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Modern Tendencies in Technical Education

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Modern Tendencies in Technical Education.

Harry Knowles.

Class of 1899.

Modern Tendencies in Technical Education.

During the past half century statistics inform us that many European countries- especially those on the continent, and particularly Germany and France- have excelled the United States in technical pursuits to such an extent that their manufactures have found a ready market in this country in spite of the tariff. This is due not so much to their superior manufacturing plants as to the excellent technical instruction in their schools. Until recently the subject of technical schools has aroused little interest in this country, and the interest now taken is due not only to the reason above mentioned but to the modern applications of electricity and the general inventiveness of the age.

It may be well to explain what is meant by technical education as used in this paper. The term should include school and shop work in such a way that handicraft is associated with theory. The following definition is taken from a government report entitled "Art and Industry". "Technical education is the teaching of a specific art or trade, or instruction in elementary science bearing on all arts or trades and the training of the hand and eye, which together facilitate the acquisition of any art or handicraft".

Such training assumes three phases of development; Manual training, in which the purpose of the instruction is to train the mind of the pupil in connection with his hand and eye; Technical colleges, having courses to fit the graduates to become successful overseers and managers in the kinds of business for which they may prepare themselves; trade schools, in which youths are taught special trades and are instructed to become artisans.

In the United States technical education has developed principally along the lines of manual training and technical colleges. The terms manual training, and work-shop practice are interchangeable, being phrases applied to similar instruction in different countries.

The birth of the manual training school in America dates back to 1871, when the Whittling School was established in Boston. This primitive attempt was soon followed by the introduction of Eloyd into the Dwight Public School of the same city. Boston was not long alone in this innovation; other prominent cities quickly followed her example until now every large city has her manual-training school, at first supported by private subscription, now maintained by taxes and municipal appropriations.

The aim of these schools is to offer such courses as will sharpen the intellect and develop natural aptitudes; to create an interest in technical matters, and to teach the student the skilful use of tools.

The morning sessions are devoted to such subjects as are usually studied in a high school; in the afternoon, instruction in manual training is ordinarily given in laboratory periods of two or three hours each; in the evening, classes in drawing are held and some lectures are given as well as instruction in all other branches for those whose work prevents them from attending the day sessions. There is also some teaching by correspondence, certificates being granted to those who complete the courses and successfully pass all examinations.

Since the curriculum in all such schools varies but little, the Manual Training School of Washington University, at St. Louis, may be taken as an example. This opened in 1880 with a class of fifty pupils. "The object of this school shall be instruction in Mathematics, Drawing, and the English Branches of a High School Course, and instruction in the practice and in the use of tools. Tool instruction to include: Carpentry, Wood-turning, Pattern Making, Iron-chipping, and Filing, Forge work, Brazing and Soldering".

The course of study covers three years and the time of the pupils is about equally divided between mental and manual exercises. Woodwork is taken during the first year; ironwork, during the second; and machine-shop practice, during the third. Drawing is emphasized as the basis upon which all further training in the technical arts must be laid and one hour each day is given to it. Two hours are spent at shopwork, making

a total of twelve hundred hours of manual labor in the course, or one hundred and twenty days of ten hours each. Physics, chemistry, and biology are taught throughout the course, the student specializing in the one which bears most upon his particular subject. A certain amount of mathematics- trigonometry, solid geometry, and higher algebra- is required, as is also one modern language, with English literature and composition.

The success of the school has been marked. A report of its governing board in 1888 showed that all of the one hundred and forty-two graduates were filling excellent positions. It is found that the graduates of such manual-training schools are eminently superior as apprentices to those who have had no such training, because they know the use and care of tools and machines. The school turns out every year a number of students who not only know how carpentry and similar work ought to be done but who have a taste for it themselves, many making excellent artisans.

The technical college is but a step higher than the manual-training school. Its scope outside of a general college education, is to offer advanced courses in chemistry, physics, architecture, and the departments of engineering. Technical colleges are supposed to fit their students for professional positions in certain technical branches, as supervisors, inventors, or teachers.

Thus far America has been very successful in establishing and

maintaining her manual-training schools and technical colleges. Much inferior opportunities are open to laboring men for perfecting themselves in their trades. Technical education has taken this line in its development abroad; the technical schools being institutions where the practical side of such arts is taught, and men are trained to become skilled artisans. England profited much by the report of an investigating committee on educational matters, instructed to visit various manufacturing centres on the continent, and to report on the way in which they maintained their supremacy in those arts in which they excel. This inquiry showed that a city's prosperity was effected by the establishment of schools for the working class, giving special instruction and technical training bearing on the principal local trades.

All large cities which have a particular interest in any technical business maintain one or more schools offering instruction in that art. The management is wholly under municipal control and independent of the local school boards. The funds are taken from the excise duties and sometimes as much as £100,000 is annually spent.

Manchester and Birmingham have the most complete system of the cities in the United Kingdom. The former, besides many important engineering schools, maintains a great spinning and weaving school, where every branch of those industries is taught, thereby giving Manchester the means to support her supremacy in the textile industries. The ob-

of the school is stated thus: "The principal object of the municipal technical school is to provide instruction in the principles of those sciences which bear directly or indirectly upon our trades and industries. The aim of the school is distinct from that of the university colleges, inasmuch as it is designed to teach science solely with a view to its industrial and commercial applications, and not for the purpose of educating professional scientific men". Instruction is mainly in the evening, to accommodate the laborers and apprentices who are taught all branches of engineering and all building trades; commercial and artistic subjects; also science and literature.

Other cities have similar institutions, adapted to their particular needs. Nottingham has founded schools of weaving, dyeing, designing etc; Oldham and Huddersfield, of cotton and woollen manufacturing respectively. A mining town like Swansea, has schools of metallurgy and mechanical engineering. Hansley and Burslem, both pottery centres, maintain schools of technical science, and decorative art; while a carpet town like Kidderminster, supports a school of design. In Glasgow several colleges have been united into the "Glasgow and West of Scotland Technical College", where 20 thousand working artisans are instructed in shipbuilding, chemical and textile industries.

Educators support technical training for the following reasons:

(a) The students are desirable as laborers, because they have regard for

to tools and machinery they use. (b) A fondness for scientific books and periodicals is developed. (c) Courses in technical training often stimulate a liking for intellectual pursuits. (d) The student attains a higher degree of usefulness.

The greater progress of countries maintaining technical institutions is evident in many ways, some of which may be briefly noted; new streets are made by improved methods; new industries are developed; more artistic and better ventilated buildings are erected. The influence in elevating the producing class and the popularisation of education are very marked as well as the diminution of crime. Nations become better able to compete successfully in manufactures by means of educated labor and technical skill, which are the best elements of defense for any country against trade competition, in that they promote excellence of execution, inventiveness and enterprise.

Although some trade schools have been founded in this country by private energy and the government has also established institutions to investigate the sugar industry of Louisiana and to give instruction in stock raising in the West, it is safe to say that if the United States wishes to make the best use of her vast possessions, she should favor a more general establishment of trade schools.