

written and a different exposition to the existing one should be given by teachers of geography and geology.

Excursions were conducted to Eridge Park and Costume Museum, and to Lewes, where the historic buildings were described by Mrs. E. Bradley, while material of interest to the botanists and zoologists on the Levels was shown by Dr. Langmead.

The sixty-second annual congress of the Union will be held next year in Hastings during April.

NATIONAL RESEARCH DEVELOPMENT CORPORATION ANNUAL REPORT FOR 1954-55

THE report and statement of accounts of the National Research Development Corporation for the year ended June 30, 1955*, records only 135 cases of assignment of United Kingdom patent rights to the Corporation by government departments and research councils, compared with 315 during 1953-54. Of the 597 inventions communicated to the Corporation during 1954-55 (compared with 664 during 1953-54), 203 were from government departments and research councils, 22 from official organizations of the British Commonwealth, 8 from industrial research associations, 54 from universities and 310 from private firms and individuals, 283 of which were British. Patent rights assigned to the Corporation during the year totalled 187, including 42 from universities and 9 from industrial research associations; holdings of British and foreign patents and patent applications at June 30, 1955, included 492 United Kingdom applications and 522 granted patents, and 982 overseas patent applications and 639 granted patents. The accounts show a rising trend in the return from the Corporation's activities when compared with its outgoings, the annual income of £94,749 during 1954-55 representing 61.3 per cent of the expenditure.

Of the projects initiated in previous years, the report notes that four of the six big electronic digital computers had been delivered, installed and accepted by June 30, 1955. The '401' computer, leased to the Agricultural Research Council, continues to operate satisfactorily at Rothamsted Experimental Station and has also been used in developing a numerical technique for predicting the predisposition of an aircraft to aerodynamic 'flutter', in which it has been demonstrated that the flutter speeds and frequencies may be conveniently and quickly computed by digital equipment. In addition, it has been used for computing the optimum trajectories of particles under acceleration in a cyclotron, with contributions to the understanding of cyclotron design. The response to grants for training computer engineers at the Universities of Manchester and Cambridge has been small. Uncertainties of marketing conditions and the absence of firm orders appear to be the chief barriers to obtaining licences for the Ricardo light steam engine, and prototype installations were being placed at the disposal of some Commonwealth governments for field trials and demonstrations. The production of hecogenin from sisal has been transferred to firms engaged in the industry on satisfactory commercial terms, and cortisone is being produced from the hecogenin now available. In view of the favourable report of

* National Research Development Corporation. Report and Statement of Accounts for the Year 1st July, 1954, to 30th June, 1955. Pp. ii + 20. (London: H.M.S.O., 1956.) 1s. net.

a firm of chemical engineering consultants, the Corporation is continuing to support the acetylene synthesis project at the Imperial College of Science and Technology, London. Development of an experimental prototype stereoscopic motion-picture camera was completed during the year, and the camera is extremely promising.

Of the new projects, the Corporation is supporting an extended design study at the Manchester College of Technology of the possibility of controlling machine tools directly with a digital computer, and is sponsoring the development and initial marketing of Prof. H. S. Lipson's optical diffractometer. It is also financing the research and development work on the application of Prof. G. Pontecorvo's technique for synthesizing new strains of non-sexually reproducing micro-organisms, and is participating in a joint project with the Department of Scientific and Industrial Research and the Herring Industry Board to develop full-scale prototype equipment for commercial trials of new techniques of fish-smoking. Established projects now proving a useful source of revenue include those on the Bailey bridge, the Denny-Brown ship stabilizer, a technique for light-alloy cutting by electric arc, an air-position indicator, a course-setting dial-adjustment for aircraft, a backward-travelling-wave tube, a signalling system for teleprinter operation over radio links, a synthetic resin stoving enamel, a fire-fighting foam from degraded animal protein materials, a composition tablet for rendering brackish or sea water drinkable and an improved synthesis of an intermediate required in the production of the anti-malarial, 'Derraprim'.

UNIVERSITIES COUNCIL FOR ADULT EDUCATION REPORT FOR 1954-55

THE report of the Universities Council for Adult Education for the session 1954-55* is critical of the Ashby report of adult education in Britain on two points: it has serious doubts regarding the administrative arrangements proposed for the annual assessment of grants to responsible bodies; and it regards the recommendation that a committee should be set up to advise the Minister of Education on the subjects and types of adult education courses which should receive priority in qualifying for grants as a serious threat to the academic freedom of the universities. The Council re-asserts its conviction that responsible bodies must truly exercise the responsibility of determining the form and content of their programmes, in shaping which consultation with the Ministry is always welcomed. When the Minister of Education intimated his acceptance of the recommendations of the Ashby Committee, this particular recommendation was specifically excepted, and friendly discussions with the Ministry have led to a mutually acceptable arrangement for assessing grants. The new Further Education Grant Regulations, issued in July 1955, contained the statement, according with the cardinal recommendation of the Ashby Committee for more active but flexible control of expenditure by the Ministry, that "in determining

* Universities Council for Adult Education. Report on the Year 1954-55. Pp. 24. (From the honorary secretary and treasurer, W. E. Salt, University of Bristol, 1956.)

the amount of grant the Minister will have regard to the general standards of the courses, the needs of the area, the activities of other bodies providing further education in the area and the fees paid by students". The report remarks that it is to the sense of partnership built up, over the years, between the Ministry and the responsible bodies that we must look for a solution of the difficult problem of maintaining a reasonable control over expenditure while preserving the due rights and responsibilities of the responsible bodies.

During the session under review the Minister was able to relax somewhat the severe limitations on grant-aid during the previous two sessions and, in particular, to give some assistance towards the mounting cost of tutors' salaries. Most extra-mural departments of universities at the end of the session reported a slight increase in the number of courses provided, the total of 4,302 exceeding the peak of 4,116 in 1950-51, while the number of students increased from 78,672 in 1953-54 to 84,752. The increase was largest in short courses of three to nine meetings (19 per cent) and smallest (0.9 per cent) in tutorial classes; sessional classes increased by 6 per cent. There was an increasing tendency, particularly in tutorial classes, to provide tutorial and sessional classes outside the traditional framework of collaboration with the Workers' Educational Association, and all this expansion has been achieved mainly with the help of part-time tutors, who increased in number from 2,342 to 2,768, 1,127 being university teachers; university lecturers appear to have been responsible for 57 per cent of the tutorial classes and 48 per cent of the sessional classes.

The extension lecture course is still an important element in most extra-mural programmes; but the majority of universities now use short extension courses in the broad field of the liberal studies as a means of interesting the general public in some aspect of university study and keeping those already interested abreast of recent developments. Such courses are often given by a team of lecturers. A variety of courses has also sprung up to provide for serious study by other kinds of student groups, particularly those with a good background of previous education. Many courses of the extension tutorial or study course type are provided in collaboration with societies or professional organizations, and an increasing proportion of extension courses is now run in this way. While some of these courses have a strong vocational appeal, all are liberal in subject-matter and treatment. In the post-war years, however, the universities are also providing courses directed to providing specific vocational groups with information on recent advances in university studies, especially in science and technology, mostly at a postgraduate standard. A striking feature of post-war development is the increasing use being made by extra-mural departments of residential courses, while there is now a remarkable amount of coming and going between Great Britain and foreign countries in the field of adult education. As regards subjects of study, the largest increases in the number of courses have been in the physical sciences (26 per cent), religion (17 per cent), history (12 per cent) and international affairs (12 per cent); the decline in psychology (5 per cent) and geography (10 per cent) has continued, and there has been a sharp contraction (31 per cent) in government. The demand for history is mainly for local history or archaeology, and the study of languages appears to be on the

increase. Interest in the social studies is much less marked, and the substantial increase in science courses is largely vocational.

Besides the Ashby report and the new regulations, the Council discusses the report on broadcasting and adult education prepared by Mr. Maurice Bruce and is concerned about the provision of books to adult classes. Its own inquiry in England and Wales has indicated that all thirteen universities and three of the eight university colleges have their own extra-mural libraries, usually administered separately, whether or not they are part of the university or college library. Issues to book boxes ranged between 2,000 and 10,000 volumes a year, and expenditure between £200 and £800 a year, with substantially higher figures for London and Oxford. Five of the sixteen extra-mural libraries supplied 90 per cent or more of the books required by classes; three between 70 and 90 per cent; and three between 50 and 70 per cent. In four instances 20-50 per cent of the supply came from the National Central Library and few libraries did not make some use of the National Central Library.

THE NATIONAL VEGETABLE RESEARCH STATION OPEN DAY

THE first open day of the National Vegetable Research Station was held on June 5 at Wellesbourne, Warwickshire, when visitors saw the progress made in the development and work of this Station. Field experiments were on view, and there were exhibits of various aspects of the research in progress.

The Plant Breeding Section illustrated how it is using inbreeding, followed by the crossing of inbred lines, in an attempt to produce hybrid varieties of Brussels sprouts having improvements in uniformity, yield and other characters over ordinary varieties. Male sterility is being used as a helpful tool in this work, as it is also with onions, in the production of hybrid seed. The cause of deterioration of varieties of brassicas is also being investigated. F_3 progenies from crosses between lettuce varieties and a wild species, *Lactuca altaica* Fisch and Mey, which showed little attack by mosaic virus, were exhibited. These progenies were raised from the small proportion of F_2 plants which remained mosaic-free when grown in an epidemic of the disease. Stages in the process of breeding a non-bolting, high-quality variety of red beet having single-seeded fruits were shown, also work in the production of asparagus which should give only male plants from seed instead of the usual 1:1 ratio of male and female. Breeding material of forcing radish, spring cabbage and early cauliflower was also exhibited.

Long-term field experiments were seen which provide the Chemistry Section with material for its soil studies and work on the nutrition of vegetables. Descriptions were given of the effects of deep and shallow ploughing and of rotavating; of the application of fertilizers and farmyard manure at different depths, rates and times; and of inorganic and organic nitrogenous fertilizers on various rotations of vegetables. A demonstration was given of the restriction in development of the root system of peas brought about by soil compaction following certain cultivation treatments. Results from the use of chromatography in