K-FERNIE COAL AREA-46(1)A.

PRELIMINARY REPORT.

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INTRODUCTION

From the latter part of June to early November a detailed geological examination was carried out in the area surrounding the Fernie coal mines. In addition a brief reconnaissance of the area adjoining the highway west of the Elk River between Fernie and Elko was made. Several weeks were spent prospecting at Morrissey Creek, Coal Creek and Erickson Creek with the object of locating coal seams that would be amenable to strip mining. A few days were spent underground at the No. 9 and 10 Mines at Coal Creek and suggestions were offered regarding the local erosion of the No. 9 seam. Inasmuch as the maps and cross-sections needed to present a final report on the area examined are still being constructed, and certain changes will doubtless be made as a result of field work in the area in 1947, this report is presented with the object of briefly describing the general geological conditions encountered, along with an outline of contemplated plans for work to be done in 1947.

General Statement

The Crow's Nest Pass Coal Company Limited, largest coal producer in British Columbia, obtains its production from two sources, the Michel Colliery and the Elk River Colliery. Detailed geological mapping of the area surrounding the Michel Colliery was completed by B.R. MacKay of the Geological Survey in 1933[1], a similar study is now being undertaken of the area surrounding the Elk River Colliery.

[1]MacKay, B.R. --- Michel Coal Area, B.C. and Coleman South Coal Area, Alberta G.S.C. Summ. Rept. 1933, Part B.

The presence of coal on Coal Creek was mentioned by Dawson in 1885[1]. Coal mining was initiated in the Fernie area in 1897 and since then a total of over 16,000,000 tons has been produced[2], or an average of 350,000 tons per year. Prior to 1942 ten mines had been operated with varying success on both sides of Coal Creek, with production being handled at the Coal Creek Colliery. In 1942 a new plant, the Elk River Colliery, with an ultimate capacity of 4,000 tons per day, was constructed ¾ of a mile west of the Coal Creek plant. The new plant handles the present production (1,150 tons per day) from 5 mines located on the south side of Coal Creek, No. 1 East, No. 9, No. 10, No. 4, and the new No. 3 mine.

A general geological study of the Fernie area was made by James McEvoy in 1900 as part of a broader regional study of the Crow's Nest Coal Fields and his results are portrayed on a geological map at a scale of 1" - 2 miles[3]. Since 1900, with the exception of a brief visit by B.R. MacKay to Coal Creek in 1933[4] (the results of which were not published) no geological work has been undertaken in the Fernie area.

[1] Dawson, G.M. --- Ann. Rept. G.S.C. 1885, p. 76 B.

[2] Whittaker, W.C. --- Trans. C.I.M.M. Vol. XLVII, 1944, pp. 437-448.

[3] McEvoy, J. --- Summ. Rept. G.S.C. 1900, pp. 85 A - 95 A, also summarized by Dowling in Mem. 69, "Coal Fields of British Columbia", 1915 and G.S.C. Map No. 767 "Geological and Topographical Map of Crow's Nest Coal Fields, 1902.

[4] MacKay, B.R. --- The Mesozoic-Paleozoic Contacts and Associated Sediments, Crowsnest District, Alberta and British Columbia, G.S.C. Summ. Rept. 1931, Part B, p. 21 B.

Stratigraphy

Within the Fernie Coal area are three distinct conformable formations ranging in age from Jurassic to Lower Cretaceous. The lowest of these, the marine Jurassic Fernie Formation is to be found on the gentle lower tree-covered slopes of the Elk River valley. No complete section of the formation could be obtained but its thickness is estimated to be at least 1,000 feet and possibly 3,000 feet. Overlying the Fernie is a thick series of freshwater Lower Cretaceous sediments that were termed the "Crow's Nest Coal Beds" and the "Elk Conglomerates" by James McEvoy. Following the terminology used by MacKay, the lower coal-bearing measures are referred to as the "Kootenay" and the overlying conglomerates, as the "Blairmore". These two formations have a combined thickness of 5,000 feet within the map area.

Fernie Formation

Although the base of the Fernie shale is not exposed within the map area, Telfer[1], in describing the area west of the Elk River near Fernie, mentions an "apparent" conformity of the Fernie with the underlying thin-bedded, rusty-weathering Triassic shales. MacKay[2] has noted a similar conformable contact in the Crowsnest area but mentions that the Fernie unconformably overlies the Rocky Mountain Quartzite in other areas. Numerous short sections of the

[1] Telfer, L. --- Phosphate in the Canadian Rockies, Trans. C.I.M.M. Vol. 36, 1933, p. 572

[2] MacKay, B.R. --- The Mesozoic-Paleozoic Contact and Associated Sediments Crowsnest District, Alberta and British Columbia, G.S.C. Summ. Rept. 1931, Part B, p. 17 B.

Fernie were examined on Coal Creek and on tributaries of the Elk River south of Fernie. In all the sections examined the Fernie was found to be intensely folded, often faulted and sheared, with the shears being filled by secondary calcite. The lower part of the Fernie consists of black, relatively-soft, thin-bedded marine shales. These grade upward into grey sandy calcareous shales with the top of the formation being represented by a 35 foot section of hard, light brown, fine grained, rusty-weathering, calcareous, thin and slightly cross-bedded, "Ribbon Sand". This "Ribbon Sand" corresponds in stratigraphic position, composition, and appearance, with the "Brown Sand" of Turner Valley and the "Ribbon Sand" of Southern Alberta. Overlying this marker bed is a 90 foot section of light brown, hard, fine-grained calcareous sandstone that carries numerous carbonized plant fragments. This sandstone along with the "Ribbon Sand", represents the transition from the marine conditions of the Fernie to the freshwater conditions of the Kootenay. In the Crow's Nest area this transition is represented by beds that McLearn has called the "Passage Beds".

It was found that fossils were not common in the Fernie within the map area. However, two belemnite horizons were noted in the lower part of the formation and one brachiopod zone was discovered just below the "Ribbon Sand". On the top of Castle Mountain and just above a folded thrust plane, a 30 foot bed of rusty-weathering indurated shale proved to be highly fossiliferous, but the position of this bed in the section has still to be ascertained.

Kootenay Formation

Overlying a gradational contact with the aforementioned

sandstone is a 100 foot bed of hard, dark, cherty, coarse grained sandstone or fine grained conglomerate, the "Basal Kootenay Sandstone". This sandstone contains thin lenses of hard shiny coal, carbonized plant remains, and irregular tree trunk impressions. The Basal Kootenay Sandstone, being resistant to erosion, outcrops as a prominent ridge on the hillside, and thus becomes a most useful marker. Its presence may be observed in air photos along the western edge of the Crow's Nest Coal basin from Morrissey to Sparwood, a distance of 25 miles. Above the basal sandstone is a succession of 1,500 feet of interbedded dark grey to black, sandy, rusty-weathering shales, coarse-grained, cross-bedded, cherty sandstones, lenses and beds of conglomerate composed predominantly of pebbles of chert and quartzite, and occasionally, thin beds of rusty-weathering clay-ironstone. Although several conglomerate beds are present in the section two of these, located 540 feet and 920 feet above the base, are the most persistent. The lower of these overlies the No. 4 seam and the upper is to be found approximately 50 feet above the No. 5 seam. A composite section of the Kootenay Formation, obtained by utilizing a compilation of drill holes from Coal Creek valley for the upper part and a portion of McEvoy's measured section northeast of Fernie for the lowest 200 feet, is as follows:

Section of Kootenay Formation at Coal Creek, measured in descending order.

Thickness in Feet	
20	Shale, carbonaceous, with dark grey shale bands.
4 to 7	COAL, "B" seam.
53	Shale, dark grey, carbonaceous in part, with streaks of coal near top.
13	Sandstone, grey, coarse grained.
57	Conglomerate, grey, medium to coarse grained
- - - - - - -	Base of Blairmore Formation - - - - - - - - - - - -
10	Shale, carbonaceous
3	COAL, "A" seam.
57	Shale, dark grey, sandy in part, carbonaceous at top.
30 ±	COAL, No. 10 seam, Top, 3' coal, 1' coaly shale, 10' coal, 2' carbonaceous shale, 10½ coal, 2" shale.
175	Conglomerate, grey, hard. This interval varies from 3 - 200 feet.
11	COAL, No. 9 seam, 1 foot carbonaceous shale parting 4 feet below top.
92	Shale, dark grey to black, carbonaceous at base.
6½	COAL, No. 8 seam.
7½	Shale, black, carbonaceous
9	COAL, No. 7 seam.
52	Shale, dark grey to black, carbonaceous at top.
12½	COAL, No. 6 seam, Top, 4½ feet coal, 2 feet carbonaceous shale, 6 feet coal, Bottom.

71	Interbedded sandstone and dark grey (carbonaceous in part) shale.
14	Conglomerate, grey, fine grained.
16	Sandstone, grey, coarse grained.
46	Shale, dark grey, carbonaceous to coaly in part.
6	COAL, No. 5 seam.
21	Shale, Black.
21	Sandstone, grey, fine grained.
6	Conglomerate.
9	Shale, black.
2	COAL
38	Shale, black.
3	COAL
47	Shale, black, sandy near base.
20	Sandstone, grey, fine grained.
44	Conglomerate, rusty-weathering, darker at base.
10	Sandstone, grey, fine grained.
31	Shale, dark grey, sandy at base.
28	Sandstone, grey, coarse grained.
39	Shale, dark grey, sandy, grading into fine grained sandstone in part.
5	Conglomerate, dark, fine grained.
10	Sandstone, medium grained, conglomerate at base.
18	Shale, dark grey, carbonaceous at base.
11	COAL, No. 4 seam, 1½ foot band of carbonaceous shale 7½ feet below top.
23	Shale, black, carbonaceous in part.

79	Shale, dark grey.
5	Shale, black, carbonaceous.
19	COAL, No. 3 seam, 2 foot band of carbonaceous shale 2 feet above base.
26	Shale, dark, carbonaceous in part.
61	Sandstone, dark, fine to medium grained, thinly-bedded.
5½	Sandstone, dark grey, cross-bedded at top, carbonaceous at base.
2	Shale, black, fine grained, sandy.
35	COAL, No. 2 seam Top, 4' 2" coal, 6' carbonaceous shale with coal lenses, 7' coal, 1' carbonaceous shale, 6½' coal, 7' coal with bands of carbonaceous shale, 3' coal, Bottom.
21	Shale, carbonaceous.
4	COAL, No. 1 seam.
22	Shale, black, carbonaceous in part.
22	Shale, dark grey, sandy.
3	Shale, black.
7	Sandstone, grey, fine grained.
18	Shale, dark grey to black.
49	Shale, dark grey, sandy.
2	Shale, black.
8	Shale, grey, sandy.
50	Sandstone, dark grey, hard.
5	COAL, dirty.
34	Shale, brown and black.
11	COAL.
100	Sandstone, dark, hard, grading into fine grained conglomerate in part, carries coaly lenses and tree trunk impressions BASAL KOOTENAY SANDSTONE.
1593 feet	Total thickness of Kootenay Formation.

Of the 12 seams of commercial thickness listed above, only 4 are at present being mined on the south side of Coal Creek. These are the numbers 3, 4, 9 and 10 seams, with greatest production being obtained from the No. 10 seam.

Blairmore Formation

The youngest formation of the lower Cretaceous exposed within the map area is the Blairmore Formation. It consists, for the most part, of alternating hard, grey or brown, cross-bedding, sandstones, massive conglomerates, dark grey shales, with, in the lower part, some thin coal seams. A few thin beds of green sandstone and red and purple shales were noted in the upper part. Although the formation has been estimated to have a total thickness of over 6,500 feet, only 3,000 feet of the section has escaped erosion in the map area. The generally gentle eastward dip of this resistant formation on the east side of the escarpment flanking the Elk river has resulted in the formation, by consequent streams, of extensive dip slopes of surprising regularity. The base of the Blairmore is placed at the bottom of the 65 foot conglomerate bed which overlies the Number 10 coal seam. The reasons for the selection of this horizon are twofold; firstly this conglomerate marks the upper limit of commercial coal seams, and secondly the strata above this point contain more and thicker conglomerate beds than those below. However, it must be admitted that this Kootenay-Blairmore (conformable) contact is a rather arbitrary line and further (paleontological) evidence may necessitate an upward revision of the position of the contact.

Field Work

A. Area West of the Elk River

A brief study of the outcrops adjoining the highway on the west side of Elk River between Fernie and Elko was made. The black Fernie shales adjoining the highway between Fernie and a point opposite Morrissey had a generally-steep westward dip, but the structure has been complicated by the production of compressed, often faulted, overturned folds. From a point opposite Morrisey (the highway tunnel) southwestward, road cuts expose an excellent Paleozoic section. The Rocky Mountain Quartzite, Rundle, and Banff Formations were observed, all with a steep westerly dip. As one travels westward through the westerly-dipping beds of the Lizard Range, older geological formations are encountered, yet the contacts with adjoining formations appear to be conformable. Telfer[1] has offered an explanation of this rather unusual condition by suggesting complete overturning of the Lizard Mountain section.

A brief visit to Fairy Creek (northwest of Fernie) resulted in the discovery of a thick section (at least 750 feet) of dark shales and quartzites tentatively referred to the Triassic. The formation is exposed in a roadcut near the dam and also along the creek at this point. One dark shale horizon revealed a few pelecypods, and several faint ammonite impressions. Specimens of a sandy bed, which had very slight porosity, exuded very light dark green oil on fresh fracture surfaces.

[1]Telfer, L., op. cit.

Fernie Map Area

The greater part of the field season was spent in the 23 square miles which adjoins the town of Fernie and is referred to as the "Fernie Coal Area". Most of the traverses followed tributaries of the Elk River or of Coal Creek, where outcrops were fairly prevalent. Some plane tabling was undertaken in the Coal Creek valley. The data collected in this way is now being plotted on a map of the area, on a scale of 1" = 800' that was produced by photographically enlarging a portion of J.O. Wheeler's topographic map of the "Crow's Nest Coal Area", published on a scale of 1" = 2500' with a 100 foot contour interval. The final geological map will be supplemented by a series of east-west structure sections at ½ mile intervals.

Morrissey Area

Reconnaissance work was carried out along the north side of Morrissey Creek near the old mine workings. It was hoped that an area suitable for strip mining could be located but no encouraging results were obtained. However, some interesting structural features were noted in the area. It was found that the Basal Kootenay sandstone, just west of the old mine workings, is tightly compressed in a series of prominent folds that have a southeasterly plunge of about 8°. A few minor east-dipping thrust faults were noted near the old mine workings. On the escarpment northwest of the Chudik residence, and lying just above the Basal Kootenay sandstone, is exposed the thickest observed coal seam of the Kootenay section. This seam

(48 feet thick) comprises 42 feet of good coal and 6 feet of shale.

Michel Area

During the summer of 1946 the Crow's Nest Pass Coal Company carried out an extensive prospecting campaign east of Michel along Natal ridge and southeastward to the mouth of Erickson Creek. Part of the area examined had been geologically mapped in detail by B.R. MacKay but the most promising area was found to be just southeast of MacKay's map sheet. For several miles along Natal ridge a series of trenches were made with a bulldozer. Several thick coal seams were discovered and much structural information was revealed. It was noted, for example, that the greater part of Natal ridge consists of Kootenay measures with a steep westward dip (with occasional local flattenings of dip) rather than an area of gentle dips (with local steepening) as MacKay had portrayed on his structure sections. At the lower end of Natal ridge a 25 foot coal seam was discovered that dips (at 50°) in the same direction as the hillside. Several cross sections of this seam have been made with the bulldozer, a six mile highway is being constructed to join the Michel - Crowsnest road, and plans have been made to start strip mining at this locality early in 1947.

Coal Creek Stripping Project.

Approximately 1½ miles west of the Elk River washing plant, on the west flank of a southerly flowing tributary of Coal Creek, 2 thick coal seams were found to outcrop on the hillside in a thickly-wooded area. The two seams, believed to be Numbers 2 and 3 seams,

dip eastward at about 20° ~~feet~~, the dip being in the same direction as the slope of the hillside. A detailed map of the area, on a scale of 1" - 100', and a series of cross sections, were made. ~~The plan and sections, were made~~. The plan and sections revealed that it should be possible to strip the two coal seams, and that about 300,000 tons of coal should be available. Late in November a preliminary road was being constructed to the area and plans were made for further prospecting of the two coal seams.

Proposed Itinerary, 1947

During the winter months, it is proposed to continue the plotting of data obtained in traversing the Fernie map area and to construct a series of structure sections. If time permits, a three dimensional model of the area will be constructed, with the cross-sections mounted on glass plates. In addition an underground study is planned in the No. 4, 9, and 10 mines on Coal Creek. It is hoped that this study will reveal the configuration of certain Cretaceous stream channels that have, in places, eroded some of the seams.

When weather permits it is proposed to continue plane table mapping along Coal Creek valley and if possible to carry a survey along the No. 10 seam horizon throughout the length of the area. Some further detailed work will be done at the No. 2 and 3 seam Stripping Project if present prospecting shows encouraging results.

It is hoped that it may be possible to measure a complete section of the Kootenay formation on the escarpment at the northern edge of the map area.

Reconnaissance trips are planned for the area between Fernie and Michel, and also along Michel Creek valley. This will be done with the hope of locating a stripping project of greater size than the one now being opened up near Michel.

Some detailed mapping is contemplated in the vicinity of the Michel strip mine. This work will incorporate much new information revealed by stripping and prospecting operations in that area.

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Section of the Kootenay Formation (and uppermost Fernie Formation), North side of Coal Creek.

The following section was measured in two stages. The line along which the lower part of the section (upper Fernie and Cokato member of the Kootenay) is shown on the map as "S" - "T". The upper part of the section (Elk Conglomerate member) is located on the plan as "U" - "V". Points "T" and "U" are at approximately the same stratigraphic horizon - the base of a pebble conglomerate bed just above "B" seam. The strata are listed in ascending order. Description of parts of the section that were concealed have been obtained by comparison with a section measured at the same locality by James McEvoy in 1902. Mr. McEvoy's descriptions are indicated by placing them in brackets with quotation marks.

The underlying beds are shale, grey, sandy, calcareous, fossiliferous - Fernie shale.

Feet above base of Kootenay	Thickness in feet	
	35	Sandstone, fine-grained, calcareous. Alternating light and dark-coloured thin laminae, a few plant fragments. "Ribbon Sandstone" member of Fernie Formation.
	90	Sandstone, fine-grained, dark grey to brown, slightly calcareous, massive, rusty-weathering, cross-bedded in part, occasional plant fragments. "Upper Fernie sandstone".

Feet above base of Kootenay	Thickness in feet	
40	40	Sandstone, medium to coarse-grained, grey, non-calcareous. It is composed of subangular grains of grey to white quartzite, grey to black chert, and quartz, with a little magnetite, cemented by chalcedonic quartz. Some limonite occurs along fracture surfaces. Fragments of coal or carbonaceous material and irregular carbonized wood impressions are prevalent. A generally coarse salt and pepper sandstone - the "Basal Kootenay".
52	12	COAL, fairly clean. No.-1 Seam (Minus One)
100	48	Shale, black, carbonaceous at base, sandy at top.
150	50	Sandstone, medium-grained, hard, with carbonaceous laminae (cliff-forming).
175	25	Shale, black.
190	15	Shale, carbonaceous.
195	5	Coal and carbonaceous shale, thinly-banded.
220	25	Shale, black, sandy in part.
230	10	Coal, shaly in part. No. 0 Seam (old No. 11 mine).
297	67	("Shale, brown and black").

Feet above base of Kootenay	Thickness in feet	
317	20	Pebble conglomerate (coarse sandstone matrix), with some coarse-grained sandstone lenses. The conglomerate rests on an irregularly-eroded surface of the dark shale that represents an occasional unconformity.
322	5	Sandstone, coarse-grained, dark-coloured.
346	24	("Sandstone, hard, grey").
380	34	("Shale, brown and black").
400	20	Coal, No. 1 Seam, top 10 feet fairly clean, remainder somewhat shaly.
486½	86½	("Shale, brown and black").
490	3½	("Coal").
498	8	("Shale, brown and black").
525	27	Sandstone, medium-grained.
545	20	Sandstone, fine-grained, dark, shaly in part.
560	15	Sandstone, very fine-grained, dark, shaly.
585	25	Sandstone, coarse-grained, grading into granule conglomerate in part.
587	2	Shale, black, sandy.
589	2	Pebble conglomerate.
610	21	Sandstone, coarse-grained, with lenses of granule conglomerate.
630	20	Sandstone, fine-grained, thin-bedded.
647	17	Interbedded fine-grained sandstone and dark sandy shale, a few rusty-weathering ironstone concretions.

Feet above base of Kootenay	Thickness in feet	
650	3	Shale, black, carbonaceous in part.
675	25	Coal, No. 2 Seam, a few shaly bands near base.
681	6	Shale, carbonaceous.
685½	4½	Coal (upper part of No.2 Seam) hard, bright, clean.
734	48½	("Shale").
799	65	("Sandstone, grey, hard").
814	15	("Shale, brown and black").
841	27	("Sandstone, hard, grey").
861	20	Sandstone, coarse-grained.
880	19	Interbedded dark sandy shale and fine-grained, thin-bedded sandstone, with rusty-weathering ironstone concretions.
897	17	Sandstone, very fine-grained, dark.
905	8	Shale, black, sandy in part.
909½	4½	("Coal"), No. 3 Seam (thickness variable, up to 20 feet in places).
941	31½	Shale, black, carbonaceous in part, occasional thin streaks of coal.
949	8	Sandstone, fine-grained, shaly in part.
954	5	Sandstone, fine-grained, thin-bedded.
972	18	("Sandstone, shaly at top").
984½	12½	("Coal") No. 4 Seam.

Feet above base of Kootenay	Thickness in feet	
1044½	60	("Shale, brown and black").
1052	7½	("Coal, upper 4½ feet good").
1059	7	("Shale").
1120	61	Sandstone, fine-grained, dark, thin-bedded.
1140	20	Sandstone, coarse-grained, grey.
1157	17	Sandstone, very coarse-grained, with lenses of granule conglomerate (persistent cliff-forming bed).
1169	12	Sandstone, fine-grained, dark, thin-bedded.
1172	3	Shale, black, sandy in part.
1175	3	Sandstone, fine to medium-grained.
1215	40	Sandstone, coarse-grained, with lenses of granule conglomerate.
1240	25	Sandstone, fine-grained, shaly at top.
1258	18	Shale, black, carbonaceous, coaly in part. Numerous plant fragments.
1286	28	Sandstone, medium to coarse-grained, with occasional lenses of granule conglomerate.
1346	60	Sandstone, fine-grained, dark, thin-bedded (forms the crest of the ridge at top of Coal Creek Mountain).
1376	30	("Shale, brown and black").
1394	18	("Coal, dirty") No. 5 Seam (lower part).
1399	5	("Shale").
1410	11	("Coal, dirty") No. 5 Seam (upper part).

Feet above base of Kootenay	Thickness in feet	
1445	35	("Shale, brown and black").
1566	121	Shale, brown to black, carbonaceous in part.
1580	14	Shale, carbonaceous.
1582½	2½	("Coal"), No. 6 seam.
1624	41½	"Shale, brown to black".
1625	1	("Coal"), No. 7 seam.
1649½	24½	("Shale, brown and black")
1654	4½	("Coal"), No. 8 seam.
1672	18	("Shale, brown and black").
1717	45	Sandstone, fine-grained, rusty-weathering.
1735	18	("Sandstone, hard, grey").
1777	42	("Shale, brown and black, carbonaceous at top").
1785½	8½	Shale, carbonaceous.
1796	10½	Coal, No. 9 seam, shaly in part.
1819	23	Shale, black, carbonaceous in part.
1827	8	Coal, No. 10 seam, some shaly bands.
1919	92	Sandstone, coarse-grained.
1945	26	Sandstone, fine-grained, thin-bedded.
1991	46	Interbedded dark shale and very fine-grained sandstone.
1999	8	Coal, No. "B" seam, shaly in part.
2063	64	Shale, brown to black.

Feet above base of Kootenay	Thickness in feet	
		Top of "Cokato member" of Kootenay formation.

Feet above base of Kootenay	Thickness in feet	
2081	18	Pebble conglomerate, with occasional cobbles up to 5 inches in diameter. Base of "Elk Conglomerate" member of Kootenay formation.
2123	42	Sandstone, fine to medium-grained, cross-bedded in part.
2160	37	Interbedded and irregularly cross-bedded pebble conglomerate and coarse-grained sandstone (cross bedding makes angles up to 20° with the normal bedding planes).
2175	15	Sandstone, fine-grained, thin-bedded.
2189	14	Shale, dark, sandy in part, carbonaceous in part.
2194	5	Sandstone, fine-grained, concretionery, rusty-weathering.
2196	2	Sandstone, black, shaly.
2209	13	Partly concealed interval - consists of black shale, carbonaceous shale and occasional 1 to 2 foot coaly sections, occasional plant fragments.
2239	30	Sandstone, fine-grained, thin-bedded.
2245	6	Sandstone, fine-grained, with numerous [illegible] ferruginous nodules (Nodules are spherical, average 3/16" in diameter, and are composed of fine grained sandstone that carries up to 50% magnetite).

Feet above base of Kootenay	Thickness in feet	
2248	3	Shale, dark, sandy.
2250	2	Irregularly bedded pebble conglomerate and coarse grained sandstone.
2301	51	Concealed.
2303½	2½	Coal, shaly.
2306½	3	Sandstone, very fine-grained, shaly.
2308	1½	Coal, slightly shaly.
2309	1	Sandstone, fine-grained with spherical magnetite sandstone nodules averaging 1/8" in diameter, and a few ironstone concretions.
2325	16	Pebble conglomerate.
2355	30	Interbedded granule conglomerate and medium to coarse-grained sandstone.
2372	17	Pebble conglomerate.
2417	45	Sandstone, medium to coarse grained.
2417½	½	Coal.
2452	34½	Sandstone, medium to coarse-grained, light-coloured, with several 2 foot bands of pebble conglomerate.
2514	62	Sandstone, medium to coarse-grained.
2522	8	Shale, black, carbonaceous, a few plant fragments. (The shale is cut by a 2 inch vertical sandstone dyke that originated in the underlying sandstone).

Feet above base of Kootenay	Thickness in feet	
2524	2	Sandstone, fine-grained, shaly, rusty-weathering.
2527	3	Shale, black, carbonaceous, a few plant fragments.
2564	37	Pebble conglomerate with a few fine-grained sandstone bands.
2577	13	Sandstone, medium-grained.
2627	50	Partly concealed interval - short sections of carbonaceous shale and fine-grained sandstone.
2647	20	Sandstone, fine to medium-grained, dark-colored, rusty-weathering.
2692	45	Sandstone, fine to medium-grained.
3139	447	Concealed.
3219	80	Sandstone, fine to medium-grained, rusty-weathering.
3226	7	Pebble conglomerate, rusty-red-weathering.
3229	3	Sandstone, coarse grained.
3232½	3½	Pebble conglomerate.
3234	1½	Sandstone, fine-grained, light-coloured, with magnetite sandstone nodules (½" in diameter).
3237	3	Pebble conglomerate.
3252	15	Sandstone, medium-grained.
3304	52	Concealed. Talus is fine-grained sandstone and sandy shale.

Feet above base of Kootenay	Thickness in feet	
3321	17	Partly concealed. Short exposed sections are fine grained sandstone.
3326	5	Shale, black, carbonaceous, numerous plant remains.
3342	16	Pebble to cobble conglomerate (cobbles up to 5" in diameter).
3360	18	Interbedded very coarse-grained sandstone and granule conglomerate.
3400	40	Partly concealed interval. Fine-grained light-coloured sandstone at base grading upward into dark silty shale.
3408	8	Interbedded fine to medium-grained sandstone and granule conglomerate.
3424	16	Cobble conglomerate (very coarse sandstone matrix).
3439	15	Sandstone, fine-grained, dark-coloured, rusty-weathering.
3474	35	Sandstone, fine grained, grading into carbonaceous shale and a few inches of "needle" coal at top.
3489	15	Concealed, talus is sandy shale.
3513	24	Pebble conglomerate.
3533	20	Sandstone, fine-grained, dark-coloured.
3557	24	Pebble conglomerate, rusty-weathering.

Feet above base of Kootenay	Thickness in feet.	
3572	15	Sandstone, fine-grained, dark, shaly in part, with a few inches of "needle" coal.
3602	30	Sandstone, fine-grained, dark, thin-bedded (cross-bedded in part).
3608	6	Shale, dark grey to black, silty to sandy.
3658	50	Concealed interval. Talus suggests interval is mostly fine-grained sandstone.
3669	11	Pebble conglomerate.
3709	40	Sandstone, fine-grained, light-coloured.
3714	5	Pebble conglomerate.
3749	35	Concealed (Talus suggests fine-grained sandstone with magnetite sandstone nodules near the base).
3767	18	Partly concealed, a few exposures of fine-grained quartzose sandstone. Top of "Elk Conglomerate member" of Kootenay formation.

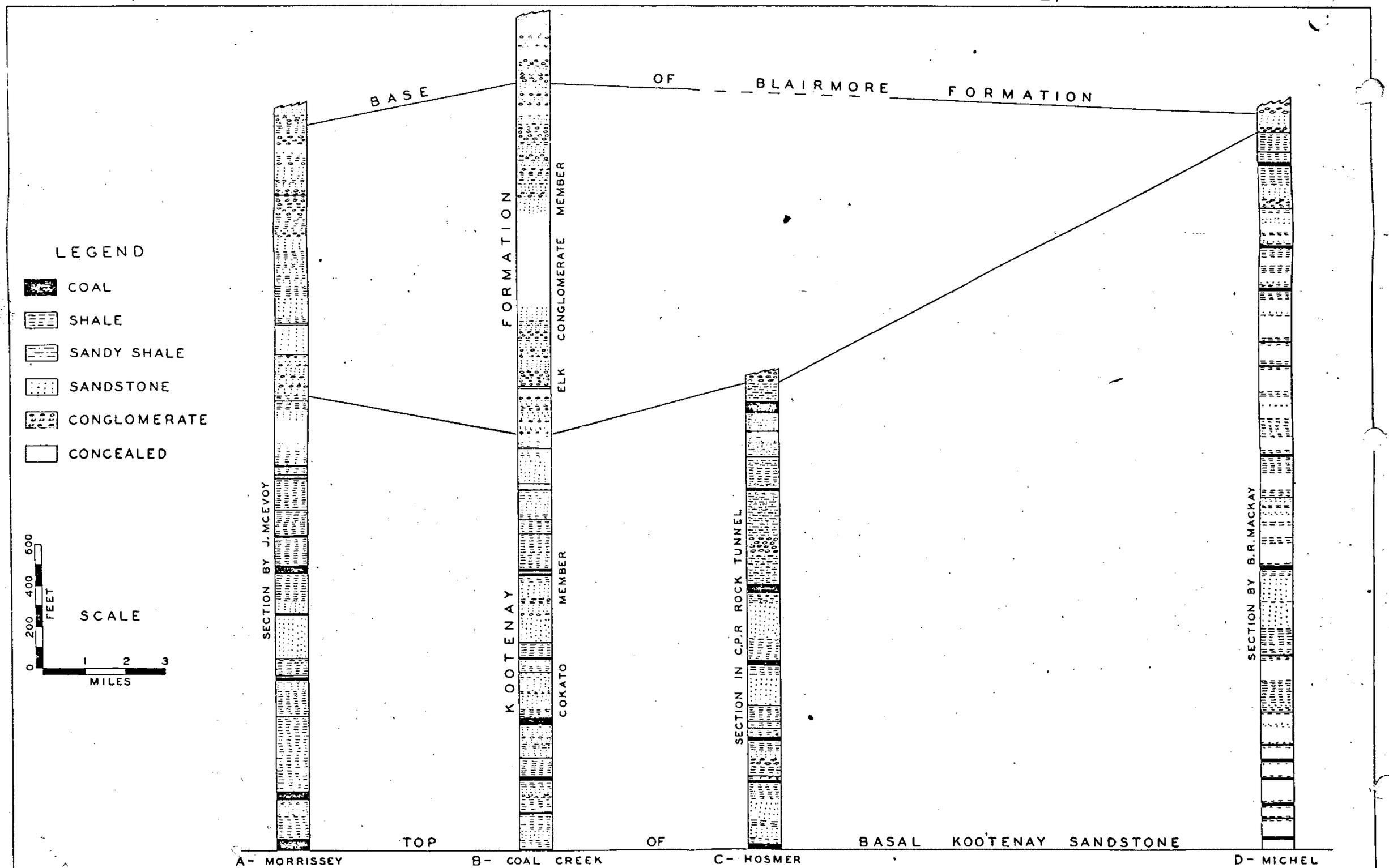
CBM
Jan '48

Section of lower part of the Blairmore Formation, North side of Coal Creek

The following section, in which the strata are listed in ascending order, represents an upward continuation of the "Elk Conglomerate" section. The line along which the section was measured is shown on the map as "V" - "W".

Feet above base of Formation	Thickness in feet	
44	44	Pebble conglomerate (cliff-forming) Base of Blairmore Formation.
84	40	Concealed. Talus is mostly fine-grained sandstone with a few feet of maroon and yellow shale near the top (typical Blairmore colours).
114	30	Pebble conglomerate (cliff-forming).
157	43	Concealed. A few feet of reddish shale observed in the talus.
165	8	Sandstone, fine-grained, light-coloured with numerous soft, silty nodules which weather to produce a boxwork structure.
167	2	Sandstone, medium to coarse-grained.
181	14	Granule conglomerate.
196	15	Sandstone, very fine-grained, light-coloured.
218	22	Concealed, talus is fine-grained sandstone.
228	10	Pebble conglomerate.
237	9	Sandstone, fine-grained, light-coloured.
240	3	Cobble conglomerate.

Feet above base of Formation	Thickness in feet	
245	5	Sandstone, medium-grained, with lenses of granule conglomerate.
277	32	Concealed. Talus is fine-grained sandstone.
297	20	Sandstone, fine-grained, light-coloured.
378	81	Sandstone, fine-grained, light-coloured, shaly in part, with occasional rusty-weathering concretions.
392	14	Sandstone, medium-grained, salt and pepper, cross-bedded in part.
431	39	Concealed. Talus is fine-grained sandstone.
445	14	Sandstone, medium-grained, salt and pepper, cross-bedded.
447	2	Sandstone, fine-grained.
543	96	Shale, pale green (purple-weathering) sandy in part.
585	42	Sandstone, fine-grained.
597	12	Sandstone, fine-grained, cross-bedded with magnetite sandstone nodules.
605	8	Pebble conglomerate.



CORRELATION OF KOOTENAY SECTIONS- CROWS NEST COAL BASIN.

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