

connection with our technical classes arises from the want of preparedness in the elementary work, and valuable time of instruction is wasted in giving information which ought to have been well grounded in elementary work.

There is one other point of great importance, and that is the necessity of our manufacturers and master tradesmen identifying themselves closely with our technical-education system. It is by the means of this education that they reap considerable benefits. There can be no question of the value of this work to them, neither can there be any question of the value to education if an interest is shown by those so intimately concerned. French and German employers largely recognise this fact, and in the latter country it is common in some industries to find employers giving their apprentices one and in some cases two afternoons per week to enable them to take advantage of technical classes. Some such arrangement, even if only half a day per week, would be of great advantage to apprentices. In Birmingham some two hundred and fifty apprentices leave work an hour earlier upon class evenings twice weekly to attend the well-equipped jewellery classes connected with the art school.

I suggest that conferences of the trades and technical authorities should be held, with a view to eliciting useful information as to the nature of the instruction required, the needs and requirements of the various trades, and the best means of encouraging young journeymen and apprentices. Such conferences will strengthen the position considerably, as it is only with the sympathy and help of the workmen and employers that technical education will be successful.

Germany attaches the utmost importance to science instruction in all branches of work. From various reports it is made apparent that the prosperous condition of manufactures in that country is due to the excellent schools provided at an enormous cost. In 1882 the British Technical Education Commission expressed an opinion that Germany had too many polytechnics. The reply to this has been a large increase of schools, upon the most modern lines, with every possible equipment for technical instruction—one of these institutions alone costing no less than £100,000.

*Apprenticeship.*—The apprenticeship system is now a thing of the past. Boys are now sent to a trade as improvers, and from improvers develop into journeymen as fast as they possibly can, in order to obtain the increased wage. No consideration, as a rule, is given to their fitness or knowledge. Apparently it is nobody's business to teach the boy—he must look after himself. Technical instruction is therefore a necessity if our industries are to flourish, and we are to keep pace with the world. The youth, then, must be taught the principles underlying his trade, and the best way of applying those principles. Industry and integrity are not the only capital now needed—there must be a certain amount of skill and knowledge displayed in connection with his daily work, and this may best be provided by our technical institutions.

Professor Silvanus Thompson thus describes the modern English apprentice: "He (the apprentice) is placed in the manufacturing workshop under a journeyman carpenter, who is supposed to look after him, but who, having his own work also, and not being paid to teach apprentices, nor, indeed, qualified to do so, loses no opportunity of neglecting him. The boy must do some work, so the first odd job that may be supposed easy enough is set before him; he has the very vaguest instructions given him, and nobody troubles to explain to him the difficulties he will encounter, or tell him how to overcome them. He spoils two or three pieces of wood before he has produced anything, and is simply sworn at or threatened with blows at each failure. Of instruction there is none, for the workman who ought to have instructed him could not do so if he would, and would not if he could, as he has no mind to be displaced by a clever young workman, who could do his work for less wages. So the lad learns, with weary months of aimless and unsystematic labour, to ape the tricks of the elder workmen, falling irrevocably into their worst methods, and acquiring their slang talk. He is, of course, a perfect slave to the inaccurate 'rules of thumb' handed down in the traditions of the shop. At first, before his hands have acquired any rude kind of skill, he is the common drudge—must run for one man's coat and for another's tobacco. From the moment when he has obtained some skill with his fingers he must be continually producing paying work, and so, without regard to that which would be best fitting for him for doing further work, he must drudge on, planing, moulding, or shaping legs of stools by the year together. He does not know how to describe his work; could not read his instructions aright if given him, as they ought to be, in the form of a working drawing, much less could he himself set out a working drawing for another to work by. So he grows up an uninstructed, uneducated, bad workman, and, having served his seven years of apprenticeship duly, cannot well be forbidden entrance to that haven of bliss, the union of his trade, where, having entered, he can claim to be paid at least as well as his fellow-workman. And this is apprenticeship."

Upon another occasion Professor Thompson, speaking of technical education, remarked, "A most important reform is that of utilising the faculties for instruction to develop breadth of view and capacity in those who are trained. This is all the more vital to the future of technical education because of the extreme degree to which the subdivision of labour has been pushed in many handicrafts. Formerly the apprentice learned a whole trade, nowadays the apprentice learned but a part of his trade. In many industries the result is deplorable. Men grow up capable of doing but one thing, and are dependent upon a wholly different set of men to finish what they have begun. The all-round hand is rare; trade suffers, workmen suffer. Technical education may do much to remedy this. Every effort should be made to give the student a broader view and practice of the craft in which he is engaged."

I feel strongly that it would be a great gain if the system of apprenticeship could to a certain extent be revived, a wider recognition of modern conditions of work being taken into consideration, together with the opportunities of instruction in technical schools. Possibly the most serious objection comes from the employers, who find many difficulties in regard to discipline and conduct of apprentices, and the responsibility of providing the instruction to the satisfaction of all persons concerned. I suggest, however, a trial of the apprenticeship system, say, in connection with the