SPACE RESEARCH IN BRITAIN: GRANTS

SIXTEEN grants to British universities for space research projects, totalling £184,540, have been made on the recommendation of the British National Committee on Space Research, set up by the Royal Society under the chairmanship of Sir Harrie Massey. The grants, which cover a variety of periods, are for salaries of staff, travel and subsistence, and development or purchase of special equipment. These grants have been approved by the Steering Group for Space Research, set up by the Minister for Science under the chairmanship of Sir Edward Bullard, and the financial responsibility for them is with the Department of Scientific and Industrial Research:

University College of Wales, Aberystwyth, £16,530 over 3 years, to Prof. W. J. G. Beynon for measurement of electron density/height profiles with rockets using the Doppler method and the pulse method.

Queen's University, Belfast, £15,005 over 2 years, to Prof. D. R. Bates for upper atmospheric rocket research, including artificial air-glow, altitudes of night-glow layers, and a study of micrometeorites.

University of Birmingham, £26,000 over 3 years, to Prof. J. Sayers for electron and ion-population studies of the upper atmosphere and interplanetary space.

University of Cambridge, £1,694 over 2 years, to Dr. K. G. Budden for research into the theory of propagation of radiations from artificial satellites; £2,678 over 2 years, to Prof. M. Ryle for the recording and the interpretation of Doppler and Faraday effects in the radiations from artificial satellites; and £11,230 over 26 months, to Dr. F. G. Smith for the measurement of cosmic radio noise by receivers mounted on rockets and satellites.

University of Leicester, £13,006 over 39 months, to Prof. E. A. Stewardson for investigations of solar and stellar soft X-ray emissions.

Imperial College of Science and Technology, London, to Dr. H. E. Elliot, £7,275 over 2 years for satellite measurements of the primary cosmic-ray energy spectron, and £1,500 over 2 years for an investigation into cosmic-ray intensity variations at rocket altitudes; also £7,935 over 3 years to Dr. S. H. Hall for geomagnetic field measurements in the Earth's upper atmosphere.

University College, London, to Dr. R. L. F. Boyd, £8,880 over 3 years for the development and use of photoelectric satellite tracking equipment, and £35,450 over 3 years for rocket research in the upper atmosphere of: (1) atmospheric temperature, density and winds; (2) ionospheric temperature, density and composition; (3) short-wave-length solar radiation; and (4) stellar ultra-violet light.

University of Manchester, to Dr. R. C. Jennison, £15,277 over 40 months for micrometeorite investigations from an Earth satellite (to be carried out at the Nuffield Radio Astronomy Laboratories, Jodrell Bank), and £15,020 over 44 months for low-frequency radio astronomy from an Earth satellite (to be carried out at the Nuffield Radio Astronomy Laboratories, Jodrell Bank); also £2,500 over 1 year, to Prof. A. C. B. Lovell for the tracking of satellites and space probes (to be carried out at the Nuffield Radio Astronomy Laboratories, Jodrell Bank).

University of Oxford, £4,560 over 18 months, to Dr. J. T. Houghton for the development of photoconductive material for satellite measurements of infra-red radiation.

THE BANGOR RESEARCH STATION OF THE NATURE CONSERVANCY

THE new Welsh headquarters of the Nature Conservancy was formally opened on July 20 by Prof. W. H. Pearsall, chairman of the Scientific Policy Committee of the Nature Conservancy. The building, of rough-cast stone and slate-roofed in the local Welsh style, is primarily designed as a laboratory, and its chief function is to act as the Conservancy's research station in Wales. It will, however, also house regional officers mainly concerned with the management of nature reserves and with the cartographic and advisory work of the region. The whole will be under the supervision of Dr. R. Elfyn Hughes, who has been appointed director (Wales), so that the Welsh organization of the Nature Conservancy now resembles that in force in Scotland.

As at present organized, the laboratories are equipped mainly for research in plant ecology. The special equipment is designed mainly for plant analysis and for detailed soil studies, especially the estimation of mineral elements and the properties of clay minerals. A notable feature is the provision of an X-ray fluorescence spectrograph, a new type of apparatus which it is expected will speed up and greatly extend the range of mineral analysis.

The facilities available are suitable for studying the general problems present in all nature reserves, the relation of vegetation to soil and the trends of change affecting these relationships. There are, however, special problems in Wales which are of fundamental importance and of the widest interest to highland Britain as a whole. The great range of rainfall easily accessible in Snowdonia as well as the diversity of rock type make it a most favourable centre for research on the effects of these factors, singly or interacting, upon the development of soils and vegetation. In Snowdonia the interest in this field lies especially in the grasslands and their animal life, and notably in the pattern of grazing by sheep. The evidence already obtained by Dr. Hughes stresses the

great importance of the minerals derived from the soil in the interchanges and inter-relations between soil, plant and animal. It also raises the interesting possibility that high rainfall in the west of Britain may have an ameliorative effect as well as that to be expected from soil leaching.

In order to study these complex relations, it has been necessary also to envisage technical advances in the development of statistical methods for the analysis of the vegetation mosaics and their correlation with the complex soil characters, and the diversity of rainfall.

No part of Great Britain has, however, remained unaffected by the impoverishment of flora, fauna and soil induced by human activities in the past. Changes in land-use, even, for example, in the time of mowing a meadow, may have profound effects on the flora and invertebrate fauna. Thus, the increasing historical and archæological evidence accumulating in North Wales about early human settlement also offers considerable scope for developing knowledge of the influence of former land-use on existing vegetation and wild-life. This is a field of research which is scarcely possible elsewhere in highland Britain because of the scarcity of information about the past.

The basic researches which are thus developing owe much to the pioneer work on soils of the late Prof. G. W. Robinson, as well as to the more recent inspiration of Prof. Alun Roberts. They have also profited much from the existence in the University College of North Wales of strong Departments of Agriculture, Botany, Forestry and Zoology, the continued co-operation of which augurs well for the future.

While, in the present stage of investigation, much of the work centres around the general problems of upland and moorland vegetation and soils, there are other centres of developing research in the nature reserves, notably the special mountain floras and faunas, the dune vegetation and invertebrates at Newborough, and the problems presented by the woodland reserves now becoming available. These are likely to offer much scope for development into other fields of investigation as the primary researches mature.

THE DAVID NORTH PLANT RESEARCH CENTRE

THE Colonial Sugar Refining Co. is to build a plant research centre in Brisbane to conduct basic research on the sugar cane plant. The laboratory, costing £300,000, is to be completed by June 1961.

The Company has been well aware that, over the past twenty years, there has been a very considerable increase (more than 50 per cent) in the yield of agricultural productivity per acre. For example, in the United States, that of corn has risen about 80 per cent, milk by 40 per cent and beet sugar by 50 per cent. In contrast to this, the increase in yield per acre of cane sugar in Australia, and probably elsewhere, has risen only by 25 per cent. This suggests ample room for improving the yields of sugar. However, the scope for increasing the yields of sugar by conventional methods may be somewhat restricted as many of the clones which make up the present-day breeding material are the result of perhaps thousands of years of selection for sweetness and low fibre during cultivation by primitive communities and, secondly, the more obvious improvements, mainly associated with disease resistance, have been effected. Future important advances are only likely to be achieved through a background of thorough understanding of sugar cane physiology and genetics.

The laboratory will be known as the "David North Plant Research Centre", after Mr. David Shepherd North, who, as early as 1904, was investigating plant diseases in sugar cane. Later, he became interested in seed germination and breeding of cane. His pioneering work on both diseases and breeding in Australia did much to ensure the success and the stability of the industry.

In 1958, plans for the new laboratory were initiated in collaboration with Dr. H. R. Highkin, Dr. D. Koller and Mr. P. Keyes, of the Earhart Plant Research Laboratories at the California Institute of Technology. The basic plan of the new laboratory is very similar to that of the Earhart Laboratory, which was constructed in 1947–48, under the direction of Prof. F. W. Went. Five air-conditioned greenhouses, each of 240 sq. ft., are to be held at temperatures of the range 10–40° C. These are connected by an atrium to a group of eight constant-temperature rooms occupying 1,500 sq. ft. The rooms encompass a range of temperatures from 40° C. to frost conditions at −10° C.

The constant-temperature rooms are each subdivided into four compartments which are artificially illuminated and provide opportunity to study the interaction of temperature, light intensity and light quality in growth and flowering. Means will also be available to control root temperatures independently of other environmental conditions. Because cane plants grow to considerable height, 20-ft. head-room has been allowed in all of the growing areas.

The remainder of the building is broken into two sections. The entrance to the whole structure is secured through air locks ; change rooms are provided, and visitors and staff alike are required to wear sterile clothing. The main laboratory area, 1,800 sq. ft., provides facilities for biochemical investigations with particular emphasis on tracer techniques.

Studies on the physiology and biochemistry of sugar cane were commenced in 1955 as a joint venture between the Botany Department of the University of Sydney, the Plant Physiology Unit, Division of Plant Industry, Commonwealth Scientific and Industrial Research Organization and the Colonial Sugar Refining Co. The initial work covered studies on the respiration of sugar cane stalks and the germination of sugar cane sets. At the same time, basic studies were undertaken on the mechanism of auxin action in plants. This work showed that the adsorption of pectin methylesterase to the tissues of cell walls could be altered by the addition of auxin and synthetic auxins. Experiments with tissue slices demonstrated that pectin methylesterase could be extracted with dilute salt solutions and that the enzyme was