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BRITISH COLUMBIA DEPARTMENT OF MINES

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NOTES ON
PHYSIOGRAPHY
AND
GEOLOGY
OF
BRITISH COLUMBIA

by
OFFICERS OF THE DEPARTMENT



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PHYSIOGRAPHY

Physiographic divisions and names are established by the Geographic Board of Canada. Recently H. S. Bostock, of the Geological Survey of Canada, studied the physiography of the northern Cordilleran region; his report and maps are published

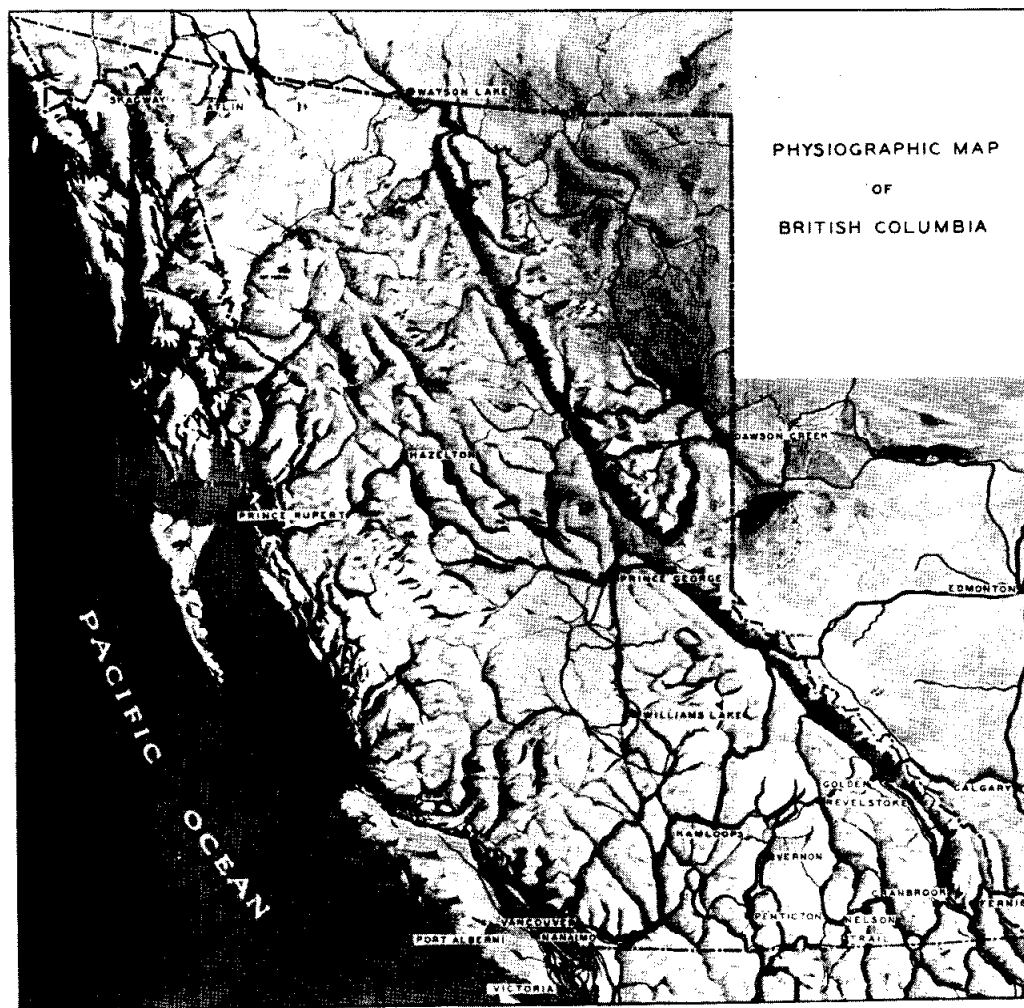


Fig. 1. Relief map of British Columbia.

in Memoir 247 of the Geological Survey, Department of Mines and Resources, Ottawa. The divisions shown on the accompanying sketch, Figure 2, and the nomenclature used in the text are those proposed by Bostock.

Most of the Province of British Columbia lies within the region of mountains and plateaus, the Cordillera of Western Canada, that forms the western border of the North

American Continent. The extreme northeastern corner of the Province, lying east of the Cordillera, is part of the Great Plains region.

The Rocky Mountain Area extends along the eastern boundary of the Province for a distance of 400 miles, and continues northwestward for an additional 500 miles entirely within the Province. The high, rugged Rocky Mountains, averaging about 50 miles in width, are flanked on the west by a remarkably long and straight valley, known as the Rocky Mountain Trench, and occupied from south to north by the Kootenay, Columbia, Canoe, Fraser, Parsnip, Finlay, Fox, and Kechika Rivers. Of these, the first four flow into the Pacific Ocean and the second four join the Mackenzie River to flow ultimately into the Arctic Ocean.

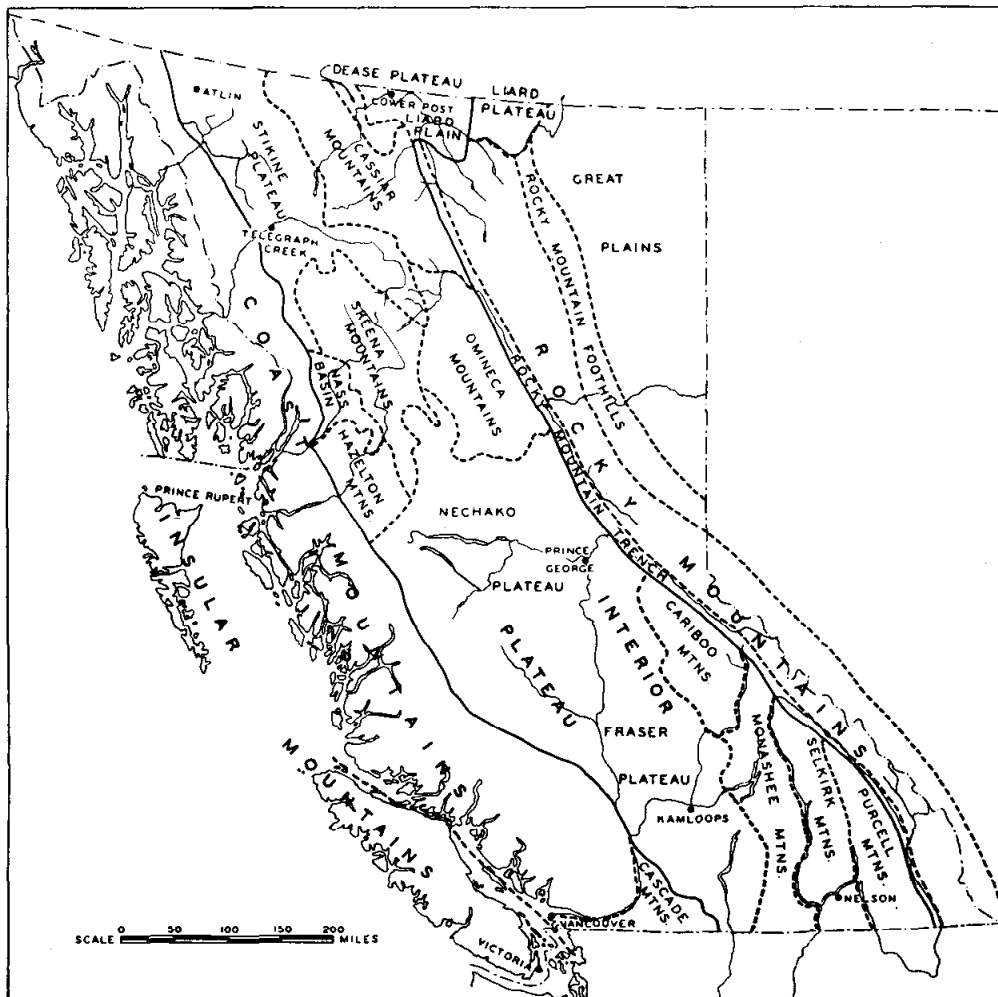


Fig. 2. Principal physiographic divisions of British Columbia.

In the southern part of the Province, lying immediately west of the Rocky Mountain Trench, are the Columbia Mountains, comprising the Purcell, Selkirk, and Monashee Mountains in the extreme south, and the Cariboo Mountains to the north yet within the big bend of the Fraser River. These four mountain groups are separated by prominent intermontane valleys.

In the northern part of the Province the Omineca and Cassiar Mountains lie to the west of the Rocky Mountain Trench.

The Coast Mountain Area, comprising the Cascade Mountains and Coast Mountains, extends northwestward along the Mainland coast, with a maximum width of about 150 miles. Long, narrow fiords of the deeply indented and submerged coast reach into the heart of the mountains.

The central part of the Province, between the Coast Mountain Area on the west and the Cassiar, Omineca, and Columbia Mountains on the east, is divided into the Interior Plateau in the south, the Hazelton and Skeena Mountains in the vicinity of the Skeena River, and the Stikine Plateau in the extreme north. East of the big bend of the Fraser River, the Nechako Plateau, part of the Interior Plateau, separates the Cariboo from the Omineca Mountains and bounds the Rocky Mountain Trench on the west.

To the west of the Coast Mountain Area, and west of the Coastal Trough, are the Insular Mountains, comprising the Vancouver Island and Queen Charlotte Ranges.

British Columbia lies within the belt of prevailing westerly winds, which, coming from the great area of the Pacific Ocean, are mild and laden with moisture. On encountering the colder areas of the mountains, they are chilled and precipitate a great part of their moisture, producing a luxuriant forest growth on the western slopes of the Coast Mountains. Passing eastward, the air currents, deprived of most of their moisture, take up moisture over the eastern slopes of the Coast Mountains and the Interior Plateau, causing arid to semi-arid conditions. Once again encountering high, colder land in the Selkirk and other mountain systems, precipitation is great on the western slopes, and once again the air currents collect moisture as they pass eastward toward the Rockies, producing the dry belts found in some of the larger intermontane valleys such as the Upper Columbia. In the northern part of the Province the changes are not as marked as in the southern part. The climate varies accordingly with moderate temperatures and heavy precipitation along the coastal region, and more extreme temperatures, with greater seasonal variations, in the interior and eastern parts of the Province.

Physiographic and climatic conditions exerted a great influence on the early exploration and development of the Province. The natural routes of travel cross the Interior Plateau and use the great intermontane valleys which trend from southeast to northwest and from south to north. Only a few passes suited to all-year transportation exist through the mountains from the interior of the Province, either westward to the coast or eastward to the Great Plains region.

GEOLOGY OF BRITISH COLUMBIA

The northeastern corner of the Province, east of the Rocky Mountains, lies within the Great Plains region and is underlain by sedimentary rocks chiefly of Mesozoic age. No igneous rocks are known. Deposits of coal are known, and field exploration and drilling for oil and natural gas are being undertaken. In the light of present knowledge it is not considered likely that many metalliferous deposits will be found in this region.

The Rocky Mountains are largely made up of sedimentary rocks of Palæozoic and Mesozoic age. A few small bodies of igneous rock are known at Ice River and elsewhere, but the proportion of igneous rock in the entire mountain chain is believed to be almost negligible. Some lead-zinc and some copper-bearing deposits have been found, but few gold-bearing deposits. The Rockies have long been considered relatively unfavourable for placer prospecting even though coarse placer gold in the south has come from Wild Horse River and Bull River, and placer gold is known to occur in small quantities in a few westerly flowing streams in the northern part of the mountains.

The Cassiar and Omineca Mountains contain granitic rocks throughout most of their length; concentrated in three areas—near the Yukon Boundary, in a batholith or belt of intrusives extending some 400 miles through the southern part of the Cassiar Mountains into the northern Omineca Mountains, and in the southeastern Omineca Mountains.

The granitic rocks intrude sedimentary rocks of diverse ages, and volcanic rocks chiefly of Mesozoic age; the structure is complex. Tertiary lavas cover the older rocks at a number of points. Although the region has not been fully explored, the main geological facts are known, and prospectors have covered a good deal of the ground during the past seventy years. Difficulties of transportation make prospecting of many parts difficult, but interest has reawakened during the last few years and some discoveries have been made. Although there has been no production from them, gold-bearing veins have been found at many points and there is a variety of metallic mineralization.

The Cariboo Mountains are largely made up of sedimentary rocks. A few small granitic stocks and a few dykes are known in the central and southern parts of the mountains. Sedimentary rocks of Precambrian age, which extend throughout the central part of the mountains, are overlain by Mesozoic rocks on the southwest and by Palæozoic rocks on the northeast. The central part of the Cariboo Mountains has been the most productive placer ground in the Province and, although quartz veins in abundance were known for years, it was only in the early 1930's that lode-mining was established. The Cariboo area is now one of the major producers of lode gold.

In the Monashee, Selkirk, and Purcell Mountains extensive areas are underlain by granite and allied rock, between which sedimentary and volcanic rocks of diverse ages are folded, faulted, and to a greater or lesser extent metamorphosed. The same general conditions extend from the coast across the southern part of the Province, almost to the Rocky Mountain Trench. There is no clear distinction between granitic rocks referred to the Nelson batholiths on the east and to the Coast Range batholiths on the west. This general region has been, and is, the most productive of metallic minerals in the Province. Within it lie the gold camps of Rossland, Sheep Creek, and Hedley, as well as important silver, silver-lead-zinc, and copper and copper-gold mines, and many smaller camps of diverse mineralization. Unlike the Cariboo, however, the gold camps were not accompanied by exceedingly rich placers.

The Interior Plateau region does not differ greatly geologically from the mountainous regions to the east. A great diversity of sedimentary and volcanic rocks is intruded by igneous rocks of many sorts. The structure as a whole is complex, but locally, as in parts of the Chilcotin plateau, the rocks are less deformed. Lavas of Tertiary age are widespread, more so than in any other part of the Province. The areas of lava, many of which are extensive, blanket the country and effectively hide from view the older rocks and any mineralization they contain. Although erosional effects of glaciation are not prominent in the plateau region as a whole, glacial deposits are widespread. Most of the major valley bottoms and much of the upland surfaces are blanketed by glacial drift. Metalliferous deposits are varied in the plateau region and placer deposits have been discovered at many points.

The Coast Mountains contain much granitic rock. This is the Coast Range batholith, now known to consist of a complex of several intrusives and of small and large areas of older rocks. The intrusives range in age from Jurassic to early Tertiary. The older rocks, consisting of sediments and volcanics, are for the most part greatly altered and deformed, particularly where closest to the intrusive bodies. Most of the sedimentary-volcanic assemblages are of Jurassic age. The gold camp of the Bridge River and the gold-silver camp of the Portland Canal are among the most important in the Province. Other gold deposits occur at various points along both sides of the

batholithic area. A great deal of the Provincial copper production has come from Britannia and Anyox, and metallic deposits are widespread throughout the region.

Vancouver Island, the Queen Charlotte Islands, and other islands of the coastal area are similar geologically to the Coast Mountains. Palæozoic and Mesozoic sediments and volcanics are intruded by igneous rocks of various sorts. Much gold has been produced from the Zeballos camp and older production came from Texada and Princess Royal Islands. Other metallic deposits are principally of copper and iron.

In Pleistocene times the entire Province was covered by ice which caused some erosion and which on melting left vast quantities of drift to blanket the land. Many peculiarities of drainage are traceable to the erosional and depositional effects of glaciation, evidences of which are to be seen in all parts of the Province.

References: *B.C. Dept. of Mines*, Bull. 20, 1944.

Geol. Surv., Canada, Ec. Geol. Series 1, 1957, "Geology and Economic Minerals of Canada," pp. 283-392.