State Department of Geology and Mineral Industries

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Portland 1, Oregon

GEOLOGY OF THE ROSEDALE CHURCH AREA MARION COUNTY, OREGON

Introduction

This report was prepared at the request of Mr. E. T. Pierce, Clerk, Oregon State Land Board, in his letter dated November 27, 1957.

The purpose of this report is to present the State Land Board with information concerning the possible occurrence of economic minerals including oil and gas underlying the property described below.

Summary

Although previous work by this Department (Corcoran and Libbey, 1956)* indicated that bauxite would likely be found on the subject property, one hole drilled for the purpose of this report to a depth of 12 feet failed to encounter any. This could mean that either the bauxite horizon has been removed by erosion or it occurs more than 12 feet below the surface. The presence of gibbsite nodules in the topsoil suggests that the bauxite horizon has been stripped by erosion.

One drill hole does not conclusively prove or disprove the presence of bauxite for the entire property under examination. The findings from hole no. 22 drilled to the north of the property suggest that a few tons of ore might occur in the northwest corner of lot no. 20, and along the very western edge of the property.

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*See references at end of this report.

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To obtain more precise data it is recommended that at least three holes be drilled to a depth of about 30 feet.

No other mineral materials of economic importance are believed to be present.

Area investigated

Legal description: The subject property is described as follows: lots 20 and 21 of Sunnyside Fruit Farm No. 8, which property is located in secs. 22 and 27, T. 8 S., R. 3 W., in Marion County, Oregon.

Topography: The area known as the Rosedale Church district, a part of the Salem Hills, has a gentle rolling topography with elevations ranging from about 800 feet to 400 feet. The subject property ranges from 695 feet to a low of about 620 feet. The average slope is about 200 feet per mile.

Previous work

The Salem Hills were geologically mapped by Thayer (1939) as part of a larger study which included the Santiam River basin. The Salem quadrangle was mapped by Mundorff (1939). Ferruginous bauxite in the area was described by the State of Oregon Department of Geology and Mineral Industries in Bulletin 29 (Libbey, et al, 1945), which was published in 1945. The most complete and detailed work devoted to laterization of the basalt in the Salem Hills was made by Corcoran and Libbey and published by this Department in 1956 as Bulletin 46 (Corcoran and Libbey, 1956). This publication has no doubt stimulated the interest which has been shown by the various aluminum companies in the bauxite, especially the Harvey Aluminum Company.

Geology

Stratigraphy: The Salem Hills are underlain at depth by the Eugene formation which is composed of a series of marine-deposited tuffs, sandstones, and conglomerates of Oligocene age. These rocks

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are exposed along the western and southern slopes of the Salem Hills. The steep slopes and landslides in that area are the result of erosion of these relatively soft sediments by the Willamette River. The Eugene formation is overlain by a thick section of Miocene lava flows named the Columbia River basalt. Except for the western and southern slopes, the bedrock of the Salem Hills is entirely Columbia River basalt or its laterized equivalent. On some areas a dark-red silty clay exists between the topsoil and the bauxite or the Columbia River basalt. The clay ranges in thickness from 4 to 10 feet and appears to thicken northward (Corcoran and Libbey, 1956). This is believed to represent residual material from the Fern Ridge tuffs, or material possibly equivalent in age to the Portland hills silt.

Structure: The Eugene formation dips northeast at about 10 degrees while the overlying Columbia River basalt dips 2 to 3 degrees to the northeast, indicating an angular disconformity of 7 to 8 degrees. Folding and erosion and probably some faulting occurred between deposition of the Eugene formation and the Columbia River basalt. Several faults in the Columbia River basalt have been observed and others undoubtedly exist.

Possible economic minerals of the property

Oil and gas: In 1935 the Steiwer Hill area just south of the Salem Hills was drilled to a depth of 2,845 feet by the Portland Gas and Coke Company. No favorable indications were found. Since that time several of the major oil companies have examined the Willamette Valley area but their findings were not sufficient to promote a drilling program. Although a series of deep tests may some day prove otherwise, the present opinion is that the occurrence of oil or gas in commercial quantities is remote.

Uranium: Uranium has been discovered at the western edge of the Salem Hills near Roberts in an outcrop of the Eugene formation. The mineral is not believed to occur in commercial quantities. In the Rosedale Church area, the Eugene formation is buried by about 400 feet of lava, and uranium probably could never be located or mined if it were present.

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Bauxite: According to present usage, the term "laterite" refers to de-silicated rock in which the alkalies and alkaline earths have also been removed by leaching. The other mineral constituents of the original rock remain; in the Salem Hills these minerals are iron, titanium, and aluminum oxides (Corcoran and Libbey, 1956). During the process of laterization, the following alterations occur in sequence. First, fresh basalt alters to weathered basalt, then to kaolinite clay, and finally to bauxite (Sherman, 1952). Laterites therefore must pass through the intermediates or clay stage (high silica) before bauxite can form. Mechanical erosion must remain at a minimum during and following laterization if a bauxite deposit is to form.

The occurrence of bauxitic laterite in this area is controlled by topography. The ground surface at the time bauxite was formed was quite level. Subsequent folding and faulting, together with uneven erosion, have made its distribution very irregular. Previous investigations (see enclosures) by the Department did not point to delineating occurrences of bauxite on specific properties but for a picture of its general distribution. Property tonnage estimates will depend upon close (maximum of 200 feet between holes) drilling.

Examination of the property

In order to determine the presence of bauxite on the property a surface examination was made which revealed the presence of gibbsite nodules (high-grade aluminum ore). This material sometimes occurs on the surface of a bauxite horizon. Results of the investigations published in Bulletin 46 indicated that the area was located favorably for the occurrence of bauxite and that hole no. 22 (see enclosures) drilled just north of the property penetrated ore. Hole no. 1 (see enclosures) drilled about a quarter of a mile to the south also indicated ore and it was decided to drill one hole (no. 28) on the property for the purpose of this investigation and to verify the presence of ore. This test hole was drilled to a depth of only 12 feet because of the high water table and the caving nature of the clay. Analysis of the samples from hole no. 28 failed to show bauxite (see differential thermal analyses).

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Conclusions

Although the results from one test hole drilled on the property should not be considered as conclusive it is doubtful whether much ore will be found. The presence of gibbsite nodules in the topsoil underlain by a high-silica clay instead of bauxite indicates that the bauxite horizon has either been removed and the gibbsite has remained as float, or both the bauxite and gibbsite were removed by erosion and the present gibbsite has been transported from the bauxite area a few hundred yards upslope.

It is our opinion that if bauxite occurs on the subject property it can amount to only a few tons which will possibly be found in the northwest corner of lot 20 and along the very western edge of the property.

Recommendations

It is recommended that the services of the State Highway Department truck-mounted continuous flight auger be rented if possible, and that one day be used to drill three holes to a depth of about 30 feet, and that samples from these holes be analyzed. Although continuous flight augers are not entirely satisfactory, their results would be sufficient to indicate the presence of ore.

Bibliography

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Libbey, F. W., Lowry, W. D., and Mason, R. S., 1945, Ferruginous bauxite deposits in northwestern Oregon: Oregon Dept. Geology and Min. Ind. Bull. 29.

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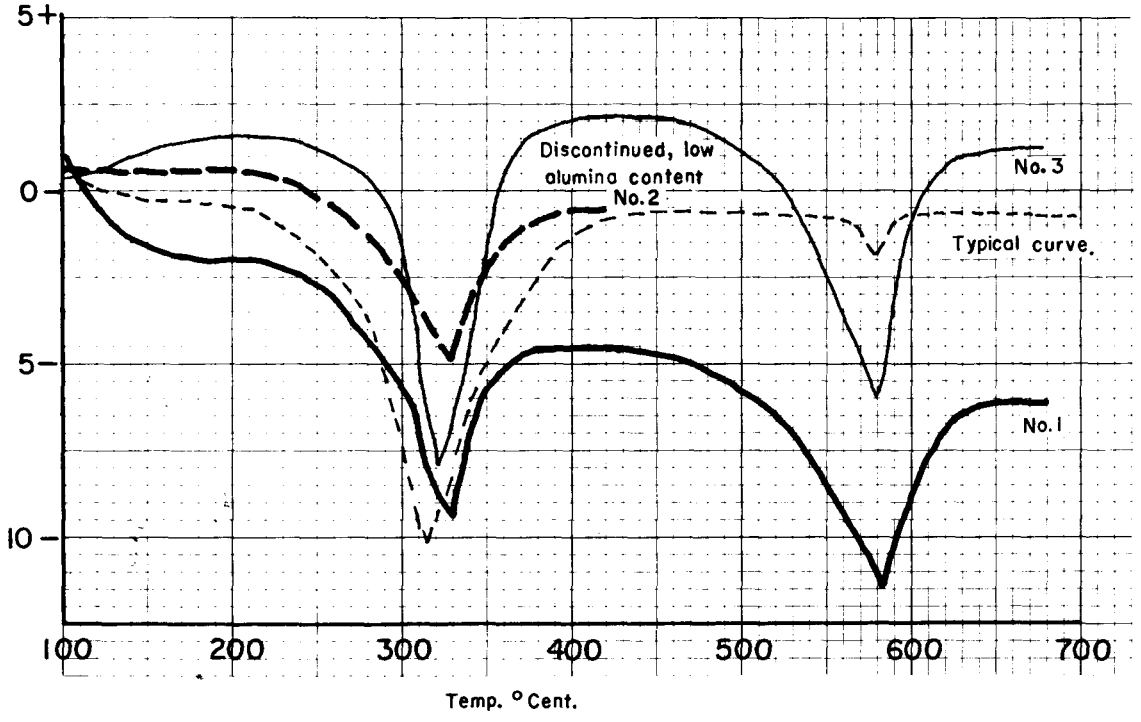
DIFFERENTIAL THERMAL ANALYSES OF SAMPLES FROM DEPARTMENT TEST HOLE NO. 28 1/7/58



EXPLANATION

Sample No. 1 ——————

Sample No. 2 – – – – –

Sample No. 3 ——————

Typical Bauxite Curve – – – – – –

Differential thermal analysis is a method of identifying and approximating the percentages of certain substances having endothermic or exothermic reactions. Each of the clay and bauxite minerals shows a characteristic endothermic reaction (absorption of heat). Gibbsite (aluminum hydroxide) shows a strong endothermic peak at 310° to 330° C., while kaolin (clay) shows a moderate endothermic reaction at 530° to 580° C.

The material in the Salem Hills grades from clay to bauxite: thus, differential thermal analysis provides a rapid approximation of the silica and alumina content.

The above curves indicate high silica and therefore not bauxite. This material occurs below the bauxite and above weathered basalt. A typical bauxite curve is shown for comparison.

LOG OF HOLE NO. 28