

THE OLYMPIC COAL FIELDS OF WASHINGTON.

BY ALBERT B. REAGAN.

The Olympic Peninsula covers an area of about eight thousand square miles. It is approximately a right angle triangle in shape with its hypotenuse on the Pacific side. Its shorter limb faces the "Sound," the longer limb of the triangle faces the Strait of Juan de Fuca. This peninsula consists of a moderately benched area forming a coastal bench surrounding a high central area termed the Olympic Mountains which are situated somewhat southeast of the center of the peninsula. And from this high area there extends northwestward to Cape Flattery a gradual declining ridge. The most commonly heard-of places of the region are LaPush and Quillayute on the Pacific front and Neah Bay, Clallam Bay, Port Angeles, and Port Townsend on the Strait of Fuca side.

The region is much fissured and faulted and much of the strata are tipped at a high angle. The core of the Olympic Mountains is supposed to be pre-Cretaceous in age. The exposed rocks along the Strait of Fuca are Pleistocene and Tertiary. The Pleistocene is the Country rock from Port Townsend to Fresh Water Bay north of Port Angeles. Eocene rocks are exposed at Port Crescent, and from there northward to Cape Flattery and then down the Pacific front as far south as the Point of Arches, the exposed rock is Oligocene-Miocene. The Point of Arches appears to be pre-Cretaceous in age, as do also the rocks at Point Elizabeth, one hundred twenty miles further south, while the intervening coast exposures appear to be Cretaceous in age. The troughs of the Quillayute river and its tributaries are incised in Tertiary strata.

Coal is exposed in the Oligocene-Miocene from Pyscht to Clallam Bay on the Strait of Fuca, a distance of about eight miles. Coal is also found inland near Fresh Water Bay. Small stringers of coal are also exposed in the Hoko Canyon. Small seams of coal were also observed at Strawberry and Johnson Points and near Portage Head on the Pacific Coast. Coal is also found in the Quillayute trough. The three principal coal areas will receive special mention.

The Quillayute River Field. About two miles southeast of Mora P. O. on the east bank of the Quillayute River a coal seam runs in an east and

west direction with nearly a vertical dip. A thirty-foot tunnel was driven into this seam some years ago. The coal was found to be good quality of lignite, but the vein being less than a foot in thickness, the work was abandoned.

Another exposure in this field is near the Bogachiel river, about eight miles southwest of Forks P. O. Some years ago a company, said to be the Narrow Gauge Railroad Company, drove a thirty-foot tunnel into the exposed coal seam here. The coal was found to be a good quality of lignite, but as the vein was less than a foot in thickness, the work was abandoned. Below is an analysis of a specimen of coal from the headwaters of the Quilayute river, likely from the above tunnel:¹

| | |
|----------------------------------|------------------|
| Moisture..... | 5.10 per cent. |
| Volatile combustible matter..... | 39.15 per cent. |
| Fixed carbon..... | 47.01 per cent. |
| Ash..... | 7.77 per cent. |
| Sulphur..... | .97 per cent. |
| <hr/> | |
| Total..... | 100.00 per cent. |

The Fresh Water Bay Field. Drilling inland from the bay has exposed several seams of coal, some of workable size. The coal is in the Oligocene-Miocene formation. So far no development work has been done. Below is a drill record from a hole in a deep gulch in a broad synclinal trough about one mile south of the eastern end of Fresh Water Bay:

| | Feet. |
|--|------------------|
| Dark sandstone..... | 39 $\frac{2}{3}$ |
| Coal..... | $\frac{1}{3}$ |
| Gray sandstone..... | 24 |
| Soft white sandstone..... | 17 |
| Sandstone containing oyster shells..... | 10 |
| Sandstone containing green boulders..... | 10 |
| Sandstone..... | 40 |
| Fireclay..... | 20 |
| Gray sandstone..... | 40 |
| Hard blue shale..... | 30 |

¹Mines and Minerals of Washington. Ann. Report, First State Geological Survey pp. 15, 16, Olympia, 1891.

| | Feet. |
|---------------------|-------------------|
| Gray sandstone..... | 50 |
| Coal..... | 2 $\frac{1}{6}$ |
| Gray sandstone..... | 420 |
| Coal..... | 4 $\frac{2}{3}$ |
| | <hr/> |
| Total..... | 527 $\frac{5}{6}$ |

The Clallam Bay Field. This field lies in a synclinal trough between Pillar Point at Pyscht and Slip Point on Clallam Bay on the Strait of Fuca and extends inland about seven miles, but is interrupted on the east and south by sharp faults and is truncated at the north by the Strait of Fuca. The coal is in the Oligocene-Miocene formation. The formation here consists of six hundred feet of coarse, thick-bedded, massive sandstone, interbedded with an occasional bed of conglomerate. In it are also interbedded several workable seams of coal.

This field was discovered in the early 50's of last century. Of a specimen of coal obtained at Slip Point then, Prof. J. S. Newberry gave the following analysis:²

| | |
|----------------------|------------------|
| Fixed carbon..... | 46.40 per cent. |
| Volatile matter..... | 50.97 per cent. |
| Ash..... | 2.63 per cent. |
| | <hr/> |
| Total..... | 100.00 per cent. |

Later, in about 1865, a mine was opened up 2 $\frac{1}{2}$ miles east of Slip Point, known as the Thorndike Mine. At this place there were six leads of coal, ranging in thickness from one to three feet, all having a dip of ten degrees. The formation was sandstone and the coal seams were found to be from twelve to one hundred feet apart. The coal was one of the best coals found in the State of Washington. Mining at this time was continued till a fault cut off the veins, or they pinched out.

Coal is now being mined from other locations in the sea-front of the same field. The work is being done by the Clallam Bay Coal Company. Prospecting in 1904 discovered veins as follows: One seam exposed along the coast was forty inches in thickness, another eighty feet stratigraphically below this one was twelve inches in thickness, and another, a twenty-two

²Pacific Railroad Report, Vol. IV, Part II, p. 67.

inch seam, is about one hundred feet below this one. This was near Slip Point. Other seams have been discovered farther down the sea-cliff to the eastward of these.

A tunnel has been driven more than 600 feet along the line of the 40-inch seam near Slip Point. The mouth of this tunnel is on the beach, so that coal can be loaded right onto ships from it.

The coal of this mine breaks with a conchoidal fracture and shows extreme sharp edges. It is clean, hard, glossy black lignite, with small quantities of pyrite. This pyrite is often included in the coal in veinlets, but not in quantity to damage the coal. The coal leaves no clinkers. Until recently the output of this mine was said to be 200 tons per month. An analysis of a specimen of this coal gave the following:³

| | |
|----------------------------------|------------------|
| Moisture..... | 5.55 per cent. |
| Volatile combustible matter..... | 34.25 per cent. |
| Fixed carbon..... | 47.80 per cent. |
| Ash..... | 11.40 per cent. |
| | <hr/> |
| Total..... | 100.00 per cent. |

Thorough prospecting will likely disclose more and large coal seams.

³Analysis by Prof. N. W. Lord of the Department of Metallurgy and Mineralogy, Ohio State University, Columbus, Ohio.