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## FACILITIES FOR INDUSTRIAL EDUCATION.

CHARLES A. PROSSER.

Secretary National Society for the Promotion of Industrial Education.

IN the discussion of the topic "Facilities for Industrial Education," the term "industrial education" as distinguished from manual training will be used as meaning a course of instruction for boys and girls between fourteen and eighteen years of age who, while being trained for good citizenship as well, are at the same time being prepared for successful service as wage-earners in agriculture, household arts, or industry. Wherever facilities for manual training or training in the practical arts as a part of a general education are discussed, this will be indicated.

Those who are attempting to bring about industrial training in their communities find themselves confronted with two great difficulties: the lack of funds, and the lack of knowledge, in this new field where the work is to a considerable extent yet experimental, as to the kind of training which is necessary in order to fit boys and girls properly for wage-earning careers. School authorities find it almost impossible to secure funds which they need in order to meet the new duties and responsibilities in the general education of the child which our day is thrusting upon them. This not only requires state and national aid to stimulate and encourage local communities everywhere to take up practical education, but makes it necessary also that the work should be begun on a small scale and, unfortunately, many times without proper facilities for carrying it on successfully.

The course of study and the method of instruction in the work cannot be arrived at by the theory of the schoolmaster from within the school but must be determined as the result of the study of the particular industry for which the school attempts to prepare the child. In many lines of industrial education today we do not know with sufficient clearness what should be given the child to justify us in carrying on the work on a large scale. We do know, in part at least, what should be done in training girls in millinery, dress-making, machine operating, and to a considerable extent at least, for home-making. We do know what we should do in training boys for woodworking and metalworking. We do not know, for example, what we ought to do as yet in training children for textile working and shoe working.

These considerations make it necessary that school systems should proceed on an experimental basis in dealing with different new groups of children who are to be trained and with new lines of industry which we have not yet entered with practical education. Only in this way can the school learn the kind of plant and equipment necessary in order to deal with the problem on a larger scale.

#### THE QUESTION OF THE PLANT FOR INDUSTRIAL EDUCATION.

Sometimes the training is given in a separate school and sometimes in a department of the regular high school. Where the work is given in a separate school, three kinds of plant are to be found in this country:—the special building erected for the purpose usually by an issue of bonds; the old factory building remodeled for the purpose; and the abandoned schoolhouse which has outlived its usefulness for general education and is remodeled to serve temporarily for industrial training.

The Williamson Trade School near Philadelphia, and the Wentworth Institute at Boston, which are private endowed schools, the Worcester, Massachusetts Trade School for Boys, and the Milwaukee Trade School for Boys, which are publicly supported, are quartered in special buildings planned for the purpose. See Fig. 1. This seems to be a wise and safe course to pursue in cases where the local authorities are certain that they know just what kind of building is needed to meet the local situation. It insures proper conditions for doing the work from the start. There is danger that the building will not meet the changing conception of the service which the school should give its pupils. Experience seems to show that where a special building is erected for giving industrial education it is advisable to build it one wing at a time, each wing being devoted to some one feature of the work, and wings being added from time to time which are adapted to meet the needs of the school.

The New Bedford and Springfield, Massachusetts Independent Industrial Schools and the Industrial School at Rochester, New York, occupy old factory buildings which have been remodeled so as to provide for a time at least fairly adequate accommodations for the school. See Fig. 2. This method of housing the work is one which can be resorted to successfully in communities which are not yet ready to issue bonds in order to provide a special building, or the school authorities of which have not yet determined just the kind of plant they need to meet their changing ideas of what the school should do. The plan has some excel-

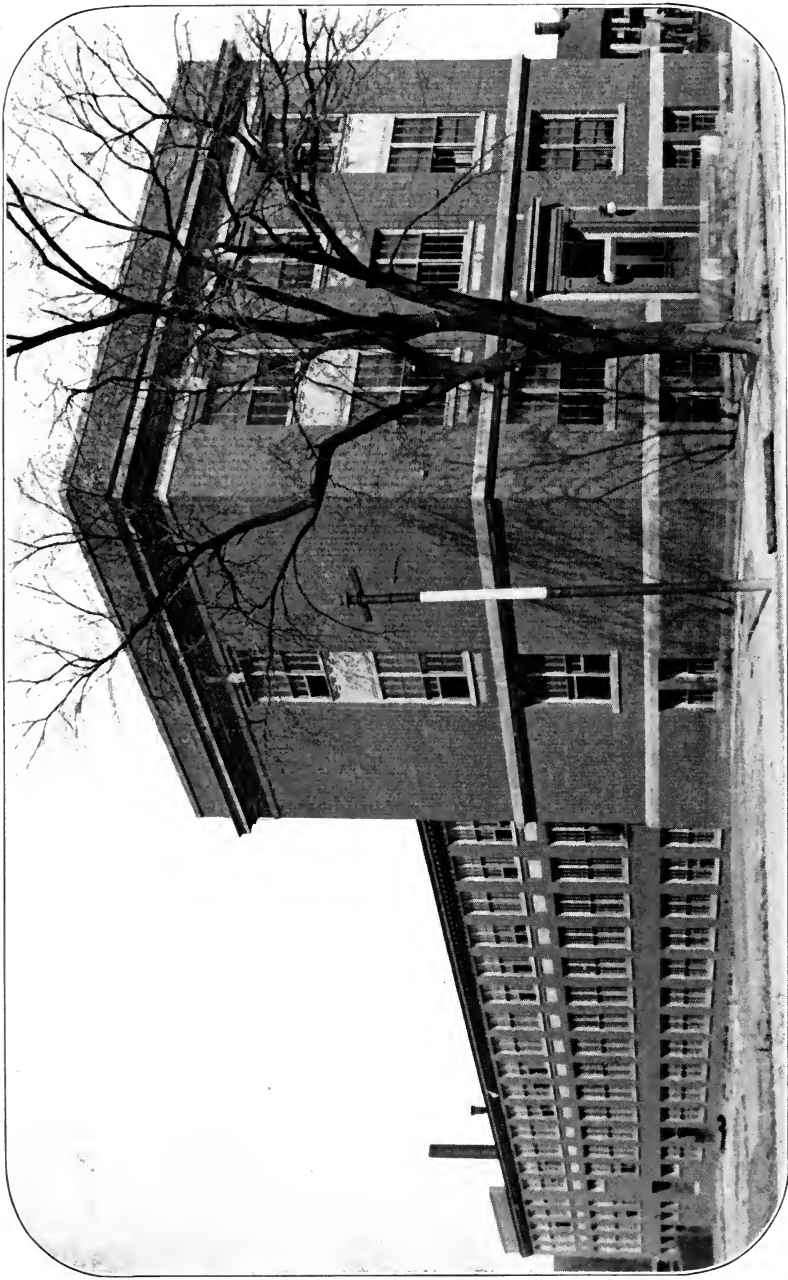


FIG. 1. WORCESTER, MASS., TRADE SCHOOL FOR BOYS. THE WORCESTER PEOPLE ISSUED BONDS AND BUILT A SPLENDID NEW BUILDING AT THE OUTSET.

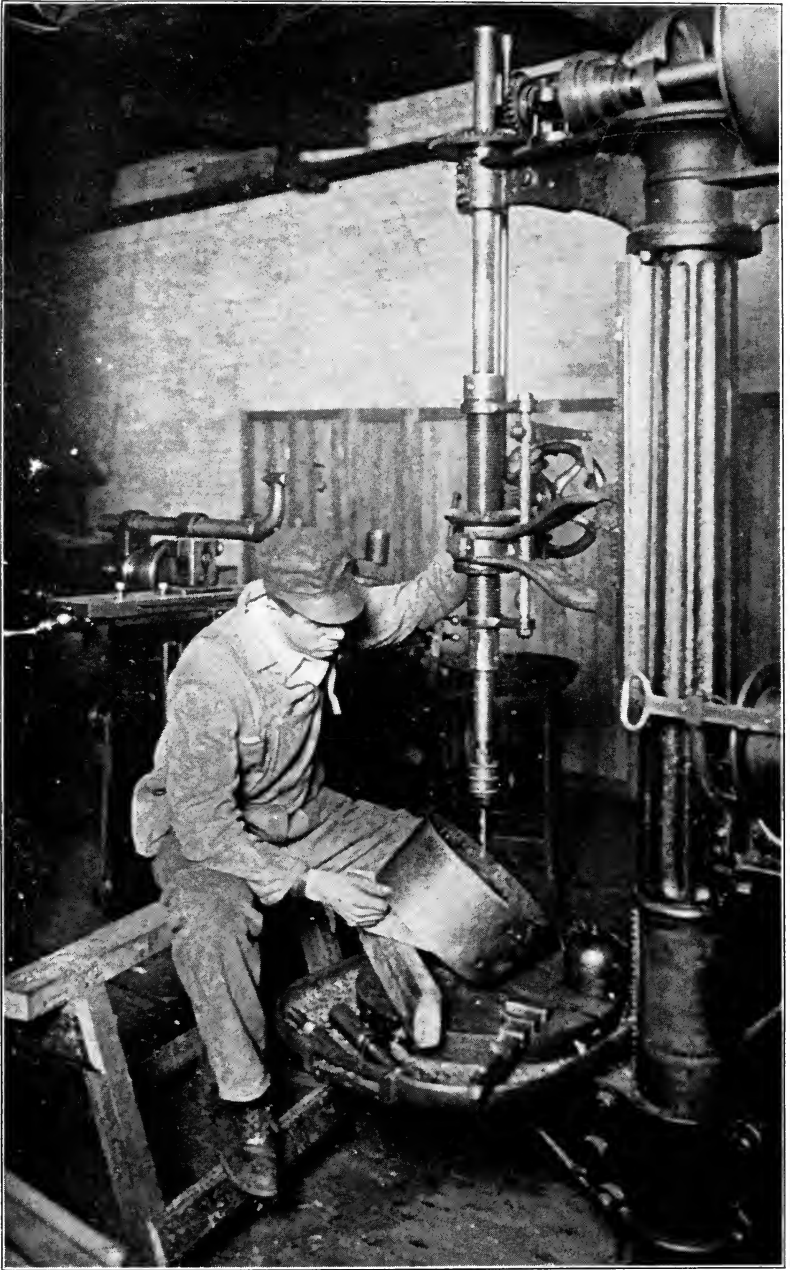


FIG. 2. MACHINE SHOP, NEW BEDFORD, MASS., INDUSTRIAL SCHOOL FOR BOYS. AN OLD FACTORY BUILDING HAS BEEN MADE TO SERVE AS A SCHOOL.



lent features to commend it. The rent for the old factory is small. Plenty of floor space is usually secured. The school has from the start an air of reality and commercialism that appeals to many children who desire to go to work. Alterations in the building are readily and cheaply made. Changes and additions to the building and the installation of fixtures and equipment afford an excellent opportunity for productive work of a kind not offered by the special industrial school building. See also Fig. 3.

The factory building, however, is usually poorly adapted for school purposes. Sometimes the location is bad; usually the lighting is poor and the heating arrangements inadequate. Such buildings should probably be regarded as a makeshift or device to be used for a period of, let us say, from three to five years as the first step in the introduction of industrial education in the community.

The Newton, Lowell, and Somerville Independent Industrial Schools, of Massachusetts, are quartered in old schoolhouses which have been remodeled. See Fig. 4. This method of introducing industrial education is good when the community is carrying on a small experiment or beginning in the work. The expense for rent of the factory or issue of bonds at a time when this might be burdensome to the community is avoided. School authorities are able to find out thru this kind of small beginning what should be done on a larger scale with any kind of training. An opportunity is given to prove the worth of the work before larger public funds are asked for. Public sentiment is created in favor of the new kind of education and the public becomes accustomed to the presence of the new kind of education and the need of its adequate support by the community.

Abandoned schoolhouses, however, are poorly adapted to the work. The lighting is always poor; the rooms are not the right shape and size; the construction of the building is not adapted to the use of machinery; the building does not appeal to the children from any standpoint. See Fig. 5.

Experience shows that, on the whole, the best methods of establishing a school, in the order of their desirability, are:

- (1) The special school fully equipped;
- (2) The old factory building remodeled;
- (3) The abandoned schoolhouse remodeled.

The chances are that some of the states will attempt to solve the problem of industrial education in separate departments of the regular

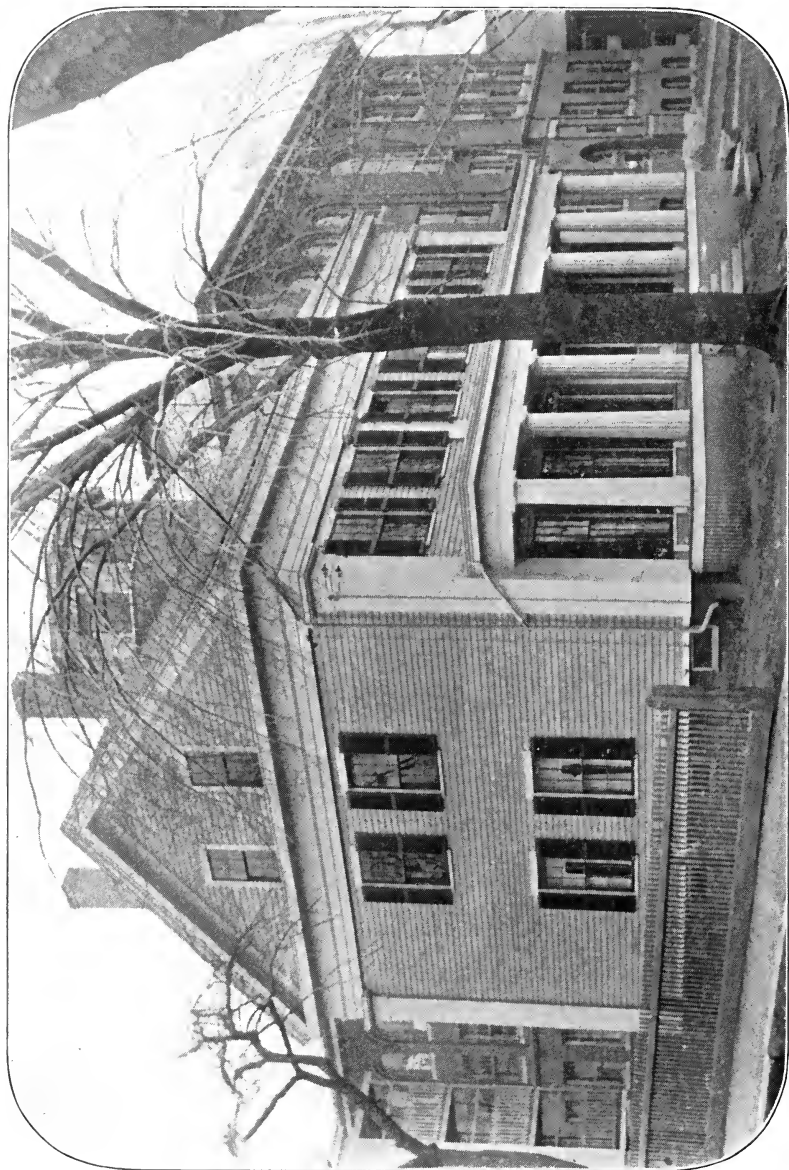


FIG. 3. SOMERVILLE, MASS., INDUSTRIAL SCHOOL FOR GIRLS. AN OLD RESIDENCE HAS BEEN FITTED UP FOR SCHOOL PURPOSES.

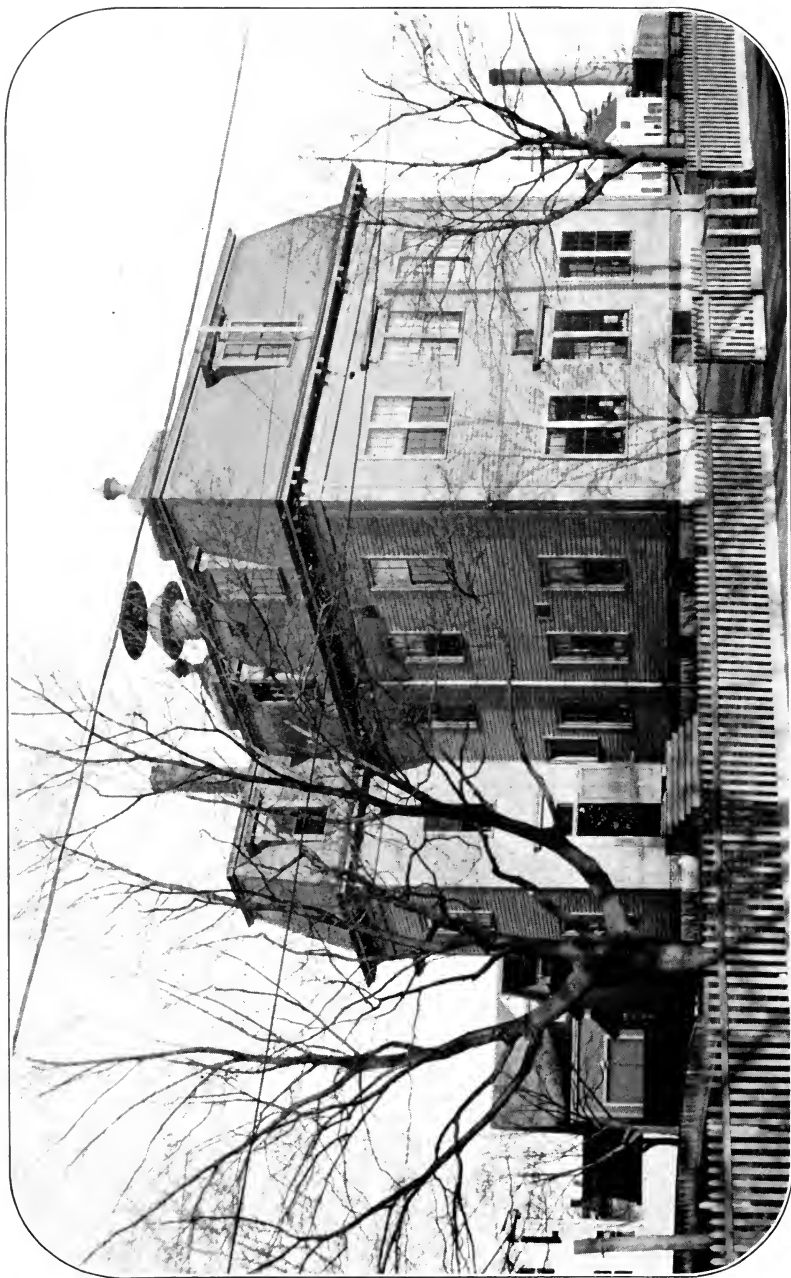


FIG. 4. NEWTON, MASS., VOCATIONAL SCHOOL, AT NONANTUM. ADAPTATION OF AN OLD SCHOOLHOUSE FOR AN INDUSTRIAL SCHOOL.

high school. The Page Bill, providing federal aid for vocational education, leaves it optional with the states in the exercise of their autonomy to use federal money for industrial training in separate schools or in departments of the regular high schools, or in both. There can be no doubt of the fact that at the present time, because of the academic traditions of the regular high school, the chances for effective work in practical education are much better when it is given in a separate school with a separate principal, separate teachers, separate courses of study and equipment. It is probable that twenty-five years from now, as the result of the experiments that are now being carried on whereby standards in effective training are being worked out, many high schools will be able to do good work in fitting boys and girls for useful employment that would not do so now. At any rate, there is great need for the development of liberality on the part of the regular high school in dealing with this problem and for the approach to it always in the experimental spirit.

Where vocational training is attempted by the regular high school, certain conditions need to be created if the work is to be done successfully. The door of the industrial education department should be open to the fourteen-year-old boy able to take the course even if he has not graduated from the elementary school. He is the boy who usually is going into the industries to be a machinist, a carpenter, an electrical worker or a printer. In the development of the service to these wage-earners, the high school must learn to follow the boy to the industry and thru a part-time arrangement with the employer bring him back for a portion of his working week for the training he needs.

In most places, at least, the teachers who give the instruction in such a department of the high school must be teachers with preparation, experience, and sympathetic point of view different from the equipment of those who teach in the regular academic departments of the school. Teachers of industrial or trade work should have had successful experience in the occupations taught. Teachers of the technical and academic work should have had sufficient contact with the industries for which the children are being fitted to enable them to understand and to deal successfully with the kind of boys and girls they must handle. The academic work must be of a kind entirely different from that which is given to those who are fitting for college.

There should be an absolute differentiation in the industrial or vocational training from that of the regular high school in all practical and

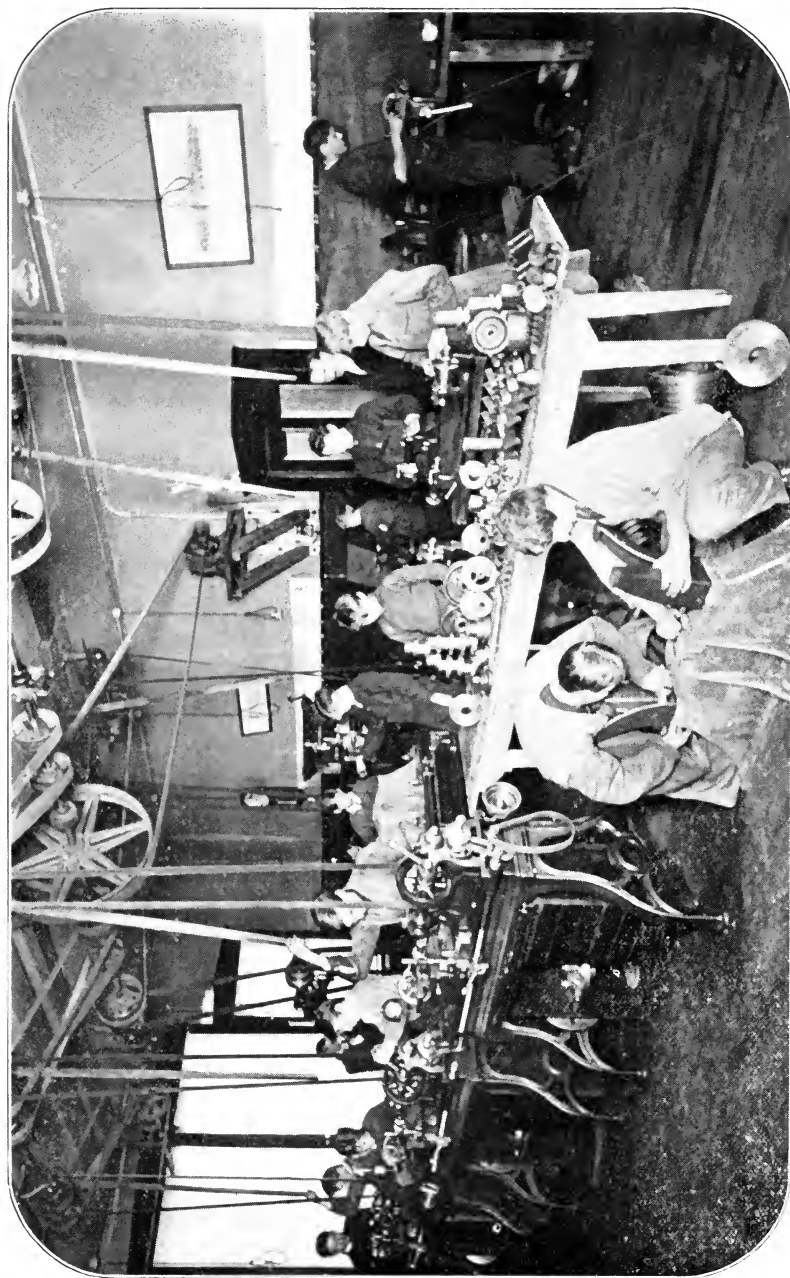


FIG. 5. MACHINE SHOP, NEWTON VOCATIONAL SCHOOL. SPACE FOR MACHINE SHOP FLOOR WAS SECURED BY REMOVING WALLS AND ENLARGING ROOM IN AN ABANDONED SCHOOLHOUSE.

technical work at least. The departments of industrial education should be under a separate department head who is an expert in the work. He should be regarded as an expert by the principal of the high school and the superintendent of schools, and under him there should be a corps of teachers especially adapted for the kind of instruction which needs to be given.

While the children of the department of industrial education might well participate in the social activities of the school, the best results will be secured where their training is given in a distinct wing of the building erected or set apart for this purpose. The difference in the character of the work which they are carrying on requires such a separation for much of the day.

#### THE QUESTION OF EQUIPMENT FOR THE WORK.

It is an unfortunate thing for an industrial school to have a complete building and equipment turned over to it at the outset. If the pupil is to be adjusted to meet the demands of the industry, his training must be real. If it is real, it must be given in a productive shop, making useful things that can be utilized in the school system or sold on the open market at or above the market price. See Fig. 6. Schools giving training in such subjects as woodworking, metalworking, electrical working, can readily find use for the work of the pupils either in the building itself or in the school system. Every school should make a part of its own equipment. This has been done by most of the industrial and trade schools. See Fig. 7. Enough equipment ought to be bought at the outset to start the work. Sometimes an equipment sufficient to give the first year's training is bought, after which the pupils are able to make most at least of the tools and machines and facilities necessary for their further training in the following years.

Where schools find themselves with limited resources at the start, much secondhand equipment for use in the first year of the work at least, can be bought that will serve its purpose well. In the other years of the course, it is necessary to secure the very latest and best machinery so that when the boy leaves the school he will be familiar with it and can take his place in the shop successfully.

One of the handicaps under which the school shop must always labor is that of keeping its machinery from time to time fully abreast of the best equipment of the commercial shop. It is doubtful whether this can be done altogether successfully. Under the stress of competition,



FIG. 6. WORCESTER TRADE SCHOOL FOR GIRLS. GARMENT-MAKING CLASS WORKING ON CUSTOM ORDERS. THE WORK IS BEING CARRIED ON IN A BUILDING FORMERLY USED AS A DORMITORY FOR WORCESTER POLYTECHNIC INSTITUTE. THE EQUIPMENT WAS CONSTRUCTED IN THE BOYS' TRADE SCHOOL.

the commercial shop changes its equipment from time to time. The school without such competition is very likely to remain content with machinery that is behind the times. This is one of the strongest reasons why the part-time scheme of education that enables a boy to get the most of his practical training in the industry itself promises to be most effective in dealing with the great body of wage-earners between fourteen and eighteen years of age.

Many enthusiastic supporters of part-time education have been led to claim that all the equipment the school needs in dealing with the wage-earner for the time which it demands away from the shopwork is a teacher, a textbook, a blackboard, and some desks. In their enthusiasm they fail to recognize the conditions under which most of those who are employed in the industries labor. Large scale production, extreme division of labor, and the specialized machine have supplanted the artisan or tradesman with the machine-worker. The old trades in which men were able to get experience with all the different tools, machines, and processes of their callings are rapidly disappearing. Modern industry does not give the worker a chance to get a broad experience in working with different machines. The typical boy who comes to the part-time school will be one who is spending his entire time at one machine making one small part or portion of the final output of the factory.

The schools must always take the boy as it finds him and give to him the training he needs. In giving part-time instruction to the worker at the specialized machine, the school must provide under the school roof, if it is to meet modern industrial conditions, a sufficient amount of equipment to enable the boy to get the elementary practice and experience at the machines, with the tools and in the process which the shop denies him and which is necessary to his insight, interest, and growth in the occupation. Every experience goes to show that a minimum amount of equipment under the school roof is necessary as a teaching device which will make it possible for the teacher to closely correlate or connect the instruction which he is giving with the shop processes as they can be illustrated on the machines.

One great mistake which many manual training and technical high schools have made, and which industrial schools are in danger of making, is that of providing a large number of tools and machines of one kind rather than a smaller number of different tools and machines. There are manual training and technical high schools in this country where in order to carry on the teaching of pupils in groups enough metal lathes





FIG. 7. NEW BEDFORD, MASS., INDUSTRIAL SCHOOL FOR BOYS. FENCE ENCLISING GENERAL ATHLETIC FIELD UNDER CONSTRUCTION BY INDUSTRIAL SCHOOL PUPILS.

have been secured to provide one for each pupil in the largest section which the school handles. This policy requires both an enormous building with many different shop rooms and a large outlay of money for equipment for the work, much of which is unnecessary and dooms the school forever to a system of training where the pupil is taught by the exercise rather than the job method, where individual instruction has no place, and where the pupils are handled entirely in groups. The same amount of money put into a more varied equipment would enable the school, whether it be a manual training school or industrial or trade school, to deal with the pupils individually so as to give each a wider range of experience with different machines, substitute the individual for the group method of instruction, and to approach more nearly the conditions of real shopwork so necessary in the proper training for success in the industries.

Many are coming to believe that training in the practical arts for boys and girls between twelve and fourteen years of age in order to uncover taste and ability is a necessary part of a program of vocational guidance and direction. If children are to find out what they would like to do, and what they are fitted to do, this training in the practical arts should, during the two years from twelve to fourteen, bring the children in contact with experiences drawn from many different callings. A course in woodworking alone only determines whether or not the boy would like to follow woodworking and whether he could do it successfully. The same is true of a course in metalworking alone. The school day should be lengthened and not less than three hours per day given to training in the practical arts in which the boy is subjected to a series of jobs, projects, enterprises, or experiences drawn from woodworking, metalworking, electrical working, printing, bookbinding, gardening, leather working, clay modeling, etc. This work should be given not with the expectation that it is to meet trade standards but for the purpose of giving the boy an insight into the occupations among which he might choose a life work.

If such a scheme as this were carried out, instead of having a carpenter shop filled with carpenter benches and a printing shop full of printer's cases, the school shop would be equipped with a small number of tools and machines necessary to give in an elementary way experiences in different occupations, and the progress of the boy thru the work would be stated in terms of experiences which he would carry on individually, drawn from these different lines of employment. Such a varied

equipment would not take any more room than that now occupied for straight courses in wood or metal and would cost no more than the amount which is now devoted by school authorities to the purchase of duplications of the same kind of equipment for some one line of work which does not provide any test of the pupil outside of that one line and which does not afford any data upon which an intelligent choice or advice could be given to him at the age of fourteen when he is facing the question of what he shall do.

Doubtless in these early years of its growth industrial education will have a difficult time to secure its fair share of money necessary in order to secure the proper plant and equipment. If the public wants schools that will better serve the needs of its children, it must give more money by taxation for their support. When the public comes to feel, as it is coming to feel strongly, that it is not only as wise but as equitable to train the many for successful service in life as it is to train the few for professional and technical leadership, it will find the way and the means by which vocational education will receive at least as liberal support as that which has been given to the general education of those over fourteen years of age who are fitting themselves for college and professional careers. It is probably fortunate at the present time, when industrial education is finding its field and the kind of training it is to give for different callings, that it is being checked in a too rapid development, which would be fatal to its final success, by the lack of large resources with which to carry on work that now needs to be approached carefully, cautiously, and experimentally.





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