State Department of Geology and Mineral Industries

702 Woodlark Building
Portland, Oregon

Report by: Ray C. Treasher
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Columbia County Coal — Columbia County

Coal was mined in Columbia County in the late 1800's and early 1900's, on Pebble Creek, south of Vernonia. Diller (96) reported on the coal indicating it was observed over an area several miles long and a mile or so wide. No coal has been mined in later years and outcrops and old workings are "lost" in the heavy underbrush. It will be necessary to "face up" outcrops and clean out old workings before the coal can be adequately sampled and measured.

A coal locality was sampled by Geer (Yancey & Geer 40) at Deer Island.

Previous Work Diller reported as follows (Diller 96):

UNITED STATES GEOLOGICAL SURVEY, SEVENTEENTH ANNUAL REPORT.
--pp.491-496

THE UPPER NEHALEM COAL FIELD

The Upper Nehalem coal field is in Columbia County, within the drainage of the upper portion of the Nehalem River. It extends northeast and southwest a total length of about 13 miles, and has a width of 1 to 2 miles. The coal of this field is exposed upon the forks of Pebble Creek, the east fork of the Nehalem, and the Clatskanie.

Beginning at the southwest end of the field, in sec. 34, T. 4 N., R. 4 W., there is a bed of coal which has been opened in the main fork of Pebble Creek near the county line. The pit, which once exposed the whole thickness of the bed, had been filled up by the stream, but I was informed by Mr. N. C. Adams, who prospected much of the coal in that region, that the bed is 4 feet 10 inches thick, including a parting of soft yellowish sandstone which measured 4 to 6 inches. At the time of our visit

only the upper 18 inches of the bed could be seen. On a fresh fracture the luster of this coal is brilliant, but soon becomes dull. It has a fine-banded structure parallel to the bedding, and upon exposure to changes of temperature and moisture fissures develop along these planes in the coal, but much of it does not slack. It contains a few nodules of pyrites, breaks readily into flattish pieces, and burns with a bright yellow flame. Analyses numbered 2 and 3 in the table given latter are of coal from this locality.

The coal lies between sandstones. In the gray sandstone above, Mr. F. M. Angerson, who assisted me in the examination of nearly all the coal fields, collected a few fossil shells and fish scales. The sandstone is occasionally hard, but not so firm throughout as to make timbering entirely unnecessary in mining the coal.

About 100 yards farther down Pebble Creek, upon the right bank above the stream, apparently the same coal crops out, showing that the strata dip gently eastward.

The best exposure of the coal seen in this field is upon the East Fork of Pebble Creek, in section 23, where the Great Northern Coal Company has opened several drifts along the croppings of the principal coal bed. From any elevated position affording a good general view of the upper portion of the Nehalem Valley, it may be seen that the streams all flow in canyons cut in the broad upland platform, which is almost a plain-- a peneplain. The general level of this peneplain bordering the canyon of the East Fork of Pebble Creek is from 1,250 to 1,340 feet above sea level. The canyon in section 23 has a depth of 420 feet, and the steep slopes of its lateral gulches afford some good exposures of the coal beds and associated sandstones.

Nearly midway down the western slope of the canyon, at an elevation of 1,050 feet, two small coal beds occur. The upper contains about 12 inches and the lower 14 inches of impure, dull platy coal. The beds are 10 feet apart, and both are inclosed in soft sandstone.

Fifty feet lower upon the side of the canyon, and a short distance farther up the stream, are three tunnels, run in a few years ago by the Great Northern Coal Company upon a bed of coal nearly 9 feet in thickness. The longest tunnel follows the bed about 100 feet, and affords a fine exposure of the coal. The coal is generally compact and fine-banded, splitting most readily parallel to the bedding. Near the bottom of the bed the woody structure of the lognite is well preserved. On a fresh fracture the luster is often brilliant, but, with the exception of occasional thin, irregular bands, it soon becomes dull-brown, and upon exposure falls to pieces more or less readily. It lies between beds of rather soft sandstone, which may in places be firm enough to support the roof without timbering. The coal dips gently to the southeast, and a large portion of it lies above drainage, so as to be economically mined. The canyon would afford an easy line for a railroad to the Nehalem River, along which the easiest grade for a railroad toward the coast could be obtained.

Eighty feet below the tunnel already mentioned, by a stream at the bottom of the canyon, another bed of coal crops out. It is from 6 to 8 feet in thickness, contains several sandstone partings, and is overlain by soft sandstone. The quality of the coal is much the same as that in the larger vein above. It has been prospected by the Great Northern Coal Company, but for only a few feet beneath the surface. This bed is inclined at an angle of about 10° in a direction between south and southeast.

About one-third of a mile northeast of this locality, in the next gulch, two beds of coal appear. The upper bed is about 10 feet in thickness, but is is impure below and contains two sandstone partings. Farther down in the same gulch is an 18 inch coal, and near it occur numerous fossils similar to those found in the same bed at the lower drift of the Great Northern Coal Company. They resemble the fossils which occur close to the coal in section 34.

Analyses 4, 5, and 6, in the table given later, are of the coal on the East Fork of Pebble Creek. The coals contain an unusually large percentage of ash and sulphur. Fearing that there was some mistake, these determinations were made again, with practically the same result.

The position of the strata on Pebble Creek and the East Fork of Pebble Creek suggests that the coal in section 34 is probably continuous with that in section 23. If so, it should crop out in the ravines in section 27 and the adjacent corners of sections 22 and 26. This view is supported by the fact that the Eocene fossils at the two localities are clearly related, and yet the striking differences inchemical composition tend to show that the beds are distinct.

The thickness of the beds is sufficient to suggest considerable lateral extension, and for this reason the same coal might be expected to appear upon the East Fork of the Nehalem River. In fact, two coal beds have been discovered upon one of the forks of that stream. Mr. A. H. Powell has prospected them in sec. 27, T. 5 N., R. 3 W. At this point the general elevation of the peneplain is about 2,200 feet, and the canyon is over 400 feet deep. The coal is about 5 feet in thickness, and lies between horizontal beds of sandstone. It is shaly, and, judging from its looks alone, appears to be inferior in quality to that of the East Fork of Pebble Creek.

Mr. Powell reports a bed of coal farther down the ravine, about 80 feet below the one just noted, and smaller beds farther up, but on account of landslides, the luxuriant undergrowth, and a large amount of fallen timber we were unable to find them.

Mr. Anderson collected a number of fossil shells near the coal, and it was then thought probable that the same bed continues from sec. 34, T. 4 N., R. 4 W. At this point the general elevation of the peneplain is about 2,200 feet, and the canyon is over 400 feet deep. According to Dr. Dall, the fossils do not support this view, for in section 34 the shells are apparently of Miocene age, while these of sections 34 and 23 are

Mr. Anderson collected a number of fossil shells near the coal, and it was then thought probable that the same bed continues from sec. 34, T. 4 N., R. 4 W. to sec. 27, T. 5 N., R.3W. a distance of nearer 10 miles. According to Dr. Dall, the fossils do not support this view, for in section 37 the shells are apparently of Miocene age, while these of sections 34 and 23 are unquestionably Eocene. So far as the writer is aware, no coal has yet been found on the main stream of the East Fork of the Nehalem, where it ought to be exposed if continuous, as suggested above. In that locality it would be more conveniently located for shipment to the main valley of the Nehalem and the coast.

Fragments of coal have been found on the Clatskanie, showing that the coal beds occur within its drainage. It is most probable that they outcrop near the head of the stream, where it is nearest the coal on the East Fork of the Nehalem.

The Upper Nehalem coal field, while it has a length of over 10 miles, is, as far as yet known, not over 2 miles in width, so that the whole area of the field is less than 20 square miles. Nevertheless, with two beds of coal, one 6 and the other 9 feet in thickness, it ought to yield a quantity of coal of commercial importance, if upon practical tests the coal is proved to be good enough to create a demand for it, and if facilities are provided for cheap transportation. At present the best outcrops are not reached by even a poor road.

About a ton of coal from the East Fork of Pebble Creek was packed out and sent to Portland, where it is said to have burned well in stoves, but, so far as the writer knows, its steam producing power has never been measured.

Coal Analyses from U.S.G.S. 17th Ann. Report, 1895-1896, pp505-505
J. S. Diller

No.	No.	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur	Physical Properties of coke
Upper Nehalem	2	11.16	42.82	41.64	4.38	4.32	Sooty, incoherent
	3	10.83	41.05	43.17	4.95	2.47	Partly brilliant
	4	10.03	43.40	29.98	16.59	3.69	and coherent
	5	12.23	42.47	34.29	11.01	3.19	Sooty, noncoherent
	6	10.07	44.52	32.18	13.23	3.97	Do
	7	9.75	32.25	50.50	7.50		Do
Pebble Cr.	8	9.53	42.73	42.29	5.45		
	9	9.00	37.83	45.17	8.00		
	10	19.75	33.20	42.59	4.73		

Upper Nehalem Coal Field, Columbia County

2.	Pebble Cr., sec. 34, T. 4 N., R. 4 W.	
3.	Do.	
4.	Do , East Fk.	Face at interior end of tunnel of Great Northern Coal Co.
5.	Do ,	SW¼ sec. 23, T. 4 N., R. 4 W., at bottom of canyon.
6.	Pebble Cr., East Fk.,	NW¼ sec. 23, T. 4 N., R. 4 W., at bottom of side ravine.
7.	Do	Face of tunnel of Great Northern Coal Co.mine. Published by the Co.
8.	Do	Face of tunnel of Great Northern Coal Co.mine. Published by the Co.
9.	Nehalem No. 1. Location?	Published by Great Northern Coal Company.
10.	Nehalem No. 2. Location?	Do

Yancey and Geer (40) reported as follows:

St. Helens Prospect

An abandoned prospect drift 4 miles north of St. Helens, Columbia County, in sec. 18, T. 5 N., R. 1 W., exposes an unnamed bed at an elevation of about 300 feet. The bed is of undetermined thickness and strikes N.-S. with a dip up to 5°W. The portion of the bed exposed in the drift was measured and sampled at a point 50 feet west of the portal by M. R. Geer and J. E. Morrison, September 16, 1939, as described below:

Section of unnamed bed in St. Helens prospect

Laboratory No.	B-43483	
Roof, undetermined[b]:	Ft.	in.
Clay, gray, soft		a 5
Coal		a 2-1/2
Clay, gray, soft		a 3
Coal		a 4-1/2
Clay, gray, soft		a 3
Coal		a 4
Clay, brown		a 4
Coal		a 1
Clay, gray, sandy		a10
Bone		a 5
Clay, gray, sandy		a 6-1/2
Bone, coal streaks	a 1	
Coal	1	
Bone		a 2
Floor, undetermined[b]		
Thickness in drift	7	1/2
Thickness in sample	1	

a Not included in sample.
b Neither the roof nor floor of the bed was exposed. The section measured is overlain by at least 12 feet of clay and coal.

Analyses of the coal show that.

	As Received	Moisture Free	Moisture & Ash Free
Ash	16.0%	22.7%	
B.t.u's	6690	9470	12259
Moisture	29.4%		

Recommendations: As no coal exposures are available,- as brush and timber are so dense that one can pass within a few feet of an outcrop without seeing it,- and as our schedule was very limited,- Irecommended to County Judge ~~Woods~~ Tarbell as Follows:

(1) Have the outcrops found, (also old workings), so we can get to them with a minimum expenditure of State Dept. personnel.

(2) Have the outcrops "faced up" so that the coal may be measured and sampled. If information is desired from old workings these should be opened, drained, and the coal vein made accessible for measurement and sampling. I feel it would be inadvisable right now to dig into fresh coal for a U. S. Bureau of Mines type of sample (25 ft. from a weathered surface).

(3) Optional: To open outcrops and workings to good bright coal for a U. S. Bureau of Mines type of sample.

(4) When (1) and (2) are done, I felt that our Dept. would be willing to return, cut samples and advise the County Court as to recommended action.

Comparative Cost of Wood and Coal.

Fire wood of almost any grade is selling for about $12 a cord in Aug. 1943. Coos Bay coal is selling for $9 delivered in North Bend. It is interesting to compare the cost per unit of

heat, the British thermal unit, abbreviated B.t.u. Figures on the B.t.u. value of wood are difficult to obtain. None could be found for fir, but as oak is classed as a better fuel wood, and figures for oak are available, they are used. The weight of a cord of dry old growth Douglas fir was obtained from a reliable coastwise trucking concern.

	B.t.u's per lb. dry (?)	Wt. per cord dry	B.t.u's per cord		¢ per B.t.u
Wood.	8316	2100 lbs.	17,463,000.	@ $12	0.0000681
Coal	9000(low grade)	per ton of 2000lbs.	18,000,000.	@ 9	0.0000500
Coal	9500(med.low gr.)	" "	19,000,000.	@ 9	0.0000482

In other words, very low grade coal at $9 a ton costs 73% as much as wood at $12, per unit of heat. Even if wood dropped to $9 a cord, coal would still be slightly cheaper.

On the basis of the above figures, heat could be supplied to Columbia County residents cheaper by means of Columbia County coal than it can by wood, under present conditions.

References:

Diller 96 Diller, J. S.; The upper Nehalem coal field: U.S.G.S. 17th. Ann. Rept. pp. 491-496

Yancey & Geer 40 Yancey, H. F.; and Geer, M. R.; Analyses and other properties of Oregon coals as related to their utilization: Oreg. State Dept. Geol.& Min. Ind., Bull. #20, pp. 17, 19-20, 1940.