Headmasters and University Engineering Courses

SIR,

In the March, 1961, issue of the *Universities Quarterly*, Lord James is quoted as saying of the boy 'who says he wants to do honours physics, but what he really wants to do is electrical engineering', that 'it would be easier for him to get in and much easier, of course, when he got in'. It is necessary to challenge the last part of this statement, since the fact that many headmasters are erroneously and without knowledge convinced of its truth is one of the major hurdles in the way of the proper development of engineering education in this country.

We assume that neither Lord James nor anyone else wishes to claim that electrical engineering as a field of study is intrinsically easier than physics, and we take it that he is referring to electrical engineering and physics as they are taught at present. It is probably true that it is harder to obtain a good honours degree in physics in some universities than it is to obtain a good honours degree in electrical engineering in other universities, but the reverse is also true. There is no reason to believe that the variations in standards between all departments of electrical engineering and physics is any greater than the variation in either of the subjects taken separately. Our department, like many other departments of applied science in this and other universities, continues to receive applications for admission from boys of whom their headmasters say that they 'had hoped that he would be able to read physics but his performance has been somewhat disappointing. Moreover, he has a practical bent and we are sure that he will do well in an engineering course.' It may be that some of these boys can make themselves into good engineers, but many of them are rightly refused admission and others fail to complete their university courses.

It is unfortunate, to say the least, that most headmasters and probably the majority of science masters seem to be quite unaware of what modern engineering is about and have no real knowledge of the education now given in university departments of engineering. In the 'Third Report on the Procedure for Admission of Students' the *ad hoc* committee of the Committee of Vice-Chancellors and Principals reports that there were, in October, 1960, 214 unfilled places in university engineering departments and that although applications as a whole had increased by some 13 per cent over 1959, the applications to technological departments were relatively constant. One of the reasons for this situation is the low prestige of engineering in the eyes of schoolmasters, who have very rarely had any experience of engineering. To remedy this it will be necessary for schoolmasters to be made acquainted with the present situation in engineering, within and outside the universities. It does not help at all to suggest that boys who are academically weak should try to enter the engineering profession. It is certain they would be no more able to cope with engineering courses than with the physics courses for which they are deemed to be unsuitable.

Electrical engineering is based on physics and therefore a rigorous and very substantial course in physics is given to electrical engineering students; but more than this is required for engineering students—not only the application of physics to practical problems (we may add that many headmasters in our experience cannot and do not distinguish between 'practical' and 'manual')—but also some additional abstract and highly mathematical subjects which pure scientists do not touch, e.g., Electrical Network Theory, Information Theory, Theory of Control Systems, etc. Moreover, electrical engineers have in many universities been the pioneers of broader education. Partly due to the rigour of the course and partly due to the less competitive entry, the proportion of failures to graduate in the proper time in engineering is regularly two or three times that in physics, and the proportion of honours awarded to total entry is barely half of that obtaining in physics. So far as our university is concerned (and we have no reason to think it is not typical) it is generally agreed that at present the ordinary degree in electrical engineering is harder to obtain than the ordinary degree in pure science. Indeed, in some engineering departments the ordinary degree students take the full honours degree course whereas the ordinary degree student in physics normally studies his subject only to the level of the second year of the honours course. It may be that this situation will be changed at the initiative largely of the pure scientists, but the present practices do not in any way confirm the statement made by Lord James.

Yours faithfully,

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from Universities Quarterly, 15, June 1961, pp. 290-292.