Preliminary Report of a portion of the main coast British Columbia and adjacent islands 1908

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CANADA
DEPARTMENT OF MINES
GEOLOGICAL SURVEY BRANCH
HON. W. TEMPLEMAN, MINISTER; A. P. LOW, DEPUTY MINISTER;
R. W. BROCK, ACTING DIRECTOR.

PRELIMINARY REPORT

ON A

PORTION OF THE MAIN COAST

OF

BRITISH COLUMBIA AND ADJACENT ISLANDS

INCLUDED IN

NEW WESTMINSTER AND NANAIMO DISTRICTS

BY

O. E. LEROY

OTTAWA
PRINTED BY S. E. DAWSON, PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
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CANADA. Geological survey

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INTRODUCTION.

The area described in this report embraces that portion of the coast of British Columbia lying between the International Boundary and the mouth of Powell river on Malaspina strait. It includes Burrard inlet, Howe sound, Jervis inlet and the adjacent islands. With the exception of Texada and Lasqueti islands, the area is wholly in the mining district of New Westminster.

The greater part of this region has not been previously examined geologically. In 1873 and 1875 the late Mr. James Richardson* visited Texada and Lasqueti islands, while the late Dr. Dawson† examined the shores of those islands, and the main coast from Jervis inlet to Powell river, during his reconnaissance trip in 1885.

The present report is of a preliminary character, and the exploration was confined mainly to the shore line, the examination of inland areas being made only where the formations were of sufficient economic importance. Texada island, in its western half, was subjected to a somewhat detailed examination, as it seemingly presented a large area with possibilities for mining under very favourable conditions. The object of this geological reconnaissance was primarily to examine all formations of economic importance, and to secure all possible information with reference to the extent and value of the mineral deposits now known to occur in these formations. At the same time the relations of the various formations were to be studied, in order to elucidate such geological problems as might be presented, this latter work often being an important factor in successfully assisting the exploitation of the narrower and more purely economic horizons.

Owing to the general character of the coast, and the deep indentations or fiords which extend far inland, and present splendid geological exposures along their steep and precipitous walls, it was decided that the easiest and most effective way of travelling would be by water. An auxiliary gasoline launch built for the purpose was therefore used and answered admirably in making a continuous examination of the coast line. This method of work was rendered more effective by the fact that the fiords cross the trend of the coastal belt almost at right angles, and occurring as they do, at comparatively short intervals, the cross sections obtained give a good general idea of the geology of the inter-

* Report of Progress, Geol. Sur. of Can. 1873-74 and 1876-77.
† Annual Report, Part B, Geol. Sur. of Can. 1886.

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fiord belts. At present this is the only method that could be followed, as no work of any value could be undertaken inland without proper topographic maps.

In this preliminary work the Admiralty charts were used and were found to be excellent in giving sufficient topographic information to allow the several formations to be mapped very closely as they occur along the coast.

The geological map which accompanies this report is based mainly on the charts and is on a scale of four miles to the inch. The geological boundaries inland are shown as conjectural but it is believed that they will be found to closely approximate the true contacts.

GEOGRAPHY.

In this region two distinct physiographic types are developed with Burrard inlet as the dividing line. To the south lie the lowlands, which include the Fraser River valley and delta, while to the north lies the Coast range.

From Burrard inlet south the country, with the exception of the prominent ridge between Hastings and Port Moody, is comparatively low and rolling, and is marked by a few parallel ridges of glacial drift with east and west trend. Locally the country is much dissected by narrow and deep ravines. South of the Fraser and extending to the International Boundary the country is plateau-like in character, and represents parts of the old delta of the Fraser, which in the glacial period was formed at the edge of the ice sheet. This delta extends to Point Roberts, and also to Point Grey at the western extremity of English bay. It varies in elevation from 150 to 200 feet above sea level. The post glacial uplift allowed the distributaries of the Fraser to cut deeply into the early delta, and at present a new delta is being formed and is rapidly extending seawards. Richmond, Sea, Annacis and Westham islands, and the plain around Port Guichon, form the greater part of it.

The old channel of the Fraser south of Sand Head lighthouse is now entirely closed to large craft, and the main entrance is one and three-quarter miles northwest of the lighthouse. Dams and training walls have been built to allow for scour, and prevent the present channel from being silted up.

The bottom lands of the flood plain and delta are exceptionally fertile, and offer great inducements to the agriculturist. The higher

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tinguished in a few places, owing to the amount of alteration and the similarity in composition. In the slates and limestones the relations are plainly seen showing these eruptions as broad sills that have intruded along the contact between two formations and along the bedding planes. The eruptives are both volcanic and plutonic, and incline towards the basic end of the series, being principally hornblende and augite porphyrites, diorite, gabbro, with some quartz and syenite porphyries. They have been provisionally placed in the Triassic and are at all events older than the Coast Range batholith.

At certain localities considerable areas of these rocks may be associated with the Texada group, but without very detailed and laborious work, it is impossible to separate them.

UPPER JURASSIC (?)

THE COAST RANGE BATHOLITH.—The Coast Range batholith extends in a north-northwesterly direction from the Fraser valley to the White River basin in the Yukon territory. It is the master geological feature of the coastal belt of British Columbia, being nearly 1,000 miles long, and from 30 to 100 miles broad. The present description only applies to that part of the batholith accessible from the coast, lying between Burrard inlet and Powell river.

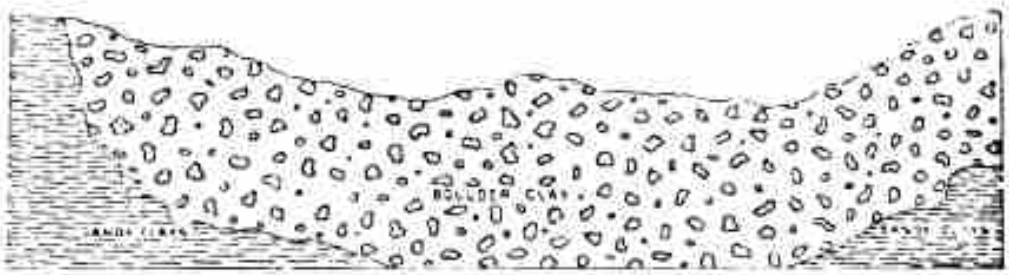
The batholith intrusion has been referred to the Upper Jurassic provisionally. It is younger than the Triassic, but older than the Cretaceous coal measures.

The term granite has been used as a general field name which strictly can only be applied to a small portion of this enormous intrusion. The less siliceous types of the plutonic rocks are well represented, and the whole batholith varies in composition from an acid granite to basic gabbro. The more basic types are usually at or near the contact with the overlying remnants of the old roof covering of Palæozoic rocks.

The rock as a rule has a granitoid texture, and varies from medium to coarse grained. At or near a contact a narrow marginal zone may be porphyritic with quartz phenocrysts in the acid, and feldspar or hornblende in the basic types. Along many of the contacts the granitoid rocks are more or less distinctly foliated, and the strike of the foliation coincides with the contour of the contact line.

The contact between the intrusive batholith and the overlying Palæozoic rocks illustrates at many points the powerful action of the magma in preparing chambers for itself, by the rifting and stoping of

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CAPILANO VALLEY
Stratified deposits eroded by lateral glaciers
Horizontal and Vertical Scales

FIGURE 1.

At the close of the ice age the land was relatively much lower than at present. The position of the former sea level is marked by beaches which have been preserved in a few localities. On both sides of Texada island, in the northwest half, beaches are found from 300 to 350 feet above sea level. At Powell river on the main coast sands and gravel occur 350 feet above the sea. From these examples it is assumed that the post-glacial depression in this region was at least 350 feet. Seechelt inlet formerly opened in the Strait of Georgia at Seechelt. In late post-glacial time, when the land was but a little lower than it is at present, a sand and gravel bar was built up by long shore currents across the entrance. This bar is now twenty to thirty feet above sea level and 1,100 yards broad.

Between Southeast bay and Welcome point on the mainland, and on the Thornmanby islands, there is a considerable thickness—145 feet on west Thornmanby—of well stratified sands and gravels, with some very fine and pure clays, overlain by false bedded sands and gravels. The basal beds contain large boulders of granite left by the ice sheet. Some of the beds contain large numbers of marine shells, the most common being specimens of *Cardium Nuttali* and *Tapes staminea*.

ECONOMIC GEOLOGY.

The principal areas of economic importance are those occupied by the Palæozoic rocks. The mineral deposits occur in them or along their contacts. In prospecting, therefore, it is important that these rocks should receive the greater amount of attention.

The difficulties which the prospector has to contend with are many in this coastal belt. The whole country is extremely rugged and diffi

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over sixty feet in the river draining the Clowhom lakes. The falls in Powell river have a maximum height of 120 feet. It has been estimated that 12,000 and 30,000 H. P. could be respectively developed from these two sources.

The British Columbia Electric Power Company's power house is situated on the north arm of Burrard inlet. Power is developed from the 400 foot fall from Lake Buntzen to tide-water. A tunnel two and a half miles long connects the above lake with Lake Choquitlam, the level of the latter being thirty-five feet higher, and this assures a sufficient supply of water for the extensive plant.

TIMBER.

Lumber is a very active industry in parts of the lowlands between Burrard inlet and the Fraser river and generally along the main coast and inlets. In the early stages of the industry timber was only cut along the shore in the broader valleys and on the general slopes. The growing demand has caused more extensive exploitation in the less accessible areas, and the cutting is extending farther inland each year.

Transportation to Tide-Water.—The logs are carried to tide-water by small railways and log chutes, where they are collected in booms and towed to the mills at Vancouver and elsewhere along the coast. In some of the valleys long flumes have been built along the creeks for the transportation of cedar shingle bolts.

The principal commercial woods are the Douglas fir (*Pseudotsuga douglasii*) and the western cedar (*Thuja gigantea*). The following species also occur in greater or less abundance in this region: Spruce (*Picea sitchensis*), hemlock (*Tsuga mertensiana*), yew (*Taxus brevifolia*), white pine (*Pinus monticola*), scrub pine (*Pinus contorta*), yellow cypress (*Thuya excelsa*), and alder (*Alnus rubra*).

Many of the older limits will shortly be worked over and considerable timber formerly thought valueless will be taken out.

The regrettable forest fires still break out every dry season and at times cause incalculable damage when they secure a foot-hold in good timber areas.