REPORT ON PRINEVILLE AREA, OREGON

By

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The country adjacent to Prineville has been a subject of superficial investigation for a good many years with reference to the question of whether or not it may be an oil-producing region.

The country to the west for a long distance is largely covered by the Columbia basalt and andesite. Beginning almost at Prineville however, a sedimentary formation bearing fossils has been observed between the formations of igneous rocks. Starting from Prineville and following the Crooked River, basaltic cliffs are encountered for many miles, but about forty miles from Prineville by the Crooked River road formations of sedimentary and metamorphic rocks appear. The sandstone, however, from weathering closely resembles at a distance the basaltic rocks and must be determined by closer examination. Beginning at about this point stratified rocks in the form of shale and sandstone predominate and at a few miles beyond a fault cuts through the formation and may be observed close by the road, showing a beautifully polished face known as slickenside. A short distance beyond this fault a line of igneous rocks may be observed cutting across the country in a general easterly and westerly direction. These igneous formations are surrounded by the sedimentary rocks which in some places are highly metamorphosed but at other locations appear to have undergone no change and probably have only been slightly domed. It is adjacent to these igneous necks that the gilsonite is found. This when observed is seen to be only disseminated through the rock and some specimens are little more than existing in any quantity similar to the deposits in Utah and other places. In other words, they have simply been formed by the presence of igneous intrusions and have served to seal this end of the field. It will be apparent, then, that the western end of this field is doubly sealed, first by the fault just referred to and, secondly by the hardened asphaltum or gilsonite.

Passing beyond this section of the country for the next forty miles, the formations are largely sedimentary rocks, sandstones and shales, with many fossil beds and locally capped by small layers of basalt known as out-layers, the remnant of the old flows originating in the igneous necks referred to above. Beyond this, in the country east of Paulina there is every evidence of one of the most perfect oil formations and structures in the nature of long, gentle anticlines and extensive domes that can be found in any place in this country. Plenty of fossil beds in the lower Tertiary or Eocene and great beds of Cretaceous fossils with probably a few Jurassic have been observed. It is well known that half of the oil of the world has been obtained from these same formations, the lower Tertiary and Cretaceous, and these formations must be found and considerable quantity in the western section of the U. S. to justify the hope of producing oil fields. The structures are so unbroken, the anticlines being very smooth and undulating and the domes of the same nature, that seepages would not be expected in this region.

However, some distance from the locality described, an excellent seepage has been observed, and the presence of strong bubbles of gas, and at one or two other locations on the edge of the field considerable seepages have been reported. From

the geological formation and the structures, no oil field in the world could be predicted with greater certainty until actual producing wells have been brought in. The extent of the field also places it as probably one of the very greatest in the whole country.

The conditions at the lower end of the field in the vicinity of the igneous necks already described closely approximate the conditions known at the famous oil fields of Tampico, Mexico. The central and upper portion of the field bears a close resemblance to the Bakersfield, California field and a great many other producing fields of the country.

In outlining the plan of operation it would seem advisable to drill first about a mile distant, where a dome is located, from the igneous necks and in the immediate vicinity of where the gilsonite is formed. Several wells should be started in the vicinity of Paulina along one of the great anticlines before referred to and also on the side of the most prominent dome. In order to carry out this work it is recommended that some form of portable rig which would at the same time drill a standard hole be employed and the conditions for this seem to be met by the Okell heavy rig known as Type K, which is capable of the depth of 3,000 feet.

An important point to any geologist examining the country in the vicinity of Paulina is to remember that what appears to be basaltic cliffs and other formations over which the road passes are only what we may call tuffaceous agglomerate which have been formed evidently at the close of the Miocene period or later from the ash thrown out by the line of volcanoes along the Cascade Range. This being compacted by atmospheric or other agencies has produced the very light or tuffaceous formation. In this conglomerate may be found quartz pebbles and other evidence of the old beach or shore line while surrounding it the country is composed of sedimentary rock rich in fossils. In other words, this formation has no effect on the conditions of the oil field whatsoever, being entirely superficial, but it has led to serious errors in the reports concerning this country by previous geologists. It may have resulted in the neglect of this great and most promising oil field during past years.

The above brief report corresponds closely with the deductions and observations made in this field by the well-known mining engineer and oil geologist, D. O. Kidder, who has mapped the region and has spent considerable time there.

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