

long-term applied research and development work proposed and carried out by industry. Aid is given on a shared-cost basis, with industry supplying at least half the funds for any one project. Companies of all sizes, representing a wide range of industrial activity, are eligible for assistance and the companies retain all rights arising from the work. In 1963-64, at a cost of \$1,600,000, the Council supported 88 research projects carried out by 56 Canadian firms. This work gave rise, also, to more than 350 new research positions.

Foundation Aspects.—University research in science and engineering has been supported by the Council since its inception in 1916. This aid has been of considerable help to the universities in building up the excellent graduate schools that now exist in Canada. Awards to individuals make up most of the university support program. Included are research grants to university staff used for employing assistants and purchasing equipment and supplies, postgraduate scholarships, and post-doctorate fellowships. Approximately 1,400 research grants and 850 scholarships and fellowships were awarded in the year ended Mar. 31, 1964, at a cost of \$12,600,000.

General promotion and encouragement of university research—the remainder of the program—includes publication of seven Canadian journals of research; contributions to scientific organizations and functions, Canadian membership in international scientific unions, and the administrative costs of the program. Expenditures for these activities in 1963-64 totalled \$1,140,000. An annual *Report on University Support* describes the foundation program in detail.

In 1948 the Council instituted a program of post-doctorate fellowships, open to Canadians and to the nationals of all other countries. Originally these were tenable in the Council's own laboratories but the training and experience brought to the work by the young scientists proved so stimulating that the program has been gradually expanded. Fellowships are now tenable at Canadian universities (these are considered part of the university support program), in the laboratories of Atomic Energy of Canada Limited, and in the federal Departments of Agriculture, Forestry, Mines and Technical Surveys, and National Health and Welfare. More than 250 of these awards are being held at the present time (June 1964), mostly in chemistry, physics and biology.

Biosciences.—This Division's program covers practical problems related to the national economy and fundamental studies in microbiology, biochemistry and biophysics as a basis for future application in agriculture, medicine and industry.

Apparatus and techniques for preparing, preserving and storing food make up a large part of the work, with particular attention in recent years to food freezing, cold storage and refrigerated transport. Recent studies have involved further tests on a process developed in the Division and now widely used in industry for the immersion freezing of poultry, quality loss in poultry meat during freezing and refrigerated storage, and an improved cooling system for frozen food trucks. The physical and chemical reactions preventing coagulation in evaporated milk during sterilization were also investigated. Microorganisms related to the preparation and preservation of food are studied, particularly those found in salted foods and in cheese, and those that grow at low temperatures. A national culture collection of about 3,000 yeasts, bacteria and fungi is maintained.

Considerable effort is devoted, also, to questions of animal and plant physiology. Studies of the mechanisms by which mammals, birds and man adapt to cold have provided important basic information on cell, muscle and metabolic activity, and also serve to explain practical problems such as the high death rate of newly born caribou. Fundamental plant processes such as translocation are investigated, and an exhaustive study is being carried out on strains of blue-green algae believed responsible for cattle deaths. Plant fibres such as cellulose—the skeletal material of plants—and the structure and function of plant cells are also examined.

Other studies involve fermentation mechanisms and enzymology, and the structures of proteins, carbohydrates and fats. One group, among its other projects, is engaged in