

Radio and Electrical Engineering.—The work of this Division includes fundamental research in electrical science, and engineering problems of interest to Canadian industry. The Division co-operates with the Armed Services and associated industries in designing, producing and evaluating new equipment.

Fundamental studies are carried out on radio wave propagation, radio astronomy, upper atmosphere research, and electronic and solid state research. A new radio observatory is being constructed at a site in Algonquin Park, where some equipment and laboratory buildings have already been installed. The Canadian rocket program at Churchill has introduced a new trend in upper atmosphere research, and instruments are being developed to study conditions in auroral displays and meteor showers.

Engineering problems include high-voltage studies, current and potential transformer calibration, the development of electronic medical instruments and operating-room facilities, antennas, electronic aids to navigation, and high-frequency standards. Equipment for calibrating current and potential transformers is being modernized to increase its accuracy and frequency range. An electronic system previously developed to automatically measure and record sweat rates in humans is now being applied in anaesthesia and in other fields where detection and control of moisture content of the air is important.

Among other projects are a microwave system for determining precisely the position of vessels engaged in hydrographic surveying offshore; a 'creative tape recorder' much in demand in electronic music studios; and a highly mobile counter-mortar radar.

Atlantic Regional Laboratory.—The Atlantic Regional Laboratory studies practical and fundamental problems related to the resources and industries of the Atlantic Provinces. In co-operation with industry, a semi-continuous dryer has been constructed for use on Irish moss—a red seaweed of commercial importance. Optimum operating conditions have been established and the quality of extracts from seaweed dried in the apparatus has been tested. The equipment has served as a model for mobile dryers to be used throughout the Atlantic Provinces. The dietary effects of seaweed components are also being investigated. Because carrageenin is used extensively as an additive in foods and drugs, studies are under way to determine any possible harmful effects of the extract. A similar project involves the use of dried, ground seaweeds as components of animal feeds.

The long-term investigation of the basic chemistry involved in the fabrication of steel has continued. Studies have been completed on the rate of oxidation of carbon in molten iron, and on the activity of ferrous oxide in molten slag. Magnesia refractories impervious to molten basic slags have been constructed. At the request of the adhesives industry, a fundamental study has been undertaken into the properties of collagen—a protein in cod skin used as the mother-substance for photoengraving glue.

Prairie Regional Laboratory.—One of the chief aims of the Prairie Regional Laboratory is to develop wider uses for crops grown on the prairies. This is achieved by determining potential uses of crops now in production and by encouraging new crops to meet specific needs. Research is therefore carried out on the properties and reactions of plant components, and on the biological, chemical and engineering processes for turning them into other compounds. The development of oil-seed crops as alternatives to seed crops has received considerable attention.

The Laboratory has studied, for some time, major plant constituents such as carbohydrates, protein, starch, lignin and fibres. An example of this work is the definition of the chemical structure of several polysaccharides found in cereal grains and important in baking, milling and fermentation technology. Attention is being given, also, to minor plant constituents—such as phenols, flavonoids, and terpenes, which are known to have fungicidal and germicidal properties. A plant extractives laboratory has been set up to systematically study extractives from local plants and shrubs.

The engineering and process development group is engaged in research on continuous fermentation processes, pulping processes on wood and straw fibres, and the effects of glyceride structure of fats and oils on the quality of margarines and shortenings. Large-