

*Supply—Mines and Technical Surveys*

of 400 geologists, technical officers and supporting staff—will be spotted in all 10 provinces and the territories. They will work in all physiographic regions and in all types of terrain. Some, as in the case of the Hudson bay project in submarine geology, will even work over water.

For the geological survey, Mr. Chairman, we have requested \$5,303,834. Specifically, it will provide for major reconnaissance surveys requiring the using of Piper Cubs and helicopters over the district of Franklin, the Yukon, British Columbia, Alberta, Quebec and Labrador. It calls for geochemical studies in the Northwest Territories, Alberta, and New Brunswick and Nova Scotia and seismic, magnetic and palaeomagnetic observations in many places. Ground water surveys will be carried out in seven of our 10 provinces, with special emphasis on the prairies where homes, factories and farms are dependent on underground water. We have been urged to intensify our program in this field and are making every effort to do so as trained men become available.

My department will also be fulfilling its commitments under the roads to resources program, and will send five geological field parties to northwestern Ontario at a cost of \$101,800 of which \$23,000 will be for the charter of aircraft. We also have made provision for a series of aeromagnetic surveys over large parts of the Canadian shield, the beginning of a 12 year project which we are undertaking in co-operation with the provinces. When completed it will cost \$18 million, two thirds of which is to be paid by the federal government.

I might also mention operation Leaf river, calling for the mapping of large pre-Cambrian areas in northern Quebec, and operation Ogilvie involving about 15,000 square miles of mountainous terrain in central Yukon. It is interesting to note that by the end of the 1962 field season we will have mapped on a reconnaissance scale all sedimentary formations of our northern areas, which are conducive to the occurrence of oil.

Mr. Chairman, an expanding field program of this kind, imposes a great responsibility on the laboratory staff, who must not only conduct many types of supporting investigations and analyses, but who must develop new techniques and tools that will further the work both in the field and at home. Accordingly—and the estimates reflect this—the survey is gearing itself to meet a sharp rise in the demand for rock and mineral analyses, X-ray identifications and other laboratory research and services. It has asked for several highly specialized pieces of equipment including the apparatus required for radiocarbon dating. This will be used for

[Mr. Comtois.]

determining the ages of deposits not more than 35,000 years old by measuring the carbon-14 content of organic remains. I might add that the survey's radio-carbon laboratory will also be of service to archaeologists in their study of prehistoric cultures here in Canada. This is a good example of how progress in one discipline can benefit another.

To finance the work of the mines branch we have asked for \$4,808,095, a sum that can be regarded as a good investment in the future growth of our mineral industry, for although Canada has been endowed with a handsome share of mineral deposits, comparatively few of these can be regarded as high grade and many of them are difficult to process. Developing commercially feasible techniques by which these can be made marketable is a research problem of major proportions. At the same time other nations of the world are giving our traditional mineral products strong competition, and it is essential that we explore every avenue by which present processing costs can be reduced; and we must find new uses for those minerals of which we have an overabundance.

You will not expect me, Mr. Chairman, to explain all the projects under way in the mines branch. In the physical metallurgy division alone there are over 100. But I should like to be specific about one or two.

Our work on uranium we regard as a matter of utmost urgency. We are seeking to improve the extraction processes currently in use at uranium mining camps, and we are seeking new non-atomic uses for the metal. As I announced last December, we have had promising success with uranium as an alloying element in commercial steels. Uranium can be added at very little cost and will bring about improvements in corrosion resistance, fatigue strength and behaviour at high temperatures. The branch is also experimenting with additions of uranium to non-ferrous metals such as copper, aluminum, zinc and lead and, while much work remains, I can at least say that results so far have been encouraging. It is my hope that these projects will lead to a better market for Canadian uranium.

The mines branch is stepping up its work on iron ores, investigating the possibilities offered by direct reduction and other processes. Our scientists are also seeking means of beneficiating Canadian niobium and manganese ores, of which we have large low grade deposits, and they are investigating a great variety of metallic and non-metallic materials. In one way or another the branch is dealing with just about every known mineral commodity.