PRESIDENTIAL ADDRESS.

By SIR ARTHUR DUCKHAM, K.C.B.

In making the first Presidential Address to our Institution there is no precedent to follow, there are no past happenings to summarise and use as a guide to the future, and the Institution being still in its early infancy, no tradition has developed, and, therefore, one cannot prepare an address on the ordinary lines. When I was asked to participate in bringing into being one more technical institution I promptly refused. The number of existing technical institutions, societies and associations is legion, and it seemed to me ridiculous to add another. However, taking further thought, and possibly over-persuaded by our energetic, and I might almost say virulent hon. secretary, I consented to join the small *ad hoc* Committee, and in time the Institution was launched. The new Institution had two attractions to me, the first that it might be the last straw that would break the camel of technical society's back, or, as it might be better put, our Institution might be that last addition to the already concentrated solution of technical societies that would cause precipitation; the second, that it would give a definite status to the body of men who must be responsible for industrial development in the future, that is to say, the chemical engineers.

I was listening recently to a speech by Sir Charles Morgan, the President of the Institution of Civil Engineers. He asked the question: "What is the need for so many institutions and societies?" "Why could not the parent Institution fulfil the requirements of the technical investigator and administrator?" The reason he gave was that specialisation had grown rapidly, and the lines of development were so numerous that no such Institution could adequately deal with the needs of its members, and provide occasion for the discourse and discussion of the many complex branches of engineering, chemistry and physics. Undoubtedly, the rapid increase of knowledge has led to ever-increasing specialisation in investigation and institutions, and societies have been formed in which men and women working on similar problems may meet to discuss kindred subjects, and by personal touch help on the work of technical development for the benefit of humanity. However, if we look at the records of any technical society we find that specialisation exists even there, and that comparatively few papers are presented which are of real interest and use to all members; and it will be found that those papers which are of general interest would have been of considerable value to a far larger audience than the members of the society in question. The rapid technical development that has taken place this century has largely been the work of specialists under direction. It is easy enough to provide what the specialist requires in the matter of technical institutions, but it is to the technical administrator or director that the legion of societies and institutions becomes an absolute burden. It is to this class of man that we must look for efficient and economic development. It is not possible that such a man should be an active member of all such societies as may cater for one or more of the lines of his activities, nor can he be expected to have intimate knowledge of the many branches of work that go to make the sum total of his responsibilities. Let us take, for example, say a gas engineer. Properly speaking, a gas engineer should be a member of at least six technical societies. He has to be responsible for excavation and foundation work, the design and erection of buildings, roofs, and steelwork structures, etc., the flow of liquids and gases in pipes, and many other phases of civil engineering. Then he should be a first-class mechanical engineer, capable of obtaining the most efficient results from power units, mechanical handling plant, repair and maintenance of works, etc. Then to be efficient he should have a thorough grounding in chemistry with specialised knowledge of those chemical processes present in a gas works. A close knowledge of ceramics and the properties of metals under varying conditions is necessary for the proper execution of his duties. With the present development of electricity he must know how to make the best use of it for his own purposes, and to intelligently enter the competitive field with his own product. Finally, inasmuch as coal is the basis of his whole work, he should keep in close touch with the methods of getting coal, the effect of its varying composition, the chemical and physical side of its carbonisation, and the various problems of solid, liquid and gaseous combustion. No one society caters for the requirements of such a man, and it is impossible for him to belong to, and take part in, the activities of the several bodies dealing with his interests.

Other examples can be taken with like results, and in considering such examples we must begin to realise that the present condition of affairs cannot continue. The technical administrator will gradually lose interest in the general societies, and will confine himself to taking part in the work of the society which specially applies itself to his own sphere. Thus, such institutions as the Civil and Mechanical Engineers, the Institute of Chemistry, the Institution of Electrical Engineers will gradually lose vigour, and such societies as for station electrical engineers, gas engineers, coke oven managers, tramway engineers, sanitary engineers, concrete engineers, etc., will gain in vigour, because they provide not only more valuable assistance to their members than the general societies, but better opportunities to meet men closely interested in the same lines of work.

To what end are we moving? We cannot go on as we are, we must attain some co-ordination between the varying societies, we must endeavour to prevent

the overlapping that exists, and, above all, we must try to eliminate the large amount of redundant effort that is apparent to-day. I would make the following proposals with due deference :—

That a committee be appointed composed of, say, two representatives appointed by the Council of each technical society to consider the whole question. I would suggest as a line of consideration, that all members of such societies as might agree to join together could become affiliated members of the other societies in the group whose work was of interest to them at a small annual subscription; that each society should continue as at present to publish its independent records of its proceedings, but that the group should publish a joint record of all papers and discussions of general interest that might be presented to any of the societies during the year. A committee representing the societies in the group should be formed to make the choice of the papers. Each affiliated member should receive the joint publication, and should have the right to attend the meetings of any society to which he was affiliated, and take part in the discussions.

A central building should be obtained to house the officials of the affiliated societies containing conference rooms, libraries, reading rooms, etc., to meet the needs of members. It might be possible to combine the existing accommodation owned by the various leading societies into this centralised scheme, and so make full use of existing premises. On considering the whole problem one realises its immensity, and I have but touched the fringe of the subject. I would strongly press the Councils of the various technical societies to consider the proposals to take steps to form a Committee of Investigation into the existing conditions.

The Institution of Chemical Engineers was founded because it is becoming more and more apparent that the technical administrator of to-day, and more especially of to-morrow, must have a wider training than in the past; he must be able to intelligently control both the specialised chemist and engineer working under him; and he must be able to efficiently supervise and develop processes based on both chemical and engineering facts. Many times in the short existence of the Institution have the Council endeavoured to describe a chemical engineer, and we have had great difficulty in approving applications for membership to ascertain whether the applicant was, indeed, a chemical engineer. We have come to the conclusion that a chemical engineer as such does not in reality exist to-day. We have good engineers who have a superficial knowledge of chemistry, and we have good chemists with some knowledge of engineering, usually gained in works experience of running processes, but the man with a thorough grounding in both arts and in the connecting art of physics practically does not exist. We are convinced that the technical administrator of the future must be a chemical engineer; efficiency and progress in the industrial world and in public services must depend on the sound and general training of the men who are to lead and control the forces under them, and the Institution of Chemical Engineers very fully realises this fact, and have, therefore, made their chief endeavour the proper training of the chemical engineer.

Now, to deal with the future of our Institution. We must justify our existence—membership will grow and our resources become stronger in the degree that we prove ourselves a living force in the industrial life of the nation. Education must be our chief concern, and we must work so that the diploma of this Institution, obtained probably through the approved examination of existing institutions, shall be the hall-mark of the technical administrator of the future. On the other hand, we must present material of such general interest to our members that we feel fully justified in spending the time and money demanded by this membership. It is moderately easy to obtain papers dealing with detailed observation on apparatus carried out by members of a staff keen on presenting the result of intelligent and accurate observation. An Institution, such as ours, cannot justify itself or subsist on this type of paper. What we require is that those men or firms who have been making studies of chemical engineering problems connected with improvements in manufacture, should come forward and make known and freely discuss their work. Gradually we are realising that the propagation of knowledge and the open discussion of our problems not only is to the general benefit but benefits the originator. How closely were works secrets and processes guarded before the War and during the War; and the outcome was great good to the nation with benefit and not, as was feared, detriment to the individual. Let such public spiritedness continue, and let our Institution be the leader in making it apparent. That is a matter I would press strongly. This work, continuing over years, by a thoroughly equipped technical staff, would be of the greatest interest to us in our discussions. Many of us are working on similar problems of very great interest in industrial life to-day, and I am sure that if members will bring forward these problems for discussion and will freely put forward their ideas, I am certain benefit will accrue all round.

Another way in which we can make the Institution a live factor is to organise a close relationship with the public schools, colleges and technical institutions, in which the chemical engineer of the future may be trained. The schoolmaster or professor is rarely in close touch with industrial life, and he is not often in the position to put vividly before his students the actualities of industrial life, and prepare him so that he may readily be absorbed into and assist industry. Our Institution should organise addresses by its members to the various institutions specially promoting the subject of chemical engineering, and, further, members should endeavour to assist the Institution in making arrangements for students to spend their vacations or other free time in works learning the essentials of industrial life and appreciating the essentials that make for success in the future. That is a point I would bring to your notice. During the past years I have been in touch with public education and its development, and I have found that in visiting public schools a boy at the school has practically no knowledge of what his

life in the future means, and what the problems are that he will have to face, and how he can prepare himself beforehand for the work he will have to take up. I am certain that we, as an Institution, could do most valuable work by getting our members with works knowledge, and the knowledge of actual production, to go into these schools and show the student exactly what is wanted of him in the future, what are the points that we come up against, and what are the factors that will turn to his benefit. I have found the very greatest interest in talking to public-school boys on these matters, and the greatest appreciation of these boys.

Finally, to make the Institution a living force, it is essential that the members of Council and officers should be in a position to devote time and energy to its interests. The men who hold such positions are usually men who have been successful in their lives and have many calls on their time. I have expressed to the Council many times my lack of fitness to hold the high and honourable position of President. I have definitely failed in the position when comparison is made with what could and should be done. I trust that succeeding Presidents may be in a more favourable position than myself, or will be willing to make greater sacrifices. The work to be done and the ideals to be attained are fine, and I look eagerly forward to the advancement and success of our Institution.