

advantage of linking the research association serving such an industry with an established and related research association serving a larger industry is emphasized. Confidence is none the less expressed that during the past five years the research association movement as a whole has demonstrated its strength and vitality and that most of British industry believes firmly in the value of its research associations.

#### **Awards for Advanced Courses at Technical Colleges**

In a written answer on March 15 to a question in the House of Commons, the Minister of Education, Sir David Eccles, said that during 1953-54, the latest year for which figures are available, 9,829 awards were obtained by students of advanced courses at technical colleges. Of these, 237 were internal degrees in science and 209 internal degrees in technology at the University of London; 722 external degrees in science and 283 external degrees in technology; 110 associateships of the Royal Institute of Chemistry; 248 Higher National diplomas; 6,940 Higher National certificates; 350 college diplomas (technical); and 90 college diplomas (science).

#### **Agricultural Research in Scotland**

In a written reply on March 9 to a question in the House of Commons, the Secretary of State for Scotland, Mr. J. Stuart, said that eight institutes for agricultural research in Scotland are financed by the Department of Agriculture for Scotland and administered by independent governing bodies under the general scientific guidance of the Agricultural Research Council. Expenditure on agricultural research for the current financial year amounted to £875,800, of which £140,050 was capital expenditure; on agricultural education to £362,300, of which £148,300 was capital and £159,000 maintenance expenditure on agricultural colleges, and £55,000 on farm schools; and on agricultural advisory services to £537,400. These figures take no account of expenditure at Scottish universities on agricultural education met by the Universities Grants Committee.

#### **Projected Giant Radio Telescope in Australia**

In 1954 the Carnegie Corporation of New York offered the Australian Commonwealth Scientific and Industrial Research Organization 250,000 dollars towards the construction of a giant radio telescope for its Radiophysics Division, subject to the provision of sufficient further funds from other sources. Since then the Australian Commonwealth Government has promised to pay half the cost of the project, and further private donations have been received including a second 250,000 dollars from the Rockefeller Foundation. These generous contributions are sufficient to permit the construction of an instrument, and arrangements have been made with the London firm of consulting engineers, Freeman, Fox and Partners, to undertake a design study. In this work they will be assisted by Dr. B. N. Wallis. Details of the instrument will depend on structural factors and available finance; but the broad specification is for a steerable reflecting telescope of the maximum feasible aperture which will work without deterioration in performance down to a wave-length of 21 cm. (the atomic hydrogen spectral line). A corresponding instrument, of 250-ft. aperture, is nearing completion at Jodrell Bank in England, and the construction of

others is contemplated in the United States; but this is the only one projected for the southern hemisphere. It will be invaluable in completing the coverage of the whole sky, and, with this in mind, the International Astronomical Union and the Royal Astronomical Society have each expressed themselves as strongly favouring the project.

#### **Natural History of Coral Atolls**

DURING the American atom-bomb tests in the Marshall Islands in 1946, known as 'Operation Crossroads', comprehensive investigations on the geology, ecology and oceanography were carried out not only at Bikini atoll where the weapons experiments took place but also, as controls, at the neighbouring atolls of Eniwetok, where the ecology had been somewhat disturbed by wartime military operations, and at Rongerik and Rongelap, which had scarcely been touched by the outer world. The studies were continued by expeditions in 1947 and 1950, when the geological structure at Bikini was explored by several diamond-drill holes, and when seismic refraction and aerial magnetic surveys were made over this atoll, an adjacent guyot and the surrounding sea-floor. The conclusions of the large team of workers engaged in this project have lately been published by the United States Geological Survey (Professional Paper No. 260, 1955; parts A-R, 684 pp., 218 text figs. and 224 plates). Along the submarine slopes of Bikini and of the nearby seamount, specimens of olivine-basalt, basaltic ash and basic volcanic tuff were dredged from depths of 1,000-2,010 fathoms (6,000-12,060 ft.), providing the first direct evidence of the volcanic nature of the base on which a coral atoll is built. In the deepest borehole (2,556 ft.) the coral reef was not bottomed, the strata penetrated consisting entirely of fine detrital limestones, in composition almost a pure calcium carbonate, all originally deposited in lagoonal waters not less than 30 fathoms in depth. The oldest sediments reached are of (?) Oligocene age. Seismic refraction studies have confirmed and extended the results of drilling by indicating that several thousand feet of relatively unconsolidated calcareous rock overlies a volcanic core with a highly irregular topography. Unlike the borings undertaken at Funafuti atoll (to a depth of 1,114 ft.) in 1896-98 and at North Borodino (1,416 ft.) in 1934-36, the drilling at Eniwetok (1,285 ft.) and Bikini (2,556 ft.) has yielded cores of limestone rock which is quite free from dolomitization. It is a measure of the intensity of the collecting carried out during the recent surveys that more species of corals are now known from Bikini atoll than from anywhere else in the world.

#### **Animal Husbandry**

THE sixth holder of the Devon County Agricultural Association Lectureship endowed at Seale Hayne Agricultural College was Prof. J. E. Nichols, of the University College of Wales, and in his series of four lectures on "Animal Husbandry", given during 1954-55 and now published (pp. 40. Newton Abbott: Seale Hayne Agricultural College, 1956; 4s.), he deals with general principles and then the particular problems of beef and dairy cattle, sheep and pigs. His final lecture is concerned with the methods and aims of to-day and to-morrow. In the first two lectures he gives particular attention to the sequences of change in bodily form and function in relation to nutritional requirements and to costs: to the interacting factors which affect beef and milk production