

## PRESIDENTIAL ADDRESS.

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*(Read before the Sydney University Engineering Society, on  
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In reviewing the position of this Society it is pleasing to note that during the present year the ordinary membership has increased from 251 to 274. Our Secretary and Treasurer must be congratulated upon the sound financial statement presented, and the Society is specially indebted to these two officers and their assistants for the manner in which they have carried out their duties. Mr. McKeown has resigned his position as Honorary Secretary, and is on his way to England. In his place we are to welcome Mr. Sutherland as the most recent addition to the staff of the Engineering School, also Mr. Hennessey, who takes up the position of Lecturer in Architecture in place of Mr. Sulman. We look forward to both these gentlemen taking an active interest in the Society.

During the year the Society has lost two of its members, Mr. Norman Selfe, well known from his distinguished ability as a Civil Engineer, and Mr. McCrae, a graduate who was among the many unfortunates in the recent appalling disaster of the Titanic. Such events make us realise most forcibly that as this Society progresses its members will be called upon more and more to take their part in the world's great events, be they successes or disasters. At the present time one of our fellow-graduates, Mr. Douglas Mawson, is pursuing his investigations in Antarctica, conducting scientific work which is attracting considerable attention from many parts of the world.

Many others of our members represent this Society in different parts of the world.

Meanwhile, our main body of graduates are gradually but firmly establishing themselves as leaders of their professions, and thereby creating opportunities for our coming men. The

prejudices against the so-called theoretical engineer are gradually giving way, and it is well for our younger graduates to remember that they owe a debt of gratitude to the pioneers who have made the path more or less easy for them.

As an officer of this Society, and at the same time a member of the staff of the School to which the Society owes its existence and from which it recruits its membership, I feel warranted in referring in this address to matters more particularly academic and to their bearings upon the futures of our graduates.

There are many matters in this connection which have received in recent years the close attention of different Engineering Societies in all parts of the world. It seems to be generally recognised that a University should aim at something more than the mere teaching of technical matters, which by themselves make a very poor sort of engineer, although, of course, they are of fundamental importance. Something more is required of the engineer who is to take a high place in the ranks of his profession.

His general character, clearness of thought and expression, general knowledge and taste and discipline of will all play a very important part in his career.

The engineer is frequently brought in contact with men whose interests are vastly different from his own; he is faced with the commercial aspect, he may have to deal with a board of directors or a council; in fact, he may have many tasks more difficult than those of dealing with a technical staff or an engineering problem.

It is undoubtedly the men who possess these varied capacities who are most sought after, who get the best opportunities, and who represent the profession in the broadest sense. They are to the rest of the world the spokesmen and representatives of the engineering profession. Such are the men who must find applications for engineering, and show the world how engineering can be of use to it, at what price and with what risks, and all in such a way as to instill confidence.

It should be the special function of a University to train such men, but the detail of the training will require great consideration. If one recognises with Thorndyke "that it is wasteful to attempt to create and folly to pretend to create capacities and interests which are assured or denied to an individual before he is born, that environment acts for the most part not as a creative force but as a stimulating and selective force," then we must encourage and make provision in a course for the development of those traits which may be acquired.

I look forward to the opening of the Union Building this year as an important event to Engineering as well as other faculties. The Union should be intellectually what the oval is physically, a congenial meeting-place for all faculties, and engineering students should recognise that they may themselves gain much and unconsciously impart much of value to others through its medium.

I think it is possible to make a more liberal arrangement of syllabus than that which exists at present without in any way lowering the standard of a Degree. Under existing conditions a student may take one of several courses in Engineering, and he must pass all his subjects for the year at the one examination before proceeding to the next year's work. I would suggest doing away with individual years, and placing only a minimum limit of four years on the course, so that, if he chose, a man might take as much longer as he pleased. Certain essential subjects would be specified in each department, leaving a certain number as options.

Finally, although the test in languages and literature as at present required at Matriculation may well be retained as essential to a Degree, it need hardly be considered as an essential for entrance to an Engineering course.

Situated as we are in Australia, in many cases at a great distance from the manufacturing centres, we are at present more frequently concerned with the application of manufactured articles rather than with their design, and consequently it is natural that our courses of instruction should differ somewhat from elsewhere.

In some ways this may be an advantage, as the courses need not deal so fully with the fine points of design, and greater attention may be bestowed upon principles, and I feel that the success of many of our graduates who have gone to Universities in other countries is due in no small way to this fact. As new subjects grow in importance it becomes necessary to sacrifice something, and in this process care must be taken not to deprive the courses of proper breadth, nor, on the other hand, to make them of too general a nature.

The indirect as well as the direct value of work must be considered, and specialization must not be gained at the expense of sound general knowledge. In the case of the so-called pure Sciences some modifications will be found necessary, as there is little to be gained by making the student cover the whole region of Science; rather should he gain a sound quantitative knowledge of those portions which directly concern his professional work.

It is essential that the system of training should consist, firstly, of a clear exposition of the fundamental principles of Science, and, secondly, of a study of methods of application of these principles to problems of very practical nature.

One of the present defects in our system of teaching is due to the fact that a student is given most of the principles in one course, and it is then left for him to deal with the applications at a later stage.

A more useful method would be one in which he was shown the practical applications of a principle as soon as that principle was understood in a general way; he would then understand the principle better, see the application better and be better able to appreciate the method of application. At present there is a tendency to remember the applications and forget the principles.

Leaving the University undergraduate courses, there is room for extension in the way of short graduate courses, such as are now well established in other countries.

Courses of from six to ten lectures given by the staff, or graduates who have had special opportunities in some of the more specialized branches of engineering, should meet with considerable support.

There is still the question as to whether the University should extend its teaching in Engineering subjects to evening classes.

Here we find ourselves beset with many difficulties. Such work would be costly, on account of the necessary increases in staff and maintenance, and if students were required to attain a reasonable entrance standard it is doubtful whether many would avail themselves of the opportunity of attending courses which it would take years to complete.

On the other hand, by reasonable co-operation with such an institution as the Technical College, it should be possible to cater to a certain extent to the demand for evening work.

It should also in the same way be possible to allow some exemption to a student who had gone through such work, so that he might complete his University course in a shorter time than the four years required of regular students.

A complete reorganization of the Technical College is to be looked forward to, as there is much valuable work for such an institution to carry out.

Its first object should be the thorough and systematic teaching of trade work, and its product should be a thoroughly equipped tradesman. From among these men a certain number should be given opportunities of continuing their work and proceeding to the University. In this way most of the present needs would be met.

In the equipment of the Engineering School, which may at first sight appear fairly complete, there is still much to be desired. We had fortunately been able to make some progress by the aid of a special Government grant for new equipment. This will enable more individual work to be carried out, especially in Electrical Engineering.

The Mechanical Engineering Department is making extensions in the direction of an internal combustion engine laboratory, and we may look forward to the installation of a steam-turbine equipment.

The nucleus will also be laid for a hydraulic laboratory.

There is need for considerable development in the direction of research. Greater facilities are necessary and more inducements. In this respect again we are fortunate in that a special vote of £1000 for Science Research Scholarships has been made by the Government.

A question which is becoming of more and more importance to the community is that of the maintenance of Standards.

This involves not only the keeping of necessary standards, but investigations in connection with them.

Other countries are fully equipped with such Standards Laboratories, and much work of considerable importance from a business as well as a technical point of view is carried out by them.

The Bureau of Standards, Washington, established in 1910, has in its custody the standard weights and measures of the United States. The Bureau does much testing for other departments of the Government, as well as for commercial firms. It deals with the qualities of materials generally, and investigations are being carried on continuously in regard to the maintenance and replacing of Standards. Such investigations as the effects of electrolytic corrosion upon reinforced concrete form part of its work. The results of investigations upon the conductivity of copper carried out by it have been adopted by the Institution of Electrical Engineers as the basis for a new wire table.

In England similar work is dealt with by the National Physical Laboratory, and considerable prominence is given to hydraulic, metallurgical, optical and aeronautical problems.

International comparison of Standards is a phase of the work of great importance.

In Germany the Physicalische Reichsanstalt has for years been working on similar lines, dealing mainly with electrical work, pyrometry and thermometry.

The Materials Prüfungsamt deals with the testing of raw materials for manufacture, building, etc.

Japan also has lately established a similar institution.

Such an institution is badly needed in Australia. When it is remembered that the total generating plant in Australia is 117,000 K.W., of which New South Wales possesses 56,000, and that there is over 55,000 K.W. of plant under order for delivery within twelve months, that the apparatus for the utilization of this power is also being provided, it will be seen that the interest involved in this one direction is large.

In many cases local conditions determine to a large extent the most suitable types of apparatus to be employed for any purpose, and investigations are necessary before one can tell what the effect of such conditions may be.

It is to be hoped that Australia will not lag behind in this matter. Such Standardization Laboratories are needed, and in the initial stages the Universities may possibly be able to supply some assistance, but their resources are not sufficient to enable all the necessary work to be carried out.

