

In the *Division of Applied Chemistry* special attention has been given to corrosion in automatic cooling systems by ethylene glycol solutions, the corrosion of iron in aqueous solutions, and various means of reducing these effects. In the textile section studies on laundering, dry cleaning, and preservation are being emphasized, this work leading to a much better understanding of detergent action.

A major function of the Division is the development of chemical processes that will utilize Canada's natural resources. During the year, petroleum products have received the greatest attention, most of it on a pilot plant scale.

A new technique has been developed for contacting solids and fluids, a method showing considerable promise for industrial use. In the rubber laboratory researches have been directed towards the use of lignin as a reinforcing agent for rubber. Improvements have been made in an adhesive based on cyclized rubber and suitable for bonding rubber to metal and an adhesive formulation suitable for use at elevated temperatures has been developed.

The *Division of Pure Chemistry* is concerned with investigations in the major chemical fields—organic, physical, inorganic and colloid. Most of the work is fundamental—trying to find out why certain chemical reactions behave as they do, and determining the ultimate spatial structure of unknown compounds.

The *Division of Applied Physics* divides its effort between research on problems directly related to the development of Canada, and the establishment and maintenance of fundamental physical standards that form the basis of so many industrial operations. The first category includes a close and successful co-operative program with the Canadian Pulp and Paper Association on noise abatement in the paper industry; the provision of a common dosage standard for X-radiation at cancer clinics throughout Canada, and a significant contribution to Canadian mapping methods.

Activity in the standards field has led to the completion of a mutual inductance on which the Canadian ohm will be based; a highly precise temperature scale through most of the international range; the reproduction of the standard of brightness through the brightness of melting platinum; and a considerable contribution to the preliminary work necessary for basing the metre on a wavelength of light instead of on a physical prototype.

In the *Division of Pure Physics*, work is being pursued on various fundamental problems that do not have an immediate application, but they advance the frontiers of knowledge and supply the basis for further progress in the applied fields. Work is under way on cosmic rays, solid state physics, spectroscopy, X-ray diffraction, and theoretical physics. Important contributions have been made in each of these fields.

In the *Division of Medical Research*, whose only function is to make grants, eight senior and sixteen ordinary research Fellowships were granted in 1954. Ten of these were first awards. Since 1946, 244 Fellowships have been taken up by 148 graduates. One-half of these Fellows are now fully trained and of these, 70 are known to be attached to faculties of medicine in Canadian universities, engaged in teaching. Twenty-six have full time appointments in which they direct or actively participate in research. The Fellowship program has borne good fruit.

Throughout the year, the *Division of Building Research* steadily developed its service to the construction industry of Canada. Laboratory research, as might be expected, covers the whole range of building materials from bricks and mortar to modern plastics. A project of unusual interest has been the continuation of the joint study of conductive flooring for hospital operating rooms. Co-operation with the Central Mortgage and Housing Corporation included not only service with unusual technical operating problems, but steady progress towards improved technical housing standards and designs, consistent with every practicable reduction in true costs.