

**How does the British system of engineering education stack up against ours? A report on what's good, bad, or different about**

# **THE BRITISH WAY**

**by Charles Susskind '48**

**A** RECURRENT theme of the report published last year by the President's Commission on Higher Education is the recommendation that education on the professional level should be made available to a greater number of students. Such a policy, as applied to engineering education in America, has been subjected to criticism ever since the engineering college ceased to be a "school of the industrial vocations" and adopted the collegiate plan of organization. It may be of interest to examine the merits and shortcomings of a system of engineering education apparently based on the opposite policy: the British system.

To realize the vast difference between American and British university attendance figures, it should be borne in mind that in 1947 there were only 2,000 full-time engineering students registered in all the universities of England and Wales; the figure for Scotland, though higher in proportion to population, was of the same order of magnitude.

The American educator may well ask how a highly industrialized country, with a population one-third that of the United States, can get along with an engineering-college population roughly one-hundredth that of the United States? The answer is that British universities supply only a small fraction of the technological personnel needed by industry. The bulk is trained by technical "colleges," in part-time and evening classes, and through correspondence courses.

The technical colleges afford a wide variety of courses for the industrial vocations, as well as for the trades. They resemble the type of school which in America usually evolves into a four-year college sooner or later—like Pratt, Armour, and our own Throop Polytechnic Institute. The British technical colleges differ from the universities mainly in that they do not confer degrees. Their entrance requirements are consequently somewhat lower and they can accommodate many students who, from economic considerations or otherwise, could not remain in secondary schools long enough to reach the matriculation standard. Part-time and evening attendance (not feasible at most universities), as well as the lower tuition costs, combine to provide educational opportunities for many young men who would otherwise leave school for good at 15 or 16. The attainment level of some of these institutions compares favorably with that of many American universities.

In some cities the technical schools are tied more or less informally to the local universities, and the exceptional student is often encouraged to proceed toward a degree. For instance, some of the excellent Polytechnic Institutes managed by the London County Council have university-approved teachers, and students may take the "internal" bachelor's degree of the University of London;

whereas in Scotland, most of the courses given by the technical colleges may be credited toward a university degree. For other students there is a complex system of "leaving certificates" to show the work done; among others, the so-called National Certificates in the various branches of engineering and the Diplomas for examinations administered by the City and Guilds of London Institute, are widely recognized.

Another standard of attainment is membership in one or more of the professional societies. A measure of the role played by such bodies in British life is the fact that most students of law, medicine, and other well-established professions qualify (i.e., earn the right to practice) by passing the examinations of their respective professional societies, without ever having obtained a university degree at all! This system, an outgrowth of the old pupilage scheme, has quite naturally extended to the younger engineering profession. The various grades of membership—Associate, Associate Member, Member, Fellow—can be attained only after rigorous examinations which are quite often on a par with university standards; this fact accounts for the usual profusion of abbreviations and initials signifying the various memberships whenever the name of a British engineer or scientist appears in print.

## **Four groups of British universities**

British universities may be divided into four groups, each group catering to approximately the same number of students. The ancient Universities of Oxford and Cambridge form one group; London University, with its many colleges and affiliated institutions, the second; the eight more recently founded civic universities located in the large cities of England are the third group; and the fourth comprises the four Scottish universities, as well as one each in Wales and Northern Ireland.

With one exception, each university has a faculty of Engineering, mostly quite small, averaging less than 200 students. The usual residence requirement for the ordinary B.Sc.(Eng.) degree is three years; this period is comparable to the customary four-year requirement in America if it is remembered that virtually all humanistic studies are excluded from the British curriculum on the principle that they should have been concluded in secondary school.

The Honours degree, which requires a more extensive or, at some universities, a more extended period of study, has a much higher standing than the ordinary degree; unlike his American counterpart, the British "honours" student is from the outset placed in a separate category and arranges his plan of study accordingly. The honours degree is almost invariably the prerequisite for more advanced degrees, which are awarded mostly on the basis of research, theses, and practical experience; graduate study in our sense of the word, with students attending classes, is quite rare.

Instruction in British universities bears a marked intellectual emphasis. There is little reliance on textbooks; instead, the student is expected to do a good deal of outside reading on his own. Examinations are usually comprehensive, rather than detailed, in character; the students are expected to obtain practical experience by working in factories during vacations or, at some universities, through the sandwich (cooperative) plan of alternating study with industrial apprenticeship.

As can be expected, British universities are highly selective. Efforts are constantly being made, especially through increased scholarships (the number of which has been trebled since 1939), to ensure that the selection is determined by scholastic standards alone, rather than

by the student's means. It is the proud claim of British educators that no student, if he only has the ability, need be prevented from attending a university by pecuniary conditions. Nevertheless many families cannot spare the son's earnings for the long period of study, and a tendency toward social stratification persists.

It remains to be seen whether the system of grants for veterans, introduced as a result of a postwar scheme somewhat akin to the G. I. Bill of Rights, will be extended in scope. If such a plan is adopted, British university education will be rid of the main disadvantage from which it suffers in comparison with the American system: limited availability. For various reasons—academic, social, and economic—it has never been feasible for the British student to "work his way through college"; a greater accessibility of higher education could probably be achieved only by means of cash subsistence grants to needy students.

Even if the British university is gradually made available to a wider section of the population, it is doubtful whether the over-all enrollment will be increased. A survey made for the Ministry of Education in 1945 speaks of maintaining the wartime attendance figures, but not of increasing them. British industry and government are well satisfied with the dual system of engineering education. They are content to allow the universities to continue in their leisurely, unhurried task of producing the type of man who will find his place in research, education, government, and the planning side of industry. Technicians for the operating side of industry are more profitably prepared at the technical institutions having curricula which are readily adaptable to industry's local needs, and generally show a decidedly more practical (i.e., vocational) approach to

engineering. The universities, for their part, remain free from the necessity of mass production and can devote themselves more fully to intellectual, scholarly pursuits.

Other aspects of the British system of interest to American educators and engineers are: (1) abundant provision for the education of sub-professional personnel, both for industry and the trades; (2) the far-reaching influence of engineering societies on curricula by means of the nationwide standards imposed by membership examinations; and (3) formal recognition of nongraduate attainment by various credentials.

The last of these items should be of particular interest to us: many observers fear that the value of the American bachelor's degree threatens to become inflated to the point of being rendered meaningless. It is here that the private, small colleges find their ultimate justification: by keeping enrollments low and requirements high, they can force the larger, publicly owned universities to maintain higher standards in accordance with a spirit of healthy competition. As for the training of technicians, other provisions must be made. The granting of diplomas of "Associate" at the conclusion of a two-year terminal program, as practiced at the University of Nebraska, is a step in the right direction; so is the Junior College (4-4-4) plan adopted in California. We should realize that the many undergraduates who leave our universities after one or two years, at an educational level which is neither useful nor recognized, represent a terrible waste of effort—both for the individual and for the school. Not until some definite provision for the education and formal recognition of engineering technicians is made will this waste be avoided.

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