

Some idea of the increase in research undertaken by Canadian universities may be obtained from a comparison of the situation in 1919 with that in 1959. In the former year, two universities—Toronto and McGill—offered graduate courses beyond the master's degree and graduated 11 students; in 1959 Ontario had four, Quebec three and six other provinces each had one major university offering graduate courses leading to the Ph.D. degree. They conferred 284 doctorates in course, distributed by fields as follows: biological sciences, including medical and agricultural sciences, 64; engineering and applied science, 19; humanities, 61; physical sciences, 101; and social sciences, 39. Subject matter covered in these courses and other research conducted by university professors and reported in professional journals is encyclopaedic and reflects specialization and variety. Outstanding research in particular fields has become associated with various universities, for example: nuclear research and geophysics in McGill, Queen's, McMaster and Saskatchewan; medical research in such institutions as the Connaught Laboratories and the Montreal Neurological Institute; agricultural research in the western universities; and fisheries research in British Columbia.

Outside financial support for university research comes primarily from four sources: agencies and departments of the Federal Government including the National Research Council and Defence Research Board, which provide grants for approved and contracted government-sponsored research; industry, which supports both basic and applied research; private foundations, which provide grants for approved research, sometimes in selected fields; and provincial governments.

Subsection 5.—Industrial Research

Industrial research in Canada is changing very rapidly. In the past, industry in general was largely unaware of the value of research to its own development and to that of the country, partly because many Canadian companies were subsidiaries of companies in the United Kingdom and the United States and partly because small companies found it impossible to finance their own research. The problem was accentuated by the vast size of the country, the absence of concentration of similar industries and the proximity to the relatively large research facilities of the United States.

However, the emergence of Canada as a highly industrialized society, its entrance into multitudinous fields of production, the rapid growth of many large nation-wide industries, the serving of a discriminating domestic market and the meeting of competition from abroad have had the effect of making Canadian manufacturing establishments research conscious and many of the larger ones now possess competent research organizations. The fields covered by some of these industries are outlined in the 1956 Year Book at pp. 386-389. The research work of the Pulp and Paper Research Institute, an independent corporation combining efforts of government, university and industry in the expanding field of pulp and paper research, is described in the Forestry Chapter of this volume.

Industrial Research-Development Expenditures.—In 1958 a survey was conducted by the DBS which attempted to measure the extent of the research program undertaken in the preceding year by industrial firms in Canada and to obtain an indication of its direction. Summary statistics from that survey are given in the 1960 Year Book, pp. 431-433.

A similar survey was taken in 1960 covering research expenditures in 1959, summary results of which will be carried in the 1962 Year Book and detailed statistics in DBS Reference Paper No. 75 entitled *Industrial Research-Development Expenditures, 1959* (catalogue No. 13-516).