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Provincial Universities in the United Kingdom

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When used in connection with British universities, the word *provincial* denotes all universities save the ancient foundations of Oxford and Cambridge; even London University, now well over a century old and with a firmly established reputation and traditions of its own, is "provincial" in this special academic sense. The provincial universities of the United Kingdom are of high standing, and indeed many of them can offer facilities not available at the older institutions. Particularly is this so in the case of many of the science faculties, which collectively offer great opportunities for the student.

Enlightened Policy

When all the provincial universities have so much to offer, it is difficult to decide which should have first mention. On any count, however, the University of Manchester must rank very high, and its enlightened policy of scientific training and research certainly justifies the city's traditional boast that what Manchester thinks today London thinks tomorrow. Certainly there is no sign here of provincialism in the sense of narrowness and lack of enterprise.

Manchester University is the oldest civic foundation in England, having been opened—originally as Owens College—in 1851. The faculty of science offers the student as extensive a range of subjects as is to be found anywhere, and apart from its degrees, the university offers diplomas in various special subjects such as bacteriology and chemical engineering. In addition there are a number of exceptional facilities.

Outside the city, at Jodrell Bank, the great 260-foot radio telescope, an instrument without parallel in the world, is nearing completion. It is impossible to say precisely what this remarkable instrument will achieve, for it will be used for the exploration of a new domain of science, but recent progress in radio astronomy made with less powerful instruments makes it clear that the prospects are exciting. It is clear that with its help a tremendous amount of new information about the remotest parts of the universe will be collected. For many years to come, Jodrell Bank will be an outstanding international center for radio astronomical research. At Barton airport is a well equipped laboratory for research on fluid motion. The university has also been for some years an important center for the development of electronic computing machines. It has an experimental horticultural station in Manchester and an out-station in Cheshire.

Also in Manchester, and closely associated with the university, is the College of Technology, which offers a choice of well over 200 courses. At any given time nearly one-tenth of its 8000 students are reading for university degrees or diplomas. Among the special courses of study available there are ones on textile chemistry, printing and photographic technology, and municipal engineering.

Ties with Local Industry

Manchester University is situated in the heart of a busy manufacturing area. It is typical of many similarly placed universities in that, apart from offering a full range of essentially academic courses, it has special courses reflecting local industrial interests, among which cotton is in this instance outstanding. Leeds, some 40 miles away, is comparable, but here a different textile, wool, is the center of interest. The departments of textile industries and of color chemistry and dyeing at Leeds have an international reputation. There is also a course in the chemistry of leather manufacture which is the only one of its kind in the United Kingdom. The technological faculty also offers courses in coal gas and fuel industries and mining. Mining students receive first-hand practical instruction under arrangements made with the National Coal Board.

The very name of Sheffield is almost synonymous with steel, and it is therefore not surprising that in Sheffield University there is a strong metallurgical faculty. The department of glass technology was the first of its kind in the world and remains among the best known. Among other special facilities at Sheffield may be mentioned the laboratories for research on concrete and soil mechanics; these enable research to be carried out under conditions not usually obtainable in universities.

Durham University, too, has developed close ties with local industry. Newcastle-upon-Tyne, where King's College, one of the constituent colleges, is situated, is a famous shipbuilding center, and there departments of marine engineering and naval architecture have been established. Also at Newcastle is an extensive agricultural department with its own experimental farm. Since World War II a new and very well equipped chemistry block has been built.

To the south of Newcastle is Hull, on the Humber, whose university is next to the youngest in the the United Kingdom, having been incorporated as recently as 1954.

Also reflecting the industrial activity of its environment is the University of Liverpool, whose faculties include one of veterinary science. Liverpool is a famous center for all kinds of research on tropical diseases, arising primarily from the fact that to the busy port go ships from every part of the world; and there are special facilities for their study. These include a heated insectarium. The university maintains a marine biological re-

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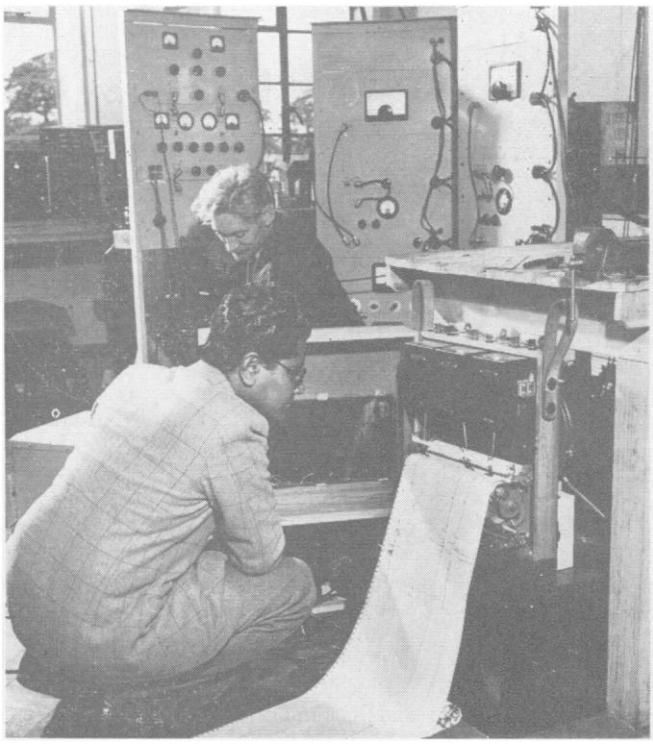
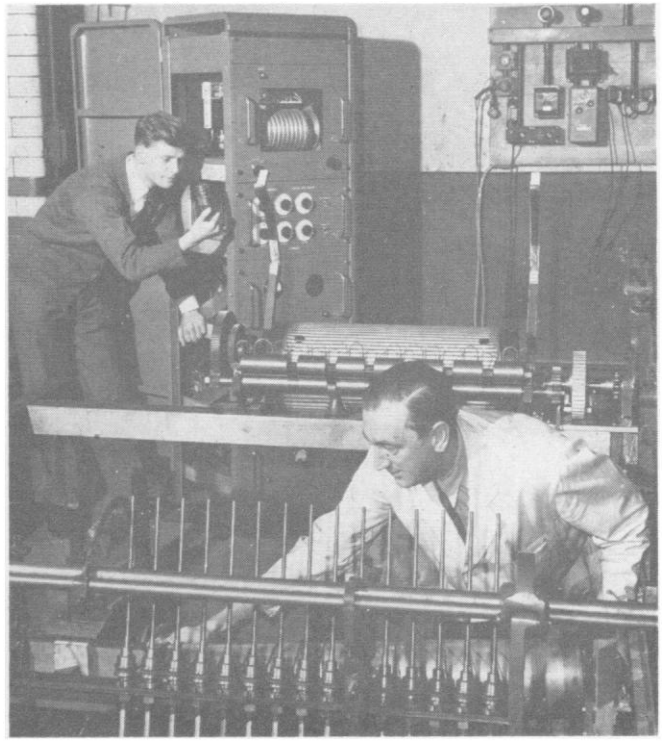




(Left). M. K. Das Gujola and R. C. Jennison studying the recordings made from results coming through from the solar interferometer aerials at Manchester University's giant radio telescope. (Right). E. A. Mather (foreground), an instrument engineer, working on the electronically controlled spinning mule in the department of textile industries at Leeds University. The cabinet replaces the large and cumbersome headstock of the old-fashioned spinning mule. It was invented soon after World War II by N. H. Chamberlain and postgraduate research student B. E. King (left).

search station in the Isle of Man. The Liverpool Observatory and Tidal Institute is a unique center for research on tides and related geophysical subjects. The department of inorganic and physical chemistry is housed in a finely equipped laboratory opened only a short time ago, and it is well known for its work on polymer chemistry. The department of physics offers very exceptional facilities for atomic research. Its equipment includes a large, 156-inch cyclotron as well as a smaller 37-inch machine.

Active Research Centers

At Birmingham the faculty of science is divided into 14 separate schools and offers a wide range of courses, including such diverse subjects as industrial fermentation, chemical engineering, and metallurgy. The equipment of the physics department, which is a very active research center, includes a 60-inch cyclotron and a 1000-Mev synchrotron.

Further to the south, well away from the main industrial area, is the University of Bristol. Here again, a very wide range of general courses of study is offered, as well as some special facilities. The physics department is exceptionally well housed and equipped, and the work done on cosmic rays is internationally known. Internationally known, too, but in a very different sphere, is the agricultural research station at Long Ashton, just outside the city. Here extensive research is done on fruit growing. At Reading University, too, there are special facilities for studies in experimental farms and also the well known National Institute for Research in Dairying.

Further to the south still is the newly incorporated University of Southampton, which received its charter in 1952. The university is in fact, however, a much older foundation, for it evolved from the Hartley Institute, which was founded in 1852. It offers a full range of scientific studies. Southampton itself is an important center for aircraft construction, and this interest is reflected in the university. The engineering department, which has high- and low-speed wind tunnels and other special provisions for instruction in aeronautics, offers a special 4-year course in aeronautical engineering. Each year the student spends two terms at the university and 6 months with a local firm of aircraft manufacturers. At Warsash is a school of navigation which is affiliated with the university.

London University is the largest university in the United Kingdom. It has a special claim to fame as being the first university in England to admit students of all creeds, the first to admit women to all degrees and distinctions, and the first to found a faculty of science. Its development has, in the main, been precisely the opposite of that of both Oxford and Cambridge. While the residential colleges of the latter have grown out of the university, the University of London is primarily the result of the amalgamation of several nonresidential institutions.

The teaching organization of London University is too complex to discuss here in detail, but it falls under three headings. First, there are institutions belonging to and controlled by the university. Second, there are schools of the university, each controlled by its governing body—outstanding among them in the present context is the Imperial College of Science and Technology at South Kensington. Third, there are a number of other educational institutions whose teaching is recognized by the Senate of the university. These include East Malling Research Station and Rothamsted Experimental Station. Collectively, these bodies offer a remarkable variety of scientific training.

The Imperial College of Science, in South Kensington, exists "to give the highest specialized instruction and to provide the fullest equipment for the most advanced training and research in various branches of science, especially in its application to industry." It already has comprehensive facilities for technical training, offering courses in, for example, aeronautical engineering, chemical engi-

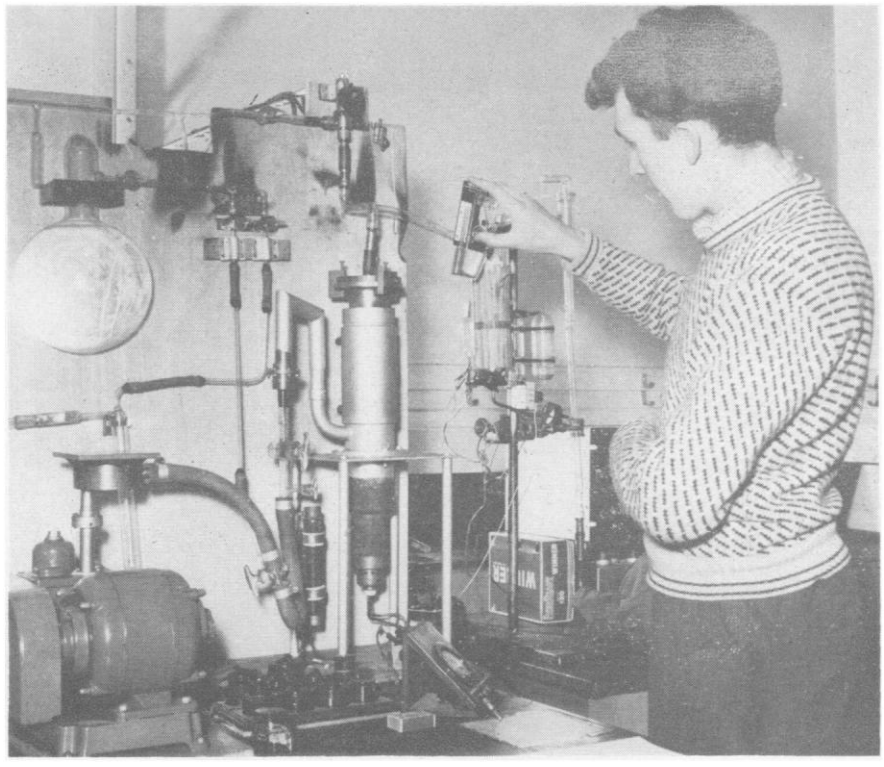
neering, botany, and geology; plans are being put in hand immediately to expand it greatly, at a cost of some £15 million ($42 million), and make it the foremost center for technological study in Great Britain. The expansion should be complete by 1962, by which time there will be provision for 3000 full-time students.

Facilities in Wales, Scotland, and Northern Ireland

Wales, Scotland, and Northern Ireland can all provide excellent facilities for advanced scientific education. The University of Wales, for example, can offer several special courses. Aberystwyth can provide facilities for training in dairying, agriculture, plant breeding, and animal science. Cardiff offers, in addition to a wide range of scientific degree courses, diplomas in engineering, metalliferous mining, metallurgy, and social science. Swansea includes departments for chemical engineering and metallurgy. Bangor has a marine biological station.

Scotland has a very firmly established tradition of sound education, and science was introduced into the curriculums at a relatively early date. All the Scottish universities are ancient foundations. St. Andrews University dates from 1410; today it offers a comprehensive course of training in science. Much of the technical and scientific training is provided at Queen's College, Dundee.

One of the constituent colleges of Aberdeen University traces its history back to 1494; the other original college was founded in 1593. This university has the distinction of having been the first in the United Kingdom to establish a faculty of medicine. The university itself offers a comprehensive training in all branches of science, and associated institutions give facilities for various kinds of special instruction. Thus the Macaulay Institute is well known for soil research, and the Rowett Institute is well known for research on animal nutrition.

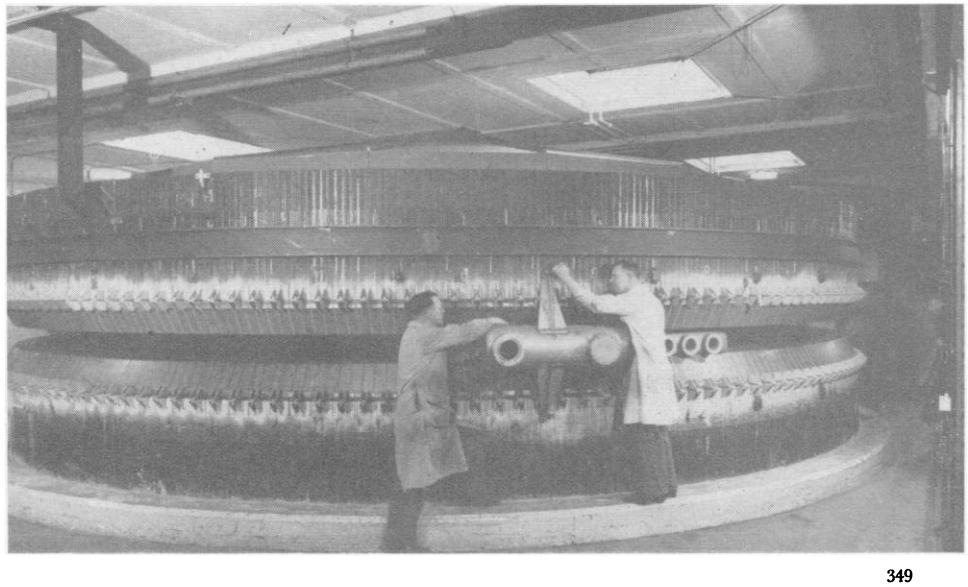


Physics student engaged in atomic research at Glasgow University.

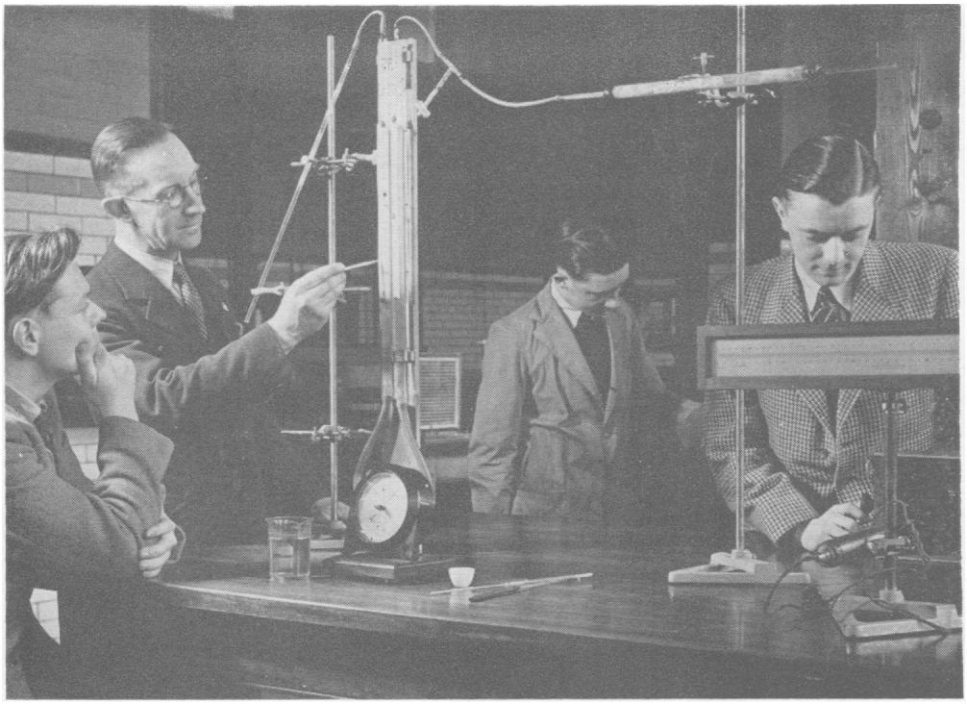
The University of Edinburgh is another very old foundation, dating from 1583, and particularly well known for its medical teaching, with which the teaching of science, and especially of chemistry, has long been associated. There are comprehensive degree courses in science as well as diploma courses in such special subjects as electronics and radio, animal genetics, forestry, and geophysical surveying. The Royal (Dick) School of Veterinary Studies was incorporated in the university in 1951.

Glasgow University, too, is a very old foundation, having been founded in 1451, and the teaching of science was firmly established there during the 18th century. It now offers a full degree course of instruction in all the major branches of science and engineering. Closely associated with the University is the Royal Technical College, at which certain of the degree courses are given.

By comparison with the Scottish universities, the Queen's University of Belfast is a modern foundation, having been founded in 1845, but it is nevertheless



Proton synchroton at Birmingham University. It was built by members of the physics department.



Lecturer demonstrating a viscometer to a group of students in the Herschel Laboratory of the physics department of Durham University.

quite old enough to have a firmly established tradition of science teaching. This is being much strengthened by the building of a new science block, to be completed in 1958, to house the departments of civil engineering, chemistry, botany, and zoology. At Hillsborough the university maintains an agricultural research institute.

Conclusion

This necessarily brief survey of the scientific facilities of the provincial universities in the United Kingdom cannot even mention many of their special features. But enough has been said, it is hoped, to indicate that they deserve the most careful attention of the intending student, whose requirements must be exacting indeed if he cannot find among them a course to suit his needs.

It is worth remarking, too, that the provincial universities can offer a great deal more than good technical facilities and competent teachers. For the student who stays long enough to complete a full course of study, they offer the opportunity of seeing sides of life in the United Kingdom which the visitor all too seldom appreciates. Like every other country, the United Kingdom is not homogeneous, and every region has its own characteristic features. Although the advent of rapid transport, and of media of mass entertainment, such as the radio, television, and films, is rapidly ironing out the local differences in the population which were so marked only 50 years ago, they still exist in sufficient degree to be very noticeable and interesting.

Some parts in which are situated such universities as those of Manchester, Sheffield, Leeds, Liverpool, and Glasgow are heavily industrialized and thus have innumerable features of interest for the student of applied science. At the same time, all have fairly close at hand attractive country whose exploration can provide pleasant occupation for leisure hours.

Fellowship of the Royal Society

D. C. Martin

"Gentlemen, . . . I trust that in all our researches we shall be guided by that spirit of philosophy, awakened by our great masters, Bacon and Newton; that sober and cautious method of inductive reasoning which is the germ of truth and of permanency in all the sciences. I trust that those amongst us who are so fortunate as to kindle the light of new discoveries will use them not for the purpose of dazzling the organs of our intellectual vision but rather to enlighten us, by showing objects in their true form and colors; that our philosophers will attach no importance to hypotheses except as leading to the research after facts so as to be able to discard or adopt them at pleasure treating them rather as parts of the scaffolding of the building of science, than as belonging either to its foundations, materials, or ornaments; that they will look, where it be possible, to practical applications in science, not however, forgetting the dignity of their pursuit, the noblest end of which is, to exalt the powers of the human mind, and to increase the sphere of intellectual enjoyment, by enlarging our views of nature and of the power, wisdom, and goodness of the Author of nature."

These words were addressed to fellows of the Royal Society in 1820 by Humphry Davy. The society was in the

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