

The work of previous years on the measurement of ocean waves has served the National Institute of Oceanography as a nucleus for an expanding programme in the action of winds upon the sea. Directly following the Second World War, work was confined to the measurement of sea waves, computation of power spectra, and a qualitative interpretation in terms of the ocean-wide distribution of storms as revealed by weather maps. The present annual report shows that the wave studies have expanded in scope; for example, a serious attempt is being made by Dr. M. S. Longuet-Higgins to measure vertical displacement of the water surface and instantaneous atmospheric pressure at the water surface simultaneously—a type of measurement that is essential for developing a clearer physical understanding of the mechanism of wave generation. Dr. Longuet-Higgins has also developed an elegant theory of the statistical properties of a random moving surface—a form of mathematical language particularly suitable for the statement of the properties of the ocean surface and most necessary for a future physical theory of the generation, propagation and dissipation of ocean waves. Also under way are several ingenious programmes for the observation of shallow drift currents due to the wind, studies of natural oscillations and storm surges in large basins such as the North Sea, and preparations for the Institute's part in the coming International Geophysical Year.

To describe in detail each of the studies reported for 1954–55 and to name each investigator would be to reproduce the annual report in substance. My selections or omissions do not imply any evaluation or criticism; they merely reflect varying degrees of personal interest and the necessity for keeping this review brief. However, mention should be made of Dr. J. C. Swallow's newly developed neutrally buoyant float for tracing deep currents in the ocean. One hopes that the new float will lead to a reawakening of interest in the problem of the general circulation of the ocean, a problem which has lain dormant for about twenty years largely because no adequate means existed for measuring directly the deep-sea circulation. The problem of describing the deep-sea circulation accurately—and independently of present-day hypothetical elements—is of considerable practical importance because so many eyes are cast toward the oceans as a place for the ultimate disposal of wastes from nuclear reactors. It is known that certain seas, like the Black Sea, are virtually stagnant beneath the top hundred metres and that these deep waters might possibly serve as an ideal dumping-ground for large volumes of radioactive wastes, barring a climatic catastrophe and a sudden turnover of bottom water.

The deep waters of all the oceans are isolated from the surface to a much lesser extent. The question then arises as to whether one can tolerate a fairly high level of radioactive waste in the deep ocean water without contaminating the surface. The oceanographer cannot at present give an affirmative answer to this question, but certainly Dr. Swallow's new device is the first glimmer of hope that we shall soon describe deep-sea currents more accurately. Before the War most of the effort of oceanographic institutions was directed toward exploring the large-scale ocean circulation. At present, only about 5 per cent of the publications issuing from the National Institute of Oceanography and from the Scripps Institution of Oceanography concern the general

circulation of the ocean. The percentage from the Woods Hole Oceanographic Institution averages somewhat higher, due probably to its proximity to the Gulf Stream. The present paucity of investigation of the really deep sea in Britain and the United States will doubtless be remedied through the stimulus of such new techniques as that of Dr. Swallow, because of the increasing pressure for definite information from those concerned with nuclear energy and as a result of theoretical advances in dynamical meteorology. HENRY STOMMEL

CARNEGIE UNITED KINGDOM TRUST REPORT FOR 1955

THE forty-second annual report of the Carnegie United Kingdom Trust, covering the year 1955*, is of special interest for its review of the quinquennium 1951–55, during which grants totalling £558,495 were paid, and for the statement of policy for the next quinquennium, which is appended. The development of the visual arts scheme, which was a new venture during 1951–55, has been most encouraging, and a larger allocation is contemplated in the new quinquennium. New life has been infused into many small museums, which have been converted into lively centres of culture and of education through recreation, and the Trust has joined with the Museums Association in urging on the Government the need for State aid to the national museums as the only real hope of retrieving a serious situation. In the field of community services the largest single determining factor during the past five years has been the Trust's awareness that problems of material want have given place to problems of personal, family and community relations, and both the Community Services Committee and the Education Committee have been concerned with research into the causes of social problems arising in families, into the effectiveness of new techniques for dealing with family problems, the development of family case-work agencies, experimental projects for restoring problem families to health, demonstration homes for delinquent boys and for the homeless sick, re-training of social workers and counsellors and the development of a new university course designed to produce general practitioners in social work.

The rehousing of the Scottish Central Library and several other building projects accounted for half the Trust's expenditure during the quinquennium, but the passing of legislation which brought the Scottish Central Library, during 1955, into financial independence of the Trust completed the Trust's historic contribution towards the development of the public library system. Building projects which the Trust has recently supported are used for housing its beneficiaries or for accommodating services it wishes to support, and have been designed to meet needs which have not so far been comprehended in the provisions of the Welfare State; the Trust also emphasizes its intention to keep a proper balance between rescue work and amenity.

The statement of policy for the quinquennium 1956–60 points out that the Trust prefers to con-

* Carnegie United Kingdom Trust. Forty-second Annual Report, 1955. Pp. viii+92 (9 plates). (Dunfermline: Carnegie United Kingdom Trust, 1956.)

concentrate its resources in limited fields where it can make an effective contribution to development, and that in selecting projects it distinguishes two main types: development work which is carried out over the country as a whole; and experiment or investigation, which may be carried out on a local basis but with the hope that the results may be of general application and usefulness. The main branches of activity for which part of the Trust's funds have been allocated for this current quinquennium are six in number: the encouragement of amateur music and drama activities; the encouragement of the practice of the visual arts by amateurs through grants towards the cost of occasional expert tuition for groups of three or more art clubs; the development of the local museum service, in co-operation with the Museums Association; the support of the National Councils of Social Service; the support of the efforts of the Family Welfare Association and Family Service Units to improve the quality of family life; and projects selected by the Trust to encourage outdoor group activities. In this connexion, the Trust hopes to contribute to the resources of a national park or a national forest park and to increase the value of the parks, as well as to assist field-work in the biological sciences and archæology, and a sum of £50,000 has been provisionally earmarked for expenditure on such schemes.

Reviewing the work in 1955, the report records the award of grants to sixteen museums and of exceptional grants, each of £1,000, to the Highland Folk Life Museum at Kingussie and to enable the Bowes Museum at Barnard Castle to remain open. Grants were also given to students and to museum officials to enable them to widen their professional and technical knowledge. During the past ten years nearly a hundred museums have been assisted to reorganize their basic layout, and a sum of £50,000

has been allocated for such purposes for the 1956-60 quinquennium. Support of the visual arts is being continued on the usual lines, and £15,000 has been allocated for the purpose.

The report expresses the hope that the plans which the Executive Committees of the National Councils of Social Service are now considering for increasing their free income will soon produce results commensurate with the public services it performs, but meanwhile the Trust is increasing to £8,600 its total contribution for this service in the quinquennium. The Family Welfare Association's general-purpose grant has been renewed at £2,000 for 1956, £1,750 for 1957 and £1,500 for each of the following three years, and £10,000 has been set aside for the further development of Family Service Units, of which there are now eleven established on a permanent basis in reasonably well-equipped centres, with warm support from the local authorities. A grant of £5,000 over five years was made to the Liverpool Research Service Society for the purchase and equipment of sub-standard working-class houses for the accommodation and training of homeless families, and satisfactory progress is reported. A final grant of £1,500 was made for the blind-deaf machine, 'Arcaid', to be administered by the National Institute for the Deaf. The first group of twenty-five students completed, in the summer of 1955, their four years course of training as social workers at the London School of Economics, to which the Trust made a grant of £20,000 in 1953, and a second group started in October 1955. The Trust has also agreed to finance for five years, at a cost of £25,000, the Bristol Social Project which has as its main objects the investigation of stresses and strains in a developing community and their practical prevention and control and the education of the community to a higher level of responsibility.

THE GOLGI APPARATUS AND THE ELECTRON MICROSCOPE

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IN 1951, A. J. Dalton¹ first made satisfactory electron pictures of the Golgi apparatus. In 1953, Dalton and Felix² published an important memoir on the Golgi apparatus of the epithelial cells of the epididymis and duodenum of the mouse. Those who previously had at their disposal only the light microscope found much food for thought in this work. Dalton and Felix described the small granules (or Dalton-Felix bodies) which probably always are associated with the Golgi apparatus. They showed that the net type of Golgi apparatus found in the epididymis really consists of a series of hollow tubes, in section much thicker on one side than the other, their cavity filled by more or less compressed vacuoles in chain form (Fig. 1). The wall of these tubes consisted of double lamellæ sweeping along the length of the Golgi apparatus. Their work agreed in broad details with the previous light microscope study by Nassonow³. Outside the Golgi apparatus were found comparatively large bodies which stain with neutral red and methylene blue, probably of a nutrient nature (lipochondria⁴).

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The double membranes have also been described by French and Swedish workers, of whom Johannes Rhodin⁴ may be mentioned for his study of the cells of the convoluted tubes of the kidney.

None of this work, however, answered completely some important questions which have arisen in recent years. Three of these are the supposed relation between the commonly occurring dictyosome of invertebrate somatic cells, and of all animal male germ cells, and the Golgi apparatus of higher vertebrate neurones; another, the supposed relation between secreted material and the Golgi apparatus. Work on the latter with special reference to the pancreas has been recently dealt with by one of us⁵; a paper by Sjöstrand and Hanzon⁶ not accessible to us should be consulted in addition. Another puzzling question was the nature of the so-called chromophobe part of the dictyosome, which usually had been assumed to be a coagulable material, which formed a greyish inner mass, as observed in osmium preparations under the light microscope. If this mass was an intrinsic coagulable part of the dictyosome and not vacuolar and watery, it became difficult to