Prior to World War II, uranium and uranium compounds were used in the arts and industry as colouring materials for ceramics, as chemical reagents, and in a variety of alloys. At that time, however, the metal and its salts were costly and the supply was limited. In addition, the preparation of pure metal was difficult and relatively little was known of the physical and chemical properties of the metal or its compounds. Extensive studies made as part of the nuclear program greatly increased the knowledge of this metal and resulted in the development of more efficient and less costly production methods.

To exploit the potential of uranium in commercial applications unrelated to the nuclear program, the uranium-producing companies in Canada joined together late in 1960 to form the Canadian Uranium Research Foundation,* the stated objective of which is "to provide for research in the use of the products of the uranium industry, to disseminate information relative to such products and to promote, foster, and stimulate the uranium industry".

From their own resources the uranium producers have agreed to provide a minimum of $250,000 per year for five years to support the Foundation, contributions being based on the value of output by individual companies. Although the principal effort of the Foundation is directed toward immediate applications, nevertheless it is considered desirable that a small proportion of the funds be expended on longer term projects of a more basic nature. The investigation of additions of uranium to steel now comes under the Foundation, with the work continuing in the Mines Branch laboratories.

Important developments on two nuclear-power stations are under way—a 20,000-kw. experimental station, known as NPD-2 (Nuclear Power Demonstration) being built near Rolphton, Ont., and a full-scale 200,000-kw. station, known as CANDU (Canadian Deuterium Uranium) under development on the shores of Lake Huron, nine miles north of Kincardine, Ont. These developments are described at pp. 378–383.

Sulphur

The accelerated industrial expansion in Canada during the past two decades has been accompanied by a steadily growing need for sulphur. Sulphur is usually consumed as sulphuric acid but in Canada large amounts of elemental sulphur are required by the pulp and paper industry. Other consumers are the fertilizer, chemical, uranium and steel industries.

Although there are no known deposits of sulphur in this country, sulphur or its equivalent in other forms has been produced from native pyrite and pyrrhotite for many years. In 1959, by-product pyrite and pyrrhotite from base-metal mines amounted to 1,051,873 tons with a sulphur content of 418,220 tons, much of which was utilized as sulphuric acid.

However, a new and highly important source of this commodity was created by the natural gas industry of Western Canada which has experienced its greatest expansion since 1948. Natural gas is termed 'sour' when it contains appreciable amounts of hydrogen sulphide and carbon dioxide which must be removed prior to marketing. By the end of 1960, seven natural gas recovery plants in Alberta, one in British Columbia and one in Saskatchewan were in operation and several others were in various stages of construction. In the processing plant, hydrogen sulphide and carbon dioxide are removed from the natural gas by passing the gas stream through solutions of monoethanolamine and dimethanolamine. The acid fractions are completely soluble in these absorbents. When the absorbent solution is nearly saturated with acid gases, it is regenerated by heating. The concentrated hydrogen sulphide and carbon dioxide are thus driven off and the absorbent is recirculated to pick up more gases. The enriched hydrogen sulphide collected in this way is further processed to produce elemental sulphur.

* Member companies: Gunnar Mines Limited; Bicroft Mines Limited; Eldorado Mining and Refining Limited; Denison Mines Limited; Rio Algom Mines Limited; and Faraday Uranium Mines Limited.