

ferred without perceiving that the history of ocean and continent is an example of progressive design, quite as much as that of living beings. Nor can we fail to see that, while in some important directions we have penetrated the great secret of nature, in reference to the general plan and structure of the earth and its waters, and the changes through which they have passed, we have still very much to learn, and perhaps quite as much to unlearn, and that the future holds out to us and to our successors higher, grander, and clearer conceptions than those to which we have yet attained. The vastness and the might of ocean and the manner in which it cherishes the feeblest and most fragile beings, alike speak to us of Him who holds it in the hollow of His hand, and gave to it of old, its boundaries and its laws; but its teaching ascends to a higher tone when we consider its origin and history, and the manner in which it has been made to build up continents and mountain-chains, and, at the same time, to nourish and sustain the teeming life of sea and land.

ON THE CANADIAN ROCKY MOUNTAINS, WITH SPECIAL
REFERENCE TO THAT PART OF THE RANGE
BETWEEN THE FORTY-NINTH PARALLEL
AND THE HEAD-WATERS OF THE
RED DEER RIVER.¹

BY GEORGE M. DAWSON, D.S., F.G.S., A.R.S.M.,

Assistant Director of the Geological Survey of Canada.

The term Rocky Mountains is frequently applied in a loose way to the whole mountain region bordering the west coast of North America, which is more appropriately—in the absence of any other general name—denoted as the Cordillera belt, and includes a number of mountain systems and ranges which on the 40th parallel have an aggregate breadth of about one thousand miles. Nearly

¹ Read before Section C, British Association, Birmingham Meeting, 1886.

coincident, however, with the latitude of the head-waters of the Missouri, a change occurs in the character of this Cordillera region. It becomes comparatively narrow, and runs to the 56th parallel or beyond, with an average width of about four hundred miles only. This narrower portion of the Cordillera comprises the greater part of the Province of British Columbia, and consists of four main ranges, or more correctly speaking, systems of mountains, each composed of a number of constituent ranges. These mountain systems are, from east to west, (1) The Rocky Mountains proper. (2) Mountains which may be classed together as the Gold Ranges. (3) The system of Coast Ranges sometimes improperly regarded as a continuation of the Cascade Mountains of Oregon and Washington Territory. (4) A mountain system which in its unsubmerged parts constitutes Vancouver and the Queen Charlotte Islands. This last is here actually the bordering range of the continent, as beyond it, after passing across a submarine plateau of inconsiderable width, the bottom shelves very rapidly down to the abyssal depths of the Pacific. The Tertiary coast ranges of the south are here entirely wanting.

Between the second and third of the above mountain systems is the Interior Plateau of British Columbia, with an average width of about one hundred miles, a mean elevation of about 3500 feet and peculiar character and climate. The present paper refers more particularly to a portion of the Rocky Mountains proper. This system of mountains has, between the 49th and 53rd parallels, a mean breadth of about fifty miles, which, in the vicinity of the Peace River, decreases to forty miles, the general altitude of the range, as well as that of its supporting plateau, at the same time becoming less. Beyond the Peace River region, these mountains are known only in the most general and unsatisfactory way. The portion of the Rocky Mountains which has been explored, is bordered to the eastward by the Great Plains, which break into a series of foot-hills along its base, and to the westward by a remarkably straight and definite valley which is occupied

by portions of the Columbia, Kootanie and other rivers, and is known to preserve its general direction and character for over six hundred miles.

Since the early part of the century, the trade of the great fur companies has crossed the Rocky Mountains chiefly by the Athabasca and Peace River Passes, the first complete traverse of the continent having, in fact, been accomplished by the latter route by that most adventurous of travellers Sir Alexander MacKenzie, thirteen years before the same feat was performed further south by the much advertised Lewis and Clark expedition. Posts once established to the west, these routes became familiar to the traders and voyageurs of the Companies, who in their modest records speak with as much indifference of starting from the mouth of the Columbia or Vancouver Island for Montreal—a journey occupying, under the most favourable circumstances, almost an entire season—as might the modern traveller who makes the traverse by rail in a few days. With the exception, however, of the geographer David Thompson, these adventurers gave little or no information as to the geography of the mountains, which were mapped for them only in days' journeys, and till the date of the explorations carried out under Captain Palliser in this region in 1858 and 1859, nothing was known in detail of the features of the Rocky Mountain Range within the British Possessions. At the inception of explorations for the Canadian Pacific Railway, Palliser's map was still the only one on which any reliance could be placed, and it applied merely to that portion of the range south of the Athabasca Pass. During the progress of the railway explorations a number of passes were examined more or less in detail, including in fact all those which appeared likely to be of service, between the International Boundary on the 49th and the Peace River Pass on the 56th degree of latitude, and the general fact was developed that the gaps became lower toward the north, the Peace River, where it breaks across the range, being, in fact, 2000 feet only above the sea-level. Directness of route and other considerations, however, led finally to the adoption of the Kicking Horse Pass, by which the

watershed is crossed at an elevation of 5300 feet. Had it been anticipated by Dr. Hector, who when attached to Palliser's expedition discovered and named this pass, that it would have been traversed by a railway, he might possibly have endeavored to bestow on it some more euphonious name.

In 1874, I examined the South Kootanie Pass in connection with H. M. North American Boundary Commission, and in 1883 and 1884 that portion of the Rocky Mountains between the parallels of 49° and $51^{\circ} 30'$, was explored and mapped in some detail by myself and assistants, in connection with the work of the Canadian Geological Survey. Access to this, the southern portion of the Rocky Mountains in Canadian territory, being now rendered easy by the completion of the railway, its mineral and other resources are receiving attention, and the magnificent alpine scenery which it presents is attracting the notice of tourists and travellers generally. This portion of the mountains, including a length of about one hundred and seventy-five miles, measured along the axis of the range, may be taken as a type of that which is not yet so well known, and some of the main results of the reconnaissance work so far accomplished are here presented.

With certain local exceptions, the geological structure of these mountains is as yet very imperfectly known. In a report of the Geological Survey, shortly to be issued, it is intended to publish such detail as has been worked out. It will here be necessary only to give the main facts, which form the structural basis of the actual surface features. The old crystalline rocks form no part of the Rocky Mountains, either in the district here specially mentioned or northward as far as the Peace River. The lowest rocks here represented are quartzites, slates and shales more or less indurated, with occasionally true schists of a subcrystalline character, forming a series several thousand feet in thickness and referable, so far as the scanty fossil evidence shows, to the Cambrian. Overlying these, with no very marked unconformity, is a great limestone series of Devonian and Carboniferous age, which occasionally holds massive

quartzites, and may prove, in the western part of the range, to pass down into Silurian or Cambro-Silurian. Triassic or Permo-Triassic red sandstones appear in some places near the forty-ninth parallel.

In the earliest Cretaceous times, this portion of the Rocky Mountains appears to have been an area of subsidence in which several thousand feet of shales and sandstones were deposited. These contain a characteristic early Cretaceous or Cretaceo-Jurassic flora and have been named the *Kootanie Series*. The conditions at this time appear to have been different from those obtaining in the Western States, as the equivalents of these oldest Cretaceous beds have not there been detected. Deposition, accompanied by some evidence of denudation of the older rocks, continued, over the greater part of the area, till the close of the Cretaceous, and the still later beds of the Laramie are yet found in a few places in the mountains. Throughout the whole of these periods, no evidence of great disturbance is found, and the region was not a mountainous one. For the next ensuing period, however, no representative strata are met with, and it is to this time, coeval with the earliest Tertiary, that the profound changes producing this mountain system are due. The beds were then thrown into a series of parallel folds trending north-north-west by south-south-east, and these, by a continuance of pressure from the west, were closely pressed together, and in many cases—particularly on the eastern side—completely overturned eastward. The subsequent action of denudation on the higher and more ample folds of this corrugated area has almost completely removed from them the whole of the Mesozoic rocks, while along the eastern margin of the disturbed region, in which the folding has been in many places scarcely less severe, the newer rocks still form the actual surface. This eastern belt, with an average width of about fifty miles, forms the foot-hills; while the western portion, with a width of about fifty miles, constitutes the mountains proper, the rugged character of which is almost as much due to the nature of the older rocks there brought to the surface as to its superior elevation.

Though thus, structurally considered, the district of the foot-hills may be regarded as a portion of the folded mountain region, it has characters of its own.

This district presents long ridges, or hills arranged in linear series, the positions of which have been determined by those of the harder sandstone beds. Between these are wide valleys in which the smaller streams course, while the larger rivers, with their sources in the mountains, generally cut across nearly at right angles. Though very well marked south of the Old Man River, these ridges are there generally rather low, and the prairie may be said to spread up to the very base of the mountains, the proportion of wooded country being quite small. North of the North Fork of the Old Man River, however, the hills and ridges are higher and more abrupt, and the wooded areas become more considerable, till about the Highwood River and Sheep Creek, extensive forests, interspersed with tracts of burnt woods, render the foot of the mountains well nigh unapproachable, except along the river valleys. The increased height of the foot-hill region in this vicinity is co-ordinate with a greater elevation in the base-level of the mountains, which here attains its maximum—the levels at which the Highwood and Elbow Rivers emerge from the mountains being approximately 4780 and 4800 feet respectively. The streams which leave the mountains at the lowest levels, are the South and Middle Forks of the Old Man, and the Bow River. The two first may be considered as together occupying a structural break in the front of the range, and have a level at this point of little over 4150 feet. The Bow River, but for its greater size and erosive power, which have enabled it to produce a great valley, would probably have had a much greater elevation at its exit from the mountains. Its actual height at this point is 4170 feet.

Where the summits of the foot-hills are not crested by outcropping ledges of sandstone, their outlines are generally rounded and flowing. The parallel valleys contain a deep, rich, black soil, and under the influence of a sufficiently abundant rainfall, the vegetation is wonderfully luxuriant. Few regions in a state of nature can compare with the southern portion of the foot-hills in beauty.

The base-level of this part of the Rocky Mountains is much higher on the eastern than on the western side. On the east, as ascertained by taking the average level at which the larger streams leave the mountains, it is about 4360 feet, while on the west, the mean elevation of the corresponding portion of the Columbia-Kootanie Valley is about 2450 feet. It is in consequence of this difference that the profiles of the various passes show sudden, steep descents to the west, and the streams flowing westward are also, as a rule, more actively engaged in erosion. The abrupt dip from the watershed, on the west side, was the greatest obstacle in the selection of a practicable railway route, and constituted the most formidable engineering difficulty in the pass actually adopted.

The general trend of this portion of the mountains has already been given as N. N. W.—S. S. E., but when more closely examined it is found actually to include three subordinate directions. That portion of the range which extends on the east side from the forty-ninth parallel, to the South Fork of the Old Man River, has a general bearing of N. 35° W. Thence northward to the Highwood River, the general trend is about N. 12° W., after which, the bearing again becomes about N. 35° W., and so continues to beyond the Red Deer River. The portion of the range which runs nearly north and south, is considerably wider than the rest (being about sixty miles in width) and includes a remarkable series of infolds of Cretaceous rocks. The constituent ranges and ridges of both the mountains and foot-hills conform throughout very markedly, to the directions above given; and while the three trends are most clearly shown by the outer, eastern range, they are scarcely less evident on the western border. The least regular, and most tumultuous portion of this mountain region is that in the vicinity of the forty-ninth parallel.

In common with most mountain ranges (and here specially marked, in consequence of the regular parallel folding of the rocks) the ruling features are parallel ridges and valleys, crossed nearly at right angles by a system of transverse breaks. The cause of these cross valleys is not

very apparent from a geological point of view, as they do not appear to coincide with any important lines of faulting. The general plan of the foot-hills is repeated in the mountains, on a large scale, and some of the cross valleys are continued quite through the foot-hills to the eastern plains, while others again are found in the foot-hills, which do not effect the mountains proper. It is probable that lines of comminuted fracture or shattering of the rocks may have originated these cross valleys, and it is possible that they constituted an original drainage system for the axis of elevation of the mountains, at a time anterior to that at which the longitudinal valleys became deeply excavated, and that some of them, by drawing to themselves the waters of a number of the longitudinal streams, have succeeded in maintaining their position as main waterways to the present time. The great permanence of these main, transverse drainage valleys is shown by the fact that the heights of land between them, in the mountains, are often equal in altitude to that of the main watershed. In no case, however, in the region now described, does such a cross valley preserve its characters so definitely across the entire range as to form throughout a direct pass, or practicable route of travel, though a near approach to this occurs in the North-Kootanie Pass. The routes offering the greatest facility for crossing the mountains, generally follow zig-zag courses, partly along the longitudinal valleys, and seeking the lowest points at which to cross the intervening mountain ridges. In consequence of this, the lengths of the various transverse passes are often considerably greater than the actual width of the mountains. The following list enumerates the passes known in this part of the range, with the length of each along the direction of the trail, from the eastern to the western base of the mountains. The altitude of each at the watershed or main summit is given in the second column.

	Miles.	Elevation of watershed.
1. South Kootanie or Boundary Pass, 66		7,100
2. North Kootanie Pass,..... 48		6,750
3. Crow Nest Pass..... 56		4,830
4. North Fork Pass (1)..... 46		6,773

	Miles.	Elevation of watershed.
5. Kananaskis Pass.....	85 (about)	6,200
6. White Man's Pass (2).....	70	6,807
7. Simpson Pass (3).....	70 (about)	6,670
8. Vermilion Pass (4)	88	5,264
9. Kicking Horse Pass (5).....	104	5,300

It is probable that even within this district there are other passes across the watershed range in addition to these here named. The Indians, in the course of their hunting expeditions, travel on foot in every direction across the mountains, but designate as passes only those routes which are not too steep or rough for horses.

Most of the passes above enumerated cross subsidiary summits of some height west of the main watershed. The South and North Kootanie Passes have long been in regular use by the Indians, and both these, after descending into the Flathead Valley, in the centre of the mountain region, cross a second high "divide" between this river and the Kootanie Valley. The Crow Nest Pass was little used by the Indians owing to the thick forest prevailing along parts of it, but was some years ago chopped out, and rough bridges thrown across a couple of streams, to provide a route for taking horses and cattle eastward across the range. The North Fork Pass was not known, except by Indians, till crossed by myself in 1884. The Kananaskis Pass was traversed by Captain Palliser in 1858, and has been much used by the Indians. The White Man's Pass is probably that taken by a party of emigrants, spoken of by Sir George Simpson, in 1841. Sir George Simpson himself, in the same year, crossed the mountains by the pass to which his name is now attached. The Vermilion Pass

1. Measured from the Elk River Crossing in a straight line to the Kootanie Valley; the western continuation of this pass not having been explored,

2. Measured up the Bow River valley on the east, and to the west crossing the Brisco Range by Sinclair Pass.

3. Measured up the Bow Valley on the east and across the Brisco Range in a direct line by a reported pass.

4. The eastern and western ends of this pass are identical with the last.

5. By the railway line 111 miles.

has long been a much travelled Indian route, and takes its name from copious chalybeate springs, which deposit large quantities of ochre. The Kicking Horse Pass was little known and scarcely used by the Indians, probably on account of the thickness of the woods and rough character of parts of the valley for horses. About fifty miles north of the last named pass is the Howse Pass, and thence to the Athabasca Pass, a further distance of sixty-three miles, no practicable route is known across the axis of the range. In 1884 I learned from the Stoney Indians that a hunting party, having heard reports of abundance of game in the region, had during the summer tried every valley between the Athabasca and Howse Passes, but had been unable to get their horses over, being repulsed either by impassible rocky mountains or by glaciers and snow-fields which filled the intervening valleys. It is in this part of the range that Mounts Brown and Murchison occur, with reputed altitudes of 16,000 and 13,500 feet respectively, and Mount Hooker, also reported to be very lofty. This is probably the culminating region of the range, but as yet we have no accurate or detailed knowledge of it.

In the region here particularly described, Mount Lefroy (of Hector), with an altitude of 11,658 feet above the sea, appear to be the highest peak, but Assiniboine Mountain, the height of which, as seen from a considerable distance, I estimated at 11,500 feet, may prove to be higher. A number of the mountains, however, are known to exceed 10,000 feet in elevation, and whole ranges and groups of peaks surpass 8000 feet. Considerable as such elevations are, the height of the adjacent plains and the yet greater altitudes of the valleys within the range, reduces the apparent dimensions of the mountains, which seldom rise much more than about 5000 feet above the point of view. Though thus lacking in the impressive magnitude characteristic of some other mountain ranges, the scenery has a character of its own, and what it may want in actual size is compensated by its extreme ruggedness and infinite variety, its massive, broken escarpments and bare cliffs, which rise often from valleys densely filled with *primaeval* forest.

The contrast in respect to form is very marked, as between the Rocky Mountains and the Purcell and Selkirk Ranges west of the Columbia-Kootanie Valley, along the eastern side of which the outer range of the Rocky Mountain system forms an almost continuous wall of bare and shattered, though not very lofty, limestone peaks—a character which the opposite ranges only begin to assume toward their axis, rising at first from the valley in long and rounded slopes thickly covered with forest.

The Columbia-Kootanie Valley has already been referred to as an orographic feature of the first importance. Its general features are those of a strike-valley cut out along the outcropping edges of the massive eastward-dipping limestone formation. Its width, however, is much greater than that of other similarly situated valleys of the region, averaging about five miles in the length of 185 miles between the forty-ninth parallel and mouth of the Kicking Horse River. Circumstances, which need not here be detailed, tend to show that the river which excavated this valley originally flowed southward, throughout its whole length, that during the glacial period it became deeply filled with moraine matter and terraced drift, and that subsequently a southward-flowing river again occupied it. At a still later period, however, partly as an effect of the blocking of the valley by debris brought down by the Kootanie at the point at which that river enters it, but probably also in part as a consequence of a relative decrease in elevation to the north, the present remarkable water-parting was formed. The Columbia now rises in two large lakes in this great valley, and flows northward with a comparatively sluggish current, while the Kootanie—already a large river—enters the valley at right angles, at a short distance from the head of the upper lake, from which it is separated by a narrow neck of gravelly terrace-flat, and flows rapidly southward.

On Wild Horse Creek, a tributary of the Kootanie, placer gold mining has been carried on for about twenty years and the camp is still a moderately productive one. Other streams tributary to the Columbia-Kootanie Valley are known to

yield alluvial gold, and additional discoveries are probable. No gold has yet been found on the eastern slopes of the range, but here the infolded rocks of the Kootanie (Cretaceous) series contain numerous seams of coal, some of which are of excellent quality. The coal is generally bituminous, but in the Cascade and Bow River basin becomes an anthracite, and mining operations are here already in progress on the line of the railway. Copper ores and galena are also known to occur in somewhat important deposits, and in 1884, we discovered, on a tributary of the Beaverfoot, in veins in an extensive intrusion of nepheline-syenite, a very beautiful blue sodalite which may prove of value for ornamental purposes.

Throughout the whole of this portion of the Rocky Mountains, large patches of perennial snow are frequently met with at elevations surpassing 6000 feet, and in sheltered localities, even at lesser heights. In the high mountains near the forty-ninth parallel, masses of hard snow and ice exist which appear to have a certain amount of proper motion and might be denominated glaciers, but further north, true glaciers, with all the well known characters of those of the Alps and other high mountain regions, occur. Such glaciers may be seen on the North Branch of the Kicking Horse, at the head-waters of the Red Deer, and elsewhere, and these are fed by snow-fields, the areas of which, though not accurately known, must be, in a number of cases, very considerable. Above a height of 6000 feet, snow falls more or less frequently in every month in the year, and about the first of October, it may be expected to occur even in the lower valleys within the mountain region.

In respect to the total amount of precipitation, the circumstances differ remarkably in the different portions of this comparatively limited tract of mountains, being quite small in the Columbia-Kootanie Valley, heavy on the adjacent western slopes of the range, and again inconsiderable on the eastern slopes. The position of the Columbia-Kootanie Valley, with reference to the prevailing westerly air currents, in the lee of the Selkirk and Purcell Ranges,

explains its dry climate. Meeting the western slopes of the Rocky Mountains, the air is still sufficiently moist to afford the relatively abundant precipitation of that region; but on passing still further eastward, across the summit elevations, the conditions are unfavourable to farther rainfall. Superimposed, however, on these main features, is a tendency to greater rainfall toward the north, which is specially noticeable—whether from a lessened elevation in the mountain barriers to the west, or other causes—in comparing the conditions in different parts of the Columbia-Kootanie Valley. The total amount of precipitation is evidently least in that part of this valley near the forty-ninth parallel, which is known as the Tobacco Plains. Much of the surface is there open, covered with bunch-grass and dotted with open groves of yellow pine (*Pinus ponderosa*), interspersed with the western larch (*Larix occidentalis*) and Douglas fir (*Pseudotsuga Douglasii*), while the herbaceous plants are of a drought-loving character. Northward in the valley these gradually disappear, the yellow pine and western larch cease abruptly at the head of the Upper Columbia Lake, and the black pine (*Pinus Murrayana*) and Engelmann's Spruce (*Picea Engelmanni*) form the chief part of the forest, which becomes relatively dense. Such small efforts at cultivation as have been made, prove that irrigation is necessary for the successful growth of crops in all the southern part of this valley.

In the lower parts of the eastern foot-hills and the larger valleys in the eastern part of the range, the dry conditions of the Columbia-Kootanie Valley are again to some extent repeated; and even within the range, rather extensive patches of dry prairie and slopes clothed with bunch-grass are found in the mouths of the depressions leading to the passes. The open, prairie character of the southern foot-hills has already been alluded to.

Neither the western larch nor the yellow pine recur on the eastern slopes of the mountains, and the Douglas fir, though abundant in the foot-hills, does not extend within the mountains beyond the larger valleys.

The tree most characteristic of the valleys of the western

well-watered slopes, though not abundant in this part of the Columbia-Kootanie Valley, is the western "cedar" or arbor-vitæ (*Thuja gigantea*). Its absence in the eastern valleys is probably due to the want of a sufficiently moist atmosphere rather than to the somewhat more rigorous climate. Lyall's larch (*Larix Lyallii*) forms an open fringe along the upper limit of forest growth in these mountains, or at about 7000 feet, above which arboreal vegetation is scarcely observed. When the leaves of this little larch become yellow, in September, its zone of growth may often be traced, from a distance, with the regularity of a contour-line.

Leaving out of consideration the arbor-vitæ, which, as before stated, affects a peculiar station, together with other trees of rarer occurrence, the common conifers may be arranged in a regular series from those tolerant of the most alpine conditions to those which require a high degree of summer heat combined with a dry atmosphere, as follows:—

Larix Lyallii. Strictly alpine.

Abies subalpina. Alpine and sub-alpine and extending to high and cool valleys on both slopes.

Picea Engelmannii. Sub-alpine and extending downward wherever the soil is sufficiently moist, on both slopes.

Pseudotsuga Douglasii. Lower valleys on both slopes.

Larix occidentalis. Base of Mountains on west slope only.

Pinus ponderosa. Base of mountains on west slope only.

Prof. Macoun has made extensive collections of plants in the mountains adjacent to the railway line, and it may be of interest from a botanical point of view to note his observation that a number of mountain plants obtained by myself in the southern part of the region, appear to reach their northern limit there, and do not recur even in the high mountains in the vicinity of the Bow and Kicking Horse valleys. This circumstance is doubtless in connection with the partial break in the continuity of the higher ranges about the head-waters of the Old Man River, and the species wanting are probably those which require relatively dry as well as alpine conditions.

The Indians hunting on the western slopes of this part of the mountains are the Kootanies, (*Kootenuha* or upper Kootanies) with their headquarters in the valley of the same name, together with a small colony of the Shuswap Indians of the Selish stock, with a village near the Columbia Lakes and regarded as intruders by the Kootanies. The Kootanies claim, in theory, all the mountains west of the watershed, as their peculiar hunting-grounds, and in former days made annual excursions for the purpose of hunting the Buffalo, across the range to the Great Plains, where they came into frequent collision with the Blackfoot tribes. The latter in turn occasionally carried retaliatory raids across the mountains to the Kootanie Valley, for the purpose of stealing horses, and many are the tales still told among them of these forays. The eastern slopes of the range and adjacent foot-hills are now hunted over by the Mountain Stoneys, a branch of the Assiniboines. These people are comparatively recent immigrants, dating their connection with the district about forty years back only. They intermarried with a tribe of Rocky Mountain Crees, who formerly maintained themselves here, but have since lost their identity among the Stoneys, though both languages are still commonly spoken. The extraordinary paucity of local names, whether Cree or Assiniboine—even in the case of important streams and mountains—in this part of the region, leads me to believe that the Crees themselves had not very long possessed these mountains, which, it seems highly probable, at no very distant date, were frequented only by the Kootanies. The Blackfoot tribes, being essentially plain Indians, can scarcely be supposed to have inhabited this wild, and to their ideas, naturally repulsive mountain country. The Crees may probably have penetrated to it about the date when they were first supplied with fire-arms by the Hudson's Bay Company, when they are known to have been very formidable and aggressive.

In addition to the buffalo, the foot-hills formerly abounded in other game, particularly the mule deer, wapiti and white-tailed or jumping deer. With the exception of the buffalo, all these animals are still to be found, but in much diminished

numbers. The mountains themselves yet afford sustenance to the Indian hunter, the Rocky Mountain sheep or bighorn and the mountain goat being moderately abundant. Black and grizzly bears are also frequently met with, and the puma or mountain lion—held in great dread by the Indians—is occasionally found. The moose is sometimes shot by the Indians, but the cariboo is scarcely, if at all, found within the district here described, requiring more extensive alpine plateaus than those afforded by this part of the mountains. Smaller fur-bearing animals are numerous where they have not been too assiduously trapped. Trout are abundant and large in most of the streams, and the white-fish and lake-trout, are procured from the larger lakes.

No insuperable obstacles to travel exist in these mountains. Many of the passes and trails are open and easily traversed, and the field for mountain climbing and exploration is unlimited, few of the higher peaks having yet been scaled. Starting from the line of railway, or from the vicinity of Fort MacLeod, with a few pack-animals and a small camping outfit, much may now be accomplished in a comparatively short time, the months of July or August being the best, on account of the lowness of the rivers and mountain torrents, which at other seasons constitute formidable barriers. If fine scenery, combined with adventure of the less hazardous kind, and the pleasure of exploring tracts which yet appear as blanks on the map, will compensate for the minor discomforts attending such an expedition, I can promise that the enterprising traveller will not be disappointed.
