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EXPLORATIONS

NORTH WEST TERRITORIES

PELLY, ROSS AND GRAVEL RIVERS

YUKON and NORTH WEST TERRITORIES

Scale: 1/500,000

10 0 10 miles 20 30 40

10 0 10 Miles 30 40 50

8 MILES TO 1 INCH

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Nº 1099

DESCRIPTIVE NOTES

PHYSIOGRAPHY.

The Mackenzie mountains occupy the greater part of the area represented on the map and form a divide between streams flowing into the Arctic ocean and streams flowing into Bering sea. They are regarded as a northern member of the Rocky Mountain system and have a maximum width of about 200 miles, measured along the Macmillan and Gravel rivers. They extend for about 700 miles north-westerly from Liard river almost to Porcupine river. The Mackenzie system has resulted from long continued, differential erosion acting on an uplifted, deformed area now represented by a complicated group of irregular masses with numerous peaks rising to heights of between 6,500 and 7,500 feet above sea-level.

East of Mount Schwi, on Gravel river, the mountains differ in form, structure and colour from those to the west of that point. The western portion of the system has been subjected to long continued erosion, the valleys are wide with forest covered slopes rising in easy curves, and the higher peaks are set well back from the valley bottoms. In the eastern portion the mountains are evidently in a more youthful topographic stage; they are more massive and rugged, and the drainage channels are confined in narrower valleys having steep, barren or partly wooded slopes of rock and talus.

The region lying west of the Mackenzie mountains between the lower portions of Ross and Pelly rivers, is one of comparatively low relief, the hills having a general elevation of about 3,000 feet above sea-level or of 2,000 feet above the levels of the principal rivers. The region is characterized by long, gently sloping, irregular hills covered almost to their summits with a thin growth of small spruce and balsam and the main rivers and their chief tributaries occupy extensive, well developed valleys. These valleys have fairly level floors, often several miles in width, and contain many small lakes and ponds, also extensive beaver meadows and groves of good spruce. This type of country occupies a belt extending south-easterly from the Pelly mountains, (an isolated, high group), to the Mackenzie mountains.

The high ranges of the Mackenzie mountains on their eastern side along the Gravel river, are succeeded, 50 miles from the Mackenzie river, by a belt of foothills about 5,000 feet in height above sea-level. Eastward the foothills decline in height and finally terminate in a broken, wooded plain, bordering the Mackenzie river, with an elevation of about 600 feet above sea-level.

The western slopes of the Mackenzie mountains are the gathering ground of numerous streams that flow into the Pelly, Macmillan and Ross rivers, tributaries of the Yukon. A small portion of the drainage of the western slopes, in the area shown near the southern border of the map, falls into Frances river which joins the Liard, a tributary of the Mackenzie. The drainage of the eastern slopes of the system is received by the Mackenzie river. On the western slopes, where the precipitation is heavy, the streams meander through wide, well developed valleys having easy grades. On the eastern side, where the precipitation is light, the drainage channels are contracted and are confined in narrow valleys with steep grades.

The Pelly river during high water, is navigable by small steamboats from the Yukon to the mouth of Ross river, a distance of 350 miles. The Macmillan is navigable as far as the forks, 155 miles from the Pelly. Small boats or canoes can be poled or tracked up the Pelly for at least 150 miles from the mouth of Ross river with portage at Hoole and Wolf cañons. On Ross river, Skeleton lake is the limit of boat navigation when the water is low but in high stages, John lake or even Wilson lake, may be reached. Below Louis lake there is a stretch of 70 miles of swift water, with four short rapids past which goods are portaged. The Gravel river may be descended by boat from Teichu brook to the river mouth, preferably at high water but it is practically impossible to take a loaded boat up river.

GEOLOGY.

The rocks thought to be the oldest in the region and which are regarded as pre-Ordovician, occur along the part of the Pelly river shown in the southwestern corner of the map. They seem to be confined to this area and do not appear to the north though found to the southeast on Finlayson river. While certain altered intrusives and volcanics are present, the rocks are mainly of sedimentary types but largely altered, having a crystalline texture and a schistose structure. Quartz-mica schists of a dark grey or greenish colour are the commonest varieties and all the rocks are cut by quartz veins and stringers.

The Mackenzie mountains are made up mainly of sedimentary rocks including shales, slates, cherts, sandstones, conglomerates, limestones and dolomites. They are all Palæozoic age, ranging from Upper Cambrian to Middle Devonian. The greater part of the area extending from the Pelly valley to Mount Schwi on the Gravel river, is underlain by shales and slates, accompanied by quartzites and a highly indurated, bedded rock referred to as a chert. Graptolites of Upper Ordovician age were found in black shales on Ross river about five miles below John lake. A band, several miles wide, of sandstone, fine quartz conglomerate, quartzite and limestone, crosses Pelly river in the vicinity of Wolf cañon and, extending in a northwest direction, crosses Ross river at Prevost cañon and Macmillan river near the forks. A band of similar rocks crosses Stewart river at the Tasin mountains. These rocks are supposed to be of later date than the graptolite bearing shales of Ross river and may be Silurian. Chert breccias, overlying slates and cherts, from the greater part of some of the high mountains of the Selwyn range, and a few beds of the same material aggregating about 70 feet in thickness, overlie slates at Slate rapid on Pelly river. The sedimentary rocks, at various points, are intruded by small bodies of igneous rocks. A number of higher mountain peaks are known to be composed of granite and doubtless many other high peaks and mountain groups owe their height and ruggedness to this cause.

The strata of the western portion of the Mackenzie mountains here, though with many minor deviations, a general northwest strike and dip at various angles either to the northeast or southwest. As a whole, they are broadly folded, but to pierce the folding is close. There is evidence of faulting, and the repetition of similar beds with, over long distances, the same inclination, may be due to overturned folds.

The geology of the eastern portion of the Mackenzie mountains, from Mount Schwi on Gravel river to the foothills of the Mackenzie, differs in many respects from that to the westward. Heavily bedded limestones, dolomites, sandstones and conglomerates, mostly weathering to bright colours, are the prevailing rocks. Cambrian, Ordovician and Devonian fossils were found at a number of localities. Of the fossil forms found, the most interesting probably is Billingsella Columbiana, indicating a Middle or Upper Cambrian horizon. In the eastern region, igneous rocks were found only at one locality where, below the mouth of Twitya river, a sill of diabase, about 100 feet thick is intruded in sandstone.

The strata of the eastern portion of the Mackenzie mountains have generally a northwesterly strike, the prevailing dip being southwesterly. Faulting and tilting of the strata has given the mountains their characteristic forms and in many respects they resemble the Rocky Mountains of southern Canada.

The region of lower elevation bordering the Mackenzie is underlain by small detached areas of Mesozoic rocks of Upper Cretaceous and Tertiary age. These rocks are principally soft sandstones, shales and conglomerates; the beds are either horizontal or gently undulating. The Tertiary beds contain several seams of lignite.

ECONOMIC NOTES.

Indications of the presence of minerals of economic interest are rare within the traversed portion of the Mackenzie mountains. A bed of iron ore was seen on Gravel a few miles below Shezal cañon. The ore bed outcrops from beneath a thick zone of conglomerate which extends for about 20 miles north of Mount Delthore. The associated rocks dip south; their age is unknown but they probably underlie Upper Cambrian rocks exposed in the mountains near Nahta river. The following is a section in descending order of the strata in the neighborhood of the ore outcrop:-

Brown, micaceous sandy slates	1,100 feet
Conglomerate	2,000 „
Hematite, coarsely laminated with red siliceous slates	100 „
Grey, compact dolomite	1,000 „

In 1875 the gravel bars at the mouth of Finlayson river were worked for gold and yielded pay at the rate of $6. to $9. a day. In its distribution the placer gold is found to be confined to the area underlain by the crystalline schists, that lie along the Pelly and Finlayson rivers. Alluvial gold is almost always present in the stream gravels within this area. The country has been heavily glaciated and it is probable that much of the gold that existed on bedrock during pre-glacial times has been distributed in the glacial drift. The fine flaky gold which enriches the river bars, has been derived from this drift by the concentrating action of streams. Fine gold has been found in the gravels of Pelly river from Campbell creek to the Yukon, and on most of the small streams entering from the south. No coarse gold on bedrock has been found in this region. The best bars on the Pelly are between Hoole cañon and Hoode river. On the portion of the bars where the gold is concentrated, it is possible, with proper appliances, to wash out about $5 a day, but the enriched portions of the bars are shallow and of limited extent.

SOURCES OF INFORMATION

Explorations and Geology by :-

G. M. Dawson, *1887.*
R. G. McConnell, *1888, 1902.*
J. Keele, *1907, 1904, 1907, 1908.*
W. Ogilvie, *1888.*

Map compilation by :-

J. Keele, *1908.*

To accompany Report No. 1097 (English) and No. 1036 (French)

Pelly, Ross & Gravel Rivers
5.1.11
A. Geog.

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