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BIGHORN COAL BASIN.*

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The Bighorn coal basin, situated in western Alberta, is named from the Bighorn range, an outlier of the Rocky mountains, nine miles east of the first range, and extending from the North Saskatchewan to the Brazeau river. The first discovery of coal in the basin between this range and the mountains was made by Mr. D. B. Dowling, in 1906. Analyses of his samples proved that the coal was well adapted for use in locomotives, and inasmuch as at that time, no occurrence of a satisfactory fuel was known nearer to the routes of the Grand Trunk Pacific, and Canadian Northern railways, the discovery attracted much attention when made public soon after Mr. Dowling's return. Two companies purchased large holdings in the basin, shortly afterwards, and its importance as a coal field was fully proved in 1907, when Mr. Dowling discovered that the coal-bearing formation contained at least nine workable seams, with an aggregate thickness of 66 feet. The next summer the German Development Company sent Mr. James McEvoy to make a thorough examination of their properties. During the same season the writer, in accordance with the instructions of the Director of the Geological Survey, made a photo-topographic survey of the basin and a study of its geological structure. Mr. McEvoy, who was a member of the Geological Survey for a number of years, has furnished sections of the Coal Measures, at two widely separated points, with thicknesses of the various seams, and analyses of carefully averaged samples from the more important ones.

The area mapped is bounded on the north-east and south-west respectively by the Bighorn range, and the first range proper of the Rocky mountains. These ranges form the geological as well as the topographic boundaries of the basin; and though the coal-bearing strata extend beyond the Saskatchewan and Brazeau rivers, the term basin is no longer applicable there, owing to the dying down of the Bighorn range, which does not form a well marked topographic feature except between these rivers. On the south, the valley of the Saskatchewan is mapped, and the slopes of the first range and the foothills east of it. To the north of the basin, the valley of the Brazeau is very broad owing to the confluence of three large tributaries, but because of lack of sufficient time it was found impossible to survey more than a portion of it.

The length of the area mapped south-east to north-west is about 36 miles, and its average width about 9 miles. The area is, therefore, about 320 square miles. The basin is situated, roughly, 85 miles north-west of Banff, 140 miles west-south-west of Edmonton, and 70 miles south of the surveyed routes of the Grand Trunk Pacific and Canadian Northern railways.

At present the basin can be reached by means of pack trails only. The shortest of these leaves the main line of the Canadian Pacific railway at Laggan, ascends the Pipestone to the high pass of that name, descends the Siffleur to the Saskatchewan, and follows it for about 18 miles to the basin. This trail cannot be used in the winter, spring, or early summer, owing to the depth of snow which accumulates in the pass. Another trail leaves Banff and follows

the Cascade trough, crossing Panther creek, Red Deer, and Clearwater rivers, and descends to the Saskatchewan by Rabbit creek, which enters it about 2 miles below the mouth of the Siffleur. The four summits on this trail are from 1,000 to 2,000 feet lower than the Pipestone pass, so that it can be used much earlier in the summer. Another trail, much used by the Stoney Indians, leaves their reserve at Morley, and traverses the foothills to the Red Deer river, by which it enters the mountains.

The basin may be reached from Morley or Innisfail without entering the mountains, but several bad muskegs must be encountered. In character the topography of the basin is intermediate between that of the eastern ranges of the Rockies and the foothills east of them. For the greater portion of the space between the International Boundary to the Athabaska river there is a sharp line of division between the two types. To the east the foothills form a succession of long ridges with even crest lines, and without noticeable differences in elevation, while to the west, the mountains are much higher and exhibit serrate crest lines and great irregularity in height. Seen from Calgary, situated 50 miles east of them, the mountains extend in a long line of peaks and appear to rise as abruptly from the foothills region as from a plain.

At certain intervals, however, outlying ranges occur in front of the general line of the mountains, and at various distances from it. In height, these outliers are not greatly inferior to the mountain ranges; but, unlike them, they extend for short distances only, and near their extremities they are so reduced in height that they pass almost imperceptibly into ridges of no greater elevation than the other foothills.

Both the mountains and the foothills are crossed by the deep transverse valleys of the rivers draining the region. Some of the rivers, like the Bow, follow longitudinal valleys for some distance, but the majority break almost directly across the ranges, and receive only small tributaries from the longitudinal valleys. The general direction of the ranges of the mountains and ridges of the foothills is south-east and north-west.

Local.—The distance between the Bighorn and first range—about 9 miles—is much greater than is usual between the ranges of the mountains, and the intervening basin bears a strong resemblance to the foothill country. It is traversed by three fairly well defined ridges running parallel with the bordering ranges. These ridges differ from foothills only in their slightly greater height and more irregular outlines. The transverse valleys of the Saskatchewan and Brazeau are broad and deep, and their tributaries, with three other streams which break through the Bighorn range, so dissect the area that its basin-like form only becomes apparent when a mountain is climbed, and its general elevation can be compared with that of the bordering ranges. The general elevation of the basin is between 2,200 and 3,000 feet below the ranges, and about 2,000 feet above the deep valley of the Saskatchewan.

The valleys of the Saskatchewan and Brazeau run across the ends of the basin. They are broad and deep, and like the other transverse valleys in the mountains and foothills are U-shaped. The Bighorn range reaches an elevation of

* From Dominion Government Report.