
AN ADDRESS

TO THE

Members of the Sydney University Engineering Society,

AT THE

ANNUAL MEETING, APRIL 27, 1898.

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BY MR. G. H. KNIBBS, F.R.A.S., PRESIDENT.

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GENTLEMEN,—The first duty which devolves upon me is the very agreeable one of offering, in the name of the Sydney University Engineering Society, a very hearty welcome to our visitors, whose presence this evening among us is a graceful expression of that sympathy and cordiality which characterise, we are proud to say, a profession, and the different branches of which they so worthily represent.

In accordance with a usual custom, I am also charged with the further duty of addressing you upon some subject of interest to us as a Society, and have therefore ventured to select, as my theme, the realization of the Society's aim. I do this in preference to selecting a technical topic, because I think we may often with advantage, and especially on such occasions as this, look beyond the sphere of our technical activity, to the reason and motive of it.

In the constitution of our Society its aim is said to be the promotion of the welfare of the Department of Engineering in the University of Sydney, by bringing graduates and undergraduates into closer association for that purpose, by the reading of papers, the delivery of lectures, and by such other approved means as conduce to the desired end.

Now this expressed object may be regarded in two ways, either as an end in itself, or as a means to some further end: but in whichever way we are disposed to look at it individually, the dignity of our view will depend upon the comprehensiveness of our conception of an ideal Engineer, and of his place in the economy of human affairs. And since the purpose of the School of Engineering here, is the efficient training of those who elect that honourable and useful profession as the sphere of their life-work, adequate views as to its function must of necessity determine on the broader plane, the interpretation of the work and aim of our Society. None of us liveth to himself: the character of our service, and the way in which that service is discharged in the common interest, are what enoble or degrade it. In the light of this higher view it is impossible to tolerate that conception of our professional energy which would restrict it to the promotion of mere material interests, which would make the Genius of the engineer the poor slave of physical comfort. I shall therefore, in the brief treatment of my theme, endeavour to regard it from what I think is rightly called the liberal standpoint.

Our Society includes in its ranks, not only undergraduates and graduates in Engineering, and certain members of the teaching staff of the University: it has also the honour of having associated with it eminent engineers, who are in sympathy with its aims; so that it may

be said to have three classes of members. For this reason it will be convenient to indicate how each class may suitably direct its activity in furthering the ends of the Society.

First of all let me speak to the undergraduate—the engineer-that-is-to-be—and to him I must necessarily speak chiefly in regard to his education, both professional and general. That we may with propriety commence with the consideration of the educational element, is obvious, when we reflect that upon the efficiency of this depends, both individually and collectively, the influence of the engineer upon his professional brethren, and upon the world in general.

“I am well aware,” said Froude, in his inaugural address as Rector in March, 1869, to the students of St. Andrew’s University, “that a professional education cannot be completed at a University.” While this remark may still be regarded as strictly true, there has been, throughout the length and breadth of the world, a great change in respect to the facilities afforded by Universities for professional training. And even in his day Froude could say that the theoretic and scientific groundwork of every profession can be learnt nowhere so well as in a University. At the present time we may put this more strongly, for the necessities of every class of student are not only taken into the fullest consideration, but the theoretic work is so adjusted as to meet, as far as possible, both the practical requirements of each profession and the demands of sound intellectual culture. Fortunately there is but little basis for the view, sometimes expressed, that there is an antagonism between theory and practice. The more thoroughly the principles, theory, or science of a subject are understood, the more readily will the significance of the practical side of it be apprehended, and the greater will be the facility in acquiring a knowledge of it as an art. Therefore, I would say to the student, endeavour in every subject of study to obtain a clear grasp of first principles. If we do this, not only will the most abstract branch of knowledge become an instrument of intellectual and indeed also of moral culture, but so also will every practical exercise; and both will alike help in making us forcible and accomplished in all we undertake. He who, whatever he does, strives to make his work worthily representative of his character, will surely build up a character that will be of service in promoting the higher interests of the class to which he belongs. If a thing be worth doing, it is worth doing well, and so I would say to the undergraduate, before all things be thorough.

The range of study in which an engineer is involved, is necessarily very wide, and it is by no means unimportant that the student should have a comprehensive conception as to what ought to constitute a sound professional training. It is not given to many, however, to have the genius of a Vitruvius, or the versatility of a Da Vinci, and hence the question naturally arises how, with limited faculties, can we yet acquit ourselves creditably. Now, in the practical necessities of an engineer’s education, there are certain things that must be viewed as essentials, and others that may be regarded as accessories. With respect to the former—which necessarily constitute the fundamental equipment of any engineer worthy of the name—there can be said only one thing, and it is this:—in these you must not be found wanting. Some of these fundamental things will prove irksome, and perhaps

exercise your patience considerably. We are sometimes apt to regard ourselves as specially designed by Providence to deal only with the more agreeable elements of professional activity; and the brilliant student may occasionally imagine that his energies could be better spent than in practically mastering some particular item of an engineer's training, which seems as easy to understand as it is difficult to acquire. To this suppositious student (and I am glad to state that with us here he is a *rara avis*), I would say, remember that some of your predecessors, possibly almost as brilliant as yourself, have had to go patiently through the same experience, and have not subsequently regretted it.

In regard to the other elements referred to, viz., those I have called accessories, I would say, read as widely as possible for the sake of ensuring breadth of view. Mere details you can leave, till the actual practice of your profession compels your attention. The scope of your profession, however, and the achievements of those who are engaged in its active practice, are matters of moment to you. It is only by systematically watching the progress of engineering that you can hope to qualify yourself to take up any work required of you, and to keep yourself informed of the grand total of each element of professional experience. We may fail, not only by neglecting the fundamental necessities of professional training, but also by frittering away valuable time on unimportant matter, such as may readily be acquired any time it happens to be wanted.

May I be permitted to invite your attention to another feature in the question of an engineer's education, that is, its general significance? Many here will remember the very interesting paper and discussion to which we recently had the pleasure of listening, on "An Ideal Course in Engineering." Although, in the discussion, views of the most varied kind were expressed, the advocacy of what may be called the liberal view was characteristic. The intensely practical nature of an engineer's studies and of his life-work, involves the very real danger that his contact with that more subtle world, in which all the charm and significance of the physical world inheres, will be impaired. It was exceedingly gratifying, therefore, to note that the sympathy of those who took part in the discussion referred to, was with that form of education which supplies the corrective to the over-development of, what may be called, the purely mechanical spirit. I conceive those to be fortunate individuals who have not, by the necessities of life, been called upon to specialize early; for the opportunity of cultivating a wide acquaintance with learning is one greatly to be envied. To be permitted to know something of the world's wealth of History, Philosophy, and Letters, before one becomes occupied by the intenser demands of either pure or applied Science, must be regarded as one of Minerva's richest gifts to mortals. But after all, opportunity is of less importance than a right attitude of the spirit; for the absence of the latter *nothing* can compensate. We cannot therefore be too careful to cultivate the liveliest sympathy with all forms of human energy, moral, mental, or physical, which make for the higher development of our race, and which consequently touch the nobler elements of our common humanity. In saying this, I do not mean to imply that the profession of engineering is singular in the danger of involving a limitation of sympathy and culture.

Such an idea can arise only from a limited view of what constitutes culture; and although a contrary opinion is not unfrequently expressed, reflection will, I feel sure, bring about the conviction that every direction of human energy into specialized channels is subject to the same danger. And whether this be apparent through reflection or not, the general contrast between the average professional man and the ideal to which he ought to be conformed, will be sufficient evidence of the truth of the proposition. Although then the engineer is liable, only in common with the members of other professions, to the cramping of his sympathies, with him this takes a particular form it were well to remember. An engineer's energies are mainly constructive: he has his attention largely occupied with material things: his art is to so direct the great sources of power in Nature as to make them serve the purposes of mankind: in doing this he is compelled to employ mainly physical instruments, and his offices generally have to do with the physical side of things. In so far as he is called upon to avail himself of the results of the abstract sciences, he practically uses them as instruments for the control of material ends. He enters that mysterious world of concepts explored by the genius of the mathematician, for the purpose of obtaining criteria to guide him in structural design. He exploits the realm of the physicist in order that he may control the material at his disposal and shape it to his ends, and that he may concentrate, direct, and use the various forms of energy with which we are surrounded. By the very habit of his life, therefore, he tends to become constructive and active, rather than analytic and reflective, and to regard the physical rather than the philosophical utility of knowledge as the justification of intellectual effort. He tends also to become sensitive to material things and to all that appertains to material things, and to become insensitive to that mysterious world which concerns the philosopher, and in which, as I have said, the material world has its inner being and charm. A danger realized is half-averted, and the impairing of what may be called the spiritual sight is the great danger to which I think the zealous, capable, and fully-employed engineer is exposed. Hence the need of supplying a corrective. You will all agree with me that it is an incalculable advantage to be fully developed in all that appertains to the normal man, and that a vigorous man of wide sympathies, and possessing the power to understand all classes of his fellow-beings, is the ideal to which we may aspire to conform. To be this it is not necessary that one should be a specialist in all branches of knowledge, or even in any, but it is necessary that we should react in sympathy with everything admirable in humanity. One word more to the same purpose, and in continuation of a thought previously expressed. The glory of engineering and of the splendid monuments of engineering genius with which we are continuously surrounded, is not that they are ministers of physical comfort, but that they have added to the intensity and nobility of life. It is through them that the soul, the subtle unseen director, reveals its wonderful activity and power; and even the monuments themselves become in turn the instruments of the soul's own development, and by enhancing the value and content of life, enrich and glorify it. While you are undergraduates, therefore, never allow the exacting demands of your professional studies to cause you to lose sight of the nobler view of your vocation, or to contract the range of your sympathies.

There is another and even still more important way in which the undergraduate can promote the welfare of our School of Engineering, and with it that of the University of which it forms a part. I refer to a matter which was so gracefully touched upon by his Excellency Lord Hampden, in speaking at the brilliant function of Saturday last*—the cultivation of all that is implied in the word gentleman. I speak here as an Australian to Australians. The circumstances of a young country are such, that self-assertion is strongly stimulated, while the faculty of veneration finds but little exercise. The absence of histories or traditions, such as are possessed by countries which have been the scene of centuries of struggle after those things to which a people may aspire, is the absence of elements capable of exalting our national instincts, of forming precedents for our guidance, of challenging our admiration, or of strongly awakening those higher forms of emotion which enhance the dignity and beauty of human life. It seems inevitable that a young country shall possess all the faults of a very young man. We are impeached as a people with being without reverence, and are charged with lacking that courtesy, deference, and kindliness, which do so much to soften the asperities of life, to add charm to human intercourse, and to foster that spirit of brotherhood, the lack of which plays so sad a part in human history. Such a sweeping and indiscriminating impeachment is of course grossly unfair to individuals; but, at the same time, has not the criticism, taken in its generality, some colour of truth? A wise man calmly considers the expressions in his fellow-beings' contempt, and through them attains, at any rate of some degree, to a true estimate of himself. As Schopenhauer remarks in his "Aphorismen zur Lebensweisheit"—Your friends tell you they are sincere: your enemies are really so. Let your enemies' censure, then, like a bitter medicine, be used as a means of self-knowledge. We may take it, therefore, that there is some foundation for the impeachment. If I appeal to the undergraduates here, to be among those whose personal example and influence is to change all this, I feel that I shall appeal to no unsympathetic body, because I know there is that in you which will react to the higher impulses, and that your instinct of national pride will not remain untouched. The education which you here receive—I speak of the University as a whole—involves you in this personal responsibility, viz., that it is the educated classes that ought to be representative of all that is highest and noblest in a people, and that therefore each of you will, in your careers, naturally and properly, be watched with a critical eye; and for good or evil, not only to this institution, but to your fellow-beings generally, you will have more than ordinary influence. That fact, I say, carries with it a responsibility, to the stimulus of which I have not the slightest doubt you will react; for it is unnecessary for me here to do more than say, that we regard an education which aims merely at equipping you intellectually, as miserably missing its highest function. And I feel that I but express the sentiment of your own hearts when I say that I hope the generous rivalry among the different schools of the University will include not only intellectual achievement, but also that species of culture which distinguishes the gentleman from the boor; and that our

* The Annual Commemoration of the University.

Engineering School may be remarkable not less for its refined courtesy than for its intellectual vigour.

I have spoken thus to you, undergraduates, because I feel that in no way can you so well further those aims, for the promotion of which we are cordially associated, as by maintaining a noble conception of your vocation, acquitting yourselves manfully in your duties as students, keeping alive within you the widest sympathy with your fellows, and building up the reputation of our school, of the University, and of our country, for kindness of heart and the grace of polished manners.

Turning now to those who have placed behind them forever the bitter trials of the undergraduate; to whom the weariness of lectures and the cruelties of examination have become pleasures of memory only; who no longer may enjoy those delights of anticipation which accrue to him who wonders how far the papers he will have to scan and reply to under unpleasant limitations will skilfully include what he has *not* read; in a word, to the graduates,—I would first of all like to say that I conceive the idea of an association, in which they will be afforded the opportunity of shewing their lively sympathy with the institution, which has for them so many gracious recollections, to be a particularly happy one. No one can spend several years in a university without his sympathies being involved; for to the student it is an intellectual home, full of memories of mental struggle and conquest, as well as of personal reminiscences,—a fact of which we are reminded, when at the annual reunion of the school itself, the toast “The Graduates” is proposed, and the excellencies and characteristics of each graduate are given a parting reviewal. The moral force of the University as a great public institution, and of the several schools within it, largely depends upon the maintenance of those bonds of sympathy which are forged during the student’s academic career, and we cannot be too careful to maintain and strengthen them. It is unfortunately only too easy to let these bonds be impaired or destroyed by the stress of life’s occupations, and I think therefore we cannot easily overestimate the value of every custom or incident which tends to keep the graduate in touch with Alma Mater, to whom, indeed, he owes a debt of life-long gratitude. In saying this, I have in view that we are, first of all, members of the University; and, secondly only, of our particular schools. That is a fact, that in the engrossing occupation of the curriculum in a professional school, we do well to continually bear in mind. I need not enlarge on this, however, because I know that no member of our school runs the risk of having his mental horizon so restricted as to need it.

Second only in importance to a lively sense of our responsibility and duty to the University as a whole, is that which has regard to our particular school. To the former we owe our higher education in its generality, and, indeed, our whole education, seeing that the present efficiency of the primary schools is almost entirely due to the learning which had either its locus or stimulus in the various universities of the world. To the latter we owe our specialized education, the determinant of that form of energy which is to be manifested in our life-work; and therefore our Engineering School is also to us an *alma mater* whose generous offices we shall always bear in affectionate memory.