

same college, the great numbers of elementary students statistically outweigh the advanced students. Imagine the same system to operate in the university sphere, with elementary education and also advanced academic studies in the same building. From the point of view of numbers, the elementary students would again numerically far outweigh the advanced students. In fact, in the technical colleges as in the universities, and for the same reasons, the advanced work is of vital importance. We would again urge the creation of higher technical colleges in which the advanced work at present in existence may be concentrated. The major colleges might be fed partly by satellite colleges, and also by technical schools, evening institutes and schools, just as the universities are now fed by the high schools, grammar schools and public schools. The advanced work at present done by the technical colleges, particularly on the research side, is inadequate; but with the suggested arrangement a growth of advanced technology and research becomes possible.

The new higher technical colleges, or institutes of technology, functioning along these lines, with generous financial backing by the State and, we would hope, by industry, have a vital part to play in maintaining the place of Great Britain as an industrial country. We would again point out, since this great but remediable weakness in our technical education system has not been emphasized sufficiently, that the apex of technical education, as understood in America and the Continent, and exemplified in their institutes of technology and *technische Hochschulen*, is almost entirely lacking in Great Britain. One reads, moreover, that Britain spends only a very small fraction *per caput* of the American and Russian expenditure on technical education. To hold our own in post-war industrial development requires great and unremitting efforts on our part. Nowhere can we begin better than by sorting out our technical education system, concentrating the various grades of work in appropriate institutions, and by creating some institutes of technology on the American pattern.

We are loth to make an issue of external examination systems. As a means of obtaining high qualifications in technology, we believe that the external degree system has rendered important service to Great Britain, whatever has been said to the contrary by those who disparage degree work in technology in the technical colleges. We make the further comment that before the external degree could be displaced it would be essential that an internal examination *accepted nationally by industry and commerce* as giving qualifications at least of equal standing should be *actually in existence* to take its place. We know of no such examination which is even remotely able to substitute for the external degree examination in giving an all-round qualification in the various applied sciences. One can therefore see that any attempt to suppress this system constitutes a serious threat to training in advanced technology in technical institutions. This threat comes, moreover, at a time when we should be making every effort to expand and develop all branches of technical education, particularly the advanced work.

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<sup>1</sup> NATURE, 152, 191 (1943).

<sup>2</sup> NATURE, 152, 218 (1943).

<sup>3</sup> NATURE, 152, 80 (1943).

DR. LOWERY'S letter in NATURE of August 21 contains several statements which cannot be allowed to pass unchallenged.

Referring to degree courses, he writes, "It is not right, however, that the coaching of a relatively few people for examinations run by an outside body . . . should come to be regarded as the highest function of a technical college and should unduly influence its educational aims". I am quite certain that, in general, it is not so regarded either by technical colleges or by the members of the public who know of their work, and the implication that this small volume of work unduly influences the educational aim of colleges is quite incorrect. Further, he states, "Degree courses in technical colleges are makeshift courses", but Dr. Lowery is quite well aware that there are many technical colleges where the degree courses are not makeshift courses but are properly organized courses conducted by staff, and with equipment, not inferior to some universities. Dr. Lowery should in fairness to these colleges have qualified the sweeping character of his statement.

The question of the desirability of technical colleges conducting any degree courses may be debatable—though the real debatable point is should there be such a thing as an external degree—but to imply that technical colleges are "tending to neglect their most important work" partly as a result of "flirting" with university education is to convey a wholly misleading picture of the technical colleges in Great Britain. The splendid work of these colleges, related directly as it is to the needs of industry, has been a factor of the greatest importance in our industrial development.

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THE attention of the Council of this Association has been directed to a letter from Dr. H. Lowery which appeared in NATURE of August 21, p. 218. In this the writer states that: "Degree courses in technical colleges are makeshift courses, and have grown out of a makeshift system".

While it is true that these courses have grown, as indeed the universities have themselves, from small beginnings, the statement that the degree courses in the technical colleges of Great Britain are makeshift is quite untrue and a damaging statement as regards many important colleges in both London and the provinces.

In London, several of the polytechnics are recognized for *internal* degrees of the University of London in a number of subjects. Actually, about 44 per cent of the students who obtain the internal degrees in engineering carry out their courses in polytechnics and not in the University itself, while in science the percentage is about 27.

There are also a number of well-equipped and adequately staffed technical colleges in the provinces which have been carrying on degree courses successfully for many years. These courses are in every way as satisfactory as those in the universities themselves.

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