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The ORE BIN
Volume 40, No. 10
October 1978

PRELIMINARY NOTE ON THE LATE PLEISTOCENE GEOMORPHOLOGY AND ARCHAEOLOGY OF THE HARNEY BASIN, OREGON

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Department of Anthropology, Portland State University
Portland, Oregon

The geology and water resources of the Harney Basin (Figure 1) in southeastern Oregon have been studied by Russell (1903, 1905), Waring (1909), Piper and others (1939), Walker and Swanson (1968), and others. The most detailed and definitive work is that of Piper and his team of investigators from the U.S. Geological Survey, who worked in the Basin from 1930 to 1932. They recognized a prominent abandoned beach ridge along Harney Lake at an elevation of 1,249.7 m (4,100 ft) and commented: "No higher shore features are known to exist in the central area of the Harney Basin, although most other desert basins in eastern Oregon have prominent shore features at least 100 ft higher than their playas" (Piper and others, 1939, p. 14).

These writers left unresolved the question as to whether pluvial Lake Malheur had ever reached and overflowed the basalt dam, estimated to be 1,254 m (4,114 ft) high, across Malheur Gap. On the basis of the native fish fauna in the Harney Basin, Hubbs and Miller (1948) concluded that there had been a direct connection with the Columbia via the South Fork of the Malheur River and the Snake River.

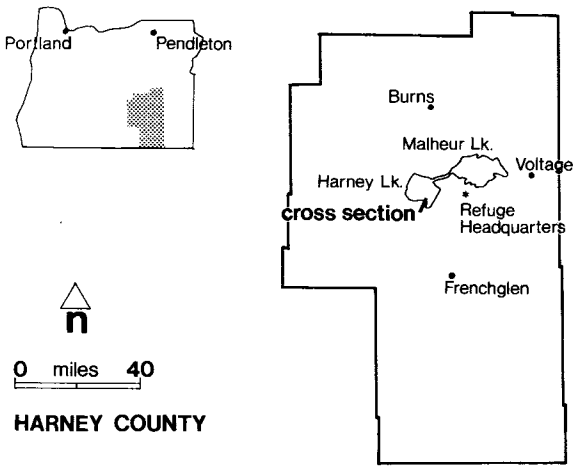

Figure 1. Map showing location of Harney Lake. See cross section, page 168.

Probably because their primary concern was with other matters, all of the previous investigators apparently failed to notice two clear wave-cut terraces,

Figure 2. Wave-cut terrace on northwest side of butte adjacent to Malheur National Wildlife Refuge Headquarters. Elevation of terrace is 1,255 m (4,118 ft).

each at an elevation of about 1,255 m (4,118 ft), which corresponds acceptably well with the elevation of the spillway across the Voltage lava flow, which blocked Malheur Gap. One terrace is on the northwest side of the low butte adjacent to the Malheur National Wildlife Refuge headquarters (Figure 2); the other, located mainly in sec. 24, T. 27 S., R. 29-1/2 E., contains a deposit of fossil shoreline molluscs that, by augering, were found up to an elevation of 1,255.1 m (4,111.7 ft). Ninety-eight percent or more of this population is comprised of a snail tentatively identified as *Lymnea utahensis*. Minority species include another snail tentatively identified as *Parapapolyx effusa*.

In 1975, two artifacts were found in the wall of a drainage ditch running roughly parallel to the terrace in sec. 34. The ditch is nearly 1,600 m (5,250 ft) long and averages 2 to 3 m (7 to 10 ft) in depth. The provenance of the artifacts was questionable, but for several reasons it seemed worthwhile to search for a possible early site. Later finds, both on and below pluvial lake gravels, have proved the presence of man in the Basin before the end of the pluvial period.

Along with the artifacts, the gravels in the ditch wall have preserved an excellent record of three pluvial lake stillstands. Two of these have been dated, as has the terrace, from carbon-14 determinations on fossil snails. Because measurements on outer fractions of samples indicated significant contamination with younger carbon in even the younger samples, ages were determined from the inner fractions of samples.

Figure 3 shows locations of the wave-cut terrace and various beach ridges at the southern part of Harney Lake. The oldest beach ridge (1), at 1,251.1 m (4,107.7 ft), has a preliminary date of about 32,000 B.P. (USGS-459). The mollusc population there is essentially reversed from that on the terrace, being 98 percent or greater *Parapapolyx effusa*, with the Lymnaeids being a minority species. This ridge is covered with younger gravels culminating in a shoreline (2) at 1,252.1 m (4,107.9 ft), now dated at approximately 9,600 B.P. (USGS-460). The lake bottom associated with this shoreline is covered with a prominent deposit of fossil Lymnaeid snails similar to those on the terrace. This line of tiny molluscs can be traced for almost 700 m (2,300 ft) in the side of the ditch. Two new species, tentatively identified as *Lymnea palustris* and *Helisoma anceps*, are plentiful in the last 100 m (300 ft) before the beach ridge. Their presence suggests a marshy ecozone that may have been seasonally dry.

A younger, undated shoreline (3) overlies the preceding one at an elevation of 1,253.4 m (4,112.2 ft). Artifacts have been found in almost unquestionable primary context both on the gravel surface of this deposit and immediately underlying it. The stratigraphically lower artifact appears to be a punch-struck obsidian blade, a tool little known in Oregon but fairly common in a surface site which overlies part of this beach ridge by about 1 m (3 ft) (Dumond, 1962).

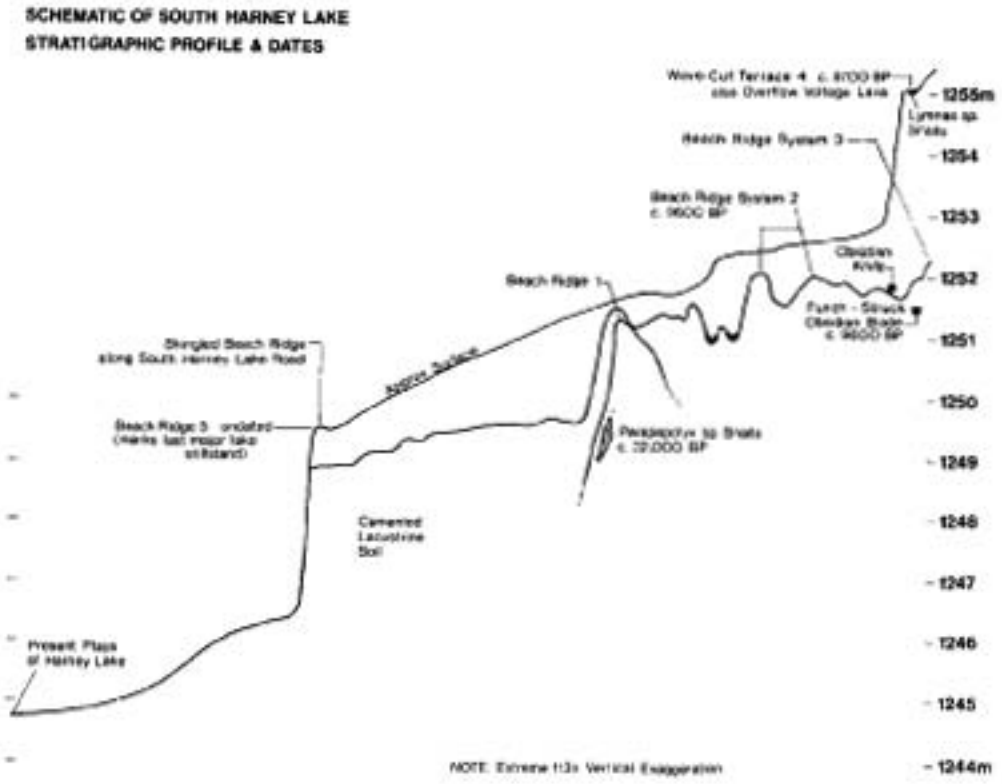

Figure 3. Cross section of southern part of Harney Lake showing elevations and ages of wave-cut terrace and beach ridges.

The previously discussed terrace (4) at 1,255 m (4,118 ft) is the youngest dated feature, with a shell radiocarbon age of 8,700 B.P. (USGS-461). It is unusual, if not unique in the Great Basin, for the highest shore feature to be among the youngest in the sequence.

Finally, the presently undated beach ridge (5), at 1,249.7 m (4,100 ft) seems to represent the final stillstand of pluvial Lake Malheur before drier conditions apparently rapidly reduced the huge Pleistocene lake to the present series of playas and marshes.

Two surface sites in the area, one on the terrace by the ditch and the other over the highest beach ridge, were clearly occupied when the lake level was at or just below the overflow point of the Basin. Dates approaching 8,700 B.P. can be inferred for these sites. Both sites have been heavily potted, but enough artifacts have been found to suggest a Cascade point-crescent-blade tool complex. Many of the Cascade points show basal grinding.

It is now apparent that the Voltage lava flow, which dammed the Basin, is not of the "very recent" age suggested by all earlier Basin investigators. Based on the shell dates, it must have occurred more than 32,000 years ago.

These observations should all be considered to be preliminary in nature and subject to later reinterpretation or change. They are presented now for any possible value they might have to other Great Basin investigators.

Particular thanks are given to Stephen Robinson and the U.S. Geological Survey for generous and speedy help on radiocarbon dating of the mollusc shells. Robert Herrmann of the Weyerhaeuser Company is also thanked for the tentative mollusc identification.

References

Dumond, D.E., 1962, Blades and cores in Oregon: American Antiquity, v. 27, no. 3, p. 419-424.

Hubbs, C.L., and Miller, R.R., 1948, The zoological evidence, *in* The Great Basin, with emphasis on glacial and postglacial times: Bulletin of the University of Utah, v. 38, no. 20, p. 17-166.

Piper, A.M., Robinson, T.W., Jr., and Park, C.F., Jr., 1939, Geology and ground-water resources of the Harney Basin, Oregon: U.S. Geological Survey Water-Supply Paper 841, 189 p.

Russell, I.C., 1903, Geology of southwestern Idaho and southeastern Oregon: U.S. Geological Survey Bulletin 217, 80 p.

_____ 1905, Preliminary report on the geology and water resources of central Oregon: U.S. Geological Survey Bulletin 252, 138 p.

Walker, G.W., and Swanson, D.A., 1968, Summary report on the geology and mineral resources of the Harney Lake and Malheur Lake areas of the Malheur National Wildlife Refuge, north-central Harney County, Oregon: U.S. Geological Survey Bulletin 1260-L, 17 p.

Waring, G.A,, 1909, Geology and water resources of the Harney Basin Region, Oregon: U.S. Geological Survey Water-Supply Paper 231, 93 p.

* * * * *

BLM TO OFFER GEOTHERMAL LEASES

The U.S. Bureau of Land Management is planning to offer geothermal leases in four parts of Oregon this fall. The lands fall within locations classified as Known Geothermal Resource Areas (KGRA's), so leases must be bid for. Sites and tentative sale dates are:

Alvord KGRA - Tps. 32-37 S., Rs. 33-36 E., W.B. and M., Harney County; October 19, 1978

Breitenbush KGRA - Tps. 8,9 S., R. 7 E, W.B. and M., Clackamas and Marion Counties; October 19, 1978

Belknap-Foley Springs - T. 16 S., R. 6 E., W.B. and M., Lane County; September 27, 1978 (new date to be set)

Carey Hot Springs - T. 16 S., Rs. 6,7 E., W.B. and M., Clackamas County; February 13, 1978 (new date to be set)

For more specific information write to the Oregon State Office of the U.S. Bureau of Land Management, 729 N.E. Oregon Street, P.O. Box 2965, Portland, Oregon 97208.

* * * * *

USGS TO REPRINT MINERAL RESTRICTIONS MAP

The U.S. Geological Survey is planning on reprinting a map,"Federal Lands Subject to Mineral Restrictions," which essentially shows that all public lands in the West currently have mineral entry restrictions. Because the map shows the Department of the Interior's recognition that all public lands do have mineral restrictions, it is important that legislators see the map before making decisions on public land minerals issues.

* * * * *

SURFACE MINE REGS PUBLISHED

A draft of surface mining regulations required by Public Law 95-87, the Surface Mining Control and Reclamation Act of 1977, has been published by the Office of Surface Mining, U.S. Department of the Interior. The proposed regulations are considered to be controversial by the mining industry.

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57.	LUNAR GEOLOGICAL FIELD CONFERENCE GUIDE BOOK, 1965, Peterson and Groh, eds. [Used by International Lunar Geological Field Conference for official field trips in Bend and Crater Lake areas, August 1965. 51 p., 34 photos, and maps.]	$ 3.50___
77.	GEOLOGIC FIELD TRIPS IN NORTHERN OREGON AND SOUTHERN WASHINGTON, 1973. (GSA guide book.) [Descriptions, with many illus. and maps, of seven field trips covering central Oreg., western Oreg., the Columbia River, Columbia River Gorge, the Portland area, and the lava caves of Mt. St. Helens. 206 p., 3 figs. in pocket.]	$ 5.00___
87.	ENVIRONMENTAL GEOLOGY OF WESTERN COOS AND DOUGLAS COUNTIES, OREGON, 1975, Beaulieu and Hughes. [Discusses geography, engineering geology, mineral resources, geologic hazards, and geology of estuaries. 148 p., 16 separate geology and geologic hazards maps in color.]	$ 9.00___
88.	GEOLOGY AND MINERAL RESOURCES OF THE UPPER CHETCO DRAINAGE AREA, OREGON (INCLUDING THE KALMIOPSIS WILDERNESS AND BIG CRAGGIES BOTANICAL AREAS), 1975, Ramp. [Covers topography, climate, and vegetation; geology; hist. of mining activity; metallic mineral resources; and industrial minerals. 47 p., plus geology and mineral deposits maps.]	$ 4.50___
89.	GEOLOGY AND MINERAL RESOURCES OF DESCHUTES COUNTY, OREGON, 1976, Peterson, Groh, Taylor, and Stensland. [Descriptions of geologic units, geologic structure, geothermal resources, and nonmetallic minerals. 66 p., 60 figs., 4 geologic and mineral location maps.]	$ 6.50___
90.	LAND USE GEOLOGY OF WESTERN CURRY COUNTY, OREGON, 1977, Beaulieu. [Covers geography, engineering geology, tectonic setting, mineral resources, geologic hazards, and geology of cities. 148 p., 45 illus., 12 geology and geologic hazards maps.]	$ 9.00___

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Bulletins (continued)

91. GEOLOGIC HAZARDS OF PARTS OF NORTHERN HOOD RIVER, WASCO, AND SHERMAN COUNTIES, OREGON, 1977, Beaulieu. $ 8.00____
[Discusses geography, geologic units, and geologic hazards. 95 p., 51 figs., 11 separate geology and geologic hazards maps.]

92. FOSSILS IN OREGON, 1977, Margaret L. Steere, ed. $ 4.00____
[Collection of 22 articles reprinted from The ORE BIN. Categories comprise fossil plants, fossil animals, and fossil localities. Paleontological time chart included. 227 p., many figs.]

93. GEOLOGY, MINERAL RESOURCES, AND ROCK MATERIAL OF CURRY COUNTY, OREGON, 1977, Ramp, Schlicker, and Gray. $ 7.00____
[Subtopics include geography, geology, rock material resources, metallic mineral resources, nonmetallic mineral resources, and mineral fuels. 79 p., 12 figs., 9 tables, 3 maps.] (Companion to Bull. 90.)

94. LAND USE GEOLOGY OF CENTRAL JACKSON COUNTY, OREGON, 1977, Beaulieu and Hughes. $ 9.00____
[Covers geography, geologic units, engineering properties of geologic units, mineral resources, and geologic hazards. Glossary included. 87 p., 29 figs., 15 tables, 5 geologic maps, and 5 geologic hazards maps.]

95. NORTH AMERICAN OPHIOLITES, 1977, Coleman and Irwin, eds. $ 7.00____
[13 papers from field excursions and seminars of 1977 sponsored by the International Geological Correlation Program. 183 p., index map of North America, and 5 geologic maps.]

96. MAGMA GENESIS, 1977, H.J.B. Dick, ed. $12.50____
[Proceedings of the American Geophysical Union Chapman Conference on Partial Melting of the Earth's Upper Mantle. Aid to geologic mapping and to assessment of mineral wealth in magmatic terrain. 13 papers. 311 p., many illus.]

97. BIBLIOGRAPHY OF THE GEOLOGY AND MINERAL RESOURCES OF OREGON, SIXTH SUPPLEMENT, 1978, C.P. Hulick, ed. $ 3.00____
[Compiled by GeoRef, American Geological Institute computer data base service. Comprises 1,400 entries including titles from 150 serials and has subject, county, and rock-unit indexes. 74 p.]

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Open-File Reports

O-76-4 STREAM SEDIMENT GEOCHEMISTRY, NORTHEASTERN OREGON, 1976. $25.00____
[Analyses of stream sediments in 33 quadrangles for copper, lead, zinc, nickel, and mercury. 48 p., 33 topog. maps.]

O-78-4 GEOTHERMAL GRADIENT DATA, 1978, Hull, Blackwell, and Black. $ 5.00____
[Data collected between December 1976 and December 1977. Tables and graphs with measurements in metric and English units. 187 p., map of well locations.]

Other Publications

Misc. Paper No. 4 RULES, REGULATIONS AND LAWS RELATING TO EXPLORATION AND DEVELOPMENT OF OIL AND NATURAL GAS IN OREGON, 1977.
[Pt. 1. Oil and gas. Text p. 1-18 plus copy of ORS Chap. 520.] $ 1.00____
[Pt. 2. Geothermal. Text p. 19-34 plus copy of ORS Chap. 522.] $ 1.00____

Misc. Paper No. 19 GEOTHERMAL EXPLORATION STUDIES IN OREGON, 1977, Bowen, Blackwell, and Hull. $ 3.00____
[Identifies seven areas of anomalously high heat flow. 50 p., 17 figs., 10 tables, and well location map.]

Oil and Gas Invest. 5 PROSPECTS FOR NATURAL GAS PRODUCTION AND UNDERGROUND STORAGE OF PIPELINE GAS IN THE UPPER NEHALEM RIVER BASIN, COLUMBIA-CLATSOP COUNTIES, OREGON, 1976, Newton and Van Atta. $ 5.00____
[56 p. with geologic map in pocket.]

Short Paper 27 ROCK MATERIAL RESOURCES OF BENTON COUNTY, OREGON, 1978, Schlicker, Gray, and Bela. $ 4.00____
[Concise data to aid planners and contractors. 45 p., 16 figs., 10 tables, and rock material location and geology map.]

GMS-7 GEOLOGIC MAP OF THE OREGON PART OF THE BAKER 1° BY 2° QUADRANGLE, 1976, Brooks, McIntyre, and Walker: cartography by S.R. Renoud. $ 3.00____
[Color map with geologic time chart and stratigraphic cross sections. Scale 1:250,000.]

USGS Map I-902 GEOLOGIC MAP OF OREGON EAST OF THE 121ST MERIDIAN, 1977, G.W. Walker. $ 3.75____
[2 sheets, each 42 by 44 in; scale 1:500,000 (1 in = about 8 mi).]

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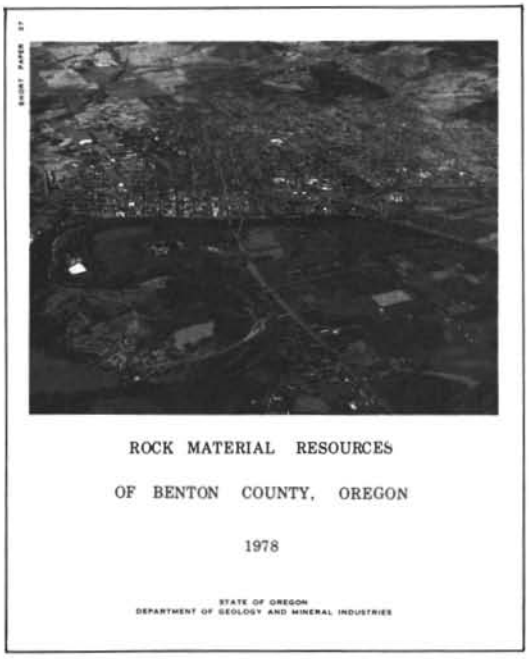
BENTON COUNTY ROCK MATERIAL RESOURCES STUDY PUBLISHED

The Department has just released Short Paper 27, entitled "Rock Material Resources of Benton County, Oregon." The 47-page study discusses future demand, planning, mining, reclamation, and geology of the rock material resources of Benton County. Included are 16 figures, 10 tables, and a geology and quarry site map for the County. By linking rock resources with a geologic map, the report becomes a useful predictive tool for planning purposes, enabling the planner to address the complex issues surrounding the rock resources industry.

This publication, which is available at Department offices, sells for $4.00.

Purpose of This Study

Benton County's population is expected to continue to expand in the future as a result of increased light industrial development brought about by available manpower; availability of land and electric power; and favorable aesthetic, cultural, and climatic conditions. While creating an increasing need for construction aggregate, this growth may simultaneously restrict the use of existing sources of aggregate by zoning, encroachment of incompatible development, and loss of rock material deposits when structures are built over them. With proper planning, however, a continued supply of these important rock material resources will be available in a manner most compatible with the environment and long-range land use plans.



The purpose of the study was to develop concise data on the rock material of Benton County in a form which could be submitted to potential users or developers of these resources and which could be used as a data base for land use ordinances in compliance with ORS 215.055. Oregon law ORS 215.055 and Land Conservation and Development Commission (LCDC) Goal 5, Topic B, formally direct the County to take the processing of mineral aggregates into consideration in the adoption of any land use ordinance. Data on the locations of sand and gravel

pits, clay pits, and rock quarries; past production; the quantity and quality of material available; and the future requirements for these products are needed before land use ordinances are passed. This study, financed by the Oregon Department of Geology and Mineral Industries and Benton County through a grant from the Land Conservation and Development Commission, provides the above data along with broad parameters for secondary and tertiary land uses after mining. The data presented in this report will be used by planners and public officials for making land use plans and decisions and also by contractors looking for rock materials for construction projects.

Recommendations from Short Paper 27

The study provides a strong mineral resource data base and a geologic map for use of the County Planning and Public Works Departments, County and State road and highway departments, private contractors, and private citizens.

Included in the text are an inventory of current mineral resource availability and a forecast of future demands, which will help to focus the County's needs. The report also stresses the necessity of planning for secondary usage and reclamation of surface mining sites in order to eliminate adverse environmental effects often associated with surface mining.

The study recommends that the land status of all active and potential mining sites, particularly those near urban areas, should be determined in terms of present use and zoning classification and that all future changes in status should consider the mineral resource potential of each parcel. County zoning of land which excludes mineral resource development has the effect of preventing any future production and reduces the available natural resource, thus affecting resource availability projections.

It is also recommended that the County encourage mined land reclamation on all surface mining sites within its boundaries. By working closely with State agencies and by reviewing all reclamation plans, the County also may have significant input into the State program.

* * * * *

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Everyone is welcome to share personal opinions with us. Why not go a step further and include a note with your order (see centerfold) telling us what you'd like to read about in the ORE BIN?

MOBIL OIL DRILLING AT OAKLAND

Mobil Oil Corporation began drilling on a deep test hole near the town of Oakland in Douglas County on July 10, 1978. If drilled to the proposed depth of 14,000 ft, the exploration hole, called "Sutherlin Unit No. 1," will be the deepest hole put down in the State.

Not only is Mobil's wildcat the deepest in Oregon, its collection of oil and gas leases is the largest ever assembled in the State. The firm reportedly has under lease or option approximately 1 million acres. Superlatives extend also to the equipment being used to drill the hole; Brinkerhoff's (the drilling contractor) Rig No. 53 is the largest to drill in Oregon and has a capability of 20,000 ft.

The Sutherlin Unit No. 1 will explore lower Eocene sedimentary and volcanic rock units as well as older rocks underlying the Eocene units. The nature of the rocks at 14,000 ft is a subject of controversy among geologists. Will they consist of Mesozoic marine sediments or will they be oceanic basalts? Mobil geologists hope that their Sutherlin Unit No. 1 will find natural gas in large quantities at depth on the Oakland anticline.

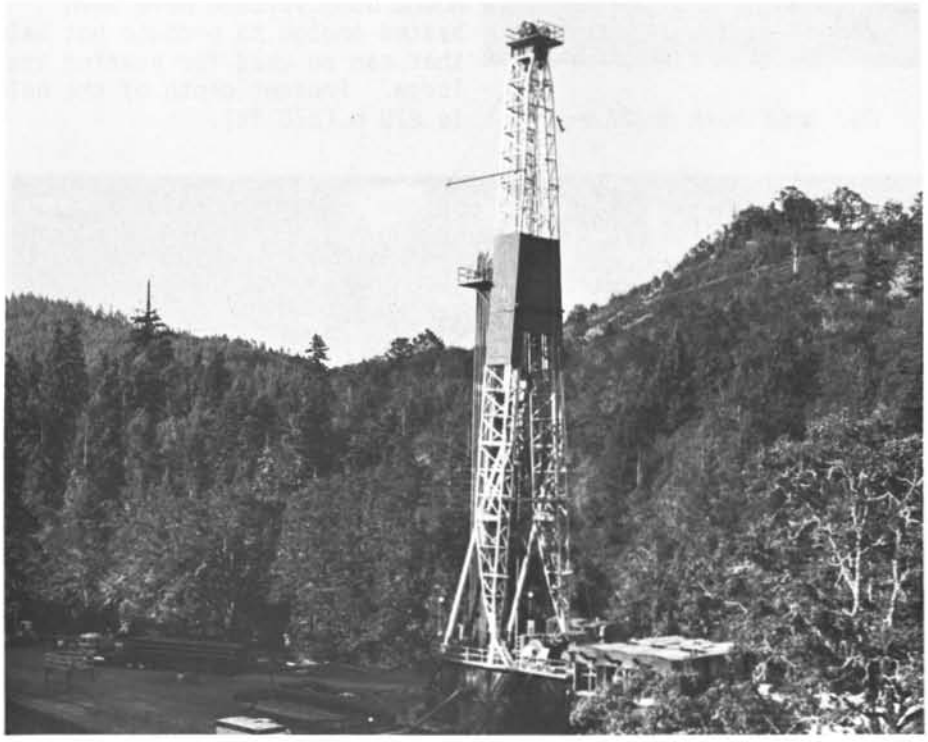
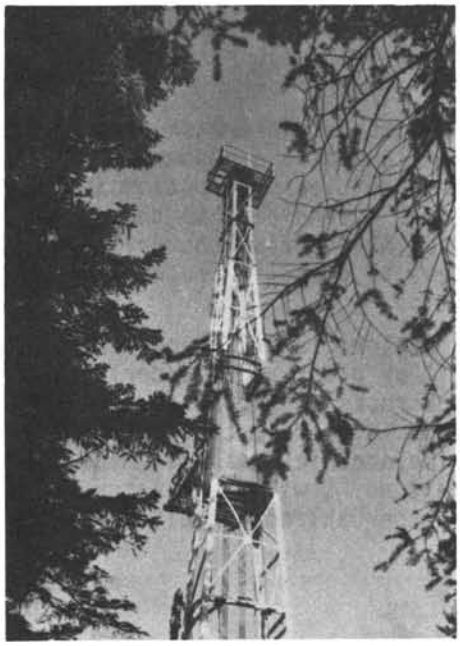


Photo courtesy Black Star, Doug Wilson, photographer

MOUNT HOOD GEOTHERMAL DRILLING PROGRAM CONTINUES



Old Maid Flat drill rig.

The Old Maid Flat geothermal test hole was deepened from 564 m (1,850 ft) to 1,220 m (4,003 ft) during July and August 1978. The preliminary bottom hole temperature of about 175°F may be high enough to make Northwest Natural Gas Company's proposed heating project feasible if a large enough supply of ground water of that temperature can be found. Results of the Old Maid Flat drilling are still being evaluated to guide future exploration.

A second geothermal test hole was started near Timberline Lodge in August. Plans are to drill to a depth of 600 m (2,000 ft) to see if rocks on the flanks of Mount Hood Volcano have been heated enough to produce hot water that can be used for heating the lodge. Present depth of the hole is 270 m (870 ft).

John Hook (left), Northwest Natural Gas, and Joe Riccio, Oregon Department of Geology and Mineral Industries, discussing results at Old Maid Flat.

Bill Covert (left), Northwest Natural Gas, and Joe Riccio, Oregon Department of Geology and Mineral Industries, conferring about drilling at Timberline Lodge.

Drilling below parking lot at Timberline Lodge.

OREGON 1977 MINERAL DATA SUMMARIZED

"Minerals in the Economy of Oregon," prepared under a cooperative agreement between the Bureau of Mines and the Oregon Department of Geology and Mineral Industries and published as SMP-21, may be obtained free upon request from the Publications Distribution Branch, Bureau of Mines, 4800 Forbes Avenue, Pittsburgh, Pennsylvania 15213.

The 14-page report contains tables summarizing Oregon's 1977 mineral production statistics; role in U.S. mineral supply; income from mineral bonuses, royalties, and rentals; and land ownership and mineral production. The report discusses the general mineral situation in Oregon, noting the construction of a new cement plant at Durkee, planned expansion of chlorine production in the Portland Rivergate district, and the reopening of small gold mines near Granite and Prairie City in eastern Oregon. The effects of regional energy problems and the implications of large withdrawals of land from mineral exploration and development are also considered in this report.

SMP-21 also contains a bibliography and 2-page map showing general locations of mineral deposits, geothermal wells, and mineral processing plants.

* * * * *

$IGN OF THE TIME$

Some 45 years ago a popular song advised, "Potatoes are cheaper; tomatoes are cheaper; now's the time to fall in love." Today's ditty, less lilting, has many variations. The DOGAMI version is, "Well, paper costs more now; and postage costs more now; ORE BIN prices must go up."

Beginning January 1, 1979, we will charge $4.00 for annual subscriptions and $10.00 for 3-year subscriptions. Each year the Department has had to spend more for supplies and printing to produce the ORE BIN without sacrificing quality. And that's not all. Changes in second-class rates are not timed or patterned to correspond with the raises in first-class postage. Between May and August 1978 alone, the cost of mailing the ORE BIN rose 29.9 percent!

Looking on the bright side, those who order before January 1 will enjoy the current rates. Use the coupons in the centerfold of this ORE BIN. Your order may be new, a renewal, or an extension of a current subscription, as long as DOGAMI has received it by January 1.

Another bright thought: On the drawing boards right now are plans for renovating the ORE BIN format. Readers may look forward to refreshing and welcome changes in '79. Be sure you and your friends will receive the hallmark January 1979 issue.

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