

## Section 2.—Scientific and Industrial Research in Canada.

Prior to 1870 the basis of research in Canada was observation and record rather than experiment. Fifty years ago, laboratories, except elementary ones of scant accommodation, were non-existent. The courses in science in the universities did not, before 1878, involve any practical work beyond extremely simple demonstrations. The industries did not concern themselves with scientific investigation, and research was not regarded as an essential feature of the work of the Government Departments, except possibly in the Geological Survey.

Scientific research in Canada began in the '80's with the institution in the universities of courses in experimental and practical science. Many of the investigators of Canadian origin who have distinguished themselves in the field of science within the last 30 years owe their incentive toward research to the outlook developed by these courses.

Since 1890, Canadian universities have steadily increased their equipment for scientific teaching and research. While many of the teachers have had little time for research or for advanced courses, scientific investigators in Canadian universities have made valuable contributions to the literature of the sciences, and many of them have achieved high distinction.

Scientific societies, such as the Royal Canadian Institute, founded in 1849, and the Royal Society of Canada, founded in 1881, have also promoted research through the publication of papers giving the results of researches in the various departments of science and through the distinction conferred by membership in such societies.

Various departments of the Dominion and Provincial Governments have maintained scientific laboratories. Some of these have been concerned merely with routine examination or analysis, but in many cases research was undertaken. The research activities of government departments have, however, been inadequate to meet the needs of the situation. Less than 9 years ago, it was estimated that the amount expended annually by government laboratories for investigations of all kinds was less than \$325,000, of which less than \$100,000 was actually expended for research in government laboratories.

Twenty years ago the value of research was not appreciated by Canadian industries. A number of firms had routine testing or assay laboratories, but until 1905 there was none which employed research for the improvement of its manufacturing processes or of its products. The example of foreign firms has to some extent altered public opinion in Canada on this question, but the number of Canadian firms which apply research to their industrial problems is still very small. In 1917 the Research Council of Canada issued a questionnaire to the industries. Replies received from 2,400 of the leading firms in Canada showed that only 37 had laboratories for research; 83 employed as many investigators and 276 assistants, but the great majority of these were engaged only in routine examinations. Apart from salaries, the total amount expended in 1916 for research by all firms listed did not exceed \$135,000.

With the growth of Canadian wealth the scientific equipment of the leading Canadian universities has been greatly increased, and scientific researches are now being prosecuted on a considerable scale as a result of the research scholarships granted by the National Research Council of Canada, or endowed, by various wealthy benefactors, in the leading universities of the country. An especially