modeller and a physiotherapist. The results collected in the survey are investigated in the laboratories by mathematical statisticians, then last models are made to incorporate the statistical results, ranges of shoes made and then taken out into the field in a statistical fitting trial. A second illustration is afforded by a wear trial of shoe components. Physicists and chemists have collected the appropriate laboratory information about the materials to be tested, which are then built into shoes and put out for systematic wear trials in accordance with a proper plan designed by the statisticians for the necessary cross-linkages and tests of significance. This type of work is essential to the development of laboratory quality-appraisement methods. A third illustration may be taken from the productivity investigations; a team going into a shoe factory for this work is composed of a shoe factory technician who acts as leader, a production methods engineer, junior observers, and often a statistician–economist.

As a final word it may be said that in addition to the work at Satra House the Association finances a fellowship at University College, London, where a research fellow possessing medical qualifications works full time on problems of the foot, and the influence of shoes on its structure and function.

H. BRADLEY

ONTARIO RESEARCH FOUNDATION

ANNUAL REPORT

THE annual report for 1948 of the Director of Research of the Ontario Research Foundation*, after referring to the increased accommodation now available and to the strengthening of the staff by graduates of British universities who have recently gone to Canada, expresses concern at the absence of a floating supply of capable research workers in Canada and at the diminishing income from investments which, with rising costs over the past ten years, has limited both the number of senior staff capable of directing applied research and also the number of young graduates which the Foundation could engage, as well as the amount of basic research it could initiate and support. The greatest problem of the Foundation to-day is to restore to their earlier proportions these three aspects of its activity. Satisfactory progress has been made in the projects in parasitology, wood chemistry, physiography and climatology, wire-rope research and ferrous metallurgy undertaken with the co-operation of the Advisory Committees of the Research Council of Ontario; with the Industrial Advisory Committee of the same Council efforts have been made to stimulate group research in that Province, but without success, and the conclusion was reached that group research cannot be developed on the basis of the existing trade associations.

In the field of biochemistry, with a fellowship on linseed oil, partly supported by the National Research Council, research has further elucidated the structure of *iso*linoleic acid formed during the hydrogenation of linseed oil. Under other fellowships, careful studies have been made of the constitution of pharmaceuticals possessing antihistaminic properties, and of the effects of small concentrations of metals on the keeping qualities of vegetable oils. In the Department of Chemistry, attention was given to a single-stage process for the production of washable wall-paper, and the flow and printing characteristics of wall-paper coatings; and investigations on the commercial possibilities of sulphite liquor and the manufacture and applications of sodium carboxymethylcellulose continued. With the termination of investigations on the development of synthetic gum from Canadian raw materials, attention is being directed to the chemistry and utilization of white birch, the essential oils contained in the leaves, cones and twigs of twelve Ontario species, and the production of tannin from waste sulphite liquor. Two other projects supported by grants from the National Research Council have been concerned with plastic dentures from acrylic resins and with the polymerization of styrene–isoprene, butadiene–isoprene and butadiene–styrene systems; this second project has now been terminated.

In the Department of Engineering and Metallurgy, fellowships in operation relate to malleable electrolytic nickel, the theoretical and applied aspects of the use of lithium atmospheres in the carbonization of steel, the controllable factors affecting the resistance of steel balls to abrasion, the behaviour of binary alloys of titanium and other metals at high temperatures and a study of methods to relieve the existing shortage of steel scrap in Canada. The Mathematical Statistics Unit undertook studies on sequential sampling from finite batches, the confidence limits for hypergeometric distribution, and methods for estimating biological populations. Work in the Department of Parasitology has been concerned with the conditions of climate and weather which determine the total population of black flies in any season and their activity to man, bird and beast. Helminthological work has related to the maintenance of a host-parasite catalogue for the vertebrate animals of Ontario, collection of material for a study of the pathological lesions caused by worm parasites and experimental studies on the toxic and allergic manifestations caused by the body fluid of *Ascaris lumbricoides*, a worm parasite of the pig, and on the immunological relations between the ascarid worms of pigs, man, cattle, horses and skunks. In the Physiography Department, the evaporation experiment in Toronto was continued for a second season, and a co-operative irrigation experiment on young pine trees was started at the Ontario Reforestation Station.

There was no extension of the work of the Textiles Department, but the existing projects on quality control, on nylon and on wool problems were continued or enlarged. During the year the Industrial Research Services Department made 790 visits to plants or offices and has received requests for assistance from more than two thousand firms or individuals, and of these, seven hundred have used the service more than once. The success of this work—nine hundred inquiries have involved laboratory work—has had repercussions on the scientific laboratories, and the director has already recommended the provision of suitably equipped laboratories to handle inquiries from the food industries and in the field of applied physics. A list of papers published during the year is appended, together with the balance sheet and accounts and a list of professional and technical staff.

* Annual Report of Ontario Research Foundation, 1948. Pp. 26. (Toronto: Ontario Research Foundation, 1949.)