

THE ONTARIO RESEARCH FOUNDATION

THE annual report of the Ontario Research Foundation for 1960 contains interesting accounts of sponsored research in its various departments*. In biochemistry, for example, work has been carried out on such projects as the tanning of leather with spruce bark from northern Ontario, the improvement of household sanitation units, the utilization of rice-hull ash, and the properties of pozzolans and other cementitious materials. Besides many existing investigations, four new industrial projects were initiated in the Chemistry Department in 1960. Work for the Reichhold Chemical Co. was started and contracts negotiated with the Brick and Tile Institute of Ontario, Toronto; L'Air Liquide, Montreal; and the National Starch and Chemical Co., Plainfield, New Jersey.

Of particular interest in this Department was work carried out under the Moore Business Forms, Ltd., Fellowship. The investigators designed and constructed instruments to measure manifold characteristics and developed analytical methods for carbon paper coatings based on new physical methods of analysis. The instruments developed permit a study of the density and clarity of carbon copies, the formation of 'haloes' in high-speed printing, the pressure-time relationship for various impacts of type on multilayers of paper and carbon paper, and provide a visual demonstration of the clarity of carbon copies. The analytical methods permit analysis of very small specimens of carbon ink such as may be recovered from carbon copies and thus yield basic information on transfer and other properties.

In the Engineering and Metallurgy Department, service work increased by about 25 per cent and accounted for about 70 per cent of the external revenue, and more than 50 per cent of the total work load of the Department. The total number of investigations in the Ore Dressing Division increased from 45 in 1959, to 56 in 1960, 55 different clients being served. The Engineering Division provides engineering services for a number of industries, and

* Ontario Research Foundation Annual Report, 1960. Pp. 46. (Toronto: Ontario Research Foundation, 1961.)

operates the Gas Appliance Testing Laboratory for the Canadian Gas Association.

Another department, Industrial Research Services, helps industries in the Province by providing a free technical information service coupled with a field engineering service. The latter delineates technical problems and recommends means for their solution. Any industry in Ontario may use this confidential service without obligation. This work is carried out under contract for the Ontario Department of Commerce and Development and for the Technical Information Service of the National Research Council.

This Department also keeps a record of the Foundation's activities. In 1960, more than 4,300 separate contacts with manufacturing and service industries, individuals, associations and departments of Government were recorded. Nearly 1,400 investigations were carried out in the scientific laboratories of the Foundation, ranging from short-term evaluations of a special nature through minor research and development projects, field engineering studies, consultation, project management and technical surveys to major research and development fellowships. Answers to nearly 1,900 technical problems were provided by Industrial Research Services and more than 400 problems requiring laboratory work were co-ordinated by the Department either at the Foundation or in some other appropriate and competent agency.

For many years the Department of Parasitology has been building up a body of knowledge concerning the parasites occurring in fish, birds and mammals of Ontario. Thirteen scientific papers were published in 1960, an outstanding contribution from a small group which is also responsible for a teaching and research programme in parasitology at the University of Toronto.

Service work undertaken by the Department of Physics included work on back-scattering of electrons from surfaces, a test-jig for an extensometer, tests of insulation tape, and consultation regarding electronic instruments, optical measuring systems, light meters and radioactive tracers.

THE COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, NEW DELHI

THE annual technical report, 1959-60, of the Council of Scientific and Industrial Research, New Delhi, covers the work of twenty national laboratories, including the National Botanic Gardens, Lucknow, and the Birla Industrial and Technological Museum, Calcutta, as well as sponsored research in progress or completed at the Rain and Cloud-Physics Research Unit of the National Physical Laboratory, New Delhi, and at the three Essential Oils Research Centres at Kanpur, Bangalore and Ootacamund*. There are also notes on the work in progress under some fifteen research committees and

* Council of Scientific and Industrial Research, New Delhi. Annual Technical Report, 1959-60. Pp. iv+440. (New Delhi: Council of Scientific and Industrial Research, 1961.)

under fellowships, as well as on completed projects. Lists of 379 research schemes in progress in 106 centres in 1959-60, of grants-in-aid, of 306 fellowships, of 738 research papers published during the year, and of patent applications filed are appended. Besides the Central Mechanical Engineering Research Institute and the Central Indian Medicinal Plants Organization, which are still being planned, the Council has approved the establishment of a National Aeronautical Laboratory at Bangalore, a Regional Research Laboratory at Jorhat (Assam), a Central Scientific Instruments Organization and a Centre for Research, Training and Documentation in Petroleum and Natural Gas.

The research schemes covered a wide range of problems in biology and public health, engineering, essential and vegetable oils, fuel, leather and food technology, metallurgy, pharmaceuticals and drugs, and physics, while a research school in earthquake engineering was established at Roorkee University.

It is impossible here to do more than refer very briefly to a few features of the work of some of the National Laboratories and Institutes to illustrate the range of the Council's activities. The National Physical Laboratory, New Delhi, was responsible for theoretical investigations on the conduction of heat in solids, and an evaluation of the convolution integral with particular reference to its application in heat conduction when the excitation function is an arbitrarily plotted function of time. Broadcast transmission of time signals over a standard carrier of 10 Mc./s. continued for 5 hr. daily on an experimental basis, and also investigations on the determination of the minimum amount of costly materials which suffices for the correct measurement of their melting points which are fixed points of temperature, and the internal energies of tantalum, platinum and titanium have been calculated. The National Chemical Laboratory, Poona, has developed a new complexing eluant, sodium triphosphate, particularly useful in preparing pure samaria from a 30 per cent samarium concentrate, and has also developed a general theory of super-exchange interaction mechanism and satisfactory processes for production of theophylline, sodium warfarin, *N*-methyltaurine and methylamine and for recovering quinine and quinidine from cinchona febrifuge, as well as a new route to naturally occurring anthraquinone carbinols using diborane.

The Central Drug Research Institute, Lucknow, has found, in indigenous medicinal plants screened for pharmacological activity, a good cardiovascular drug in ruvoside, from *Thevetia neriiifolia* (Kaner) and a drug with musculotropic properties in *Daemia extensor* (Utranjutaka), and obtained evidence of amoebicidal activity in deoxyhexahydroquinine, while immunochemical work on *Vibrio cholerae* has shown that neutral and acid polysaccharide fractions possess high serological activity. The Central Electroclinical Research Institute, Karaikudi, has developed a new technique for preparing 2:4-diaminophenol by electrolytic reduction of *m*-dinitrobenzene, and has used a rotating-cathode technique in the preparation of benzidine and substituted benzidines, while a new cathodic technique has been developed for the study of cathode protection based on the use of the Hull cell and a polarographic technique used for the determination of cystine. The Regional Research Laboratory, Hyderabad, has prepared short-, medium- and long-oil varnishes from maleic and modified phenolic resins, using dehydrated castor oil, bodied dehydrated castor oil and linseed stand oil, and established optimum conditions for the preparation of terpeneol from carene, 8-hydroxyquinoline from *o*-aminophenol, phenylacetic acid from benzyl chloride and phenylacetamide from benzyl cyanide.

The Indian Institute for Biochemistry and Experimental Medicine, Calcutta, has gained a clearer understanding of the biological activity of human chorionic gonadotrophin which accelerates the transformation of germ cells in the male toad, and has also obtained a comprehensive idea of the pattern of metabolism supporting growth and activity in *Leishmania donovani*.

RADIO RESEARCH 1960

THE Radio Research Board of the Department of Scientific and Industrial Research was established in 1920, and has in the intervening forty years continuously advised the Department on its programme of research in the radio field. For many years the work was centred on the National Physical Laboratory at Teddington, although facilities for field experiments were long ago made available in the grounds of the Admiralty Compass Observatory, at Ditton Park, near Slough. Dr. R. L. Smith-Rose has been associated with this research programme from its inception, and in 1947 he was appointed as the first director of radio research of the Department of Scientific and Industrial Research. Following this appointment, the Radio Research Station at Slough, with its new laboratories erected in 1956, became the centre for the radio research work of the Department and independent of the National Physical Laboratory.

The report of the Radio Research Board for 1960, published recently*, records that Dr. R. L. Smith-Rose retired from his post of director of radio research on September 30, when he was succeeded by Mr. J. A. Ratcliffe from the Cavendish Laboratory, University of Cambridge.

* Department of Scientific and Industrial Research. Radio Research 1960: The Report of the Radio Research Board and the Report of the Director of Radio Research. Pp. iv + 23 + 4 plates (London: H.M.S.O., 1961.) 2s. 6d. net.

During the year, the work of the Station was re-oriented so as to apply about 50 per cent of its effort to some space research problems, which are now being actively investigated. To assist in this work, a major development during the year under review was the installation of a 'Minitrack' equipment for tracking artificial satellites of the Earth, and for communication with, and reception of, telemetry signals from such satellites. The equipment has been provided on loan by the National Aeronautics and Space Administration (N.A.S.A.) of the United States, and is operated by staff of the Station. Data obtained from it are available for use by both organizations.

Predictions, on an increased scale, have continued to be issued during the year, giving the positions of all satellites of interest to observers in the United Kingdom. Signals have been received from a number of satellites at Winkfield, near Slough, and at the Radio Research sub-station at Singapore; and measurements have been made of signal strength, Doppler frequency-shift, and Faraday fading effects. The results are of particular interest in work on the ionosphere both in temperate and equatorial regions.

For many years the Radio Research Station has been very actively engaged in exploring the ionosphere by radio waves sent up from the surface of the Earth. During the past year, collaboration with the corre-