

and at Melbourne, and the reason for the interference of calcium ions in the flotation of topaz has been determined. In the field of physical metallurgy the fabrication of titanium, the effect of small additions of other elements on the structure and mechanical behaviour of lead, and the strength and structure of metals are the chief problems to receive attention.

The Division of Metrology has been rearranged into standards, research and test work, with very good results, while, in addition to maintaining the Commonwealth standards of measurement of heat and light and associated quantities and the primary electrical standards, the Division of Physics has undertaken major projects in the study of phenomena associated with precipitation and the installation of equipment for research at very low temperatures and in solar physics. In the Division of Electrotechnology a separate mathematical section has been formed, and the measuring facilities of the Division have been extended. Significant advances have been made in investigating the relation between molecular structure and dielectric properties. Continuing and extending the work of the previous year, the Division of Radiophysics has concentrated attention on fundamental studies of the radio-frequency radiation from the sun and the galaxy, the application of radar techniques to the study of natural and artificial rain formation, electronic methods of solving mathematical problems, and radio and radar methods of navigation and surveying. Plans for the work of the Meteorological Physics Section have been broadly determined, and theoretical and practical studies of the movement and behaviour of pressure systems continued, as well as experiments on the artificial stimulation of rainfall by the dry-ice process.

The Organisation is co-operating with the University of Melbourne in a programme of research on nuclear physics and cosmic rays under the direction of Prof. L. H. Martin, and has aimed at a study of the forces within the nucleus of the atom. Co-operative investigations on cosmic rays are also being undertaken with the University of Tasmania. Tracer-element investigations have been extended, but arrangements have been made to obtain supplies of radioactive isotopes from overseas and to develop a service for their handling by, and distribution to, research workers in Australia.

## GOVERNMENT RESEARCH IN NEW ZEALAND

### ANNUAL REPORT OF THE DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

THE twenty-third annual report of the Department of Scientific and Industrial Research, New Zealand, covering the year ended March 31, 1949\*, includes the Minister's statement, the Secretary's report, and reports from the branches, divisions and research committees or research associations, as well as from the university colleges and the Cawthron Institute. Results during the year came from an aggregate of small achievements in many fields rather than from a few outstanding developments, and the demands made on the Department for assistance were greater than its resources and accommodation

\* New Zealand. Twenty-third Annual Report of the Department of Scientific and Industrial Research. Pp. 88. (Wellington: Government Printer, 1949.) 1s. 9d.

could meet. The departmental organisation was arranged to provide for co-operative attack on problems by men of science trained in different techniques, and every effort was made to shorten the time-lag between the attainment of useful results and their being put into practice. Full use was made of the help available from the presence in New Zealand of some two hundred overseas scientific workers attending the Seventh Pacific Science Congress, and the exchange of ideas during the Congress made a great contribution to New Zealand's scientific effort.

Intensive work on improvement in the quality of pastures for all types of country led to improved strains of rye-grass and cocksfoot which were proved during the year. Prolonged tests on these and on clovers showed that the research work has yielded strains which under New Zealand conditions give marked increases in food values compared with the best selections from other countries. Progress was made towards an understanding of the response of pasture to top-dressing with phosphates, nitrogen and potash, and an entirely new view of nitrogen intake by the grazed pasture plant and its use in the leaf had to be adopted. Advances are also reported in the knowledge of methods for improving pasture in the hill country of both Islands, and plant-breeding work led to improved quality in stock fodder crops such as swedes, kale and lupins. An intensive programme of research on insect pests and fungus, bacterial and virus diseases of all farm crops was maintained, while, after exhaustive tests, three new varieties of apple of English origin and five varieties of peaches from Australia were selected for issue to New Zealand growers. Plant-breeding work at the Wheat Research Institute promised to afford varieties superior even to Hilgendorf in quality.

The Plant Chemistry Laboratory, besides working out two methods for determining minute amounts of weedkillers of the hormone type, also had a pilot-scale fermentation plant which could be utilized for practically any type of industrial fermentation and was studying the antagonistic properties of endemic species of Polyporaceæ and of Actinomycetes from soil samples of varied origin. The recently established Hop Research Station did much useful preliminary work, and the Dairy Research Institute, which in 1947 ceased to be a unit of the Department, continued to work on similar lines and developed on a commercial scale the system of pressing and wrapping cheese in 'Pliofilm'. Much assistance was rendered by the Department and the Cawthron Institute to the tobacco industry, and the Dominion Laboratory undertook a growing volume of research work for industry, including some of the difficult new methods where radioactive isotopes are used.

The Auckland Industrial Development Laboratories and the Canterbury College Industrial Development Department continued to provide valuable assistance to State Departments as well as to industry, as did the Dominion Physical Laboratory, where a laboratory for electron microscopy to serve all research workers in New Zealand was established. An electrical-resistance type of thermometer was in the process of being developed with the object of devising a reliable temperature alarm to protect fruit growers from serious losses due to frosts. At the request of the Dominion Observatory a quartz-crystal-controlled electric clock was built to operate from a battery supply, and an automatic exposure-timer for use in X-radiography and photofluorography

was being designed for the Department of Health, as well as equipment to record blood pressures of patients undergoing surgical operations under anaesthesia. The geophysical branches were reorganised during the year to provide for improved operation of the magnetic survey, ionosphere, seismology and oceanography activities of the Department, while the strengthening of the staff of the Geological Survey contributed chiefly to progress with coal surveys and surveys of sites for hydro-electric dams. Studies in vulcanology and the use of geothermal power were also initiated.

### BRITISH JOURNAL OF APPLIED PHYSICS

A NEW MONTHLY PUBLICATION

THE Institute of Physics has always stressed the importance of the application of physics in industry, and, as early as 1923, it commenced the publication of the "Physics in Industry" series. This series of monographs contains lectures and symposia given before the Institute, its branches and subject groups, and specially written reports on branches of applied physics. From time to time during the past fifteen years, contributions devoted to applied physics have also appeared in the Institute's monthly *Journal of Scientific Instruments*, and for the past two years the applied physics articles have been gathered together into a separate section of the *Journal*, which has been given the extended title of *Journal of Scientific Instruments and of Physics in Industry*. In January of this year the Institute launched a new monthly publication, the *British Journal of Applied Physics\**, the primary object of which is to announce new applications of physics, especially in industry, and developments of those already known. With the commencement of this new journal, the *Journal of Scientific Instruments* has reverted to its original title and to its original object with articles devoted solely to scientific instruments and apparatus.

The first three numbers of the *British Journal of Applied Physics* have a format similar to that of the *Journal of Scientific Instruments*, and it is evident that a high standard of presentation is being aimed at. Original papers of scientific merit, special survey articles in the field of applied physics, selections from the lectures, and discussions and symposia arranged by the Institute and its groups and branches at home and overseas are to form the main contents of the new *Journal*. In addition, there are book reviews, correspondence, technical notes and news items. Special articles which have so far appeared are by Sir Philip Morris on scientific education, the substance of which he delivered at the inaugural meeting of the Education Group of the Institute on October 5, 1949; by J. Moore on chemical and physical properties of rubber; and by T. Bedford on environmental warmth and human comfort. The original contributions, which average four per issue, cover a very wide field and include articles on paper, electronics, photo-elasticity and rotating mechanisms. In the March number the leading article is a summarized report of the proceedings of the meeting, held at Buxton in May 1949, on the investigation of biological systems by the electron microscope and by X-ray analysis.

\* *British Journal of Applied Physics*. (Monthly.) Vol. 1, No. 1, January. Pp. 32. (London: Institute of Physics, 1950.) 6s.; annual subscription, 60s.

The Council of the Royal Society has made a grant towards the cost of the new venture, and the Council of the Physical Society has given its support and encouragement. The new *Journal* will be welcomed by the large number of physicists now employed in industry, and it will prove valuable to those engaged on fundamental physics by giving them an insight into the problems and developments in the rapidly expanding industrial field.

### AFFORESTATION IN EUROPE

AMONG the subjects considered in the September 1949 issue of *Forestry Abstracts* (11, No. 1; Oxford: Commonwealth Forestry Bureau) are some brief reviews on afforestation. J. Tuzson describes some experiments for afforestation on the great plain of Hungary. The trees being experimented with are both exotic conifers and hardwoods. The somewhat difficult soil and climatic factors of the great Hungarian plain make forestry by no means easy; for that reason the experiments so far undertaken are of very considerable interest, and the paper merits study. A bulletin on the afforestation of the Plateau of Millevaches, by M. Vazeilles, gives an account of the reclamation and afforestation of some 156,000 hectares of barren heathland in the Limousin. Various exotics are being experimented with in order to find, it is said, the most suitable species for the area. From the afforestation work which was undertaken between the two World Wars in the Auvergne mountains and the small plateaux, one would have thought that the indigenous species would probably give better results than some of the more popular exotics.

Mountain planting in Italy is discussed by M. Zajaczkowski in the *Quarterly Journal of Forestry* (43; 1949). This paper deals with methods of planting used on steep eroded slopes of the Apennines and is of value, since it discusses three methods which should be well known nowadays in dealing with similar types of afforestation. The methods are (1) cultivated patches (*bucche*), (2) contour terracing (*gradoni*), (3) discontinuous terracing (*piazzole*) between widely spaced contour terraces. Methods and cost and a brief account of nursery practice are given.

Lastly, there is an article in *Gozd. Vestn.*, 5 (1, 2); 1946 (Sloven) by V. Beltram, entitled "Afforestation of the Karst is no Problem". The author, making use of the report of the Karst Afforestation Commission, reviews forestry work done between 1886 and 1911 in the Karst region of Slovenia in the light of his own experience in the Dalmatian islands, which are also of Karst type. The work was exclusively a planting one and no direct sowings were made; and it also favoured the exclusive use of *Pinus nigra*, which constituted 91 per cent of the planting stock. It was found, however, that owing to the long distances between the nurseries and the planting sites, and partly because *Pinus nigra* is not suited to the region, 71 per cent of the entire stock had to be replaced. On the other hand, *Pinus sylvestris*, of which small amounts were planted, is found to do better and to regenerate abundantly. From his experience the author advocates sowing rather than planting, since the former is 60 per cent cheaper, and he describes the methods he would propose to use.