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INDUSTRIAL EDUCATION
IN 1924-1926

By

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THE FIELD OF INDUSTRIAL EDUCATION

A survey of educational literature, of courses of study both in the public schools and teacher-training institutions, of the programs of educational conventions, of conference reports, and of special reports from many school systems leads to the conclusion that more activity has been manifested during the past two years in the study of the problems involved in the manual arts work and industrial forms of education than in any similar period in the past. In the field of the manual arts much attention has been given to the objectives to be included and to the types of organization to be used in making this type of work a more important factor in the accomplishment of the ends of public education.

There is, however, much confusion both in theory and practice relative to objectives for manual arts work. Frequently courses are offered without clearly defining the objective to be attained and without definite organization for a specific purpose. The result is inefficient training for any specific curriculum aim and leads to waste of time and equipment material.

Some still think of the objectives for the manual arts only in terms of exploded psychological theories and assign to them only general, supplementary, or indefinite values. Nevertheless there is a growing conviction that manual arts courses can make a unified and direct contribution to the school program, and that they constitute the best agency for realizing some phases of the generally accepted aims for public-school education. The amount of space in teachers' journals devoted to the set-up of courses and the value they carry, the discussion programs of local manual and industrial arts clubs, and the present practice in progressive schools, all indicate the importance attached to this type of work and show an effort to

develop efficient programs. A complete reorganization of the manual arts work by the State department of education for Maine and the revision of the manual arts courses for Racine, Wis., are examples of a general movement throughout the United States to give the manual arts a place in the program of studies comparable with the contribution they can make and to organize them on a plan that will insure the greatest returns. Experience indicates that the best basis for classifying the objectives for the manual arts work and industrial education is that of function. What use is to be made of the training, is the crucial question. Experience and theory both seem to point to training for three functioning objectives, namely:

(1) Training for the creation of an industrial product or service. For example, training for carpenters, bricklayers, welders, pattern makers, foundrymen, and tailors is for the purpose of providing an industrial product. Such courses are for definite training experience in some specific trade or technical subject with a view to employment in industry. This objective is strictly vocational and belongs to a special type of education.

(2) Training in the use of industrial products and services, common to home life and leisure-time activities, and which are of a non-vocational character. For example, training in the common and ordinary use and care of such industrial products as furniture, automobiles, electrical machinery, and apparatus, and for such industrial services as electricity, gas, and water in the home. Training in connection with this objective should be for the development of intelligence and skill (*a*) in buying, (*b*) in use, care, and operation for nonvocational purposes, and (*c*) in the repair and maintenance of such industrial products and services as are economical and feasible for the user to do himself rather than for him to call on the services of a tradesman. A course in automotive practice offering training in the operation and care of an automobile from the user's standpoint, such as given at Central High School, Washington, D. C.; a course dealing with the use of electricity in the home; and the study of furniture from the standpoint of its use and care in the home are examples of instruction coming under the consumer's or user's objective. Courses given under this objective are not for the purpose of training for employment, but are a part of the general education program.

(3) Training in exploratory and developmental forms of experience. Courses offered for the realization of this objective include projects in a variety of activities, such as woodworking, metal working, painting, and electricity. The character and quality of the work should be on a level comparable with the interest and achievement ability of the pupil. The work is planned not to give the first part of several trade courses, but to provide the individual, through

controlled experiences, opportunities to react in connection with a variety of materials, tools, and operations, thus furnishing opportunities for educational development and creating additional experiences favorable for the discovery of aptitudes and interests. The general shop of the junior high school, when well planned as to equipment and projects, is an excellent organization for realizing this objective. The work coming under this objective is a responsibility of the general education program.

The three classes of objectives listed are clearly differentiated as to purpose, and while a course organized under one objective may have limited values for one or both of the others, the purpose of the course is distinctly for the realization of the one objective for which the course is planned. Values other than the one specified for the course will be mere accompaniments in the realization of the objective for which the training is offered.

MANUAL ARTS IN THE SENIOR HIGH SCHOOL

The inclusion of manual arts courses in the group of elective subjects in senior high-school grades is receiving recognition as an essential in the high-school program. Such courses provide opportunities for those pupils who have chosen some other field of work as a major in their high-school course, such as commercial or college preparatory, to elect for one or more years a shop course in which they may learn something of the manipulation of tools and consequently be able to do creative work in materials. In this manner they obtain training that will result in increased efficiency in the performance of those nonspecialized tasks of an industrial or technical nature which are commonly performed by the great majority of individuals and which are frequently associated with home life and leisure-time activities. These courses often form the basis of an avocation in the later life of such pupils.

Such high-school courses are valuable in meeting the needs for general intelligence, technical knowledge, and manipulative ability of a nonspecialized nature associated with the selection, purchase, and care of furniture in the home, office, or club; the selection, operation, and care of electrical apparatus and appliances in the home; the care and operation of an automobile, together with its selection for special purposes; the selection and care of plumbing fixtures, together with the use and care of the water service in the home; care of the hardwood finish and minor paint jobs about the home; principles of radio operation and construction; selection and appreciation of the products of the print shop; and blue-print reading connected with the construction of a home or for the explanation of electrical and oiling systems of an automobile.

Shop courses of an industrial character are being inaugurated by more high schools each year, and the enrollment in them is steadily increasing.

MANUAL ARTS IN THE JUNIOR HIGH SCHOOL

The development of junior high schools is affecting the organization of manual arts work for those grades. More and more is it recognized as a part of the general education program and not a form of special education. The peculiar value that this type of work may have for realizing some of the specific purposes of the junior high school is critically studied with the consequent modification of courses, instructional organization, and methods of teaching. The shop activities included are increasing to meet the exploratory and general developmental objectives. Teachers qualified to develop shop work in projects of special interest and on the accomplishment level of the pupils, rather than teachers qualified in some particular trade, are employed in larger numbers.

The scientific study of the general characteristics, the abilities, the interests, and the learning process of this age group, together with a development of a better understanding of the kinds of handicraft activities of a nonspecialized type that function either in a direct manner in the life of the individual, or indirectly, serving as a form of controlled experience for industrial intelligence or as a basis for future trade training, is leading to an abandonment in the more progressive schools of much of the formal exercise work on the one hand and some of the specific trade shop work on the other hand. In most of the better schools offering industrial courses on a junior high school level there is much less of the old formal type of wood work, such as joinery exercises, and the production by each pupil of small pieces of cabinet work, and more work in a large number of shop activities, such as sheet metal, electrical repairing, simple auto repair jobs, cement construction, woodwork including wood finishing and painting, and printing, developed in connection with projects in line with the interests and ability levels of junior high school pupils.

As an example of such junior high school development, the city of Chicago inaugurated a junior high school program in 1924, and at the opening of school in that year established eight junior high schools. Provisions are made to include the varied forms of shop work necessary to meet the needs of junior high school pupils.

The work in New York State is an example of the acceptance of the junior high school idea, and, as a consequence, it is leading to a rapid increase in the number of schools introducing and expanding training facilities and courses in shop work in grades seven and eight. Many schools are offering general shop courses in grade seven to include instruction in the use of common tools. Such courses

include maintenance and repair jobs, woodwork, electricity, auto mechanics, pipe fitting, and the necessary related drawing in each subject. In addition to the actual manipulative work much time is devoted to discussions of different occupations and the related work for each and the opportunities the public schools offer for learning a trade.

The courses offered in grade eight are of a more intensive nature and furnish instruction either for a half year or a full year in some subject started in grade seven, allowing the student to select his shop. Most small communities have but one shop and have several lines of work in progress at one time. For school systems having a full program of industrial courses the work for the ninth grade is usually arranged to meet the needs of both those who expect to enter the senior high school and for those who expect to drop out at the end of the junior high school. For example, in the ninth grade of the junior high school in Minneapolis, Minn., for those who expect to continue manual training in the senior high school, one full semester of mechanical drawing is required; for those who expect to take either cabinetmaking or carpentry as their major subject, a semester of woodworking is required; for those expecting to major in any other high school shop courses, one semester of either electricity or sheet metal is required; for those who choose printing as a trade, two full semesters of printing are required. Those boys who know that they are to leave school at the end of the ninth grade and who have had not less than 20 weeks of mechanical drawing may choose any shop course or any combination of shop courses (printing excluded) that will best fit them for the work they intend to follow.

MANUAL ARTS IN CONSOLIDATED SCHOOLS

The growth of consolidated and union high schools during the past two years has given a decided impetus to the development of industrial courses in the rural districts. Larger enrollments per school, together with the increased amount of money available for physical equipment, make it possible, for the first time, to offer shop work to pupils in many rural communities. Some of these consolidated schools have erected a separate shop building and have installed equipment for the types of work best suited to meet the needs of the community.

The industrial work in these schools usually includes a course in farm mechanics for projects in simple construction work and repair jobs connected with farm buildings, farm machinery and tools, operation and maintenance of gas engines, harness repair, electricity as used on the farm, and painting. In addition there is usually provided an elementary course in manual arts, frequently on the general

shop plan, to serve the exploratory and developmental objectives of general education.

ITINERANT WORK

The need for industrial types of work in schools too small to furnish the necessary equipment or to employ a special teacher for the work is met in some instances by a plan of itinerant work. While this is a new scheme for furnishing training in shop work, the success which has attended its adoption in schools which have given careful attention to the necessary conditions under which it is feasible to attempt the itinerant plan, and at the same time have developed a carefully planned program for its organization, gives promise of its great value in the solution of the problem of furnishing shop work in many small communities. An account of the origin and development of this type of organization as carried on in some parts of California furnishes a unique example of what is possible with good leadership and the cooperation of all interested parties.

A few years ago the State department of vocational education was interested, because of great need, in setting up a state-wide program for training farmers in the operation, upkeep, and repair of tractors. The State board of education, through the State board of control, called a meeting of the tractor manufacturers of California to determine the advisability of setting up a state-wide program for training tractor owners and operators. As a result of this meeting the manufacturers lent to the State board of education \$100,000 worth of machinery with which to carry on the instruction. The State was divided into three units, each unit having 12 training centers. The \$100,000 worth of tractors and farm machinery were divided into three units, loaded on flat cars, and with the instructor were sent to the center where the program was to be carried on.

The courses ran for eight and a quarter hours each day for a period of three weeks. The first week instruction dealt with the theory and principle of gasoline-engine ignition, carburetion, and lubrication; the second week these principles were applied to the study of tractors and farm machinery; the third week was spent in the operation of each type of machine included in the course of instruction.

During a period of eight months the State board of education trained more than 2,300 persons at a total cost to the State of \$10 per student. The training scheme was considered a great success by the students and all agencies participating in cooperation with the State board of education, and there is a continuous demand for this type of work. The following year the State-highway commission lent to the State board of education some of its large trucks for use in transporting much of the equipment. As a result of the programs in the operation of farm machinery carried on by the

State department of education a number of school systems have inaugurated courses in industrial types of education. A study was carried on by the superintendent of Sonoma County to determine the advisability of undertaking itinerant shop teaching in the schools of that county and for securing the necessary information for the development of a program. The proposition was favorably received by the schools and the programs inaugurated in 1926. As a result of this study a program was planned to include 32 schools. Each school agreed to contribute \$250 to the county—\$240 for the services of a teacher for one-half day per week during the school year and \$10 toward a special fund for tools. The school districts raised this money in various ways, some by a special tax, some from a fund already on hand for the employment of special teachers, and in other districts the parent-teachers association raised the money. Each teacher was assigned a sufficient number of schools to keep him busy for 10 half days per week, and was given a contract by the county superintendent for 10 months at a salary of \$240 per month. The teachers furnish their own transportation. The mileage amounts to about 100 miles per week, and the cost, according to the teacher's estimates, is about \$12 per month for gas, oil, and tires.

As some of the foregoing schools had never had any shop work, the teacher was confronted with the problem of finding a place in which to carry on instruction. In some cases it was necessary for the teacher to erect a building, which was the first project undertaken by the class. A number of frame shop buildings, 24 by 32 feet, were constructed. The necessary work benches were provided in the same manner. All the hand tools are furnished by the county and are carried by the instructor in his car. Special equipment is used for carrying the tools and at each school certain pupils are assigned the duty of making the tools available for use and of reloading them in the car at the end of the period. It takes only about eight minutes to do this.

The work is given in the grammar grades and is not vocational. Instruction is based on the project method and includes work in carpentry, cabinetmaking, sheet metal work, cement, electricity, house painting, auto mechanics, and drawing. Much practical work has been done in connection with the school building and equipment and on equipment for the farm and home.

The local communities are greatly interested in the program and are giving it whole-hearted support. It represents, in many instances, the first opportunity that the people have had for any instruction in industrial types of work, and meets a need for a type of training that functions in a practical way in connection with the home and community life.

LIMITED ACTIVITIES IN THE MANUAL ARTS

Leaders in educational thought recognize the need for including a greater number of shop activities in the manual arts. While the past two years have seen some additions to the manual arts curriculum, the variety of work offered in the great majority of schools is still so limited that the values which should accrue from this type of work can not be realized. Woodwork is too commonly the only shop activity offered, or else it receives a larger proportion of the time, relative to other activities, than its value warrants.

While wood still holds a commanding place among the most generally used materials for construction, the rapidly increasing use of various kinds and forms of other materials, such as metal, cement, clay, glass, rubber, vegetable and animal fiber products, composition materials, and paints and varnishes, makes it imperative that the industrial training be enriched by the introduction of work including the use of some of these materials. Moreover, there are many types of industrial work which require much training in technical knowledge and skill for purposes of designing and operating; for example, work in printing, drafting, and power-plant engineering. The last is a service job and is not for the purpose of turning out an industrial product.

The State supervisor of manual arts for Wisconsin, in a report to the United States Bureau of Education, sets forth the situation in that State relative to the need for a variety of shop activities. While some additional activities have been included during the biennium, there are still 104 schools offering woodwork and mechanical drawing only; 35 offer in addition some form of metal working; 12 have courses in automotive work; and 15 offer printing. In the meantime, the enrollment increased from 10,274 in the high school and 7,436 in the grades (seven and eight) to 11,625 and 8,882, respectively. The report says:

We are forced to the conclusion that we have paid too much attention in the past to woodworking as a *sine qua non*, and have neglected to bring the boy into contact with other activities and materials. Such considerations as these force one to the conclusion that the manual arts work of the high school, where it consists of woodworking only, should be augmented by a number of other activities. This conclusion does not in the least deride woodworking as possessing inferior educational value, but is simply in accord with the discussion above. Under ordinary circumstances a boy taking up manual arts work in the grammar grades and continuing this work in the high school comes into contact with nothing but woodworking for four years. This limited opportunity obtains in 85 per cent of the schools of this State and deprives thousands of children of the advantage of more varied work.

HOME MECHANICS COURSES

Much interest has been manifested during the past two years in developing home mechanics courses in nonvocational types of industrial work. The projects in these courses are selected with

particular reference to the activities about the home or the farm and have functional value in connection with repair and simple construction jobs. Included in these jobs are repair jobs for windows, doors, plumbing, and lighting fixtures, and of furniture. Sometimes work is given in concrete and leather. In fact, the jobs include work in a variety of materials and necessitate the employment of many of the common hand tools.

The industrial division of the State department of education of Maine has developed these courses throughout the State. A number of regional conferences were called by the State director for the purpose of developing an outline course including projects in these subjects. The results of these conferences were then compiled by the State department and refined into a suggested course of study for the State. Home mechanics courses are particularly feasible for the smaller schools. They require no elaborate equipment and the work, which is of a nonspecialized character, permits the enrollment of larger classes.

The division of vocational education of the State department of Michigan has stimulated interest in a similar type of course for the manual arts, especially with reference to the development of projects dealing with community problems. The values of this type of problem as set forth by Michigan are: It stimulates the pupils and develops habits of cooperation; affords variety of materials and operations that may be used; and makes it possible to organize these community projects so as to give some idea of the methods and processes used in production in a commercial shop. It is also valuable in that it teaches the students the spirit of contribution in giving something to others.

THE GENERAL SHOP

The general shop, which is a recent type of organization for teaching elementary work in a number of shop activities under the direction and supervision of one individual, has been growing in favor, especially for some of the manual arts work on the junior high school level. The number of schools adopting this general shop plan has increased rapidly during the past two years. Of 1,500 representative school systems furnishing information to the Bureau of Education on this point, more than 40 per cent report that they have organized a general shop course. More than one-fourth of these were inaugurated during the past two years, and 10 per cent of all the schools having general shops started them within this period.

The majority of these general shop courses are organized on the plan of a single comprehensive shop, to include work in all the activities offered in the course, rather than on the basis of a cycle of shops, through which the students are routed as a group for a limited

period of work in each activity. The comprehensive shop plan makes it possible for a pupil to work continuously on a project involving more than one activity until it is completed.

Instruction is based upon the development of projects rather than upon a plan to teach the beginnings of any trade. The philosophy underlying the general shop course is the same as that for a general course in science or a general course in mathematics. The aim is to give elementary instruction in a number of more or less related lines of work, and on a basis corresponding to the interest and ability levels of the student, rather than to carry instruction in one branch into advanced stages. For the general shop the relating factor is based upon characteristics common to all the shop activities included, such as hand manipulation of tools and machines applied to common construction material for creative purposes, technical types of knowledge, and the working qualities of materials.

The general shop of the James Whitcomb Riley Junior High School at Logansport, Ind., is a good example of this kind of shop organization. It is planned to furnish developmental experience in eight shop activities—namely, woodwork, auto repair, electricity, sheet metal, forging, machine shop, printing, and mechanical drawing. The general shop is housed in a separate brick building of the factory type of construction, 38 by 144 feet, built especially for this purpose. The auto repair shop occupies a space 36 by 36 feet across one end of the building. The wood shop, print shop, and electrical shop, each has a space 18 by 36 feet. Mechanical drawing, sheet metal, forging, and machine shop practice each has a floor space 18 by 18 feet. In addition there are two tool rooms, one for woodworking tools and the other for metal-working tools, a teachers' room, and library near the middle of the building, a locker room for the students and a wash room. The drafting room and the printing and woodworking shops are each inclosed by dust-proof partitions with large glass windows. The other shops are separated by meshed-wire partitions 7 feet high.

Six to 12 students can be accommodated at one time in each of the activities represented. Students are enrolled for one 70-minute period of work each day, five days a week. Occasionally a special student is enrolled for two or three 70-minute periods each day. As a rule, however, if such a student is sufficiently mature and manifests interest and ability in shop work, he is early encouraged to enter vocational classes.

At the beginning of the term students in the seventh and eighth grades elect one of the shop activities offered, with the understanding that they change to some other shop activity every nine weeks. However, individual differences are taken into consideration relative

to the time spent in any shop activity. The more apt students complete the work in less than nine weeks and are transferred at once to another shop activity. They thus complete their rotation in less than two years and are ready to begin specialization earlier than the schedule calls for. The ninth-year students elect any shop activity in which they are most interested and spend either one-half or the entire year in this one line of work.

In addition to group and individual instruction, students are provided with job and information sheets which are an aid to individual progress. A record is kept of the projects completed by each student and the grade made on each. It is thus possible to tell at any time the progress that a student has made. Such a record-keeping is necessary to insure that the students, working as they do, on individual assignments, complete all of the work outlined for the shop activity represented.

Boys in all shops pay \$1 laboratory fee. This is to apply to the cost of supplies, reference books, job sheets, breakage of small tools, etc.

OCCUPATIONAL INFORMATION AND GUIDANCE

During the past two years there has been a very decided tendency to put into the school curriculum, either in the junior or senior high school, courses in occupational information for the purpose of developing intelligence which will function in furnishing (1) general education values and (2) specific values for vocational guidance. Information received by the Bureau of Education from about 1,500 representative school systems, including cities of 5,000 population and upwards, show that more than one-third offer courses in occupational information. More than one-fifth of the 1,500 schools reporting added occupational information courses to their curricula for the first time during the past two years, while of the schools offering such courses more than one-half inaugurated them during the same period. Almost one-half of the schools offering an occupational information course make it a required subject for all pupils of a given grade.

The courses offered in the different schools vary greatly both in content and organization for instructional purposes, but in general all set up direct and indirect forms of experiences which furnish information relative to specific occupations and which may be a means for the discovery of a personal interest in some occupation or occupational group that will lead to a life interest. Visits are made to industrial plants and offices and readings are assigned covering technical and skilled occupations in various lines of work, including both the manual and professional fields.

Literature suitable for use in such courses is increasing rapidly, including a few textbooks. A number of the large school systems have issued a series of publications each covering a specific occupation. The Milwaukee, Wis., Vocational School has published 60 or more occupational studies constituting the "My Life Work" series. In general, all "occupation" or "opportunity" bulletins are descriptive of the work to be done, education and training needed for entrance, working conditions, promotional opportunities, stability of the field of work, and financial compensation for each occupation represented.

PART-TIME, EVENING, AND APPRENTICESHIP COURSES

Increased interest has been manifested during the past two years in the development and organization of part-time and evening courses for those who have entered upon employment. The public schools, as never before, are assuming as one of their functions the responsibility for providing educational opportunities for those who have discontinued their attendance in the full-time school and who have gone out into the industrial fields to take their places as wage earners. Progress in providing educational opportunities is to be noted in improved housing facilities, better organization of the work, and the development of a clearer conception of its function as an aim of public-school education.

Originally courses which were not a part of a regular full-time program were housed in old grade buildings and other quarters unsuitable for the type of work undertaken. Now there is general recognition of the need for buildings and equipment adequate for the purpose of the instruction given and in keeping with the group characteristics of this class of students. The new building housing the Opportunity School at Denver, Colo., is an example of this tendency. The building is planned specifically to meet the requirements of the Opportunity School and is modern in every respect. The school shops and the baking department, which is equipped with electric ovens, are arranged for courses especially planned to meet the needs of the opportunity students.

In school systems offering part-time and evening types of courses the work is being centralized more and more and put under special direction and supervision. This is a progressive step, as it insures the development of the program by specialists in this field of education.

A brief study of part-time and evening work carried on in a few schools will give an idea of the important place that such work has assumed in public-school education. The work at Detroit, Mich., is a good example of the gradual growth and development of an

effective program in part-time education. Part-time schools for girls were started on a purely voluntary basis previous to the enactment of the part-time law. Under the present law employed persons between the ages of 14 and 17 are required to attend school. Courses for continuation school pupils are now provided in academic subjects, including English, mathematics, social science, history, drawing, shopwork in electricity, machine-shop practice, woodwork, and sheet-metal work. A general shop is also provided which takes the place of the auto shop which formerly was included. Experience in Detroit was to the effect that auto mechanics as a trade had no place in the continuation school.

There is a definite attempt to place the work in the shops upon a productive basis. Much of the work is for the Board of Education in large-quantity production. No small exercise work is attempted as such work does not appeal to the boy or the girl who is accustomed to do productive work during employment. In addition to the courses provided under the direction of the continuation school, many of the boys are sent for specific trade work to the apprenticeship groups. The following trades are included for apprentices: Bricklaying, plastering, plumbing, steam fitting, printing, tile setting, and metal lathing.

In addition to these courses provided for continuation school pupils, Detroit operates what is called the senior continuation work. All classes in this group are organized and conducted on the basis of specific trade training, for which group an apprentice council, composed of employers, workers, and a representative of the superintendent of schools, handles matters pertaining to the choice of instructors, courses of study, admittance of apprentices, and discipline. Upon the completion of the apprenticeship course a journeyman certificate is granted. This is signed by the instructor, the chairman of the apprentice council, the State supervisor of industrial education, and the principal and the superintendent of schools. These students are regularly indentured apprentices who are working at the trade and attend school one day a week. Employers pay them wages for school attendance. The instructors must be journeymen of high standing in the trade. Supply dealers donate the greater part of materials and necessary equipment. The following industrial groups are now cooperating in this type of training: Plasterers, bricklayers, tile setters, metal lathers, plumbers, steam fitters, printers, machinists, and toolmakers. In addition, groups of apprentices from several of the large factories have been enrolled for instruction. This type of apprentice must be between 18 and 21 years of age. Four hours of instruction per week are offered in mathematics, mechanical drawing, or machine-shop practice.

Enrollment in continuation classes in Detroit has increased more than 20 per cent during the past two years.

Prior to the enactment of any part-time educational law in Illinois, the board of education of Chicago maintained some voluntary continuation courses in different schools. These were particularly for carpenter apprentices and office workers and employees in the plants of the large meat-packing companies. After the enactment of part-time laws, additional facilities for housing were obtained in school buildings which had been used previously for full-time classes, so that gradually the schools became housed in five fairly large school buildings, containing about 15 to 20 rooms each and two smaller school buildings, with from 4 to 12 rooms each, and 5 continuation schools in the buildings of business houses, ranging from 1 to 5 rooms each. The Illinois Bell Telephone Co. maintains a five-room school and has recently, at considerable expense, equipped a very fine household arts and science room. The five schools maintained in business houses are financed entirely by the business houses so far as equipment, books, etc., are concerned. The only expense to the board of education is the teacher's salary. The trade apprentice part-time work has been centralized at the Washburn continuation school. At the present time there are 2,013 apprentices taking continuation work at this school. They are distributed among the trades, as follows: Carpentry, 598; pattern making, 9; shoe shop and repair, 8; steam fitting, 369; electricity, 554; sheet metal, 112; machine shop, 130; and painting, 233. Teachers for all of these classes are selected from the high-school examination list, which makes it possible to supply teachers with the highest attainments required in the Chicago public schools for teaching positions.

The term of attendance for continuation-school pupils in Chicago is eight hours per week for 50 weeks in the year, and the law is now operative up to the age of 17, inclusive. The State law, however, makes it possible to extend the age to 18, inclusive, but this has not been done for Chicago. In the seven years of existence of the part-time schools there has been a constant struggle with such problems as insufficient executive assistance, assignment of abandoned school-houses for the work, and conflicting clauses in the school law. In the face of these obstacles the continuation schools have survived and prospered and increased their enrollment from 5,918 in 1922 to 11,159 in 1926. The enrollment in apprenticeship courses increased from 242 in 1921 to 1,998 in 1926. At a recent meeting of the representatives of the unions over the State of Illinois a unanimous indorsement was given to the continuation-school movement in Chicago. These schools have the indorsement of both the employers and organized labor.

The continuation schools in New York City now number 15, with more than 500 full-time teachers, with a budget for salaries of more than a million and a half dollars. In addition to these 15 schools, 4 of which are central schools and 11 general, there are 25 annexes in department stores, manufacturing plants, banks, and insurance companies. The number of students passing through the continuation schools is approximately 90,000 a year. At the present time, the average register is approximately 63,000 pupils, with 500 teachers.

Each of the boroughs has at least one school. In Manhattan there are three general schools; the East Side Continuation School, the West Side Continuation School, and the Harlem Continuation School for Girls. There are also four central schools, the Printing Trades School, in the heart of the uptown printing center; the Central Needle Trades School, in the center of the garment-making district; the Central Commercial School; and the Central Building Trades School. Some of these schools are housed not only in old elementary-school buildings, but in rented lofts. This last observation shows the close approximation to actual industrial conditions.

The West Side School, housed in an old school building, represents a fair example of the special adaptation for continuation-school instruction. Provision is made for both boys and girls. When the children are admitted under the State law they are required to have a promise of a position, which they or their parents find. The pupil is first sent to the preparatory class where a teacher skilled in vocational counseling interviews the child, finds out his ambitions, family circumstances, education, and other factors which will enable the counselor to make the best tentative choice as to assignment to a shop class.

An outstanding development since 1925 is the organization of the central schools for specific instruction along the lines indicated by the names of the schools and which represent the apparent life interest of the student. There are about 10,000 of these students in the central schools. The most interesting of these schools is the Printing Trades School, which takes care not only of the children under 17 years of age employed in the trade but is an afternoon and evening school for commercial and newspaper apprentices and journeymen. The employers have donated equipment worth about \$150,000, and are also contributing to the salaries of the teachers. The Commercial Continuation School is, in view of the large commercial industry in this city, the largest of the central schools, and with a registration of 6,000 makes possible intensive commercial work along the various subdivisions of this occupation.

With reference to the development of the continuation school program in New York State the director of vocational and extension

education, in a communication to the Bureau of Education in 1926, deals with some of the experiences common to this field of education. The director says:

Prior to 1920 we evaded our responsibilities in respect to children who did not fit into our program by giving them a work permit. For the past six years we have been conducting an educational experiment with these employed minors which has resulted certainly in one valid conclusion—that is, that the traditional courses and traditional methods of education can not be successfully applied if we are to meet the needs of working children. On the other hand, we have encountered certain objections. Before we can proceed successfully, these objections must be removed or else we must hold that they are valid.

Perhaps the most commonly raised objection is that these children are unable to find employment; that employers refuse to hire them because of the required school attendance. I think that we can say with confidence that this is not a valid objection. When such cases do arise it requires only a little help on the part of the continuation school to solve the problem. An experiment conducted last year in Jamestown, N. Y., throws an interesting light on this matter of part-time children. The school authorities there, discovering that 45 out of a total of about 400 children then attending continuation school were without employment, decided that they would enforce the "20-hour clause" which makes it possible for the local boards of education to compel minors who are temporarily out of regular employment or service to attend part-time school for 20 hours per week. The 45 children referred to all claimed that attendance upon part-time school prevented them from securing work. But as soon as this 20-hour clause was announced all but 17 secured jobs at once. Jamestown has found out a job can be secured for every boy or girl who is ready and willing to work. Then we have those who object, not to the continuation school principle, but to the required attendance being in the daytime. I have yet to find a school executive who would agree that it was fair that night-school attendance should be made a condition to employment. But we all know that there are certain selfish employers who would refuse to employ children who elected to go to day school. Night-school attendance would thus in effect become compulsory.

The same source of information points out that the State of New York once had compulsory night schools, and that they were abandoned primarily because the city superintendents of schools argued that it was impossible to enforce attendance, and that night classes were unfair to the children.

It has been argued that attendance upon night school should be recognized as a substitute for day continuation classes.

Only a few cities in the State maintain registered and approved night high schools, and these cities can well afford to maintain day continuation high schools which have been registered and approved. The cost will not be any greater, if as great, and the instruction will be more effective.

During the past three years emphasis was placed on the working out of an effective program for the 14, 15, and 16 year old group, as the law requires, by September, 1925.

The State department is now making a study of some 45,000 continuation-school children. This study will furnish a great deal of valuable information which will be helpful not only to the continuation schools but also to the full-time schools. It will give a good picture of the occupations in which these children are engaged, their earnings, their interests, how they spend their leisure time, what the schools have done to help them in connection with employment, how well they can write and spell, and a variety of other things.

The director says that the cooperation of every superintendent of schools in the State is needed in the work of developing the continuation-school program; that suitable buildings and special equipment are essential for the successful guidance and training of these young people; that the services of trained and devoted teachers are demanded if the continuation school is to accomplish its purpose; and that the continuation school is worth while in those communities where it has had an opportunity to function.

The number of students in part-time schools is steadily increasing year by year. There were 30,236 in 1920-21; 48,538 in 1921-22; 51,198 in 1922-23; 89,104 in 1923-24; 110,566 in 1924-25; while for the past year, 1925-26, the registration reached 128,919. During the past three school years attendance has been enforced in respect to the 14, 15, and 16 year old group. The fact that during the past year almost 40,000 more children were enrolled than in 1923-24, when the present basis of enforcement was inaugurated, is a clear indication that the program is better understood than it was and that enforcement is becoming easier.

In addition, courses on the alternating plan of one week in school and one week in employment have been organized at the Haaren, Newton, and Bushwick High Schools. A number of firms are taking five or more pairs of these students.

The work carried on by the Opportunity School at Denver, Colo., is an outstanding example of the service that can be rendered by a school organized to offer part-time and evening instruction. Industrial courses are offered in automobile mechanics, vulcanizing, bricklaying, carpentry, drafting, electricity, welding, machine-shop practice, blue-print reading, paper hanging, plumbing, printing, show-card writing, and beauty-parlor trade. During the past few years additions to the list of industrial subjects have been made at the request of specific industries. The new building permits special housing and equipment for each line of work.

There is no upper age limit for entrance, but as the Colorado compulsory education law requires attendance until the age of 16 unless the eighth-grade work has been completed, a minimum age

was set at 14. The law also provides that the school may accept children of any age who are unable to read and write.

attendance of 16 is required. The ages of the students range from 16 to 70 years. No formal entrance requirements are set up. The plan is to make it easy for any individual to enter and to secure the particular instruction that he needs. Opportunity is given each individual to undertake the work he wishes provided he is qualified to carry the course successfully.

A student may enter at any time during the school year. A course is outlined into definite units. For the completion of each unit of a course the student receives a certificate for the work he has accomplished. He may receive a diploma for the completion of all the units of a course. Every effort is made to adjust the work and the hours of instruction to meet both the needs of the student and his free time. Programs are arranged for a few hours of instruction per week, for alternate weeks, for alternate day and night classes; for intensive work of eight hours per day, for a few weeks, or for months. This school maintains excellent library facilities, and for the first five months of 1926 the circulation of books was at the rate of 6,500 volumes per month.

A unique program in apprenticeship training has been put into operation by the Thornton Township High School at Harvey, Ill., in cooperation with the various manufacturing plants of that place. Harvey is a typical manufacturing city of about 18,000 inhabitants. There are 16 plants in Harvey, which employ from 100 to 1,500 men each, representing about 30 trades. A lack of skilled workmen was experienced, and the Thornton High School became interested in the training of apprentices to meet a definite community need. Each apprentice is indentured to a manufacturing company by a form known as the Harvey community apprentice indenture, which sets forth the agreement between the employer and the employee and his parent or guardian, and states that the apprentice is to attend classroom instruction for eight hours each week under the supervision of Thornton High School.

The school serves a twofold purpose. Through the process of natural selection and elimination in connection with his school work it assists in placing the proper individual in a definite apprenticeship and during the period of apprenticeship gives him school work which is directly related to his job. Each apprentice receives the same training in a given trade regardless of the manufacturing plant to which he is indentured. All forms used, such as report cards, control charts, etc., are uniform throughout the plants.

Each plant maintains an apprentice supervisor whose duty it is to see that the apprentices in his plant follow the schedule of the work as outlined in their contracts with the firm. In all plants the apprentices to a given trade receive the same training experience. If one plant does not have all the equipment necessary to give the

apprentice the experience called for in his training schedule, an interchange is made of the apprentice with a plant which has the necessary equipment for the period necessary to cover that part of his training schedule. The vocational director of the high school acts as district supervisor of apprentices and as coordinator between the school and the various plants. The apprentice receives full pay for the hours spent in school, provided his school work is reported to the plant as being satisfactory.

Three classes of apprentices are provided for: (1) An apprenticeship of four years for those pupils who have completed the eighth grade; (2) an apprenticeship of three years for those who have graduated from high school; and (3) a special apprenticeship post-graduate course of two years, including work in all departments of the plants, for the purpose of training sales engineers and department heads.

The course of study laid out by the school is a varied one. The following subjects are taught: Applied mathematics, pattern making, machine-shop practice, electricity, English, chemistry, physics, and strength of materials. In addition, each apprentice is required to carry on a reading course which is directly related to the machine or process which he is working on in connection with his job in the plant. Thus, instruction in the school is directly related to the work in the shop.

It is interesting to note that the present cooperative plan between the public schools of Pittsburgh and the industries for the training of apprentices is largely the result of the work of the committee appointed by the Pittsburgh Personnel Association in 1924, to investigate the training of apprentices by having them alternate in periods of two weeks between school and industry. This plan was adopted and had for its aim not merely providing industry with ordinary factory workers, but the development of skilled tradesmen with training on the high-school level. The studies carried on by the committee convinced them on the one hand that the average school shop is unable to develop a skilled tradesman competent to take his place as a journeyman on the job or to give the necessary trade atmosphere found in the commercial shop, and that on the other hand industrial plants in general do not afford the opportunity for training in the technical and trade-related subjects necessary to produce workmen to fill the highly skilled and technical jobs in industry.

Assuming that the success of the part-time plan depends largely upon the type of boy selected to fill the apprenticeship position and the degree to which the active sympathetic cooperation of the employer is secured in providing the necessary shop experience and in aiding the school to make its work effective, personal interviews and

conferences were held during the summer of 1925 with plant executives and department heads. By this means arrangements were made with a number of the leading industries in Pittsburgh for the employment of nearly 100 part-time apprentices. The applicants to fill the part-time positions were interviewed and selected with the aid of the teachers in the two vocational schools to which they were assigned later. The requirements for selection for a part-time apprenticeship training are: Over 16 years of age; physically qualified for the trade represented; completion of at least the eighth grade of school and good averages for the last semester's work; one year at least of school shopwork in the particular trade or allied trade; and willingness to become a tradesman in the employ of the company which provides him with his training.

The part-time apprenticeship course covers three full years of alternation between school and industry, followed by one year of full-time employment. Apprentices are paid only for the time spent at work. The minimum entrance wage is fixed at \$12 per week, with an increase of \$1.50 per week every six calendar months until the apprentice begins to work full time. All increases after that time are arranged by the apprentice and his employer.

Twenty-five of Pittsburgh's largest industrial plants are cooperating with the public school in this work, and the apprentices are distributed through 32 shops representing the following occupations: Machinists, electrical-meter testers and repairers, electrical-parts repairers, molders, pattern makers, draftsmen, plumbers, carpenters, coremakers, gas-meter repairers, upholsterers, and sheet-metal repairers.

Although the minimum age for entering part-time apprentice training is 16 years, the average age has been very close to 17 years. The minimum educational qualification also has been exceeded, the average grade of education completed being 9 A. The majority of the apprentices have also completed more than two semesters of school shop.

A large number of industrial organizations throughout the United States are maintaining educational courses of their own or have arranged with educational agencies to offer courses to their employees. In addition to any instruction carried on by industrial plants there is a growing tendency among industrial concerns to develop an agency within their plants to encourage the employees to carry educational courses in outside institutions that will make for their up-grading in the lines of work in which they are employed. For example, the Consolidated Gas, Electric Light & Power Co. of Baltimore has an educational director and maintains a library, with an office force for this type of service. Arrangements are

made with educational institutions and the public school for enrolling employees in special courses. The company arranges for giving financial aid in the way of tuition. The educational director receives periodical reports on the work that each student is doing, and exercises in a friendly way his influence for the encouragement of the employee in his studies. An excellent feeling has been developed among employees for this service and the company's efforts are received favorably.

The Ford Motor Co., at Detroit, according to a published report, maintains five educational departments and has a present enrollment of 4,500 students. There are 160 full-time instructors. The Henry Ford Trade School is maintained for boys between 12 and 18 years of age. The school enrolls 1,800. One hundred and eighty of these boys are orphans, 750 are sons of widows, and 400 are sons of Ford employees. Each boy receives at the start \$7.20 per week, and in addition receives \$2 a month for a savings account, and is given a hot luncheon daily. In addition, there are scholarships for thrifty boys. Including the various holidays there are approximately five weeks' vacation with pay. It is estimated that the boy's work is worth \$1,000 a year to the company. The Ford apprenticeship school enrolls men between 18 and 30 years of age. The company is now training 1,200 tool makers in a course covering three years. The service school gives a two-year course for service in the foreign field, and has 350 men enrolled from 30 different countries. There are 1,525 special students enrolled in classes in metallurgy, metallography, mechanical drawing, and mathematics. A group of research students from the scientific school, law school, and divinity school of Yale University spend their summer vacations in the Ford plant. They are routed through different departments and thus by direct experience obtain some valuable information relative to industrial problems.

Part-time education, representing as it does a new scheme in education, is confronted by many problems and present practices are subject to many criticisms. Further study and experimentation are necessary in order properly to evaluate its place in the school program. To what extent and under what conditions, on the one hand, should the program of the full-time day school be modified to meet the needs of those pupils who tend to drop out after they have reached the age for which working permits may be granted, and to what extent and under what conditions on the other hand should the needs of these pupils be met by developing a program based upon the working and learning plan are problems that will require time to solve. Comparative studies are needed from which inferences may be drawn for the organization, administration, and instruction in part-time work so that it may function most efficiently.

VOCATIONAL TRAINING FOR DISABLED CIVILIANS

During the past two years much has been accomplished in the further development of plans for carrying on the work of civilian rehabilitation under the administration of the Federal Board for Vocational Education. Previous to the enactment by Congress in 1920 of the civilian vocational rehabilitation act, there was no Federal agency to aid in the rehabilitation to economic efficiency those individuals who, on account of physical disability due to accident or disease, were wholly or partially incapacitated for earning a living. Several States, however, had compensation laws designed to ameliorate the economic straits of those meeting with accidents in connection with their occupational pursuits. There were, also, in the various States many philanthropic and charitable associations which were active in providing aid and comfort to those unfortunate ones within their boundaries to assist them to find reemployment in a type of work that they could do. However, to get a comprehensive and effective program under way there was needed some Federal agency to stimulate, coordinate, and direct the work. Such an agency was provided by the national civilian rehabilitation act to be administered by the Federal Board for Vocational Education. Under the provisions of this law a definite sum of Federal money is made available each year to cooperate with the various States in "the promotion of vocational rehabilitation of persons disabled in industry or in any legitimate occupation and their return to civil employment." The joint fund provided by the Federal Government and the cooperating State may be used only for tuition, training expenses, and industrial supplies. It is not available for physical restoration or for maintenance while in training. For the fiscal year ending June 30, 1926, there was a total expenditure for civilian rehabilitation work of \$1,272,877.30, of which \$578,847.33 was Federal money and \$694,039.97 was raised within the States. The total number of individuals rehabilitated for 1926 amounted to approximately 5,600.

The law is broad enough in its meaning to cover every class of disability whether congenital or caused by accident or disease, provided the disabled person may be reasonably expected to be self-supporting after training. Forty of the 48 States are now cooperating with the Federal Government in providing this type of training. The past two years has seen an increasing interest on the part of the State and local community in perfecting ways and means for carrying out the intent of the law. The State of Utah and a few other States have, in connection with their school enumeration, taken a census of all the disabled persons within the different school districts, and have furnished this information to the administrators in charge

of the rehabilitation work. More cases with various types of disability are now receiving training. Public interest is also increasing, and the local and State authorities in many places are receiving gifts and assistance in the reeducation of the disabled civilian.

VISUAL EDUCATION

During the past two years visual education aids to instruction have been greatly increased and extended to the work of industrial education. The experiences of industrial schools which have been experimenting with visual forms of education is to the effect that motion films and slides are a valuable means of providing certain types of technical instruction, for creating proper attitudes toward industrial life, and for giving broad appreciation and understanding of industry in its various forms. Where the instruction deals with a continuous production process, or with the development and application of various forms of energy to mechanical appliances and equipment, or with the subject of large scale production, the motion picture is preferable to the slide. Slides are particularly useful for group instruction where the subject matter deals with materials for which it would be difficult to use either the materials themselves or models or sections. Moreover, slides are less expensive to produce and they can be made by the individual schools and prepared by the instructors to meet their particular needs.

Several hundred reels of educational films suitable for use in industrial classes are now available through individual industries which have produced them, or through motion-picture companies devoted to the production of industrial films, or through distributing agencies. Many industrial films may be had for school use for the cost of transportation. Industrial films are frequently used to show the source of raw material and methods used in obtaining it, safety methods and devices, production methods and manufacturing processes, production operations, various steps in the production and marketing of an industrial product, and the care and use of an industrial product.

Much of the success with motion films for industrial classes depends upon the plan the school has developed for their use. The Essex County Vocational School for Boys, Newark, N. J., has worked out a detailed plan for the use of motion pictures. One instructor is put in charge of the work and made responsible for the entire program. He determines the sources for school films, keeps a card catalogue of all available films which are desirable, makes a folder containing all the useful information for each film selected, makes out the program for the use of films and sees to it that a film is available when wanted, and instructs the teachers in the use of films for class purposes.

The experience of this school indicates that better results are obtained when the students are prepared for what they are to see. Instructors, therefore, are required to furnish their students with the necessary information beforehand for an intelligent appreciation of the film. Each student is then required to keep notes upon the films used in connection with instructions in his particular line of work, the same as he is required to keep notes on his laboratory work. In the course of one year this school has shown approximately 90 titles. Part of these were shown in the assembly, the others were shown in connection with the work in English, science, chemistry, electricity, printing, bricklaying, automobile practice, machine-shop practice, pattern making, foundry practice, tile setting, heat treatment of steel, masonry work, carpentry, and storage-battery work.

Motion-picture films have been used with much success as a basis for instruction in the part-time classes of Jackson, Mich. Each film is previewed and a set of questions pertaining to it developed and given to the students before the picture is shown. In addition to the value the picture has for instruction in industrial subjects, it serves as content material for academic work. Answers to a series of questions in English, science, mathematics, history, and economics, based upon the picture, are included in the work done in English and mathematics.

Thousands of films have been made for use in the industries. In fact, the use of the motion-picture films in the industries has become almost unlimited. Many industries have prepared special pictures for the purpose of teaching their employees methods of cooperation, production, safety, and the conserving of materials. Some have also developed films for the purpose of showing the use of their plant products and to promote sales. Many of these films are of great value for industrial schools and classes. They include such subjects as railroad operation, steamship transportation, production of oils and gasoline, the manufacture of refractory materials, the use of electricity in the home, production of steel, and the manufacture and repair of storage batteries and their use.

The Bureau of Mines of the United States Department of Commerce has, in cooperation with trade associations and industrial firms, taken some industrial and some educational films showing for the most part mining and refining processes of minerals. The United States Department of Agriculture has a large number of films at its disposal, a few of which have to do with industrial work.

TEACHER TRAINING

Experience as a skilled mechanic is a necessary qualification for a shop teacher of a vocational subject, and many of the best shop teachers are recruited directly from the trade. As few experienced

tradesmen have had courses preparatory for teaching, it is necessary, in most instances, to make some provision for training in methods of instruction, after a tradesman has entered upon employment as a teacher. Moreover, improvement in instruction is a responsibility of supervision and must be assumed as a part of a continuing program for increasing the efficiency of teachers. A number of States, during the past two years, have modified their teacher-training programs more definitely to meet the needs of teachers already in the service.

The State department of public instruction of New Jersey conducts special classes and holds conference hours at certain points to give instructors assistance as they need it. In cooperation with the State department, provision has been made whereby the vocational schools of Essex County, N. J., have set up specific salary schedules and definite training requirements for teachers in its part-time and evening schools. Two salary rates are provided for such teachers, a \$5 and a \$6 rate for a two-hour session. New entrants into the teaching work may be placed on the \$6 schedule provided they meet the requirements set up for this salary. The requirements in teacher training for the higher salary rate include:

1. The preparation of a list of 15 lesson topics, stating definitely under each topic what the pupils are expected to know or be able to do after the lesson, that they did not know or were not able to do before.
2. Preparation of a set of lesson plans consisting of three detail plans and 10 brief outline plans, developing these in a form similar to a given model.
3. Satisfactory answers to 15 questions on teaching methods and principles.
4. Observation of one lesson in shop work and one in class work and reporting on forms furnished.

The requirements are practical in every way and the results show that the instructor is not only able to do a better job of teaching, but to do it with less effort.

The all-day teachers in Essex County sign a contract which includes a clause stating that the director may require not to exceed 60 class hours of professional improvement during the year. In practice about 30 hours have been required. No definite course including a layout of instructional material to be covered has been attempted. Each instructor is given the privilege of submitting what he considers the most valuable improvement work for his needs and if the director feels he has made a satisfactory choice he is allowed to carry out the program proposed. The programs vary all the way from graduate courses at New York and Columbia Universities to working during the summer vacation at the trade he teaches

in the day school. Professional improvement credit may also be earned by work on certain features of the school program. During the year 1926 there was carried on a program of curricula revision for the all-day work. The board of education passed a resolution stating that any instructor who did satisfactory work on this program would be given credit for having fulfilled his obligation under the contract for professional improvement work. However, this work resulted in stimulating a number of instructors to carry courses in curriculum revision in some teacher-training institution. The State department also put on a special course in curriculum construction which a number of instructors attended. Fifty-four of the county's day vocation teachers worked on this curriculum revision problem. There are more than 100 all-day teachers carrying courses conducted by teacher-training institutions.

One of the most important developments in industrial education—namely, the general shop—is in great need of adequately trained instructors, teachers of great initiative, teachers who have had a wide range of experience in a variety of crafts, and teachers who can apply their skill in an elementary way in the construction of projects adapted to pupils of varying abilities and interests. The normal schools and colleges have not been able to cope with this new situation in supplying good general-shop teachers in sufficient numbers to meet the need. As a result many communities have not yet reorganized their work on a general shop basis.

One of the great difficulties in organizing a general shop is getting the class started. It is here that many a teacher finds he is not a general shop teacher. No matter how well a teacher may know his subjects or how successful he may be in the manipulation of tools and materials, he must be efficient as an organizer to start simultaneously a group of probably 24 boys, in from four to six different kinds of work. The solution of this problem is the individual lesson sheet which can be placed in the hands of the pupil along with materials to meet the requirements of the problem which he is undertaking. If the lesson sheet is used and a few brief demonstrations given, the entire class can be put to work and the teacher can circulate from group to group or from individual to individual, with a criticism here, a check there, or a suggestion where most needed, leading an entire class enthusiastically into its work.

The general difficulty encountered is that of securing individual lesson sheets in sufficient quantities to carry on the work. One lone teacher in the time available can not write enough to supply even a portion of the subjects which should be covered. There are on the market many valuable sets of lesson sheets relating to different kinds of work, but experience has proved to many who have tried to use them that not all are adapted to particular situations which

arise in different localities and under different conditions, and therefore are inadequate.

The Indianapolis public schools, in cooperation with the teacher training division of Purdue University, have evolved a plan whereby manual training teachers already in service can be given general shop teacher-training work. Before the class was started there was a well-defined plan for the work. At least two semesters of work on an extension class basis are provided. Seventeen lessons are given in each semester. The work includes manipulation of tools and materials in the construction of projects suitable to pupils of the seventh and eighth grades, reading and research relative to the problems involved, and the preparation of individual lesson sheets which are suitable to place in the hands of seventh and eighth grade boys.

Three different kinds of work are undertaken each semester with teachers who are specialists in specific lines, the teachers working under the supervision of and according to plans prepared by a professor from Purdue University. Of the 44 teachers employed in the grade school manual training work, 33 attended the first meeting of the class and became members. At this meeting the aims of the general shop were set forth and discussed. The next four meetings were held in the sheet-metal shop at Technical High School, with the vocational teacher of sheet-metal instructing; the following three meetings were held in the pattern-making room of the Manual Training High School, with the pattern-making teacher instructing. The ninth and tenth meetings were held in the foundry at Technical High School under the direction of the regular foundry teacher. Castings were made from patterns developed in the preceding lessons. The next four lessons were carried on in the vocational electrical department with the head of the department in charge. Bell-wiring diagrams and the wiring of simple lighting circuits were undertaken. Lessons 15 and 16 were held in the teachers' room in the administration building. These lessons were devoted to a general summing up of the work of the semester preparatory to the final examination which was given during the seventeenth lesson.

Three types of lesson sheets have been prepared—namely, information, operation, and job. The information sheets have to do with information about materials and about the subject studied. The operation sheets set forth in logical order the manner of performing fundamental practices. The job sheets consist of four parts: First, a general statement of what a job is to be (in other words, a specification); second, the order of procedure, the operations step by step to complete the job; third, questions which will help a student to evaluate his own work; and, fourth, questions which will test a student on the information and operation side of his work.

In preparation of the lesson sheets the same subjects were assigned to at least two persons, with instructions that they were to work independently of each other. From these lesson sheets a composite was made, using the best from each. These final lessons were mimeographed and distributed to the members of the class. At the end of the semester each member of the class possessed 55 information sheets, 46 operation sheets, and 28 job sheets. All the items covered had direct bearing on the subjects and projects suitable for use in the general shop.

The work of the second semester consisted of a unit of sheet-metal work, a unit of foundry work, and a unit of concrete work. As in the work of the first semester the projects undertaken were suitable for use in the seventh and eighth grade shops. The work of the third semester consisted of two units of work, one on design and construction of woodworking projects, the other on wood finishing. Ninety-six lesson sheets were prepared during this third semester.

SUMMARY OF PROGRESS FOR THE BIENNIUM 1924-1926

1. Increase in the number of shop courses in both elementary and high schools.
2. A marked tendency to offer compulsory industrial arts courses in grades seven and eight.
3. A growing tendency to discriminate more definitely between manual arts courses and vocational courses, with a growing recognition of the former as a part of the general education program and of the latter as a special form of education.
4. Marked increase in the number of schools offering some form of part-time and apprenticeship work, the number of such courses, and the number of students enrolled.
5. A great increase in the number of schools offering an occupational information course and setting up some kind of guidance machinery.
6. Increase in the time of the school program allotted to manual arts work.
7. Increase in the enrollment of all types of industrial and manual arts courses.
8. Increase in the use of visual aids for instructional purposes.
9. The development of shop work on the itinerant teacher basis together with the extension of shop courses to pupils in rural and village communities.
10. The rapid increase of general shop courses as a form of shop organization for industrial purposes, especially for the required courses in the junior high-school grades.

11. Occasional efforts toward the reorganization of teacher training work in teacher training institutions to meet special needs of manual arts instructors, especially for such new types of work as represented by the general shop teacher.

12. Continued change in the emphasis of instruction in manual arts courses from that of skill in the use of tools and machinery to that of industrial intelligence and developmental experiences and general elementary, fundamental, manipulative abilities for general education values, including guidance.

13. A growing recognition on the part of those charged with the responsibility for organizing vocational industrial and manual arts courses of the advisability of treating the vocational industrial courses as special forms of education, strictly for employment purposes, and enrolling in such courses those students who should have training preparatory for entering upon employment in some specific trade.