niques. By 1966, geological maps had been published covering about 75 p.c. of Canada's land surface, and geophysical maps showing variations in magnetic intensity caused by various types of rocks had been published by federal and provincial agencies covering 38 p.c. of the country as well as parts of the continental shelf. (See also pp. 32-33.)

The primary geological subdivisions of Canada are outlined in the following sections. The Canadian Shield forms the ancient nucleus of the Continent. As well as comprising the vast areas exposed in Central and Northern Canada, the Shield extends beneath the veneer of younger marine sediments exposed at the present surface in the Hudson Bay region, some Arctic islands, the St. Lawrence Lowlands and the Interior Plains. West of the Interior Plains, and north and southeast of the Canadian Shield, deep, elongate troughs (geosynclines) developed. These geosynclines received sediments and volcanics which, by folding, were converted into the mountain belts of the Cordilleran, Innuitian and Appalachian regions.

The Canadian Shield.—Precambrian evolution of the present Canadian Shield extended over more than five sixths of known geological time. During this immense interval, many cycles of volcanism, sedimentation, intrusion, metamorphism, mountain building, erosion and ore formation have been completed. The complexities of this history have become better understood as the rate of geological reconnaissance mapping, with the support of helicopters since 1952, has increased and as absolute ages of minerals have been determined by isotopic ratios from about 1,500 well-distributed samples of the Canadian Shield. Many of the absolute ages represent the ages of four main orogenic periods, as indicated on the geological time chart facing p. 20. The facing map shows the eight structural provinces currently recognized in the Shield. Each structural province is defined by the equivalent isotopic ages of their terminal orogenies as well as being characterized by variations in rock types, degree of metamorphism, and dominant types of ore deposits. Following one or more major orogenies in a region, that portion involved was stabilized, and relatively undeformed younger Precambrian erosion products were deposited to form basins of cratonic cover rocks, most of which are shown on the map of the Shield. These relatively undeformed late Precambrian basins and remnants of early Palæozoic sediments show that the Canadian Shield has been remarkably stable since late Precambrian time, subject only to encroachment of younger seas and varying degrees of uplift.

Pleistocene glaciation, with scouring of bedrock and deposition of clastic materials, has profoundly affected the present drainage and physiography of the region.

The rocks of the Superior and of the far smaller Slave and Eastern Nain structural provinces were intruded by granites and folded during the Kenoran orogeny about 2,500,000,000 years ago. The Superior province now comprises a succession of folded belts of volcanic and sedimentary rocks trending east-west, separated by considerably larger areas of granite gneiss and granitic rocks. The elongate remnants of folded greenstone belts within the granitic terrane are up to 300 miles in length. Parts of these folded belts are dominantly sedimentary greywackes and slates which include iron-formations but are not known to contain major sulphide ore deposits. Other parts comprise dominantly mafic, somewhat altered volcanics (greenstones), lesser but economically significant rhyolitic volcanics, various types of economic and non-economic iron-formations which are being mined at four or more localities, some greywacke, slate and graphitic slate and, in association with these rock types, massive pyritic ore deposits containing zinc, copper, silver and gold. Deposits of this type at Noranda, Timmins, Manitouwadge, Matagami and Chibougamau rank among the large base-metal deposits of the world. Famous gold-quartz vein deposits are mined in the greenstone belts at Timmins, Kirkland Lake and Noranda–Val d'Or areas. In the Slave province, structural trends are more irregular than in the Superior province, but the important gold veins of the Yellowknife district and gold deposits being evaluated south of Bathurst Inlet also lie in volcanic belts. Deposits associated with pegmatites of the late stages of Kenoran granites contain lithium, molybdenum, beryllium and caesium.