

ing replaced by improved and simplified machines, and the new ideas and energies brought into play in the strenuous time of the war will continue to be exercised for long after the war.

One of the questions which rises to one's mind is that of how the training of our young engineers is to be affected in the future in view of the great development which has taken place in Great Britain in engineering trades, and more especially those trades which are affected by munition making, which have lately been largely handed over to unskilled labor and women labor, this labor having never served any apprenticeship, and, in fact, in a great majority of cases, the employees had never seen a lathe or a machine, but yet have been able to undertake operations which in the past were considered such as could only be properly dealt with by skilled and highly paid men who had gone through a full five years' apprenticeship. It cannot be expected that, on completion of the war and return to normal conditions that what has been demonstrated as operations which can be done by operators who had not any extended training should again be handed over entirely to only those who had served a long apprenticeship. What is more likely to come about will be that these operations will be left to be dealt with by a class of operators who will not be called upon to have served this long apprenticeship, and that the higher skilled operations and the supervising of the less skilled operators will be the work of those who have served a special training or apprenticeship. What, then, is to be done with regard to the apprenticeship of young lads to the engineering trades? It seems that it will not be fair to ask in the future that any lad who wants to follow engineering should go through the full five years' apprenticeship in the one shop, such as is now asked of him, but that some scheme must develop by which the training of engineers will be on a more technical and scientific basis, and in this way it will probably develop that engineers

will graduate in a higher class than ordinary mechanics and command a higher scale of wages than the ordinary operative. If, then, it is not necessary to have a full five years' apprenticeship in a workshop to train a skilled mechanic, what is to be done? It seems that a scheme somewhat on the lines which is being developed in Queensland promises the most success, the basis of the scheme being that in addition to the ordinary apprenticeship Governments should institute fully equipped trade day schools, by which any boy wishing to follow the higher branches of the engineering trade can be taught in a trade school and thus reduce the actual time of apprenticeship in the workshop—in other words, that a large part of the training should be done in a trade or technical school properly constituted and fitted out with proper teachers, and only a short time devoted to the actual apprenticeship in the workshop. Of course, this would necessarily require the division of all trades into two classes, one for the ordinary operations, the other for the higher branches, and a boy would probably have to settle for himself before starting out as to whether he was going to learn only the ordinary operations or aiming at something higher. If he was only aiming at the ordinary operations and looking for a quick return in the way of higher wages obtained early in life, then the trade school would not appeal to him, but if he was looking, as now a great many are, to the higher branches and higher wage to be earned as skilled operators, who would supervise ordinary operations, then the trade school would fill his requirement, and, by gaining a thorough education in more than merely actually operating machines or fitting work, he would get a sufficiency of the actual mechanical knowledge, while he would get a very largely increased education in the theoretical side as well as the practical. It seems to me that this phase of the matter wants very careful thinking out, and an association such as ours might well make very good use of their organisation

to study the question and to submit to the Government and the educational authorities their advice on what lines the development should be effected, with a view of meeting the new conditions which will undoubtedly be set up as the outcome of the changes in engineering and production from machinery and other work through war conditions. My own opinion is that the old fashioned apprenticeship of five years, where a boy was allowed to go into a shop and no one took any particular care or attention as to whether he learned or did not learn, and was perhaps allowed to go to a technical school in the evening occasionally without any great interest being shown by employers, must give way to a much more organised and carefully arranged method of training.

There is also the question of what is to be done between the period of a boy leaving school, say, at 14 years of age, and the ordinary time for starting apprenticeship, say, 16 years of age. I believe the Education Department are considering this matter, and I think it would be wise if your Council could look into this and find out just what is in the mind of our educational authorities.

I only throw out the suggestion as a sphere in which the interests and energies of the members of this Association and its Council could be very usefully engaged.

I have endeavoured to call your attention to a few of the observations which have occurred to me during my visit to England last year, and in doing so may have laid myself open to the criticism that I have said nothing on the side of general engineering development, but the reply to that is that nearly all commercial engineering is set aside for war work, the whole engineering profession is engaged on work required for the furtherance of war—in fact, the energies of the whole nation are directed to the work of prosecuting it. One meets with little or no interest when trying to discuss general work, and, in fact, very soon after reaching

England a visitor himself soon becomes of the same mind. It is not possible for anyone who considers himself a Britisher to be in England for more than a short time to keep from being interested in the same manner, and to make every other interest secondary to it. How could it be otherwise when every night, as soon as sundown comes, in every city, town or village in England or Scotland all lights are shaded, blinds must be drawn, streets in darkness, and each individual becomes liable to penalties if he causes any contravention of the law by allowing even a chink of light to show outwards. All building construction is stopped throughout the country, anything exceeding £500 in cost is an offence to undertake without permission, and permission is very seldom granted. Railway travelling is curtailed, and often held up to permit of munition trains passing or ambulance trains with wounded from the front. The countryside is dotted with training camps, the streets are full of soldiers, young men are conspicuous by their absence, and even on a quiet Sunday afternoon in Kent, a little way out of London, one can hear the boom of British guns in France.

One quite appreciates that we in Australia are so far away from the war centre that it is difficult to feel with the same intentness, but the lack of intentness is greater than it should be. Great things are doing in England, and we should be doing more here than we are, and an Association of Engineers such as this could, I think, help by taking some more active interest. Take the scheme for sending men home as munition workers to England. The British Government have asked for as many men as we can send, the need of them is urgent, and those who cannot go can help by extending their own efforts, working harder to make up for those who do. We should also urge on the Federal authorities not to stop at the few hundred they have already authorised to be sent, but to send thousands; they will all be useful now, and a great asset on their return

with the experience gained of the developments in England. I ask the support of the members of the Association for the scheme.

There is need for more organisation of all available engineering knowledge and talent, and by placing at the disposal of the authorities our engineering knowledge and resources it might help our Government to make a start with some better organisation than at present, because, if men go in response to the appeal from Britain, certain industries may suffer, and the necessary ones maintained only by organising and properly utilising what expert skill remains.

I have several times heard the remark made that the sending of men to England now might be a mistake, because they may hardly be there before they will need to return if the war finishes soon. This should be corrected at once; there is no sign of an early finish of the war, the actions of the British Government do not give the slightest indication of it, but everything points to a long time yet to elapse before the need for men will cease. Britain is not easing up in her munition work. The foundations for many new national factories were being put in before I left England, which will not be ready for some time yet, and will require many thousands of employees. The women in England are going into the factories at the rate of 34,000 a month, but above all remember Germany is mobilising her civil population to work in munition factories just as energetically as we are, and, besides, is ruthlessly forcing the male and female population of conquered countries to work as slaves in her factories.

Germany has command of the iron mines in the north of France, and is each month increasing her output of pig iron.

In conclusion I wish to suggest that there is a great scope for the immediate utilisation of the energies of this Association in the collection and accumulation of facts by

obtaining copies of reports, newspaper extracts, etc., relating to the developments and changes now taking place as the result of the war. I suggest that, to assist in this, that the Government be asked to co-operate by maintaining in connection with the Agent-General's Office a highly qualified engineer, with knowledge of Australian requirements, part of whose duty should be to watch all these developments and send along full reports and information for the information of the manufacturing and engineering public. These reports will be invaluable in making us here in Australia to develop on similar lines of economical and increased output as will most certainly develop in England, and without such up-to-date information I fail to see how Australia is going to maintain a forward position. We have already allowed ourselves to drift too far out of the stream of the world's activities.

These changes, a few of which I have tried to briefly sketch before you, are going to have a great effect on all our future conditions, and what is developing now will inevitably lead to permanent conditions fixed by legislation, and the accurate knowledge which you could collect would be of great value to lay before administrative authorities at the right time. We have too long left the framing of laws to the professional politicians; it is time the business and professional men took some say in it.

The present Government in England is making a revolution in placing business and engineering men at the head of departments, and in positions that once were sacred to the politician. The precedent now being established and the lessons learned will have a lasting effect on industrial affairs, and as they will affect the well being of the engineering profession to its great development and advancement, I commend a study of these changes as a subject for your earnest attention.