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THE NATIONAL RESEARCH COUNCIL OF CANADA

(Prepared by the Public Information Branch, National Research Council of Canada, Ottawa.)

The National Research Council of Canada has the broad mandate of fostering and supporting scientific and industrial research in Canada. The NRC Act assigns but does not limit NRC to the following functions: improvement of the use of Canada's natural resources; improvement of technical methods and processes employed in Canadian industry; maintenance and improvement of the primary physical standards of measurement for Canada; setting of standards of quality for material used in public works; standardization of scientific and technical apparatus used in Canadian industry and government; fostering the carrying-out of scientific and industrial research.

The mandate of NRC is implemented mainly through: operation of research laboratories; financial assistance for research activities in Canadian universities; financial assistance and promotion of research in industry; operation of the National Science Library and the Technical Information Services.

The Federal Government has designated the National Research Council as the co-ordinating body for the further development of a national scientific and technical information system (STI), under the general direction of the National Librarian. The integrated national system, encompassing the natural sciences and engineering, will be decentralized and based on the existing resources and systems in industry, the universities and government, all linked together. On April 1, 1970, the Government announced that federal research in astronomy would be consolidated under NRC. The Council is now responsible for the operation of the Dominion Astrophysical Observatory, Victoria, British Columbia, and the Dominion Radio Astrophysical Observatory, Penticton, B.C. Also involved in the transfer were the Time Service of Canada, the solar and meteor programs of the Dominion Observatory in Ottawa and the Meteorite Observation and Recovery Project, which is a network of photographic stations with headquarters in Saskatoon, Saskatchewan.

Since its inception, the Council has encouraged and supported research in Canadian universities. A system of postgraduate scholarships and postdoctorate fellowships is provided for the assistance of students (Canadians and landed immigrants) who have

shown promise of research ability. The awards are: postdoctorate fellowships; postgraduate scholarships; bursaries; 1967 Science Scholarships; and postgraduate scholarships in science, librarianship and documentation. Awards are for advanced studies and/or research in science and engineering, and are competitive, academic excellence being the main criterion in the selection of successful candidates.

In addition to the support provided for research in Canadian universities, the Council now has a postdoctorate program for the support of research in Canadian industry, which was introduced in 1970. These grants are intended to encourage highly-qualified science and engineering students to seek careers in industry.

Postdoctorate fellowships and industrial postdoctorate fellowships are awarded to candidates who have recently completed or who are about to complete their requirements for a doctorate degree. The purpose of the two programs is to enable those who have received a doctorate degree to undertake, before becoming permanently employed, postdoctoral research for up to two years after receiving their degrees. Postdoctorate fellowships are tenable in Canadian universities and in universities and other institutions abroad. Industrial postdoctorate fellowships are tenable in industrial organizations in Canada.

Postgraduate scholarships are awarded for tenure in Canada; successful candidates may elect to carry out their programs at the Canadian universities of their choice. Although these awards are intended for tenure in Canada only, a successful candidate for whom facilities for a Ph.D. program are limited or lacking in Canada may receive special NRC permission to hold his scholarship at a university abroad.

The Council modified the program in 1970, and the winner of an award for a first year of graduate study now has the option of deferring tenure of his scholarship for up to two years to encourage him to investigate career opportunities in industry.

Bursaries are awarded to students nominated by universities. Canadian universities receive an annual quota of bursaries from the National Research Council and are responsible for the selection of students for these awards. Unlike postgraduate scholarships, bursaries are not transferable; tenure must be at the university that nominated the student for the award.

The 1967 Science Scholarship Program was introduced in 1967 to celebrate the centennial of Canadian Confederation and the fiftieth anniversary of the National Research Council. These awards are intended to encourage young men and women of outstanding intellectual promise to pursue postgraduate studies and research leading to doctorate degrees. They are also meant to stimulate exchanges of students between different cultural and geographical regions in Canada. Scholars must select for graduate studies universities other than those from which their first degrees were obtained.

Postgraduate scholarships in science librarianship and documentation were introduced in 1967 with the object of encouraging graduates with degrees in science or engineering to become science librarians, documentalists or science-information specialists in an effort to meet the demand by universities, research laboratories, industrial firms and related organizations for properly-qualified persons in these fields.

NRC also offers awards for the support of research carried out by staff members of Canadian universities. The fields of science supported through National Research Council awards to university researchers include agriculture, astronomy, biology, chemistry, computing and information science, engineering, geography (physical), geology, geophysics, mathematics, metallurgy, meteorology, oceanography and limnology, physics, space research and certain areas of psychology.

Under its program of awards to university staff, the National Research Council offers the following types of grant:

University grants

Operating Grants, awarded on an annual or three-year basis to individual researchers at Canadian universities as contributions towards the normal operating costs of their research projects. Grant funds may be used to employ assistants, to purchase minor equipment, materials and supplies, and to help defray the costs of computing services, field trips and other limited travel.

Special Computing Grants, awarded at the discretion of NRC to researchers whose computing requirements justify expenditures that are large in comparison with other operating expenses. Special computing grants are intended to pay for machine-time only, and computing costs will, in most cases, be included as an expenditure for payment from operating grant funds.

Equipment Grants, provided to assist in the purchase of special research equipment or installations (either single items or parts that, when assembled, form a unit) costing in excess of $5,000.

Travel Fellowships, intended to defray the travel expenses of established scientists at Canadian universities who wish to spend a period of at least six months at laboratories other than their own.

Conference Grants. In general, it is expected that conferences and symposia should be self-supporting. However, a limited number of Conference Grants are awarded each year to contribute towards the costs involved in bringing invited speakers to scientific meetings held in Canada. Grants are made to Canadian institutions or organizations, usually universities, but are not available for summer schools or meetings of a purely local nature.

Senior Industrial Fellowships, a new award introduced in 1971 as a further means of encouraging collaboration between Canadian universities and industries. Fellowships are awarded to enable staff members of Canadian universities to spend a year or more with industrial organizations in Canada. The award provides for payment of a component of the fellow's salary and travel expenses where appropriate.

The E.W.R. Steacie Memorial Fellowship, in memory of E.W.R. Steacie, President of the National Research Council of Canada from 1952 to 1962. The Council in March 1963 established the E.W.R. Steacie Memorial Fellowship. It is awarded to an outstanding young researcher working in one of the fields of science supported by NRC, whose development could be vitally changed by relieving him of teaching or other duties and permitting him to devote all his time and energy to research for a period of two to three years. Provided that there is a suitable candidate, one award is made each year, for tenure at a Canadian university.

Negotiated Grants provide a means whereby the Council and a Canadian university may share in the cost of initiating or developing research in areas of significance to the scientific, regional, economic or resources development of the country. Negotiated Grants may take the form of grants to assist in the cost and installation of special scientific equipment, or development grants to assist groups of capable and highly-motivated researchers to undertake programs in new or inter-disciplinary areas of research, or generally in circumstances warranting an intensification of research effort of high potential or realized scientific merit.

In addition, some basic type of support has been provided, following annual review in each case, towards the costs involved in maintaining and operating a number of installations in nuclear and high-energy physics, and in space research and astronomy. A

similar arrangement has been made to assist in the operation of certain institutes or research centres. This type of support was awarded on an *ad hoc* basis, and is currently under review.

Special Project Grants/Project Research Applicable in Industry. These are new grants, developed within the framework of the Negotiated Grant Program, to support research that will make significant contribution to developments in Canadian industry. Proposals from university researchers must be of direct interest to particular industrial firms and awards will be made to accomplish specific objectives that will result in the transfer of research results from university laboratory to industry.

General Research Grants, awarded annually to the executive head of each Canadian university at which a program of postgraduate studies and an appreciable volume of research supported by NRC operating grants are being carried on. The funds provided through these grants may be used by the university president as he sees fit for the broad purpose of promoting scientific research in the fields supported by the Council's awards program.

NRC laboratories

The National Research Council has nine laboratories, dealing with biological sciences, building research, chemistry, mechanical engineering, aeronautical research, radio and electrical engineering and physics, as well as the Atlantic Regional Laboratory in Halifax, Nova Scotia, and the Prairie Regional Laboratory in Saskatoon, Saskatchewan.

These laboratories carry out long-term, applied and specific project research work in areas for which commercial companies have neither sufficient money nor facilities. The results of research are disseminated through NRC publications, which provide an international distribution for scientific information coming out of Canadian laboratories and institutes. Laboratory inventions are patented and made available to Canadian manufacturers.

A *Division of Biological Sciences* has been formed by amalgamation of the Biochemistry Laboratory and the Division of Biology. This union provides greater flexibility and increased resources for achieving an integrated approach to significant biological problems. Many groups have collaborative projects with scientists in universities, industries and other governmental agencies.

The provision of a comprehensive research service for the Canadian construction industry is the primary concern of the *Division of Building Research.* It also serves as the technical research wing

of Central Mortgage and Housing Corporation and, in addition, provides technical and secretarial support to the Associate Committee on the National Building Code.

The Division of Chemistry is concerned with supplying new scientific information for the development of Canada's natural resources and chemical industries. The work of the Division also consists of long-term fundamental investigations in organic, physical and theoretical chemistry designed to provide new basic knowledge.

The Division of Mechanical Engineering works in certain areas of hydraulic and mechanical engineering and naval architecture.

The National Aeronautical Establishment studies aeronautical research problems related to defence and civil aviation, working in co-operation with the Canadian aircraft industry. It also carries out its own research program.

The work of the *Radio and Electrical Engineering Division* includes engineering projects of interest to Canadian industry and fundamental research in electrical science. An Astrophysics Branch was created in 1970 for the purpose of co-ordinating the work of the various groups engaged in astronomical and related research.

The work of the *Division of Physics* is divided between research in areas of physics considered most likely to contribute in a practical way to the Canadian economy and research directed toward the improvement of the accuracy and precision of fundamental physical standards, on which all measurements are based. The Division also pursues work on fundamental problems that has no immediate application but advances the frontiers of knowledge and supplies the basis for further progress in the applied fields.

The *Atlantic Regional Laboratory* is engaged in practical and fundamental studies in chemistry and biology related to the resources and industries of the Atlantic Provinces.

One of the aims of the *Prairie Regional Laboratory* is to develop wider uses for crops grown on the Prairies by determining potential uses of crops now in production and by encouraging the production of new crops to meet specific needs.

Other units

The function of the *Space Research Facilities Branch* is to develop and provide facilities to meet the needs of the upper-atmosphere and space-research programs of Canadian scientists in universities and government agencies.

The *Administrative Services Branch* provides administrative, management and plant-engineering services for the entire organization. There are also a financial services office, an administrative planning service, an Office of the General Counsel, and a Computation Centre.

Serving Canadian science generally are the National Science Library of Canada, the Technical Information Service, and the Liaison Office in London.

The *National Science Library* provides communication services of many kinds to the scientific and industrial communities of Canada, based on one of the world's outstanding collections on science and technology. In addition, it has cable links with other centres throughout the world to expand its scope of reference material. The Library makes available English and French translations of foreign scientific and technical papers prepared in all parts of the world.

The *Technical Information Service* provides Canadian industry with scientific and technical data on materials, processes and equipment, as well as on industrial engineering problems. The Service also administers the NRC Industrial Research Assistance Program, which stimulates and promotes industrial research in Canadian manufacturing industries.

The National Research Council publishes ten primary-research journals, on biochemistry, botany, chemistry, earth sciences, geotechnology, microbiology, physics, physiology and pharmacology, zoology, and forest research. Original research papers are published by these journals in either French or English.(1)

NRC maintains a scientific liaison office in London, England, for the exchange of scientific information. The Council has a scientific exchange agreement with the Soviet Academy of Sciences that provides for visits of scientists lasting from three weeks to nine months; it has also accepted responsibility for exchange of Canadian scientists with France under the cultural agreement between the Government of Canada and France. An agreement on scientific exchanges has also been concluded with Brazil.

Canadian Patents and Development Limited, a subsidiary of NRC, patents and licenses new products and processes that come out of research by NRC, other government departments and agencies, and Canadian universities. CPDL initiates and finances the development of many inventions to a stage where it becomes economically possible for private industry to carry them through to production and sale, thus bridging the gap between research and industry.

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(1) Instructions to contributors to these journals may be obtained by writing to: Editorial Department, National Research Council of Canada, Ottawa, K1A 0R6, Canada. A charge of $20.00 a page must be paid on all papers reporting work done outside Canada.