

was the recipient of the sixth Holweck Medal of the Société Française de Physique and the Holweck Prize of the Physical Society; the presentation took place on May 15 at the Salons de l'Université à la Sorbonne, Paris, when Sir Thomas delivered the Holweck Discourse on the subject of new methods of making diffraction gratings. Sir George Simpson received the sixth Charles Chree Medal and for his address gave reminiscences of fifty years work in geomagnetism and geophysics. The twenty-eighth Duddell Medal was presented to Dr. A. B. Wood, who gave an account of his work on underwater acoustics, and the seventh Charles Vernon Boys Prize to Dr. J. H. E. Griffiths, who discussed ferro-magnetic resonance.

Details of the activities of the four Groups of the Society, the Colour, Optical, Low Temperature and Acoustics Groups, together with a list of the numerous bodies on which the Society is represented, are given in the annual report. In addition to science meetings, the Low Temperature Group held two major conferences—the Oxford Conference on Low Temperatures, and the Eighth International Congress of Refrigeration, in London. The Acoustics Group took an active part in the establishment of *Acustica*, and also in the general arrangements of the Acoustics Division of the Building Research Congress held in London during September.

The honorary treasurer again directs attention to the dependence of the financial structure of the Society on the success of the annual exhibition, which, although it had a record attendance and was of high standard, nevertheless resulted in a much smaller financial benefit to the Society than in the previous year. Thus the Society only just paid its way during 1951, and the future outlook depends very largely on the extent to which costs continue to rise. However, with the continued support of its members and with the suggested modifications in the form of subscriptions, it is hoped that the financial position of the Society may be made secure without curtailment of publications or activities.

MARINE BIOLOGY IN SCOTLAND REPORT FOR 1950-51

THE annual report and collected reprints (Nos. 57-87) of the Scottish Marine Biological Association for the year 1950-51* have recently been published. A study of this volume leaves no doubt that the Association's Millport Laboratory is working most successfully and at very high pressure. The scientific staff now numbers nine (excluding the Director), and their researches cover many fields, including plankton investigations, a re-survey of the fauna of the Clyde Sea Area, the life-history of barnacles, the factors governing barnacle settlement and their relationship with those governing other settling organisms, the operation of fishing trawls, oyster culture and marine algology. Of special interest and importance is the initiation of experiments in underwater television, for which a special grant has been obtained from the development fund of the Association. A new device for measuring the depth at which gear is working in the sea is also being developed. Already this apparatus can be used to a depth of 200 m. with an accuracy of ± 2 per cent in continuous readings on deck.

* Scottish Marine Biological Association. Collected Reprints, 1951: Nos. 57-87. (Millport: Marine Station, 1952.)

To improve facilities at the Station, a new two-story building with a reinforced concrete seawater storage tank on its roof is being built. The masonry of some extra research rooms, and a new workshop and store are mainly completed. Reconstruction of the aquarium is about to be put in hand. Certain administrative changes have also been made by which the Director of the Station acts also as Secretary to the Council—an arrangement that should bring about increased efficiency and smoother running of the whole establishment.

The Oceanographical Laboratory at Leith now comes under the administration of the Association, a special sub-committee of which has been nominated to advise on matters of scientific policy. The programme of research follows two main lines—plankton recorder surveys and investigations into the relationship between the herring and its environment during the Scottish summer fishery at Fraserburgh. During the year some thirty thousand miles of recorder sampling was carried out, the analysis of which must alone be a huge undertaking.

Until lately the Leith laboratory was administered by Hull University College and its reports published as *Hull Bulletins of Marine Ecology*. It is intended to continue their publication in the same format but under a suitably modified title such as *Bulletins of Marine Ecology*.

The Laboratory's present accommodation at Leith and Edinburgh is unsatisfactory and inadequate; but negotiations are now proceeding for the purchase of a property in Edinburgh which, when converted and equipped, will be more suitable.

COLONIAL DEVELOPMENT AND WELFARE

DETAILS OF SCHEMES FOR THE YEAR 1951-52

THE schemes detailed in the latest return made under the Colonial Development and Welfare Acts, covering the period April 1, 1951-March 31, 1952*, bring the total commitments for development and welfare schemes under the Acts to £83,983,947, of which £16,038,184 is for the year in question, and for research schemes to £10,745,100, of which £868,851 is for the year ended March 31, 1952. Of this, £373,826 is for agriculture, £136,803 for medicine, £109,804 for social science, £70,575 for tsetse and trypanosomiasis research, £42,778 for insecticides research, £42,045 for fisheries research, £38,050 for locust control and £9,100 for products research. There are no grants for research fellowships, and only £1,420 for economic research.

Of the actual research schemes, the largest are £97,220 for the establishment of the West African Institute of Social and Economic Research, covering capital and recurrent expenditure during July 1, 1951-March 31, 1956, £70,600 as supplementary provision for four and a half years for the establishment of a West African Rice Research Station at Rokupr, Sierra Leone, and £95,000 for the establishment of a Veterinary Research Laboratory and ancillary facilities in the Federation of Malaya. Pilot

* Colonial Development and Welfare Acts. Return of Schemes made under the Colonial Development and Welfare Acts by the Secretary of State for the Colonies with the Concurrence of the Treasury in the period from 1st April, 1951, to 31st March, 1952. (Cmd. 211.) Pp. 44. (London: H.M.S.O., 1952.) 1s. 6d. net.

schemes for the reclamation of tsetse-infested land in Kenya, Uganda and Tanganyika are allotted £70,000 over four years, and £38,000 over four and a half years is granted for the establishment of a Fisheries Research Unit at the University of Hong Kong. Other grants include £34,500, also over four and a half years, for research into the incidence of maize rust in West Africa, £31,500 (over the period January 1, 1952-March 31, 1956) for physiological and biochemical research at Makerere College, Uganda, £34,000 for the establishment of a training centre for ecologists selected for work in Colonial territories, £28,750 for the Anti-Locust Research Centre, and a supplementary £26,620 for the East African Agriculture and Forestry Research Organization for the year ending December 31, 1952.

The only other grants exceeding £20,000 are: £25,000 for hiring and equipping aircraft for disseminating insecticides in East Africa, £23,000 for further research over four and a half years by Dr. C. A. Walton into relapsing fever in East Africa, £24,403 (supplementary) for the Nutrition Field Station, Fajara, Gambia, £22,083 over four years for re-establishment of the Herbarium at Sandakan, North Borneo, and appointment of a botanist, and £21,000 over three years for the Ecological Land Use Survey, British Honduras. Reference should also be made to the grants of £19,300 for investigation, over five years, of seismic activity in the Windward and Leeward Islands, £17,500 to extend clove research at Zanzibar until August 31, 1953, £15,400 for experiments in East Africa on the dissemination of insecticides from fixed-wing aircraft, and £14,000 for the establishment of a Colonial pool of plant pathologists at the Commonwealth Mycological Institute.

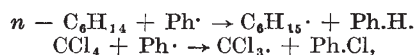
Grants of particular scientific interest for development and welfare schemes, apart from those for scholarship training schemes and the like, include £31,000 for the establishment of an Applied Nutrition Unit at the London School of Hygiene and Tropical Medicine, £150,000 for a Technical College at Nairobi, a further £202,500 for Makerere College, £130,000 for tsetse and trypanosomiasis reclamation in East Africa, £55,300 for the Geological Survey of Somaliland Protectorate, £21,911 for a survey of timber resources in Northern Rhodesia, £9,283 for the extension of the Government Veterinary Research Station, Mazabuka, £52,500 for the Geological Surveys Department of Nyasaland, and £150,000 for the comprehensive survey of the Shire Valley project. A further grant of £52,234 is to University College, Ibadan, Nigeria, and £87,700 for the development of medical and health services in Gambia, while of £6,784,700 for the revised Ten-Year Development Plan for Nigeria, £1,049,832 is for agriculture, £853,053 for technical education, £154,674 for forestry, £395,899 for leprosy control, £1,587,861 for medical and health, and £223,261 for veterinary services. £43,163 is granted for animal husbandry in Sierra Leone, £30,000 for agricultural development in Basutoland, £51,474 for anti-malarial works in Mauritius, £200,000 to the University of Hong Kong, £42,706 for meteorological services in South-East Asia, £55,000 for the Eastern Caribbean Farm Institute, £58,337 for meteorological services in the West Indies, £25,867 for cocoa development in British Guiana, and various sums totalling £311,050 to the University College of the West Indies and its teaching hospital. Grants for road development schemes, rural water supplies, the establishment of local broadcasting services and the like figure prominently among the remainder.

REACTIONS OF PHENYL RADICALS IN SOLUTION AND IN THE GASEOUS PHASE

By M. T. JAQUISS and DR. M. SZWARC

Dept. of Chemistry, University of Manchester

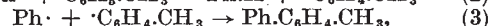
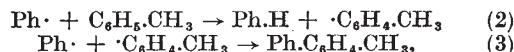
THE reactions of phenyl radicals in solution have been extensively investigated by many workers. A comprehensive summary of these studies has been presented in a monograph by Waters¹. It appears that phenyl radicals react differently with aliphatic and with aromatic solvents. With the former they seem to undergo an atom transfer reaction; for example:



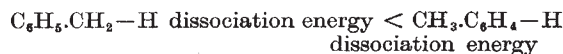
while the reactions with aromatic solvents lead to the formation of substitution products. Waters² interpreted the course of this substitution reaction by the equation



It is particularly interesting to note that the reaction of phenyl radicals with toluene leads to the formation of the isomeric methyl-diphenyls $CH_3.C_6H_4.C_6H_5$, and that dibenzyl was never detected among the products of the reaction³. This observation seems to exclude the alternative interpretation of the reaction, namely,



since the inequality:



requires that phenyl radicals should abstract preferentially the hydrogen atom from the methyl group rather than from the benzene ring. Such a reaction, however, would lead to the formation of benzyl radicals:



and thus dibenzyl or diphenyl-methane would be expected as products of the reactions, contrary to the observations.

This peculiar behaviour of phenyl radicals induced us to investigate their reactions in the gaseous phase. Several sources of phenyl radicals were explored by using pyrolytic methods. We found that iodo-benzene, bromo-benzene, mercury-diphenyl, benzylbenzoate, benzoyl-bromide and benzil generate phenyl radicals in our experimental arrangement, whereas benzo-phenone and azo-benzene required for their decomposition temperatures higher than our experimental conditions permitted. All experiments were carried out in a flow system, described in previous communications⁴, the total pressure being of the order 10-20 mm. mercury, and the time of contact of the order of half a second.

Iodo-benzene decomposes rapidly at temperatures of about 600° C. The decomposition is complicated by the presence of iodine atoms and molecules, and therefore is not suitable for studying the reactions of phenyl radicals. Neither is it convenient to use