

research worker, and the work of the Statistical Department enables field-work to be carried out with the maximum of effect. Field-work is not confined to the two farms, many careful experiments being carried out at various centres in the country; thus the main set of tests on the manuring of sugar beet, for example, involves some twenty commercial farms annually.

In a note of this length, it would be impossible to do justice to the work of so many departments; a reviewer can but mention one or two out of many significant lines of work. The experiments on deep ploughing and on cultivations have interested scientific men and farmers for some years, and the resumption of this work is welcomed. Results available before the War indicated that much time and money are lost on the farms of Britain in excessive cultivations; but farmers and Rothamsted workers alike felt that such unexpected results needed more corroboration. It has generally been considered that, in so far as yield of crop is concerned, the more and the deeper the cultivation the better; we used to point out the large, if expensive, crops raised in some gardens, where trenching is carried out, etc., and where no expense is spared on the preparation of the seed bed. The work at Rothamsted, however, which included experiments at many centres in 1944 and 1945, did not indicate any advantage from deep ploughing or from sub-soiling for potatoes or beet, and very little for wheat. Observations of root development and of the physical properties of the soil showed that none of the properties was influenced by deep cultivation.

The theoretical and experimental work on the movement of water in soils, and on evaporation, is also of great interest. Most of us have had the experience of observing small patches of a crop that have made far better growth than that of the surrounding plants, due to some physical character of those portions of the seed bed; for example, consolidation as the result of pressure from a tractor wheel, or greater pulverization on a headland where some implement may have been turned round, and where upward movement of water in the soil was presumably facilitated. On other occasions, under different weather conditions, these excessively consolidated or pulverized areas have carried the poorest plants. It is not easy for even the most experienced farmer to achieve the optimum seed-bed condition every season, and there will always be an element of chance about this until more fundamental knowledge is available about the physical properties of the soil, particularly in regard to water.

The Department of Chemistry commenced work in 1945 on forest nurseries, and interesting results are already available. It is interesting to note, for example, how the growth of Sitka spruce was improved by acidifying a slightly calcareous soil on which this species had consistently failed for a number of years. Work already carried out is sufficient to indicate that fruitful lines of research lie ahead in this field.

Work carried out in the Department of Soil Microbiology on the micro-organisms capable of the selective destruction of soil bacteria may be noted as of particular interest. The maintenance of satisfactory biochemical activity in a field soil depends on several factors, not the least important of which is the existence of micro-organisms that limit the numbers of useful organisms, either by competing with them for nutrients, or by producing toxic secretions, or by directly eating them. A number of strains of bacteria were subjected to attacks by

five predatory organisms, and by three species that are destructive to bacteria by virtue of their secretions. It was found that any one species of organism could attack about half the bacterial species tested; the organisms, however, differed markedly as to which particular bacterial strain they attacked. It seems likely that very few species of bacteria exist in the soil that are immune to attack by some of the micro-organisms.

Current advances in the use of insecticides lend great interest to the Rothamsted investigations in that field. Experiments are in progress on various aspects of the use of D.D.T. and of benzene hexachloride, including the effect of these on bees.

Tables giving the detailed results of the experimental work have been omitted, since it is intended to issue these separately. The report includes a list of the scientific papers from each department, with a short note on the contents of each, and also a list of the publications of the Rothamsted Experimental Station.

## PACIFIC SCIENCE BOARD

### FIRST ANNUAL REPORT

THE first annual report of the Pacific Science Board (National Research Council, Washington 25), set up as a result of the Pacific Science Conference, 1946, covers the year 1947, and outlines the steps being taken under the project for the co-ordinated investigation of Micronesian anthropology to fill gaps in our scientific knowledge of the Marshall, Caroline and Mariana Islands, and to provide the basic information required in setting up civilian government in these trust territories of the United States. A permanent Insect Control Committee has been appointed for Micronesia, and five entomologists have been sent to survey the distribution and destruction of coco-nut palms caused by the rhinoceros beetle (*Oryctes rhinoceros*), to study the coco-nut beetle (*Brontispa mariana*) and the giant African snail (*Achatina fulica*) and to search for parasites or natural enemies for the control of these pests. An entomological survey of the Palau Islands is also in progress.

Approval was given for eight other field projects, and in general the Board's policy is to give stronger endorsement and higher priority to proposals for intensive and long-range research than to those for extensive but superficial surveys or short-term projects. In accordance with the desire to strengthen Honolulu as a centre for research in the Pacific, the Board generally recommends that reference collections from the area should be deposited with appropriate institutions in Honolulu.

The Pacific oceanic biology project is now actively engaged in studying, analysing and evaluating the data already available, with headquarters at the Woods Hole Oceanographic Institution; and plans are now being developed for establishing a new Hawaii Marine Laboratory on an island in Kaneohe Bay, Oahu. The Board also hopes to co-operate with the research council to be set up by the South Pacific Commission in developing plans for research in that area, and conservation planning in the Pacific should be greatly assisted by three forthcoming international conferences: the meeting of the Standing Committee for the Protection of Nature in and around the Pacific, at the Seventh Pacific Science Congress to

be held in New Zealand in February 1949; the Economic and Social Council of the United Nations Scientific Conference on the Conservation and Utilization of Resources, to be held in the United States in May 1949; and the United Nations Educational, Scientific and Cultural Organisation's Conference on the Protection of Nature also to be held in the United States in May 1949.

Future activities contemplated include the encouragement of oceanographic and fisheries research in various parts of the Pacific, the initiation of a conservation programme for Micronesia, and the initiation of field studies in the Pacific area to further research bearing on problems in cancer and heart disease.

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## CARNEGIE UNITED KINGDOM TRUST

THE thirty-fourth annual report of the Carnegie United Kingdom Trust for the year 1947 emphasizes the increasing rate of expenditure, which rose from £120,000 in 1946 to £160,000 in 1947, thus exceeding the annual expendable income of about £133,000. The quinquennial policy for 1946-50 was framed on the assumption, however, that during the period a substantial part of the accumulated savings of the war years would be applied as annual revenue, and the Trustees are more concerned at a second feature of the period—the increasing proportion of expenditure allocated to the provision of services rather than buildings or capital assets.

The largest bulk allocations, totalling £150,000 each, for the Bureau of Current Affairs and for the development of amateur music and art, are wholly concerned with services, and this is also true of the £25,000 allocated to enable local organisers to be appointed by County Federations of Young Farmers' Clubs. Although the 'village hall' allocation of £100,000 is designed to help capital expenditure, payments have amounted to less than £7,500 in two years. Past experience of the Trustees indicates that grants for capital purposes have been more certain in their operation than grants for the early maintenance of services, and accordingly they regret the present restricted opportunities in the capital field. In view of the unsatisfactory position of the village halls scheme, it has been decided that when the Trust allocation of £100,000 has been exhausted by promises, subsequent schemes shall be eligible for consideration for Exchequer grants under the Physical Training and Recreation Act. For the village planning competition, forty-seven entries were received and the winning design is regarded by the adjudicators as quite outstanding. The Trust has also agreed to find up to £400 a year for a two-year programme of pioneer work for young women from the Channel Islands, partly by visits of expert organisers from England and partly by courses of instruction in England.

The report refers to the passing of the Irish Central Library for Students under an independent governing body, the Library Council established by the Public Libraries Act of 1947 (Eire). Grants to three county libraries in Eire have also been agreed in principle, and the committee set up to consider the future of the Scottish Central Library reported unanimously in September 1947 that the Library should not be merged with the National Central Library, although

continuing to work in the closest co-operation and consultation with that Library. Some form of constitutional link between the two Libraries was recommended; but it was considered that the time was now ripe for establishing the Scottish Central Library on an independent basis, with its own trustees and governing body and an initial income of £5,000, in new premises in Edinburgh. The grant to the National Central Library has been progressively decreased to £3,000, £2,000 and £1,000 for the three ensuing years and will become extinct on December 31, 1950.

Sufficient progress has been made with the Shropshire Community House at Attingham Hall, near Shrewsbury, to justify the appointment of a warden, and the Highlands and Islands Film Guild has made a very satisfactory start and is now working on a programme of six mobile film units.

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## STANDARD FREQUENCY TRANSMISSIONS IN GREAT BRITAIN

THE question of radiating standard frequency transmissions from Great Britain has recently been under consideration. Such transmissions are of great value in connexion with the calibration of industrial and scientific frequency sub-standards, in connexion with work on radio wave propagation and also for survey purposes. At present, standard frequency transmissions of guaranteed accuracy are emitted by the U.S. National Bureau of Standards<sup>1</sup> continuously on the eight frequencies 2.5, 5, 10, 15, 20, 25, 30 and 35 Mc./s. from station WWV. Unfortunately, on account of radio propagation conditions, it is often difficult to make good use of the American transmissions in Europe and farther east. At the recent meeting of the International Telecommunications Union at Atlantic City, it was agreed that the first six of the above frequencies (namely, 2.5, 5, 10, 15, 20 and 25 Mc./s.) should be allocated on a world-wide basis for all future standard frequency transmissions. Hence, if undesirable interference between such transmissions is to be avoided, all new services of standard frequency transmissions will require very careful co-ordination with existing services.

In Great Britain, an experimental low-power transmission from station GMT, on a frequency of 2 Mc./s., has been set up by the Royal Observatory at Abinger, Surrey, to facilitate comparisons between quartz clocks used in the operation of the Greenwich time service. Details of this service have been published recently<sup>2</sup>. Since no other British standard frequency service is at present available, these transmissions have been fairly widely used, and a substantial increase in power is under consideration.

In existing circumstances the provision in Britain of a comprehensive service on a number of the available frequencies will take some considerable time; but arrangements are now under consideration whereby a limited standard frequency service on three frequencies will be operated by the General Post Office. It is hoped that experiments connected with the new service will demonstrate the feasibility and value of covering the United Kingdom and Europe in this way, and also the degree of interference from and with the WWV transmissions.