

The new Geological Survey building has a greenhouse on the roof which is being used to investigate the ways in which plants take up metals and other elements. Some plants concentrate these elements in their leaves or twigs and provide valuable clues in the search for minerals. Thus, if plants over a certain area contain an abundance of, say, copper, then it is possible that the source of the copper is a buried ore deposit. Much more needs to be learned about particular plants and the way they take up minerals before the method can be properly evaluated and applied. Geochemical studies of rocks, soil and plants may also be used to learn more about the accumulation, migration and trapping of petroleum and natural gas, and thus provide data that will help in discovery of future reserves. The possibilities of geochemistry as an aid in the discovery of mineral wealth are only beginning to be realized; a new frontier opens.

The Survey building also has laboratories providing precise analyses of minerals and rocks, special studies on coal seams, data on the deposition of sedimentary material, the mineral composition and origin of rocks, rapid proximate analyses of rocks, crushing of rocks for special studies, and many other problems.

About fifteen years ago an airborne magnetometer was obtained by the Survey. It has since been flown some 640,000 line miles and the resulting data have been published in hundreds of geophysical maps (Fig. 3). The magnetometer records the magnetic pull of the rocks beneath and it is possible, therefore, to recognize places where the magnetism of the rocks is unusually strong or unusually weak. The magnetism is commonly characteristic of the kind of rock, so that it may be possible, also, to trace formations in places where the rocks are covered by overburden or by younger rocks. The geologist is thus able to make his geological maps more accurate and more useful. Because the magnetometer is carried by an aircraft, large areas can be covered in a single season. Here and there a major variation in magnetism—an anomaly—may be recorded, as happened near Marmora in Ontario where an iron deposit was pin-pointed beneath a cover of 100 feet of younger rocks. Other geophysical methods are also being investigated in Survey laboratories in an effort to develop new means of obtaining data that will assist in the discovery of mineral deposits.

In 1959 the Geological Survey and the Ontario Department of Mines began a co-operative geophysical, geochemical and geological study of an area of about 65,000 sq. miles in northwestern Ontario, the better to select possible "roads to resources" in the region. This, it is hoped, is the forerunner of similar projects in other promising mineral areas of Canada.

Not more than 15 to 20 p.c. of Canada is now geologically mapped in adequate detail; the area still to be studied in the field and laboratory will keep geologists occupied for many generations. However, the continuance of this gigantic task will ensure Canada's place in the forefront of world production of metals, fuels and other mineral products.

PART III.—LAND RESOURCES AND PUBLIC LANDS

Section 1.—Land Resources

Information currently available regarding Canada's vast land resources is shown in Table 1, where the land area is classified as occupied agricultural, forested and 'other' land, the latter including urban land, road allowances, grass and brush land and all waste land such as open muskeg, swamp and rock. Soil surveys now under way by the Department of Agriculture will make it possible in the future to estimate the amount of arable land Canada possesses and, as provincial inventories are completed, more information will be available regarding land now non-forested but not productive in an agricultural sense. The Forestry Branch of the Department of Northern Affairs and National Resources estimates that about 48 p.c. of the land area of Canada is forested and, according to the Census of 1956, less than 8 p.c. is classed as occupied farm land. A great part of the 1,611,376 sq. miles of 'other' land is located in the Yukon and Northwest Territories which together have a land area of 1,458,784 sq. miles. The occupied farm land in these Territories is practically nil and the forested area is estimated at 275,800 sq. miles.