

## Letters

# ENGINEER TRAINING AT THE UNIVERSITIES

Dear Sir,

In his article F. B. Mayo makes some serious criticisms of university departments of engineering with which, in general I find myself in agreement. It is probably true that we tend to put too much emphasis on performance in specialized studies and too little on breadth of interests, personality and character. I am afraid we tend to encourage the best students to be specialized engineers, and allow the weakest students to turn to administration as an escape from the rigours of science. We tend to emphasize learning as opposed to creating. But with all our many faults I am quite convinced we give a better and broader education than that given by most pure science departments. We insist on industrial experience during vacations, and on clear reports and drawings. We insist on proper criteria of excellence in design. We are concerned with man and his work. Our products may be narrower than is desirable, but, Sir, give us credit for what we do accomplish.

Moreover, we are not content with things as they are. Courses on the presentation of information, on industrial administration and economics have been introduced in many engineering departments. Several departments at Birmingham are introducing a variety of 'broadening' courses for undergraduate and postgraduate students, and in my own department we have for two years made success in our Broader Education (or 'Background') courses a condition of the award of a degree. I think we can help with character-building by giving students more individual projects to carry out, both before and after graduation, but I do not encourage my students to stay on too long. While the M.Sc. is a worthwhile degree to aim at, I prefer to keep the Ph.D. students in a small minority.

I rather agree with Mr. Mayo that the influence of the engineering institutions is sometimes harmful to education; it is important for universities to be independent in choosing their syllabuses, and to be judged by their success (or failure) in producing real engineers and not by their examination 'standards'. While there will always be work for those who can see only the 'trees', the real shortage is of men who can see the 'wood':

Yours faithfully,

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Dear Sir,

As a parson who graduated in 1931 in the Cambridge Mech. Sci. Trip., and who still, I hope, profits from the lessons learned in that school, I warmly agree with most of what F. B. Mayo writes on Engineer Training in the Autumn Newsletter.

In particular, I would underline his advice to the reader to make the most of the opportunities available in his university for him to meet and converse with non-engineers.

This point was made most emphatically, and for many of us effectively, by Professor Inglis in his introductory lectures.

He also stressed 'catholicity of knowledge', claiming that a man got no credit for knowing his own subject (but woe betide him if he did not!) but that if he could use, for instance, an understanding of bread baking, to suggest an improvement in a metallurgical process, he would be well in the path of success.

His later course of lectures on the Vibration of Bridges was a remarkable illustration of that truth. Most of us were not destined to be civil engineers, and few had the mathematical facility to follow his formula as it gradually swamped the vast blackboard. But I still remember his basic point, that a real-life engineering problem (and a *fortiori* any human problem) has a great number of variables of varying importance which cannot all be simultaneously taken into account. The business of the engineer (and not only of the engineer) is to decide which variables are important for the case in hand, and then to make his calculations and his decisions: but he must always keep in mind the possibility that some other variable, normally of negligible importance, may in certain circumstances be the one to watch.

I do not myself think that the importation of 'arts' subjects can do other than overload a course that already leaves too little free time. We had in my time lectures on management, and thought them poor stuff; we learned far more usefully about this (and about the then unimagined problems of full employment) from the passing reminiscences of our favourite lecturer, Foundry Fred, and I have even forgotten the title of his subject.

Yours sincerely,

GEORGE JAGER

Earl Shilton, Leicester

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