

Arctic Lowlands and Plateaux, geological conditions are favourable for commercial petroleum accumulation but serious exploration guided by known regional geology has only recently begun in this vast area. Lead and zinc deposits in dolomitic, reefoid limestones might be expected on geological grounds. Regions in which reefoid dolomites lie near boundaries of calcareous rocks where they change to dark shales of the same age might be most favourable, according to some genetic hypotheses. Massive, pyritic base-metal sulphide deposits would probably be most likely to lie within volcanics in the northern, eugeosynclinal belt of the Franklinian geosyncline.

Arctic Lowlands and Plateaux.—These geological and physiographic divisions lie in large basins separated by arches and belts of exposed Precambrian crystalline rocks. Gently inclined or flat sediments underlying the basins tend to be thin sandstones and limestones near the basal contact with metamorphosed Precambrian rocks but limestones and dolomites of Middle Ordovician to Early Devonian age are the principal rock types and at some localities are estimated to be up to 18,000 feet thick. Shales, sandstones and restricted areas of conglomerates of Middle Devonian to Late Devonian age are normally the youngest rocks preserved.

Reefoid, vuggy dolomites of Middle Ordovician to Middle Silurian age commonly contain bituminous residues in surface exposures, structural and stratigraphic traps are probably present, and thick sections of potential source beds of petroleum and gas are known. Active oil seepages have not been reported. Petroleum exploration, aided by prior geological knowledge and published maps, began during the mid-1950s.

Beds of gypsum admixed with some shale up to 970 feet thick are exposed in many localities in Middle Ordovician beds. If more soluble evaporite minerals such as rock salt and potash-bearing minerals had been formed with gypsum, they would be leached from surface outcrops, but could be disclosed in future drilling. Piercement domes of gypsum, locally with occurrences of native sulphur, are found in the Sverdrup Basin. Coal is rare here, although abundant in the Innuitian Region.

Arctic Coastal Plain.—This plain comprises late Tertiary or Pleistocene sand and gravels, which dip gently seaward along the northern exposed border of the Innuitian Region. The very young beds cover the extensions of eroded fold belts and the Sverdrup Basin. Although of minor land extent, they or their equivalents probably extend far out on the Arctic continental shelf.

The Interior Plains.—The Interior Plains are underlain by undisturbed or gently flexed or tilted sedimentary strata, which overlap the western border of the Canadian Shield and merge with the eastern foothills of the Cordilleran region. The Shield slopes at a rate of 15 feet per mile under the Great Plains, in the western part of which the overlying strata reach a thickness of 10,000 feet. The older overlying beds have been bevelled by erosion along the border of the Shield, exposing in central Manitoba marine beds of limestone, sandstone and shale of Ordovician, Silurian and Devonian ages. Farther north the exposed Palæozoic strata are mainly Devonian. The Palæozoic formations are overlain by early Mesozoic strata of marine origin and these by both marine and freshwater Cretaceous formations, which are the uppermost strata in much of Saskatchewan and Alberta. In places, however, as at Turtle Mountain in Manitoba and the Cypress Hills in Saskatchewan, these are overlain by remnants of early Tertiary formations.

The rich soils of the Great Plains, particularly in the Manitoba Plain, were derived from the weathering of the underlying strata and the unconsolidated deposits resulting from glaciation. Most of Canada's oil and gas is produced from Palæozoic and Mesozoic strata underlying the Great Plains, mainly in Alberta but also in Saskatchewan, Manitoba and northeastern British Columbia. The productive beds range from Devonian to Cretaceous in age, the reservoir rocks being largely reefs containing openings, although "stratigraphic" traps such as lenses of porous sediments overlain by non-porous ones are also important. Exploration for oil and gas has recently been extended through most of