained in this work to instructor-training classes for machine-shop teachers. Furthermore, the increase in the use of mechanical devices in the modern home renders a knowledge of mechanics as essential, if not more so, to the average woman who eventually leaves industry to take up household duties as is a knowledge of sewing, because the manufacture of clothing has ceased practically to be a profitable household industry.

While not overlooking the importance of continuing old and establishing new courses of study for woman in the occupations at which she has been employed for many years, manifestly the value of her war experiences can only be preserved by her immediate entrance into training courses directed along the lines of her successful achievement during the war period. To allow time and the adverse forces mentioned on page 22 to obliterate the war-time demonstrations of her mechanical ability would rob industry of valuable and necessary skill, and rob women of their right to every opportunity for service.

Until the use of labor-saving equipment becomes more common in factories women will continue to achieve the greatest success working on light parts where her natural deftness, accuracy, and speed will always stand her in good stead. Almost all metal-working shops machine a number of light parts. But women have secured, and will continue to secure, the best footing in shops having enough light work to make it possible to employ a considerable number of women. Other shops will employ women in times of labor shortage, but they will not make permanent provision for adequate accommodation for women workers until they expect to employ women continuously.

Metal-working industries in which women have done not only much of the machining, but the bench work, inspecting, and the assembling of many parts are the instrument, watch and clock, sewing machine, typewriter, adding and computing machine, cream separator, typesetting and shoe machinery, tool, and hardware industries. They have machined and assembled many small parts that

make up gas and gasoline engines, metal-working and textile machines, automobiles, motor cycles, and agricultural implements. Study of the characteristics of different metals, the principles of machine and tool design, simple shop mathematics, blue-print reading, training in the preparation and setting up of machine tools on plain and complicated work, and training in the grinding and care of tools are essential, however, if women are to be given the knowledge and manipulative skill that will open machinist, good specialist, foreman, or teaching positions to them in these industries.

The work on sheet metal which is open to women is not of a kind to demand extensive training, but short courses in mathematics and mechanical drawing and the use of tools and welding outfits would be great aids to women expecting to work in automobile, airplane, agricultural implement, and heating-apparatus factories.

When equipped with a knowledge of wood structure, how to make and read drawings, how to use hand tools and operate machines, and information concerning the uses and values of different finishing oils, varnishes, and fillers, women will be in a position not only to do good productive work in furniture, veneer, and other finished wood product factories, but after experience in these factories some will be in line for promotion to supervisory or teaching positions.

Courses in mechanical optics, teaching the kinds of raw materials and their manipulation for optical purposes, will fit other women to take their places as skilled craftsmen in lens manufacturing plants.

As the "controlling purpose" of vocational education is to "fit for useful employment," it is essential that training facilities be developed not only with regard to the capabilities of women but also with careful reference to the needs of the community. To direct the training of boys and girls in such manner as to insure each a craft for which local industries have need and for which he or she is best fitted will not increase the number of either girls or boys who will earn their bread; it will only effect a redistribution in the interest of the wage earners, of industry, and of the community. Undoubtedly response to calls for the training of girls in the new crafts will be forthcoming most readily in communities where competition from industries older in the employment of women is least, but the presence of competition does not in any way lessen the need of such training for girls.

LOCALITIES WHERE INDUSTRIAL TRAINING IN NEW CRAFTS IS ESSENTIAL.

Table 3 shows the States which rank foremost as employers in those industries in which women made conspicuous success during the war and in which training would be most beneficial to them.

The employment distribution shown in the table is based on 1914 figures. Some of the metal and optical industries listed have grown extensively since that year. Such growth may have changed the rank of several States when arranged according to the numbers of wage earners employed, but it is not probable that the 10 States ranking highest in the number of workers in metal industries, in furniture manufacture, or the three States ranking highest in optical goods manufacture in 1914, have been superseded by other States, and thus ceased to be among the 10 highest in 1920. It is comparatively safe to say, therefore, that States offering largest opportunity for employment in automobile, motor-cycle, engine, agricultural implements, steam fittings, oil and gas stove, cutlery and tool, hardware, small office and house machines and other machine-shop products, as well as instrument factories, are Ohio, Michigan, New York, Pennsylvania, Illinois, Connecticut, Massachusetts, New Jersey, Wisconsin, and Indiana. States giving employment to the largest number of wage earners in wood-furniture producing are New York, Michigan, Illinois, Indiana, Pennsylvania, Wisconsin, Massachusetts, Ohio, North Carolina, and Tennessee. Optical goods are manufactured most largely in New York, Massachusetts, and Pennsylvania.

TABLE 3.—*States leading in number*[1] *of wage earners in specified industries where women were either introduced into skilled and semiskilled occupations for the first time during the war, or where their numbers in such occupations were increased at rates ranging from 10 to over 200 per cent.*[2]

Industry.	Rank of States according to numbers of wage earners employed.							
	First.		Second		Third.		Fourth.	
	State.	Number of wage earners.	State.	Number of wage earners.	State.	Number of wage earners.	State.	Number of wage earners.
Machine shop products not elsewhere specified.	Pa....	43,437	Ohio..	36,732	N. Y..	33,082	Mass..	29,308
Automobiles, including bodies and parts.	Mich..	66,103	Ohio..	21,280	N. Y..	12,138	Ind...	7,630
Hardware and screws	Conn..	22,238	Ohio..	6,177	Pa....	5,185	Ill.....	4,372
Agricultural implements and dairymen's supplies.	Ill.....	19,998	N. Y..	7,337	Ohio..	5,621	Ind....	4,125
Small machines for office and home use	Ohio..	9,092	N. J...	8,429	N. Y..	6,727	Conn..	6,269
Cutlery and tools	Conn..	7,669	Mass..	6,403	N. Y..	4,928	Pa....	3,509
Engines, steam, gas and water	Wis...	6,134	Pa....	4,877	Mich..	4,660	Ohio..	2,597
Steam fittings, heating apparatus, gas and oil stoves.	Pa.....	6,004	Ohio..	5,607	N. Y..	5,460	Conn..	3,311
Motor cycles, bicycles, and parts	Mass..	2,517	Ohio..	759	Ill.....	634	N. Y..	590
Instruments	N. Y..	2,459	Ill.....	1,023	Pa....	800	Mass..	679
Total for 10 metal industries	Ohio..	91,271	Mich..	85,679	N. Y..	77,133	Pa....	69,599
Optical goods	N. Y..	3,117	Mass.	2,378	Pa....	872	Ohio..	184
Furniture, other than metal	N. Y..	17,345	Mich..	14,151	Ill.....	12,307	Ind....	10,506

[1] Figures taken from U. S. Census of Manufactures, 1914, Vol. 1, except those given for "Small machines for office and home use." As the census did not give figures for this industry by States, the figures were compiled from State reports.

[2] Tables showing changes and trend of labor during the war, included in Bulletin No. 12, Woman's Part in American Industries During the World War, Women's Bureau, U. S. Department of Labor, 1920.

TABLE 3.—*States leading in number of wage earners in specified industries where women were either introduced into skilled and semiskilled occupations for the first time during the war, etc.*—Continued.

Industry.	Rank of States according to numbers of wage earners employed.							
	Fifth.		Sixth.		Seventh.		Eighth.	
	State.	Number of wage earners.	State.	Number of wage earners.	State.	Number of wage earners.	State.	Number of wage earners.
Machine shop products not elsewhere specified	Ill.	23,235	N. J.	14,032	Wis.	12,661	Conn.	10,727
Automobiles, including bodies and parts	Wis.	4,873	Mass.	3,986	Pa.	3,183	Ill.	2,577
Hardware and screws	N. Y.	2,662	N. J.	2,145	Mass.	1,645	Mich.	735
Agricultural implements and dairymen's supplies	Wis.	3,444	Mich.	1,881	Pa.	1,812	.....	.....
Small machines for office and home use	Ill.	2,201	Mass.	952	.....	.....	.....	.....
Cutlery and tools	Ohio	2,923	N. J.	2,722	Ill.	1,628	Mich.	469
Engines, steam, gas, and water	Ill.	1,997	N. Y.	1,750	Ind.	1,414	Conn.	1,279
Steam fittings, heating apparatus, gas and oil stoves	Mass.	3,176	Ill.	3,057	Mich.	1,245	N. J.	650
Motor cycles, bicycles, and parts	Ind.	194	Pa.	126	.....	.....	.....	.....
Instruments	Ohio	483	.....	.....	.....	.....	.....	.....
Total for 10 metal industries	Ill.	60,722	Conn.	53,688	Mass.	49,024	N. J.	31,013
Optical goods	Mich.	129	.....	.....	.....	.....	.....	.....
Furniture, other than metal	Pa.	9,741	Wis.	7,484	Mass.	6,886	Ohio	6,579

Industry.	Rank of States according to numbers of wage earners employed.				Number employed[1] in all other States.
	Ninth.		Tenth.		
	State.	Number of wage earners.	State.	Number of wage earners.	
Machine shop products not elsewhere specified	Mich.	10,586	R. I.	9,464	51,299
Automobiles, including bodies and parts	Conn.	2,195	N. J.	2,133	2,940
Hardware and screws	(2)	.....	Wis.	424	4,916
Agricultural implements and dairymen's supplies	.....	.....	.....	.....	8,880
Small machines for office and home use	.....	.....	.....	.....	(3)
Cutlery and tools	Ind.	449	.....	.....	2,518
Engines, steam, gas, and water	.....	.....	.....	.....	4,663
Steam fittings, heating apparatus, gas and oil stoves	Ind.	477	.....	.....	4,137
Motor cycles, bicycles, and parts	.....	.....	.....	.....	1,886
Instruments	.....	.....	.....	.....	1,853
Total for 10 metal industries	Wis.	28,055	Ind.	22,669	79,137
Optical goods	.....	.....	.....	.....	1,422
Furniture, other than metal	N. C.	5,430	Tenn.	2,207	21,590

[1] Includes employees in boiler shops and foundries in 11 States for which separate figures for machine shops were not given.

[2] Iowa, which ranks ninth in this industry, has been included with "all other States" because it is included in this group for the other industries.

[3] Total for industry given in 1914 census is less than total for 6 leading States for which figures were compiled from State reports.

Were these States also foremost in increasing the numbers of women employed in these industries during the war?

Data on the numbers of men, women, and children at work in these 12 industries in October, 1918, were secured from manufacturers' schedules on file in several war-time agencies. Only firms employing 25 or more persons were included in the schedules tabu-

lated. The resulting figures represent for each industry in each of the largest metal and furniture and optical manufacturing States, with the exception of New Jersey and North Carolina, 20 per cent or more of the total numbers of persons employed in the entire industry in 1914 according to the 1914 census. The numbers of wage earners employed in the New Jersey and North Carolina firms reporting in 1918 were too small a proportion to be representative of conditions in industries in those States, and have therefore not been included in the tables.

TABLE 4.—*The proportion which women constituted of total number of wage earners in 1914* [1] *in specified industries in 10 States leading in the number of wage earners in such industries; and the proportion which women constituted in October, 1918, in plants employing 20 per cent or more of the total number of wage earners reported in such industries in 1914.*

Industry.	Proportion which women were of total wage earners in—									
	Ohio.		Michigan.		New York.		Pennsylvania.		Illinois.	
	1914	1918	1914	1918	1914	1918	1914	1918	1914	1918
Machine-shop products not elsewhere specified	P. ct. 1.0	P. ct. 6.7	P. ct. 2.2	P. ct. 6.1	P. ct. 1.9	P. ct. 9.3	P. ct. 0.7	P. ct. 10.8	P. ct. 2.3	P. ct. 7.6
Automobiles, including bodies and parts	2.1	11.3	2.1	8.6	0.9	6.6	0.5	6.7	1.3	8.5
Hardware and screws	8.4	20.0	9.8	17.9	4.9	13.1	9.9	21.5	8.7	10.0
Agricultural implements and dairymen's supplies	0.4	4.0	.....	10.3	1.6	3.3	.....	.....	1.0	3.7
Small machines for office and home use	6.7	21.9	.....	23.8	12.2	24.7	9.9	(2)	3.1	43.6
Cutlery and tools	8.1	15.2	2.3	20.1	11.9	18.4	3.0	8.9	5.2	7.5
Engines: Steam, gas, and water	0.3	3.6	0.2	6.1	0.2	2.5	(3)	4.1	(2)	14.9
Steam fittings, heating apparatus, gas and oil stoves	0.2	6.0	.....	5.3	0.6	7.2	1.9	2.7	3.3	6.2
Motor cycles, bicycles, and parts	3.9	36.1	.....	.....	.....	.....	.....	.....	1.4	7.9
Instruments	.....	.....	.....	.....	18.3	24.5	3.4	17.7	23.8	21.0
Total for 10 metal industries	2.6	12.7	0.9	9.0	3.7	10.4	1.7	10.4	2.8	8.8
Optical goods	15.8	36.7	48.9	(2)	23.1	23.1	43.6	(2)	.....	.....
Furniture, other than metal	4.9	13.6	3.6	13.3	3.3	9.6	3.4	13.2	2.2	10.4

Industry.	Proportion which women were of total wage earners in—									
	Connecticut.		Massachusetts.		New Jersey.		Wisconsin.		Indiana.	
	1914	1918	1914	1918	1914	1918	1914	1918	1914	1918
Machine-shop products not elsewhere specified	P. ct. 2.3	P. ct. 15.5	P. ct. 1.9	P. ct. 8.9	P. ct. 3.3	P. ct. (2)	P. ct. 0.8	P. ct. 5.6	P. ct. 3.3	P. ct. 12.0
Automobiles, including bodies and parts	0.5	5.1	0.7	9.3	2.3	.....	1.2	7.6	1.3	5.6
Hardware and screws	17.4	18.9	5.6	19.4	22.2	.....	6.4	(2)	11.0	(2)
Agricultural implements and dairymen's supplies	.....	.....	.....	.....	.....	.....	2.9	4.0	2.1	7.3
Small machines for office and home use	10.9	31.6	4.5	(2)	8.5	.....	.....	42.4	.....	.....
Cutlery and tools	9.1	13.1	10.3	18.4	10.6	.....	9.7	5.7	1.3	14.4
Engines: Steam, gas, and water	.....	6.6	.....	1.5	.....	.....	0.4	6.0	0.3	(2)
Steam fittings, heating apparatus, gas and oil stoves	4.0	7.9	2.7	6.9	1.9	.....	0.3	22.0	.....	.....
Motor cycles, bicycles, and parts	.....	.....	1.0	.....	.....	.....	.....	11.8	.....	.....
Instruments	.....	47.9	8.5	20.7	.....	.....	.....	24.8	.....	.....
Total for 10 metal industries	10.5	18.3	3.1	12.4	6.4	(2)	1.2	6.8	2.1	7.8
Optical goods	.....	.....	27.2	21.6	53.9	(2)	.....	.....	19.0	(2)
Furniture, other than metal	(4)	(4)	9.1	15.8	(4)	(4)	3.9	13.6	1.8	(2)

[1] Figures compiled from Census of Manufactures of 1914, vol. 1.
[2] Not reported.
[3] Less than one-tenth of 1 per cent.
[4] Connecticut and New Jersey do not rank among the 10 highest in the numbers employed in furniture factories.

Table 4 places side by side the per cent which women formed of all wage earners in the 12 industries in 1914 and 1918. In no State except Connecticut and New Jersey, where the hardware, typewriter, and sewing-machine industries employed many women, did the 10 metal industries employ as much as 4 per cent of woman labor in their working forces in 1914. In 1918 Connecticut still had a larger proportion of women in these 10 metal industries than did the other States, 18 out of every 100 employed being women, as compared with an approximate 10 per cent in 1914. In 1918 in Ohio and Massachusetts 12 out of every 100 employees in these metal industries were women; in New York and Pennsylvania they formed a little more than one-tenth the force; Michigan and Illinois employed 9 women in every 100, while in Indiana and Wisconsin women were 7.8 and 6.8 per cent, respectively, of the metal-working forces. Although Rhode Island does not appear among the 10 highest States in the total numbers employed in these metal industries in 1914 (see Table 3), in 1918 firms employing approximately 14,000 persons had 2,000, or over 14 per cent, women workers. A larger number of women, therefore, were actually employed in these 10 metal industries in Rhode Island than in either Wisconsin or Indiana.

TABLE 5.—*The proportion which women constituted of the total number of wage earners in August, 1919, in 261 plants representing 10 specified branches of the metal industry,*[1] *and the furniture and optical goods industries.*

State.	Ten branches of the metal industry.[1]				Furniture other than metal furniture.	
	Total wage earners—		Per cent 1919 employees are of total wage earners in 1914.	Per cent which women were of total wage earners in 1919.	Total wage earners—	
	In all plants in 1914.	In 215 plants in 1919.			In all plants in 1914.	In 41 plants in 1919.
Ohio	91,271	14,801	16.1	11.0	.....	(2)
Michigan	85,679	123,852	144.6	5.2	14,151	2,350
New York	77,133	23,689	30.7	8.4	17,345	1,453
Pennsylvania	69,599	10,513	15.1	7.8	9,741	1,146
Illinois	60,722	27,513	45.3	5.9	12,307	1,604
Connecticut	53,688	18,615	34.6	20.1	.....	.....
Massachusetts	.....	(2)	.....	.....	.....	(2)
Wisconsin	28,055	16,001	57.0	3.3	7,484	3,013
Indiana	22,669	8,133	35.8	4.0	.....	(2)
Rhode Island	9,646	8,430	87.4	8.3	.....	.....
Tennessee	.....	.....	.....	.....	2,207	760

[1] Includes machine-shop products not elsewhere specified, automobiles and bodies and parts, hardware and screws, agricultural implements, small machines for office and home use, tools and cutlery, engines, steam fittings and oil and gas stoves, motor cycles, and instruments.

[2] Figures collected represented less than 8 per cent of total employees listed in 1914 census, and have therefore not been included in table.

TABLE 5.—*The proportion which women constituted of the total number of wage earners in August, 1919, etc.*—Continued.

State.	Furniture other than metal furniture—Continued.		Optical goods.			
	Per cent 1919 employees are of total wage earners in 1914.	Per cent which women were of total wage earners in 1919.	Total wage earners—		Per cent 1919 employees are of total wage earners in 1914.	Per cent which women were of total wage earners in 1919.
			In all plants in 1914.	In 5 plants in 1919.		
Ohio						
Michigan	16.6	7.9				
New York	8.3	14.8	3,117	4,122	132.2	22.2
Pennsylvania	11.8	12.7		(1)		
Illinois	13.0	9.3				
Connecticut						
Massachusetts			2,378	2,707	113.8	27.4
Wisconsin	40.3	11.1				
Indiana						
Rhode Island						
Tennessee	34.4	2.6				

[1] Figures collected represented less than 8 per cent of total employees listed in 1914 census, and have therefore not been included in table.

Figures on the numbers of women and men employed in August, 1919, were obtained for certain of these metal industries by personal visits to 215 metal manufacturers in nine States. Table 5 shows that the total number of wage earners in the metal factories visited were from 15 to over 100 per cent of the total wage earners employed in the several States in 1914, so that the figures secured are representative of conditions in these industries in each State. From the same table it will be seen that Connecticut and Ohio still lead in proportion of women employed. In Connecticut 20 women were employed in every 100 employees, and in Ohio 11 women in every 100. While the relative importance of women in these metal industries in New York and Pennsylvania is slightly less than in 1918, these States still average, as does Rhode Island, 8 women in every 100 employees. Although the proportion of women has fallen in Michigan in these industries since 1918 from 9 to 5.2 per cent, the change in actual numbers of women has not been as great, because the automobile industry in Michigan has increased its total number of employees since 1918. Michigan would, therefore, still rank among the largest employers of women in these metal trades. Women lost a little in Illinois but still constituted a proportion of 6 in every 100 in 1919, the actual numbers of women in only 47 Illinois plants being over 1,600. Wisconsin and Indiana, while not having returned to their prewar status in the employment of women, do not approach the other States in importance in the employment of women in these metal industries. The Massachusetts reports have not been included in Table 5, as less than 10

per cent of the wage earners in these industries were covered by the schedules. The firms giving data on the numbers of wage earners, however, employed as large and larger numbers of women in 1919 than they had done in 1918, so that it seems probable that these Massachusetts industries as a whole are still retaining women in considerable numbers.

It should not be overlooked, because of the large numbers of men employed by these industries, that the proportions of women, even when they are but 6 or 8 to every 100 employees, represent actual numbers of women workers running into thousands in each branch of industry.

There can be no doubt, therefore, that the greatest need for training women in machine-shop or sheet-metal work lies in Ohio, Michigan, New York, Pennsylvania, Illinois, Connecticut, Massachusetts, and Rhode Island.

What is the situation in the furniture and veneer industries? According to the census figures of 1914, New York, Michigan, Illinois, and Indiana each had over 10,000 people, men and women, employed in these industries; Pennsylvania, Wisconsin, Massachusetts, Ohio, and North Carolina, each over 5,000, while Tennessee ranked tenth with a little over 2,000 employees.

With the exception of Massachusetts where women were 9 per cent of the furniture-factory workers in 1914, women were less than 5 per cent of the total number of employees in such factories in other States. In 1918, Table 4 shows that this proportion ranged in the plants reported in the 10 States employing the largest numbers of wage earners, from 9.6 per cent in New York to 26.3 per cent in Tennessee. The prevailing proportion of women in the furniture factories in 1918 in other States was 13 women to 100 employees. Personal visits to 41 firms in 6 States in 1919 (see Table 5) revealed the fact that women were employed as furniture builders in relatively greater numbers in 1919 than in 1918 in New York State. In Tennessee the furniture factories had reduced their woman labor force almost to its prewar status, or to 2.6 per cent. In Pennsylvania, Michigan, Wisconsin, and Illinois women were employed to a lesser extent in 1919 than in 1918, but far in excess of the relative numbers employed in 1914. Figures were not available for Indiana in 1918 or 1919.

Considering both the actual numbers employed and the proportionate number of women in furniture and veneer manufacture, the largest opportunity in this industry for women lies in New York, Michigan, and Illinois. In Pennsylvania and Massachusetts women would also find valuable use for such training, although a much smaller group are employed in woodworking here than in the machine-shop industries. In Wisconsin the proportion of women

in furniture manufacturing in 1919 was so much larger than was the proportion in the metal industries that instruction in furniture and veneering would serve a larger number of girls than would machine-shop instruction.

Optical-goods manufacture on a large scale is practically confined to Massachusetts, New York, and Pennsylvania. While the relative position of women in the total numbers employed has not changed materially from 1914 to 1918 and 1919, the growth of the industry during the war increased greatly the numbers of women actually employed as well as the total numbers. While 1919 conditions have lessened the demands on the industry, it is still employing more people than it did in 1914 and will undoubtedly continue to be a profitable field of employment for a moderate number of women in a highly important industry.

It is not difficult to point out the cities in the nine States mentioned in the foregoing paragraphs where training in machine-shop, sheet-metal, furniture-working, or optical work should be centered, for in each State a few cities stand out as conspicuous in these lines of manufacture and in numbers of women breadwinners. Not that industrial training is not necessary in the smaller cities, but it is more essential, on the theory of the "greatest good to the greatest number," that training facilities be provided first in cities having the largest numbers of working women as well as in those offering most opportunity for employment in these industries.

According to the figures given in the Directory of Ohio Manufacturers for 1918,[8] Cleveland far outranks other cities in the number of wage earners employed in the machine-shop industries listed in Table 3. Toledo, because of the large numbers employed in automobile factories, ranked second. Dayton's large numbers of workers in cash-register, calculating-machine, and sewing-machine factories gave it third place, while Cincinnati ranked fourth, although it was far more important as a machine and tool manufacturing center than Dayton or Toledo. The proportion which women formed of the total numbers employed in these industries was largest in Dayton, although the largest actual numbers were employed in metal machining in Cleveland.

In order to estimate the numbers of gainfully employed women who might benefit by industrial training in these cities in 1920, and among whom the metal industries might find the service they needed, the percentage of increase in the total population between 1910 and 1920 was applied in each city[9] to the numbers of breadwinning

[8] The Industrial Commission of Ohio, "Directory of Ohio Manufacturers, 1918." These figures were not used elsewhere in the report, as the numbers include office as well as factory workers.

[9] Preliminary Announcements of Population for 1920 by U. S. Bureau of the Census.

women and girls in each city[10] in 1910.[11] Cleveland continued to hold first place in total numbers of women estimated to be gainfully employed in 1920; Cincinnati was second, with approximately 53,000 women breadwinners; Toledo had approximately 24,000; and Dayton about 15,000 wage-earning women. There can be no hesitancy, therefore, in naming Cleveland as the Ohio city in which machine-shop and sheet-metal training for women would be beneficial to the largest number of women and the largest number of establishments. In Cincinnati, the boot and shoe and clothing industries would take precedence over the machine-shop industry in securing a foothold in industrial training of women, as both lead the machine shops in numbers of women employed. However, in Toledo and Dayton, in spite of the smaller numbers of women gainfully employed, the demand for workers in the machining industries is such as to make such training for women essential also in these cities.

For comparative purposes, the factory inspectors' reports[12] on numbers employed in 1918 in each Michigan city in the eight branches of the metal industry in which Michigan figures in Table 3 may be used. Detroit far outranks other cities in the numbers employed. Flint follows with approximately 19,000 wage earners in these eight metal industries. Lansing ranks third with firms employing over 10,000. In furniture manufacturing Grand Rapids still retains its supremacy. When the estimated numbers of women wage earners in each city are considered, Flint is of small importance compared with Detroit or with Grand Rapids. But the concentration of wage-earning women employed on manufacturing processes almost exclusively in automobile body and part making in Flint makes it profitable both for the woman worker and the industry to introduce machine-shop and sheet-metal work. Although the metal-working industries predominate in Lansing as a field for women workers, other industries, such as food and printing and bookbinding, also make demands on the supply of woman labor.

According to the 1914 census, New York City manufactured almost half of the products listed under factory and machine-shop products in the State. But according to the report of the committee authorized by the New York City Board of Estimates and Apportionment to make an industrial survey of the city of New York—

> In spite of the very large numbers of machinists in New York, the city is not a machine-manufacturing center but is, on the other hand, a great repair district, in which a vast amount of work is constantly being done in the repair of marine engines, street car, subway, and elevated equipment, elevators, motor vehicles, and central power plants, and also upon the up-

[10] Thirteenth Census of U. S., Vol. IV, pp. 208 to 275, 535 to 607.

[11] Girls 10 years of age and over had to be included in order to compare numbers involved in smaller cities with those in larger cities.

[12] Michigan Department of Labor, Thirty-sixth Annual Report.

keep of the great numbers of machines used in the industries of the city, as the printing and clothing trades.[13]

It was not in this repair work that women achieved a noticeable position during the war, but in the manufacture of printing and cigar machinery, and in the manufacture of tools and cutlery and instruments. Such factories were located in Brooklyn to a much larger extent than in Manhattan. As women formed a little over 12 per cent of the wage earners in these industries in Brooklyn in 1918, and but slightly less in 1919, it would appear that Brooklyn schools should include women in their machine-shop and instrument-making courses.

Next in rank in the machine and sheet-metal industry in New York State are Buffalo, Rochester, and Syracuse. Rochester leads in the manufacture of optical goods, while New York City (Manhattan leading) manufactures the largest amount of furniture. Advance figures on population for 1920 were not available for any of these cities except Syracuse. In Syracuse an increase of 25 per cent had occurred between 1910 and 1920. This increase is estimated to have brought the numbers of women gainfully employed in this city to approximately 20,000 women. As this was by far the smallest of the four cities which were machine-shop or furniture or optical working centers, the other cities will surpass Syracuse in numbers of working women in 1920.

Training of women is of particular importance in New York State, as this State is losing most heavily through emigration. In the fiscal year ended June 30, 1919, its emigration exceeded its immigration by 12,220 persons.[14]

In Pennsylvania, Philadelphia and Pittsburgh lead the many smaller cities whose industries machine iron and steel into finished products. The first-mentioned city showed a larger number of women employed in such industries in 1918 and 1919 than did Pittsburgh. Of the furniture manufactured in the State, Philadelphia made over 44 per cent, according to the 1914 census. This city also manufactured the greater part of the optical goods made in the State. The importance of Philadelphia as a center for training women for work can not be overlooked, when as far back as 1910 the city had over 200,000 women gainfully employed. In 1920 Pittsburgh is estimated to have had approximately 57,000. The 1920 figures are not yet available for Philadelphia.

In Illinois, Chicago dominates all other cities in the numbers employed in machine shops, sheet-metal factories, and in furniture fac-

[13] Report of committee authorized by the Board of Estimates and Apportionment, The Industrial Education Survey of the City of New York, Vol. IV, p. 20.

[14] Report of Commission of Immigration for 1919, pp. 138–149.

tories. Rockford and Moline rank next in order of wage earners in the branches of the metal industry mentioned in Table 3. While the proportion of women employed in the 10 metal industries considered was smaller in Chicago than in Rockford and Moline, the actual number so employed were far greater. As in other States, although it is important from the viewpoint of the women of Rockford and Moline to provide them with an industrial education which is designed to fit them for the big industries of these cities, it is not so important, in point of numbers affected, as it is to fit Chicago women for a place in the city's machine and sheet-metal shops and furniture plants.

According to 1914 figures Bridgeport, New Haven, and Hartford were the most important metal-working cities in Connecticut. The advance figures for the census of 1920 show that Bridgeport and Hartford increased in numbers of people in almost a like proportion since 1910, or about 40 per cent. As these cities had almost an equal number of women gainfully employed in 1910, it is probable that there is no great difference in numbers of women thus employed in 1920. New Haven's population for 1920 has not been announced. As the breadwinning women in this city in 1910 were several thousand more in numbers than in the other two cities, it is probable that New Haven woman wage earners equaled those of Bridgeport and Hartford in 1920, if they did not exceed them in numbers. In the seven metal industries in which Connecticut appears in Table 3, women formed a larger per cent of the employees in 1918 in Hartford and New Haven than in Bridgeport. This is due to the exclusion of the munitions industry from the metal industries listed.[15] Two Bridgeport munition factories alone gave employment to over 8,000 women in 1918, whereas Hartford's factories employed 1,500 and New Haven's plants 5,000. In 1919, one of Bridgeport's munitions factories continued making munitions, and employed 1,500 women. Another plant has been taken over by an electrical manufacturing company which has employed women in the machining of parts for electrical apparatus in its plants in other States. It is, therefore, probable that Bridgeport firms will be as large employers of woman labor in machine-shop trades in the next year as Hartford and New Haven.

According to the 1914 census, although Worcester ranked higher than Boston in machine shops, when automobile, hardware, tool, and steam-fitting manufactures are included, Boston occupies first position in Massachusetts. Lowell ranked third in the iron and steel product industries in 1914. The figures published by the Massa-

[15] This industry has been omitted from all tables in this report, even though much of its work was like that done in other machine shops, because its importance as an employer of labor in peace times is so intimately connected with national policies not yet definitely determined upon as to be uncertain at the present time.

chusetts Bureau of Statistics for 1918[16] indicate that Boston and Worcester continue to lead in these manufactures. Cambridge, however, had secured third place in the list in 1918. It did not, however, have one-fourth the numbers of wage earners that the other two cities had. Women formed a much larger proportion of the total employees in the metal industries in Boston in 1918 than in Worcester. However, greater competition for woman's services in manufacturing industries exists in Boston than in Worcester. Gardner and Wakefield are the furniture centers of Massachusetts. Southbridge leads in optical goods manufacture.

There were no complete figures available for the furniture industry in Wisconsin cities either for 1914 or 1918. However, the figures obtained from a partial list of Wisconsin firms in 1918 and 1919 indicate that Sheboygan employed the largest number of wage earners in this line of woodworking and that Oshkosh took second place. Women formed a larger proportion of workers in this branch in the former city than in the latter. Estimates based on the increase in population in 1910 indicate that Sheboygan has a total group of gainfully employed women numbering 2,700. Oshkosh had 3,310 in 1910; figures for 1920 are not yet announced.

Providence employed the largest numbers of men and women in machine-shop work in 1914 and in 1918 in the State of Rhode Island. The women employed in this branch in 1918 represented over 20 per cent of all employees.

EXISTING TRAINING FACILITIES FOR NEW CRAFTS IN PUBLIC SCHOOLS.

The nine States in which it is most important that women should receive school training for machine-shop, sheet-metal, furniture, or optical work are not without industrial-training facilities for these occupations in their public schools, as will be seen from Table 6. From State boards of vocational education in seven States were secured lists of trade schools and courses given by these schools. Each State supervisor of vocational education also named the number of schools receiving aid from the Federal Board for Vocational Education. As the Michigan and Illinois boards for vocational education did not reply to inquiries concerning these matters, material on trade schools in these States had to be compiled from unpublished data secured by the United States Bureau of Education in 1918 and from the 1919 report of the Federal Board for Vocational Education. All information was supplemented by data contained in questionnaires secured by the War Department from educational institutions desiring to purchase machine tools from the Government[17] at 15 per cent of their cost. As time would not permit a

[16] Massachusetts Bureau of Statistics: Thiryt-third Annual Report.
[17] Act of Congress approved Nov. 19, 1919.

complete survey of all the training facilities for these indust in the nine States discussed in the foregoing paragraphs, the info mation secured was confined to public institutions which, with a few exceptions, were administered by State boards of vocational education.[18]

TABLE 6.—*Industrial training, given by public schools to men, which is also essential to women, in States conspicuous for the employment of both man and woman labor in crafts specified.*

State.	Type of school.	Public schools giving industrial training courses.			Number schools receiving Federal funds.	Number schools receiving machine tools from Federal Government at 15 per cent of cost.[a]	Courses which women need but in which men only were enrolled in preparation for—	
		Total number.	Number in which men were enrolled.	Number in which women were enrolled.			Metal trades.	Woodworking trades.
Ohio	All-day[b]	9	9	3	2	28	Machine-shop practice	Cabinetmaking.
	Evening	44	44	2	35		Tool making.	Woodworking.
							Shop mathematics.	Pattern making.
							Mechanical drafting.	
							Blue-print reading.	
							Metallurgy.	
							Pattern making.	
							Sheet-metal work.	
							Welding.	
							Auto mechanics and repair.	
							Motor-cycle mechanics.	
							Gas engineering.	
Michigan	All-day	9	9	1	6	14	Macine-shop practice	Cabinetmaking.
	Part-time	4	4	.....	2		Tool making.	Woodworking.
	Evening	6	6	2	5		Tool designing.	Pattern making.
							Shop mathematics.	
							Mechanical drawing.	
							Blue-print reading.	
							Strength of materials and heat treatment.	
							Pattern making.	
							Sheet-metal work.	
							Sheet-metal drafting.	
							Acetylene welding.	
							Auto mechanics and repair.	
							Gas-engine testing.	
New York	All-day	34	33	3	17	15	Machine-shop practice	Cabinetmaking.
	Evening	34	32	8	.....		Tool and die making.	Furniture making.
							Shop mathematics.	Wood milling.
							Mechanical drawing.	Machine work.
							Mechanical drafting.	Wood turning.
							Blue-print reading.	Wood fininshing.
							Pattern making.	Pattern making.
							Sheet-metal work.	Joinery.
							Sheet-metal drafting.	
							Auto mechanics and repair.	
							Electrical instrument making.	
							Gas-engine construction.	
							Steam engineering.	

[a] Based on approval of Government of the applications of these schools for machine tools.
[b] Twenty-three part-time schools have not been included, as the number of these which were general continuation schools was not known.

[18] In the earlier section of this report dealing with industrial training facilities for women throughout the United States, both public and private schools giving such training were included. In this section dealing with the training facilities for both men and women in nine States, time did not permit of the inclusion of private vocational schools and small municipally operated vocational schools.

TABLE 6.—*Industrial training, given by public schools to men, which is also essential to women, etc.*—Continued.

State.	Type of school.	Public schools giving industrial training courses.			Number schools receiving Federal funds.	Number schools receiving machine tools from Federal Government at 15 per cent of cost.	Courses which women need but in which men only were enrolled in preparation for—	
		Total number.	Number in which men were enrolled.	Number in which women were enrolled.			Metal trades.	Woodworking trades.
Pennsylvania	All-day	22	21	1	[1] 12	17	Machine-shop practice	Cabinetmaking.
	Part-time	8	8	1	5		Shop mathematics.	Pattern making.
	Evening	19	18	3	19		Mechanical drawing.	
							Mechanical drafting.	
							Pattern making.	
							Sheet-metal work.	
							Sheet-metal drafting.	
							Auto body building.	
							Marine engineering.	
Illinois	All-day	6	4	2	[2] 4	5	Machine-shop practice	Cabinetmaking.
	Part-time	7	7	.....	7		Tool making.	Pattern making.
	Evening	10	10	1	10		Shop mathematics.	
							Mechanical drawing.	
							Mechanical drafting.	
							Blue-print reading.	
							Pattern making.	
							Sheet-metal work.	
							Auto mechanics.	
Connecticut	All-day	9	9	2	8	1	Machine-shop practice	Woodworking.
	Part-time	11	11	.....	8		Tool making.	Pattern making.
	Evening	9	9	1	8		Mechanical drawing.	
							Mechanical drafting.	
							Blue-print reading.	
							Pattern making	
							Auto mechanics.	
Massachusetts	All-day	19	17	4	16	17	Machine-shop practice	Cabinet making.
	Evening	24	23	4	21		Tool making.	Woodworking.
							Tool designing.	Wood finishing.
							Shop mathematics.	Pattern making.
							Mechanical drawing.	
							Drafting, machine and mechanical.	
							Blue-print reading.	
							Shop science.	
							Pattern making.	
							Sheet-metal work.	
							Sheet-metal drafting.	
							Welding.	
							Auto mechanics and repair.	
							Gas-engine practice.	
							Steam practice.	
							Heating and ventilating.	
							Molding and coremaking.	
Rhode Island	All-day	1	1	.....	1	4	Machine-shop practice	Woodworking.
	Part-time	2	2	1	2		Shop mathematics.	
	Evening	4	4	.....	4		Machine drafting.	
							Blue-print reading.	
							Ship drafting.	
							Auto repair.	
Wisconsin	All-day	5	4	1	2	36	Machine-shop practice	Cabinetmaking.
	Part-time	36	36	2	4		Tool making.	Furniture making.
	Evening	43	43	4	4		Mechanical drawing.	Machine working.
							Drafting.	Wood finishing.
							Blue-print reading.	Wood turning.
							Sheet-metal work.	Pattern making.
							Oxy-acetylene welding.	Joinery.
							Auto assembly and repair.	
							Gas-engine mechanics.	

[1] Requests for Federal aid made by several schools had not been acted upon at the time of writing.
[2] Figures for year ended June, 1919, as later figures were not available.

But the public agencies included in Table 6, even though they represented only a part of the schools giving trade training, had men enrolled in many courses valuable both for the prospective worker in machine shops and for the person already employed in a machine shop. Machine-shop practice was given in every State. Tool-making courses had men enrolled in them in seven States. Blue-print reading, shop mathematics, and mechanical-drawing courses were usual. Only Connecticut and Rhode Island schools did not give courses in sheet-metal work. Not as much instruction was given in woodworking manufacture as in metal work. However, according to Table 6, cabinet making for the trade was reported as being taught in all big furniture manufacturing States except Illinois. But it is possible that such courses are being given in Illinois in 1920, for, as hitherto stated, it is not known how complete the reports secured for 1918 and 1919 were.

As far as could be ascertained, there were at least 53 public vocational institutions in Ohio giving trade and industrial courses. In addition to these, 23 schools gave part-time courses, but the larger number of these courses were designed to "increase the vocational or civic intelligence of workers over 14 and under 18 years of age" rather than to provide industrial-training instruction, and therefore they have not been included. Thirty-seven of the 53 public all-day and evening schools received some funds for teaching from the Federal Board for Vocational Education. Twenty-eight of these schools purchased machine tools from the United States War Department at 15 per cent of the cost of such tools to the Government.

Women were enrolled in courses in only 5 of the 53 public vocational institutions reporting. In these 5 schools women were taught dressmaking, costume design, dress-pattern making, embroidery, power-machine sewing, and pottery making, as will be seen in Table 7. This does not mean that the 1,028 girls enrolled in these 5 schools for the semester ending June, 1920, were either by rule or law prevented from attending any of the other schools or taking any of the other courses. The situation in Ohio, however, is clearly reflected in a statement written by one vocational-school superintendent on the questionnaire filled out for this survey. "Unfortunately," he wrote, "we have had no courses open that were available to women. However, they have not been denied. They have not availed themselves of the privilege, since our work is all designed for men."

In spite of the fact that Cleveland employs so many women in machine-shop work, in spite of the fact that her public vocational schools give both day and evening courses in machine-shop practice, tool making, mechanical drawing, sheet-metal work, and gas-engine mechanics, and make no restrictions as to the sex of the students, women will continue to enroll in the dressmaking and millinery

courses—even though these trades may be overstocked with workers—until such time as the school authorities recognize the need of "designing" their metal courses for women as well as for men.

In Detroit a few courses in one of the large technical schools were opened to women only in the early part of 1920. This school gives all-day, part-time, and evening instruction, planned especially to meet the needs of Detroit's mechanics. It has a building especially equipped for automobile work including "garage, starting, lighting, ignition, transmission, vulcanizing, battery courses, and auto-body drafting." It has four machine shops, four pattern shops, provision for metal plating, acetylene welding, forge and foundry work, and has chemical and physical laboratories to provide skilled workers with technical knowledge. The courses to which it has recently admitted women, however, are printing, jewelry manufacture and design, bookbinding, commercial art, pharmacy, practical science, and mechanical drawing. The automobile and kindred industries in Detroit are employing women in their machine shops. The absence of women from enrollment in automobile vocational courses is a challenge to the vocational policy of the Detroit vocational schools.

At this time Flint has no public vocational school giving courses for the mechanical trades. It has, however, a "school of automobile trades" conducted by a league of employees of Flint automobile factories. This school has not been included in the tables, as it is not a public agency. It gives courses in automobile assembly and maintenance, starting, lighting, and ignition, storage batteries, brazing and welding, blue-print reading and mechanical drawing, machine-shop tools and methods, tool-room practice, auto-body drafting and design, shop mathematics and shop mechanics, metallurgy, and heat treatment—in fact, in every line of work helpful to automobile workers. But women are enrolled only in comptometer-operating courses, even though they are employed in the factories along with men.

Grand Rapids has a vocational school which was used to train men under the draft in certain metal trades. At the time of writing, however, the school officials state that they "wish to start an all-day vocational and continuation school for both boys and girls" and are interested in "machine-shop tools, woodworking tools, printing outfits, auto repairing outfits, cafeteria equipment, domestic science equipment, and sewing machines." It is evident that the girls of Grand Rapids will be taught cooking and sewing and household arts. Will they be taught woodworking, so that they can enter the city's furniture factories on an equal footing with the boys of Grand Rapids? Will any of the woodworking tools which the Federal Government sold this school for 15 per cent of the cost be used by girls? Will any of the Federal funds which this school expects to receive be used to equip girls to share in the bread-winning work afforded by the city's industries?

TABLE 7.—*Industrial training courses in which women were enrolled from September, 1919, to May, 1920, in 104 public and semipublic schools by States.*

State.	Type of school.	Number schools reporting enrollment of women in industrial training courses.	Courses in which women were enrolled in preparation for [1]—				
			Clothing trades.	Textile trades.	Millinery trades.	Printing and publishing Trades.	Metal trades.
New England:							
New Hampshire	All-day	1	Dressmaking.		Millinery		
Massachusetts	do	4	do	Textile chemistry or dyeing.	do		Mechanical drawing.
			Power-machine sewing.	Textile design	Machine straw-hat making.		
			Costume design.				
			Sewing-machine repair.				
	Evening	5	Dressmaking.	Textile chemistry or dyeing.	Millinery		Do.
			Power machine sewing.	Textile design.	Machine straw-hat making.		Machine construction.
			Costume design.	Cotton classing.			Automobile engine mechanics.
			Sewing-machine repair.	Cotton yarn manufacturing.			
				Warp drawing.			
				Weaving.			
Rhode Island	All-day	1		Textile design			
	Part-time	1	Garment making.				
Connecticut	All-day	2	Dressmaking.		Millinery	Book binding	
			Power-machine sewing.				
			Ladies' tailoring.				
	Evening	1			do		
Middle Atlantic:							
New York	All-day	7	Dressmaking.	Textile design.	do		Mechanical drafting.
			Machine-waist making.		Machine straw-hat making.		
			Power-machine sewing.		Artificial-flower making.		
			Machine hemstitching.		Feather making.		
			Dress drafting.				
			Draping or design.				
	Evening	10	Dressmaking.	do	Millinery	Linotyping	Mechanical drawing.
			Machine-waist making.		Machine straw-hat making.	Book and job composition.	Automobile repair.
			Machine hemstitching.		Artificial-flower making.	Imposition.	
			Costume design.		Feather making.	Press work.	
						Proof reading.	

New Jersey	All-day	3	Dressmaking Power-machine sewing Trade design.	Silk winding Silk warping. Silk twisting.			
	Evening	2	Costume design				
Pennsylvania	All-day	7	Dressmaking Power-machine sewing. Costume design.	Textile design	Millinery		
	Part-time	4	Dressmaking	Weave formation Fabric analysis.		Printing Bookbinding.	Drafting. Automobile mechanics.
	Evening	10	do	Weave formation Fabric analysis. Cotton yarn manufacturing.	Millinery		Mechanical drafting. Mechanical drawing.
East Central:							
Ohio	All-day	3	Dressmaking Power-machine sewing. Embroidery. Costume design. Pattern making.		do		
	Evening	2	Dressmaking Power-machine sewing. Costume design.		do		
Kentucky	All-day	1	Dressmaking			Printing	
Michigan [2]	do	1				Monotype keyboard operating. Composing or design. Bookbinding.	Mechanical drawing.
	Evening	2				Monotype keyboard operating. Composing or design. Bookbinding.	Automobile mechanics. Mechanical drawing.
Indiana [2]	All-day	3	Dressmaking			Printing	Automobile repair.
	Part-time	1				do	Do.
Wisconsin	All-day	1	Dressmaking		Millinery		Drafting.
	Part-time	2	do		do	Printing	
	Evening	4	do		do		
Illinois	All-day	3	do				Drafting. Shop work.
	Evening	2	Sewing Cloth analysis.		Millinery		Drafting. Shop work.

[1] Description of courses taken from schedules filled out by the officers of the several schools.

[2] The following additional reports were received too late to be incorporated in the body of the report: Indiana, 1 all-day and 1 evening school having women enrolled in dressmaking and millinery courses. Michigan, 1 all-day school having women enrolled in sewing, millinery, lamp-shade manufacturing, designing, drafting, and printing; 1 part-time school having women enrolled in sewing and printing courses. Colorado, 1 evening school having women enrolled in dressmaking, millinery, bookbinding, cabinetmaking, and printing courses. North Carolina, 1 all-day school having women enrolled in textile courses.

TABLE 7.—*Industrial training courses in which women were enrolled from September, 1919, to May, 1920, etc.*—Continued.

State.	Type of school.	Number schools reporting enrollment of women in industrial training courses.	Courses in which women were enrolled in preparation for—				
			Clothing trades.	Textile trades.	Millinery trades.	Printing and publishing trades.	Metal trades.
West Central:							
Minnesota	All-day	2	Dressmaking. Power-machine sewing.		Millinery		
	Evening	1	Dressmaking		do		
					French flower making.		
Missouri	All-day	1	do				
Texas	Part-time	1	Power-machine sewing				
	Evening	1			Millinery		
Pacific: [1]							
Oregon	do	3	Sewing		Millinery	Printing	
	Evening	1	do		do		
California	All-day	4	Dressmaking. Power-machine sewing. Dress design.		do	Printing. Card writing.	Blacksmithing.
	Part-time	2	Dressmaking. Power-machine sewing.		do		
	Evening	1	Dressmaking		do		
South Atlantic: [1]							
Virginia	Part-time	1	do		do		
	Evening	1	do		do		
Georgia	All-day	1	Dressmaking				
	Evening	1	do		Millinery		

[1] The following additional reports were received too late to be incorporated in the body of the report: Indiana, 1 all-day and 1 evening school having women enrolled in dressmaking and millinery courses. Michigan, 1 all-day school having women enrolled in sewing, millinery, lamp-shade manufacturing, designing, drafting, and printing; 1 part-time school having women enrolled in sewing and printing courses. Colorado, 1 evening school having women enrolled in dressmaking, millinery, bookbinding, cabinetmaking, and printing courses. North Carolina, 1 all-day school having women enrolled in textile courses.

TABLE 7.—*Industrial training courses in which women were enrolled from September, 1919, to May, 1920, etc.*—Continued.

State.	Type of school.	Number schools reporting enrollment of women in industrial training courses.	Courses in which women were enrolled in preparation for—				
			Woodworking trades.	Electrical trades.	Watch and jewelry trades.	Chemical trades.	Miscellaneous trades.
New England:							
Massachusetts	Evening	5		Electrical measurements Electrical machinery.		Industrial chemistry	Ship design. Architectural working drawing. Heating and ventilating Preparatory course for "Foreman's institute."
Rhode Island	All day	1			Jewelry making		
Middle Atlantic:							
New York	do	7			do		Architectural drafting. Lamp shades or novelty making. Wall-paper design. Technical optics. Glove making.
	Evening	10			Jewelry design		Interior decorating Commercial lettering. Architectural drafting. Lamp shades or novelty making. Technical optics. Sign painting. Glove making.
New Jersey	All-day	3					Pottery making.
	Evening	2		Industrial electricity		Industrial chemistry	
Pennsylvania	All-day	7			Watch making Engraving. Jewelry making and repairing.		Architectural drafting. Wall-paper design.
	Evening	10	Wood pattern making		Watchmaking		

TABLE 7.—*Industrial training courses in which women were enrolled from September, 1919, to May, 1920, etc.*—Continued.

State.	Type of school.	Number schools reporting enrollment of women in industrial training courses.	Courses in which women were enrolled in preparation for—				
			Woodworking trades.	Electrical trades.	Watch and jewelry trades.	Chemical trades.	Miscellaneous trades.
East Central:							
Ohio	All-day	3					Pottery making.
	Evening	2					Do.
Michigan[1]	All-day	1			Jewelry making Jewelry design.	Laboratory work in metal chemistry. General chemistry or bacteriology. Pharmacy.	Architectural drawing or tracing.
	Evening	2	Cabinet work		Jewelry making Jewelry design.	Laboratory work in metal chemistry. General chemistry or bacteriology. Pharmacy.	Do.
Indiana[1]	All-day	3					Interior decorating.
Illinois	do	3					Glove making.
Pacific:[1]							
California	do	4					House decorating.
	Part-time	2					Interor decorating.

[1] The following additional reports were received too late to be incorporated in the body of the report: Indiana, 1 all-day and 1 evening school having women enrolled in dress making and millinery courses. Michigan, 1 all-day school having women enrolled in sewing, millinery, lamp-shade manufacturing, designing, drafting and printing; 1 part-time school having women enrolled in sewing and printing courses. Colorado, 1 evening school having women enrolled in dressmaking, millinery, bookbinding, cabinetmaking, and printing courses. North Carolina, 1 all-day school having women enrolled in textile courses.

Sixty-eight public industrial vocational schools were reported in New York State in 1920. Women were enrolled in 11 of these and men were enrolled in 65 schools. There were 6 other schools teaching women trades, but these were of a semipublic character. In Brooklyn, where machine-shop and instrument-making courses would be helpful to women as well as to men workers, there is a day trade school for boys and three evening trade schools, one of which is entirely set aside to teach women dress making and millinery. The principal of one of the other evening schools states: "Women are eligible to any course, provided they are employed at that particular trade during the day." Although women are working in Brooklyn machine shops, none are found enrolled in this school's courses in machine-shop practice, mechanical drawing, shop mathematics, sheet-metal work, or technical courses for mechanics.

Buffalo has five all-day and five evening schools which teach the important instruction for metal-working and woodworking occupations. But these schools admitted women to a course in photography only—a course, however, in which women failed to enroll.

Rochester has three public all-day vocational schools and three public evening vocational schools. These had 410 women enrolled in dressmaking and millinery courses. No women were enrolled in the machine-shop courses given. Although Rochester is a center of optical goods manufacture, the only courses given for this work are given in a semipublic school, where an admittance fee is charged. Women, as well as men, are admitted to the optical courses given in this school. It is interesting, also, that in 1920 women elected to take courses in technical optics in this vocational school. The course fitted them for positions as assistants to optometrists. Girls, as well as boys, are also admitted to mechanical courses in the Rochester Mechanics' Institute, a semipublic school. Although the only course of this character in this school in which girls were enrolled in 1920 was mechanical drafting, during 1918 and 1919 women did enroll in auto mechanics and industrial training in woodwork.

When the numbers of Pennsylvania schools reporting enrollment of women in industrial training courses shown in Table 7, which is made up of both semipublic and public institutions, are compared with the numbers set forth in Table 6, it will be seen that the trade-training of women is still very largely done by semipublic schools. For of the 20 schools giving such training to women, only 5 are under the supervision of the State bureau of vocational education. This bureau has developed 47 public trade schools for instructing the boys and men of the State. Thirty-one of these give courses for machinists or in shop mathematics and shop drawing. Six give in-

struction in sheet-metal work. Nine give men instruction in cabinet-making or other woodwork for furniture manufacture. In Philadelphia, the center of the machine-shop and furniture and optical work in the State, the girls' trade school teaches only millinery, dressmaking, and light power-machine sewing.

In Chicago the public vocational trade schools give courses in machine-shop practice and other related subjects to boys and men. To girls they teach sewing, dressmaking, millinery, and glove making. Again, a semipublic school has taken the lead in admitting women to courses not concerned with clothes. For women were enrolled in machine-shop and drafting courses in both day and evening classes in such a school in Chicago.

Connecticut reports 29 public schools giving industrial training courses. Among the courses given were instruction in machine-shop practice, tool making, blue-print reading, mechanical drawing, and pattern making. But with the exception of bookbinding the trades taught women were confined to the clothing trades.

Although the public trades schools in Rhode Island give several courses for machinists, in Providence, the city where the largest numbers of women worked in machine shops, the two part-time schools under State supervision taught machine drafting and commercial drafting, auto repair, electricity, woodworking, painting, printing, and garment making. In the evening classes, however, instruction in machine-shop practice, machine drafting, blue-print reading, and shop mathematics was given to men.

Massachusetts reported 43 public schools giving vocational trade training courses. All but six of these received Federal aid, and 17 had received machine tools from the Federal Government at the time of writing. These schools taught all the established lines of instruction in the metal trades. Boston and Worcester each had a day school and an evening school in which machine-shop work was done, and another day school and evening schools for dressmakers, milliners, and power-machine sewers. In Cambridge, an evening school taught machine-shop practice, drawing for machinists, forging, heating and ventilating, and woodworking, but the girls' trade school in dressmaking and millinery had been discontinued for lack of pupils. In a semipublic school in Boston, which is designed to supplement shop work with practical but technical instruction, women were enrolled in 1920 in courses in automobile engine mechanics, mechanical drawing, industrial electricity, industrial chemistry, in heating and ventilating systems, as well as in preparatory work for a foreman's training institute.

The city of Sheboygan, Wis., whose women would be greatly helped by training for the woodworking industries, has classes re-

ceiving Federal aid and giving instruction in cabinetmaking. Women are not, however, enrolled in this course.

It is obvious, therefore, from the foregoing discussion that the States and all the larger cities in which machine-shop, sheet-metal, or furniture-making courses would be most helpful to girls and women and to the industries of these localities have already established facilities for training boys and men for these industries. Whether these facilities are extensive enough to meet all the requirements were both boys and girls trained in the proportions warranted by employment records does not invalidate the claim of either boys or girls for needed instruction. Some equipment for such instruction exists and is maintained at the expense alike of men and women of the city, State, and Nation. Such equipment as there is should serve women as well as men. It is obvious that the public vocational school authorities, with few exceptions, think of trade for women only in terms of dressmaking and millinery, and are as yet quite oblivious to the fact that these trades, except in certain clothing centers, are not the big employers of woman labor, nor are they always the best trades at which to earn a livelihood. It is the semipublic school that is beginning first to recognize the new position which woman occupies in industry as a result of the war and is opening to her its doors and guiding her into courses leading to efficiency in the new occupations. Even though the women attending these schools are relatively few, the mere fact that without encouragement they will pay a fee to advance themselves in the new trades indicates that there is a realization among the women workers themselves of their changed position.

Women work side by side with men in many factories, they take trade instruction in the semipublic and some public schools in the same classes with men. It is not necessary to establish trade schools in machine-shop, or sheet-metal, or furniture or optical work especially for women. It is only necessary to open the classes that exist to them not only in the announcement of courses but in the policy of recruiting the ranks of vocational students.

SUMMARY.

1. The experiences in the employment of women in new occupations during the war make it apparent that her most promising future as a wage earner in the new pursuits lies, in the order of importance, in—

(*a*) Machine shops where light parts are made.
(*b*) Wood-product factories where assembling and finishing are important processes.
(*c*) Optical and instrument factories.
(*d*) Sheet-metal shops.

2. The States and principal cities in which these industries employ the largest number of total wage earners and the largest number of women wage earners are—

(*a*) Machine-shop and sheet-metal industries.
- (1) Ohio: Cleveland, Toledo, Dayton.
- (2) Michigan: Detroit, Flint.
- (3) New York: Brooklyn, Buffalo, Rochester, Syracuse.
- (4) Pennsylvania: Philadelphia, Pittsburgh.
- (5) Illinois: Chicago.
- (6) Connecticut: Bridgeport, Hartford, New Haven.
- (7) Massachusetts: Boston, Worcester.
- (8) Rhode Island: Providence.

(*b*) Wood-product factories where assembling and finishing are important processes—
- (1) New York: New York City.
- (2) Michigan: Grand Rapids.
- (3) Illinois: Chicago.
- (4) Pennsylvania: Philadelphia.
- (5) Massachusetts: Gardner, Wakefield.
- (6) Wisconsin: Sheboygan.

(*c*) Optical goods factories.
- (1) New York: Rochester.
- (2) Massachusetts: Southbridge.
- (3) Pennsylvania: Philadelphia.

3. Public vocational training facilities for occupations in these industries and for preparing teachers for these industries are already in existence in these States and cities. But very few of these facilities are now being used by women, either because women are not admitted to these public vocational schools, or are not encouraged to attend.

4. The greater number of industrial training courses in which women are enrolled in public and semipublic schools throughout the country are courses in dressmaking and sewing for the custom trade and in millinery.

5. The increase in the numbers of wage-earning women, the demonstrated capabilities of women during the war, the decrease in male immigrant labor, and the growing demands of our expanding industries call, not only for the admission of women into courses in machine shop, sheet metal, factory woodworking, and optical work, but for the same policy among vocational educators of encouraging girls as is now adopted to encourage boys to take such instruction.

PUBLICATIONS OF THE WOMEN'S BUREAU.

Bulletins:

No. 1. Proposed Employment of Women During the War in the Industries of Niagara Falls, N. Y. 16 pp. 1918.
No. 2. Labor Laws for Women in Industry in Indiana. 29 pp. 1918.
No. 3. Standards for the Employment of Women in Industry. 7 pp. 1919.
No. 4. Wages of Candy Makers in Philadelphia in 1919. 46 pp. 1919.
No. 5. The Eight-Hour Day in Federal and State Legislation. 19 pp. 1919.
No. 6. The Employment of Women in Hazardous Industries in the United States. 8 pp. 1919.
No. 7. Night-Work Laws in the United States. 4 pp. 1919.
No. 8. Women in the Government Service. 37 pp. 1920.
No. 9. Home Work in Bridgeport, Connecticut. 35 pp. 1920.
No. 10. Hours and Conditions of Work for Women in Industry in Virginia. 32 pp. 1920.
No. 11. Women Street Car Conductors and Ticket Agents. (In press.)
No. 12. Woman's Part in American Industries During the World War. (In press.)
No. 13. Industrial Opportunities and Training for Women and Girls. 48 pp. 1920.

Charts:

No. I. Eight-Hour and Eight-and-a-Half-Hour Laws for Women Workers.
No. II. Nine-Hour Laws for Women Workers.
No. III. Ten-Hour Laws for Women Workers.
No. IV. Ten-and-a-Quarter-Hour, Ten-and-a-Half-Hour, Eleven-Hour, and Twelve-Hour Laws for Women Workers.
No. V. Weekly Hour Laws for Women Workers.
No. VI. (In preparation.)
No. VII. Night-Work Laws for Women Workers.
No. VIII. (In preparation.)
No. IX. Minimum Wage Legislation in the United States—April, 1920. 3 sections.
No. X. Mothers' Pension Laws in the United States. 4 sections.