production during the present century. Whilst the changed conditions of production, consequent mainly on the appli­cation of steam power to machinery, demanded a special training for those who were to be engaged in produc­tive industry, the prevalent system of education was not adapted to the requirements of these persons, and schools were wanted in which the necessary instruction could be obtained. Other circumstances resulting mainly from the application of steam power to machinery have rendered technical education necessary. Production on a large scale led to a great extension of the principle of the division of labour, in consequence of which it was found economical to keep a man constantly engaged at the same kind of work, since the more he practised it the quicker and more skilful he became. Thus employed, the workman learned little or nothing of the process of the manufacture at which he assisted, or of other departments of the work than the particular one in which he was engaged, and his only opportunity of acquiring such knowledge was out­side the workshop or factory in a technical school. The economy effected by the division of labour led to the extension of the principle to other industries than those in which machinery is largely employed. There are many trades in which manual skill is as necessary now as ever, but even in these the methods of instruction prevailing under the system of apprenticeship are now almost obsolete.

In many industries, including trades in which machinery is not as yet extensively employed, production on a large scale has increased the demand for unskilled labour, numbers of hands being required to prepare the work to be finished by a few artisans. Rapidity of execution is attained by keeping a workman at the same work, which after a time he succeeds in mechanically perform­ing, and continues to do until some machine is invented to take his place. In most trades, as formerly practised, the master employed a few apprentices who assisted him in his work, and who learnt from him to understand the details of their craft, so that, when the term of their appren­ticeship was over, they were competent to practise as journeymen. But now the master has neither time nor opportunity to instruct young lads, and the old relation of master and apprentice is changed into that of capitalist and workman. In consequence of these altered relations between employer and employed, there is an acknowledged want of properly trained workmen in a number of trades in which skilful hand work is still needed ; and in these trades a demand has arisen for technical schools, or some other substitute for apprenticeship, as a means of suit­ably training workmen and foremen. The ever-increas­ing competition in production has led to the employment, in many trades, of children to do work of a mechanical kind requiring little skill; but, whilst thus employed, these young people have little opportunity of learning those parts of their trade in which skill and special knowledge are needed ; and when they are grown up, and seek higher wages, they are dismissed to make room for other children. Numbers of young men are thus thrown upon the labour market, competent to do nothing more than children’s work, and to earn children’s wages, and knowing no trade to which they can apply their hands. To remedy this, by creating some substitute for the old apprenticeship, is one of the objects of a system of technical education.

A complete system of technical education should provide necessary instruction for the different classes of persons engaged in productive industry. It is usual to divide these persons into three classes :—(1) workmen or journey­men ; (2) foremen or overseers ; (3) managers or masters.

The industries in which they are employed may be grouped under four heads (1) those involving the use of extensive machinery, such as iron and steel manufacture, machine making, the textile industries, and some of the chemical trades ; (2) those which mainly require the use of hand tools, as cabinet-making, brick-work, plumbing, and tailoring ; (3) those depending on artistic skill, as wood and stone carving, metal-chasing, decorative work, and industrial designing generally ; (4) agriculture in all its branches. These industries will be referred to as manu­factures, handicrafts, art industries, and agriculture. The foregoing classification comprises groups which necessarily, to some extent, overlap one another. Every factory con­tains a carpenter’s and smith’s shop, and handicraftsmen of group (2) are required in every manufacturing concern. Whilst the industries in which hand labour is exclusively employed are becoming fewer and fewer, there are many trades which, owing to the frequent invention of labour- saving appliances, are passing gradually from the class of handicrafts to that of manufactures. In these trades, of which watch and clock making and boot and shoe making may be taken as examples, there is still a demand for goods largely if not entirely produced by hand work. In such trades, owing to the absence of facilities for instruction in the ordinary shops, there is a want of skilled hand labour which there is an increasing difficulty in satisfying, and to supply this want technical schools of different kinds have been established. Then, again, there are many branches of manufacturing industry which greatly depend for their success upon the designer’s art, and it is necessary that the industrial designer should possess a knowledge of the pro­cesses of the manufacture in which his designs will be utilized, as well as of the properties and capabilities of the material to which they will be applied. Indeed, it is the possession of this knowledge which mainly distinguishes the industrial designer from the ordinary artist. To determine the best training for such designers is one of the problems of technical education. There are many trades, too, in which the handicraftsman and the designer should be united. This is the case in such industries as wood-engraving, metal-chasing, and silversmith’s work. In these and other trades the true artisan is the artist and handicraftsman combined.

In order to reconcile some of the different views which are held as to the objects of technical education, it is necessary to keep in mind the broad distinction, above referred to, between the conditions of production on a large scale, as in, those industries in which goods are manu­factured by the use of extensive labour-saving machinery, and in those trades in which hand work is chiefly em­ployed. Much of the diversity of opinion regarding the objects of technical education is due to the difference of standpoint from which the problem is regarded. The volume of the trade and commerce of Britain depends mainly on the progress of its manufacturing industries. It is these which chiefly affect the exports and imports. The aim of manufacturers is to produce cheaper and better goods than can be produced by other manufacturers at home or abroad ; and technical education is valuable to them, in so far as it enables them to do so. But the artisan engaged in hand industries looks to technical education for the means by which he may acquire a know­ledge of the principles of his trade, which the absence of the system of apprenticeship prevents him from acquiring in the shop. Hence the artisan and the manufacturer approach the consideration of the question from different sides. To the spinner or weaver who almost exclusively employs women to tend his machinery, or to the manu­facturing chemist whose workpeople are little more than labourers employed in carrying to and fro materials, knowing little or nothing of the scientific principles under­lying the complicated processes in which they are engaged, the technical education of the workpeople may seem to