OCTOBER 1977
VOLUME 39, NO. 10

THE ORE BIN

SUBSCRIPTION RENEWAL ISSUE

SUBSCRIPTION EXPIRATION DATE ON BACK COVER

STATE OF OREGON

DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

The Ore Bin

Published Monthly By

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland, Oregon 97201
Telephone: [503] 229-5580

FIELD OFFICES
2033 First Street Baker 97814
521 N.E. "E" Street Grants Pass 97526

Subscription Rates

1 year, $3.00; 3 years, $8.00
Available back issues, $.25 at counter, $.35 mailed
Second class postage paid at Portland, Oregon

State of Oregon
Department of Geology
and Mineral Industries
1069 State Office Bldg.
Portland, Oregon 97201

The ORE BIN
Volume 39, No. 10
October 1977

THE AGE OF LAVA BUTTE

Lawrence A. Chitwood*, Robert A. Jensen**, and Edward A. Groh***

Lava Butte and its jagged black fields of lava, located 10 mi (16 km) south of Bend along U.S. Highway 97, have been major scenic and geologic attractions since at least 1900 (Figure 1). Public interest in the natural history of Lava Butte and the vast volcanic and glacial panorama seen from its summit led the U.S. Forest Service to construct Lava Lands Visitors Center near the base of the butte. Dedicated in September 1975, the center hosted 163,000 visitors in 1976.

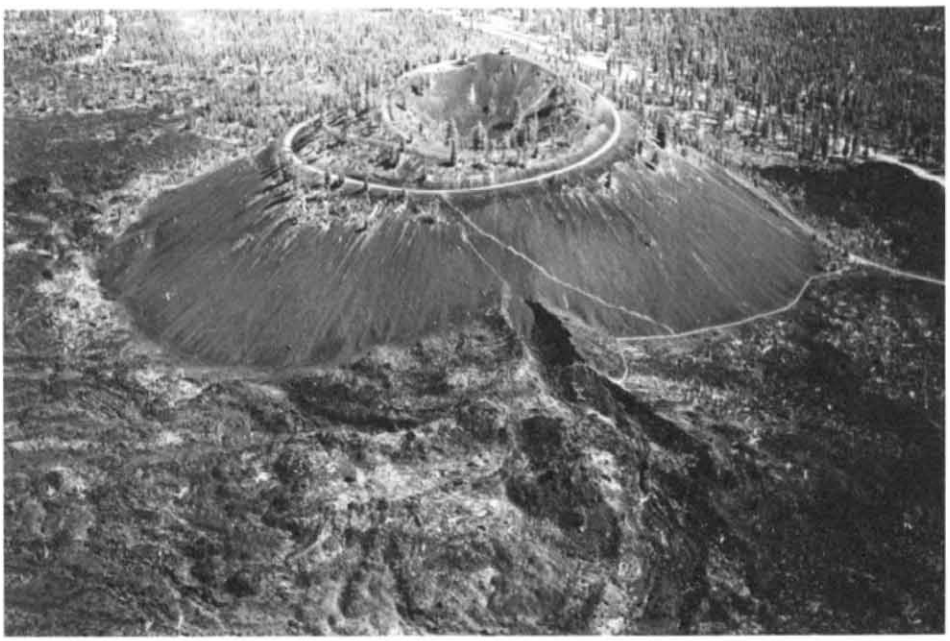


Figure 1. Lava Butte, a 500-foot-high (152 m) cinder cone.

* Geologist, Deschutes National Forest, Bend, Oregon
** Civil Engineering Technician, Deschutes National Forest, Bend, Oregon
*** Private Geologist, Bend, Oregon

The 500-ft-high (152 m) butte is actually a classic basaltic cinder cone. A paved road spirals to the top, where, from the rim of the deep crater, much of the 9.5 sq mi (25 km^2) of rugged lava that poured from the south flank of the cinder cone can be seen. Trails leading from the Lava Lands Visitors Center below pass over the fresh-looking, clinkery, basaltic lava. A small observation center that for many years served as an interpretive center at the top is capped by a U.S. Forest Service fire lookout.

Lava Butte and its associated lava flows and plume deposit erupted from the northwest end of the Northwest Rift Zone, a narrow zone of discontinuous faults and deep fractures that cut the northwest flank of the 500-sq-mi (1,300 km^2) Newberry Volcano (Figure 2). Numerous other recent lava flows and cinder cones also erupted from these fractures (Peterson and Groh, 1969).

For decades Lava Butte has hidden its age from both visitors to the area and geologists. The nearly barren surface of the lava appears starkly younger than other volcanic features nearby, even to the casual observer. Indeed, some visitors wonder if the rocks are still hot. Adventuresome people at the turn of the century may have been enticed to visit Lava Butte by this early description: "The whole surface of the lava beds looks as if the fire were smouldering beneath, and one can scarcely content one's self to remain alone in the solitude of this ruin" (An Illustrated History of Central Oregon, 1905). While the impression of a semi-demonic "ruin" lingers in the minds of many who visit Lava Butte even today, a less fearful but more provocative history lies hidden in these rocks.

Israel Russell was the first geologist to estimate a minimum age of Lava Butte; in 1905 he wrote, "The presence of pines on Lava Butte, and the occurrence of both living and dead trees on the lava flow that escaped from it, furnish evidence that the activity of the volcano ceased at least a hundred and probably more than a hundred and fifty years ago."

Howel Williams wrote in 1957, "The youngest of these [cinder cones and lava flows] are almost surely less than 1,000 years old; among them are the flows that poured from Lava Butte. . . . and those that poured through forests on the northwest flank of Newberry Volcano . . . ."

The first radiocarbon age (Lava Cast Forest Flow, 6,150±120 years B.P.[1]) of the very young-looking lava that poured from the Northwest Rift Zone astonished geologists so much that they asked the laboratory that had determined the date to check its figures. Peterson and Groh (1969) wrote, "We were rather surprised to find that such fresh-looking rocks were this old, but several other radiocarbon dates obtained later confirmed this age."

The surface of the lava from Lava Butte appears fresher than nearly all other nearby recent flows along the Northwest Rift Zone.

[1]Before present.

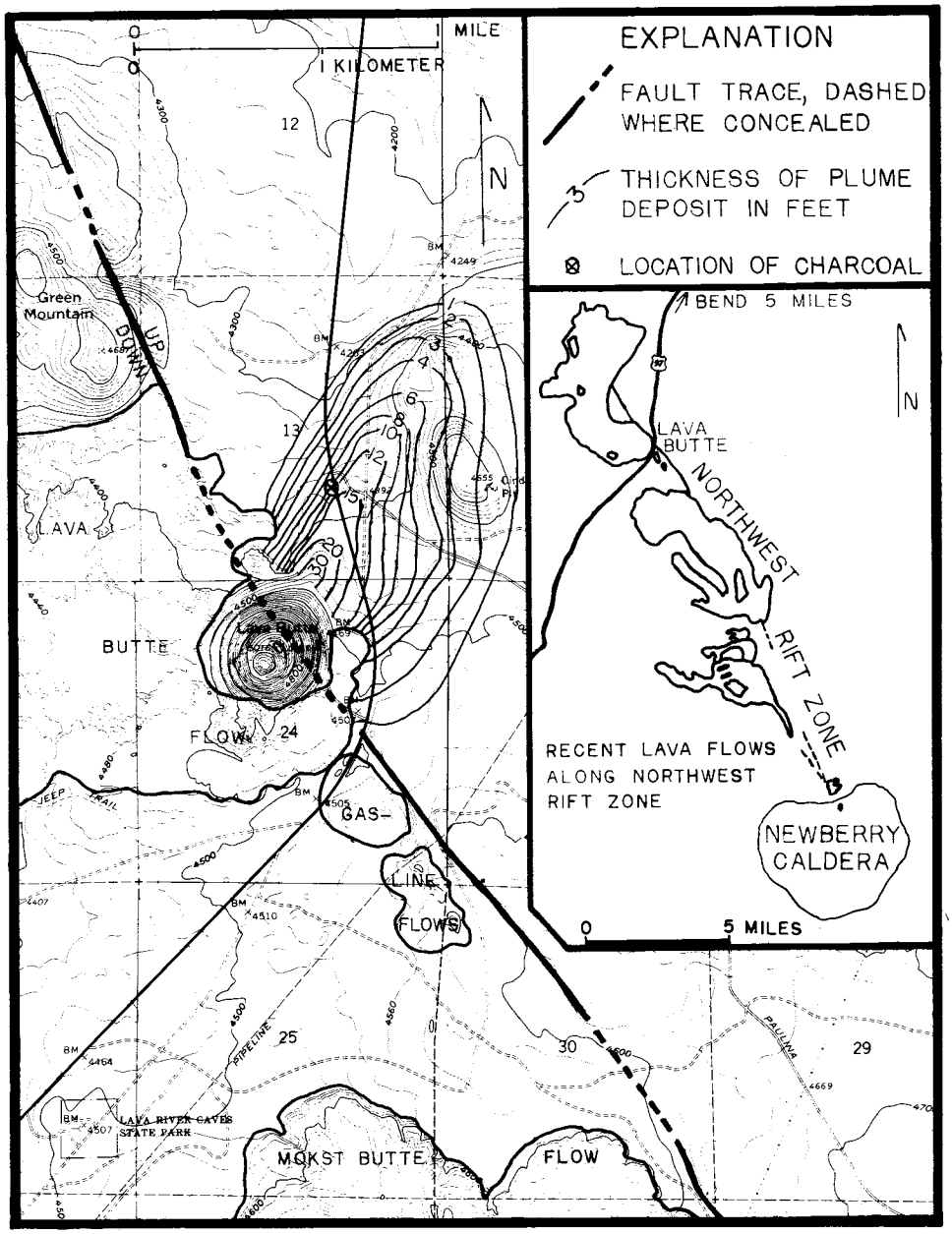


Figure 2. Lava Butte and several other young cinder cones and lava flows that were formed at different times by eruptions along the Northwest Rift Zone. During the eruption that formed Lava Butte, three types of volcanic deposits were created: a cinder cone, formed when cinders fell out of cinder-filled eruption clouds into a great pile to form Lava Butte; a plume deposit, formed when a southwest wind blew smaller cinders to the northeast; and lava flows.

Although all of those that have been dated have radiocarbon ages of about 6,000 years B.P., for a decade Lava Butte has been thought to be only about 2,000 years old because of its fresh-appearing lava.

Lava Butte is known to be younger than the Gas-Line Flows (Figure 2), named for a nearby natural-gas pipeline, because volcanic ash from the eruption that built Lava Butte lies on these flows. The radiocarbon age of the Gas-Line Flows is 6,150±65 years B.P. (USGS-80)[2]. This date supersedes the date reported by Peterson and Groh (1969).

During the last few months, 14 geologists who are familiar with Lava Butte and its geological setting were informally polled for their opinions on its age. Estimates ranged from 1,800 to 5,650 years, and the average of all the age estimates was 4,060 years.

Until recently, the search for wood suitable for radiocarbon dating has been discouraging. In this environment, wood must be carbonized[3] to be preserved; otherwise, bacterial action or rodent activity will destroy it over a long period of time. Lava molds of splintered trees have occasionally been found along the edges of lava flows, but none have contained carbonized wood. Presumably the first lava flows invaded a forest and toppled, buried, or burned virtually every tree they encountered. Then, to make the search even more difficult, additional lava flowed over some of the first flows.

Fortunately, during the eruption that formed Lava Butte, a southwest wind winnowed[4] small-sized ejecta from cinder-filled eruption clouds and carried them northeastward, forming a plume. Small cinders (lapilli) and volcanic ash rained from this plume and fell to earth, forming an ash-plume deposit (Figure 2) that extends northeastward from the base of Lava Butte for about 1 mi (1.6 km) and covers an area of at least 0.7 sq mi (1.8 km^2). The approximate bulk volumes and proportions of each of the three volcanic deposits formed by the Lava Butte eruption are (1) the plume deposit, 130 million cu ft (3.7 million cu m), 1 percent; (2) the cinder cone, 1 billion cu ft (30 million cu m), 9 percent; and (3) the lava flows, 10 billion cu ft (300 million cu m), 90 percent.

Groh suggested that the ash-plume deposit might be the best place to find carbonized wood because the ash and cinders might have retained enough heat when they fell to earth to carbonize roots growing in the ground. We therefore dug 50 holes with hand shovels to search for wood and also to determine the shape and thickness of the deposit.

[2]Sample reference number used by the Branch of Isotope Geology, U.S. Geological Survey, Menlo Park, California.

[3]Reduced to carbon by being subjected to intense heat in an enclosed space.

[4]Selectively removed fine particles by wind action, leaving the coarser material behind.

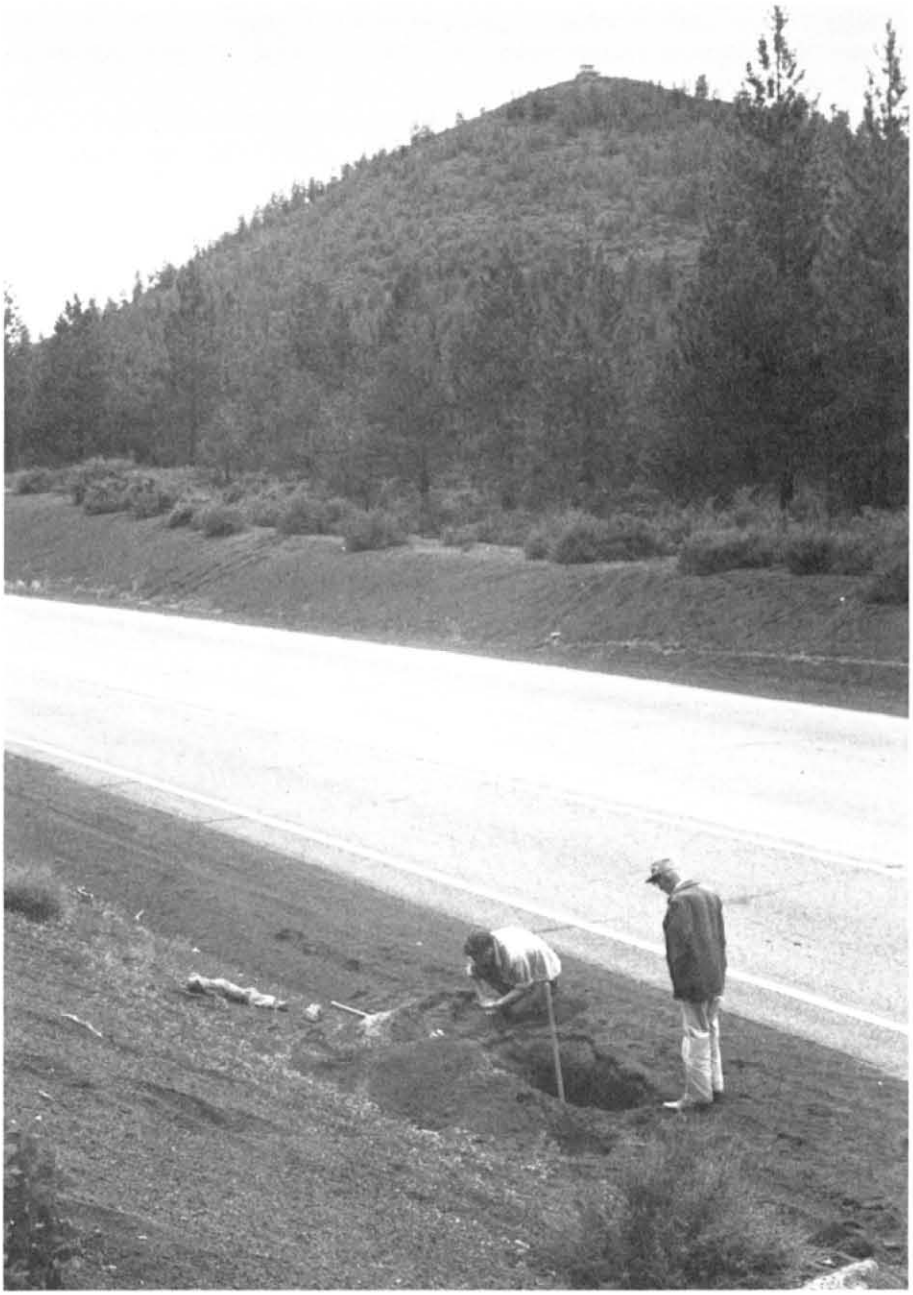


Figure 3. Location along U.S. Highway 97 north of Lava Butte (in background) where carbonized roots used to determine the age of Lava Butte were found about 2 ft (0.6 m) below the level of the road.

Carbonized wood was finally found in August 1976 within the Mazama pumice that underlies the cindery plume deposit (Figures 3 and 4).

The carbonized wood appeared to be from small roots a few millimeters in diameter that had been carbonized by residual heat from the plume deposit. The Mazama pumice is 21 in thick (53 cm), but the carbonized roots within it were found only in the upper 6 in (15 cm). The pumice blanketed much of the Pacific Northwest 6,600 years ago during extraordinarily violent eruptions of Mount Mazama, which now holds Crater Lake (Williams, 1942; Wilcox, 1965).

The radiocarbon age of the carbonized wood, and thus Lava Butte and its associated lava fields and plume deposit, is 6,160±65 years B.P. (USGS-107), as determined by Steve W. Robinson, Branch of Isotope Geology, U.S. Geological Survey, Menlo Park, California. Duane Champion, U.S. Geological Survey, who is currently doing a paleomagnetic study of the recent cinder cones and lava flows along the Northwest Rift Zone, arranged for the age determination; and again many geologists are somewhat surprised that such young-looking lava is so old.

The age of Lava Butte is significant because ages of all dated recent eruptions from the Northwest Rift Zone, including that of Lava Butte, are apparently grouped over a short period of a few hundred years. All radiocarbon ages so far lie between 5,800±100 and 6,380±130 years B.P. (Peterson and Groh, 1969).

While Lava Butte is known to be the same age as or younger than the Gas-Line Flows, the appearance of a slight radiocarbon age discrepancy between them is probably of no consequence. The eruptive period along the rift may be even shorter than the radiocarbon dates indicate. The age of recent lava flows or cinder cones is determined by measuring the radioactive carbon-14 content of wood that was carbonized by heat at the time of an eruption (Libby, 1965; Sheppard, 1975). The radioactive carbon-14 available to a growing tree from atmospheric carbon dioxide becomes fixed in the wood of the tree, and half of the carbon-14 decays (changes) to nitrogen-14 in 5,730 years. That is, if only half the amount of carbon-14 normally found in the atmosphere is found in the wood of a tree being tested by the carbon-14 method, the age of the tree is 5,730 years. But the sample of carbonized wood to be used for dating should be taken from the youngest (outer) growth rings if it is to yield an age close to that of the eruption. If older wood is mixed with younger wood, the age that is determined for the wood will be greater than the length of time since the eruption. Therefore, the apparent spread of ages along the Northwest Rift Zone may be the result of this type of sampling error.

Existing evidence thus suggests that the short period of eruptive activity that produced Lava Butte was the final event along the full length of the Northwest Rift Zone. Any future

CENTERFOLD PULLOUT - ORDER FORM

Bulletins		Price
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, Aug. 1965. 51 p., 34 photos and maps.]	$ 3.50_____
64.	MINERAL AND WATER RESOURCES OF OREGON, 1969. [Detailed outline of geology, mineral resources, water resources, and water resources devel. 462 p., 102 figs. and maps, 57 tables.]	$ 3.00_____
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., geology and mineral deposits maps in pocket.]	$ 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 illustrations, 12 geology and geologic hazards maps.]	$ 9.00_____
		PAGE TOTAL _____

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.]

Open-file Reports

O-75-3 GEOTHERMAL GRADIENT DATA, 1975, Bowen, project supervisor. $10.00_____
[Computer printouts showing depth, temperature, geothermal gradients for 75 deep predrilled holes in Oreg., measured 1971-1973.]

O-75-4 GEOTHERMAL GRADIENT DATA, VALE AREA, MALHEUR COUNTY, OREGON, 1975, Hull, supervisor. $ 2.00_____
[Detailed temperature logs of five holes in the Vale area. 18 p.]

O-75-6 ECONOMIC FACTORS AFFECTING THE MINING, PROCESSING, GASIFICATION, AND MARKETING OF COOS BAY COALS, 1975, Mason and Hughes. Complete $10.00_____
[Discusses geology, production, reserves, and economics. 61-p. text, $2.00; 4 maps @ $2.00 ea.]

O-75-7 GEOTHERMAL STUDIES AND EXPLORATION IN OREGON, 1975, Bowen, Blackwell, and Hull. $ 2.00_____
[Summary of geothermal data gathered by the Department between 1972 and 1975. Identifies anomalously high heat-flow areas. 65 p. Included are 6/74 and 7/75 Ore Bins.]

O-76-1 ELECTRICAL RESISTIVITY SURVEY AND EVALUATION OF THE GLASS BUTTES GEOTHERMAL ANOMALY, LAKE COUNTY, OREGON, 1976, Hull. Complete $ 8.00_____
[11-p. text with 14 page appendix, "Report of reconnaissance dipole-dipole resistivity survey in the Glass Buttes area, Lake County," prepared by Phoenix Geophysics, Inc., $2.00. Also available are 3 maps @ $2.00 ea.]

O-76-2 GEOTHERMAL GRADIENT DATA, BROTHERS FAULT ZONE, CENTRAL OREGON, 1975, Hull, Bowen, Blackwell, and Peterson. $ 2.00_____
[24 p. of preliminary data from 26 holes.]

O-76-3 FERRUGINOUS BAUXITES OF THE PACIFIC NORTHWEST, 1976, Hook. $ 2.00_____
[Gives location, geology, and ore reserve estimates for Cowlitz and Wahkiakum Counties, Wash., and for Columbia, Washington, Multnomah, and Marion Counties, Oreg. 26 p., 4 figs.]

PAGE TOTAL _____

Open-file Reports (continued)

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-77-2 GEOTHERMAL GRADIENT DATA, 1977, Hull, Blackwell, Bowen, Peterson, and Black. $ 5.00_____
[Charts and computer printouts of geothermal gradient data collected by the Department 1975-76. 133 p., with locality map.]

O-77-3 HEAT FLOW STUDY OF THE BROTHERS FAULT ZONE, OREGON, 1977, Hull, Blackwell, Bowen, and Peterson. $ 3.00_____
[Identifies three promising areas for geothermal resource development and includes location maps, tables of geothermal data, and computer printouts of geothermal gradient data. 100 p.]

Other Publications

Circ. 8 BEACH PLACERS OF THE OREGON COAST, Pardee, 1934 (Reprint). $ 1.00_____
[Covers climate, vegetation, and accessibility; topography; development of coast line; shore-zone fms.; and placer deposits. 41 p., 16 figs.]

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

1950's Ore Bin Packet [15 Ore Bins including articles on the 1960 Gold and Money Session, Oregon's opalite mining district, chrome ores and concentrates at Grants Pass. LIMITED SUPPLY.] $ 1.00_____

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 map in pocket.]

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 inches; scale 1:500,000 (1 in. = about 8 mi.)]

PAGE TOTAL _____

☐ Renewal ☐ New Subscription ☐ Gift
☐ 1 year ($3) ☐ 3 years ($8)
Name_____
Address_____
_____
zip
[If gift, from:_____]
ORE BIN

☐ Renewal ☐ New Subscription ☐ Gift
☐ 1 year ($3) ☐ 3 years ($8)
Name_____
Address_____
_____
zip
[If gift, from:_____]
ORE BIN

☐ Renewal ☐ New subscription ☐ Gift
☐ 1 year ($3) ☐ 3 years ($8)
Name_____
Address_____
_____
zip
[If gift, from:_____]
ORE BIN

DATE CURRENT SUBSCRIPTION ENDS IS SHOWN ON BACK COVER.

ALWAYS POPULAR

	Price	
INDEX TO THE ORE BIN (Misc. Paper no. 13)	$1.50	____
THUNDEREGG, OREGON'S STATE ROCK (OB 10/65)	.10	____
SUNSTONES IN OREGON (OB 12/72)	.35	____
COLUMBIA RIVER GORGE (OB 12/74). . . .	.35	____
STEEN'S MOUNTAIN (OB 4/76)	.35	____
CORVALLIS FIELD TRIP (OB 4/77)	.35	
QUARTZVILLE MINING DISTRICT (OB 6/77). .	.35	____
FIFTH GOLD AND MONEY SESSION (Proceedings)	5.00	____

Total, page i. . . . _____
page ii . . . _____
page iii. . . _____
page iv . . . _____ (include subscriptions)

TOTAL ORDER _____

Fill in ALL blanks; remove centerfold.

MAIL TO →

AMOUNT ENCLOSED:
$_____

OREGON DEPT. of GEOL. and MINERAL INDUSTRIES
1069 STATE OFFICE BLDG.
PORTLAND, OR 97201

NAME_____
ADDRESS_____
_____
ZIP

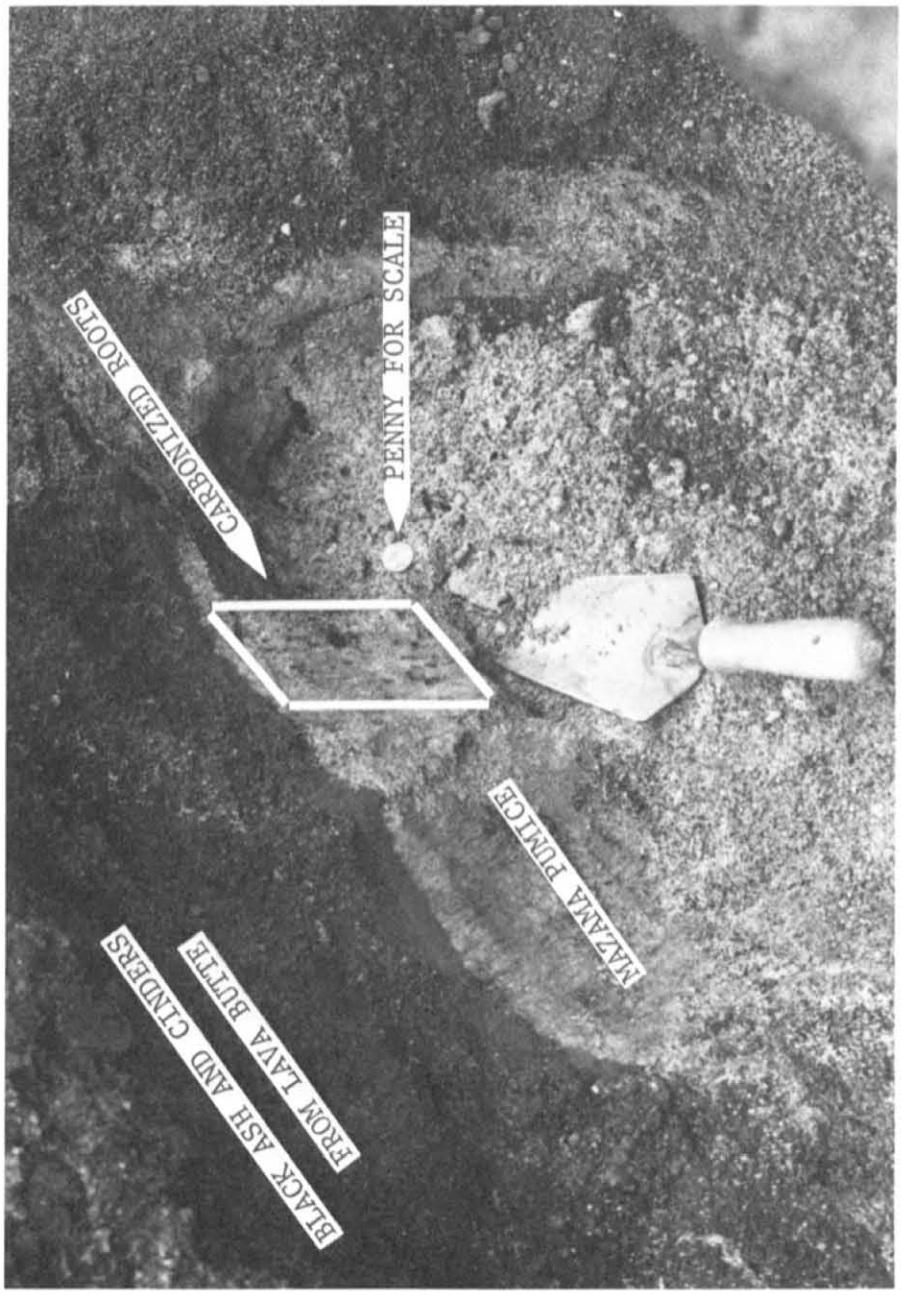


Figure 4. The small black spots above the gardener's trowel are carbonized roots from plants buried 6,160±65 years ago. The roots were found in the top 0 to 6 in (0 to 15 cm) of the 6,600-year-old cream-colored Mazama pumice which underlies the black ash and small cinders of the Lava Butte plume deposit.

volcanism in this part of Oregon would probably follow a similar pattern of multiple events in a relatively short period of time.

References Cited

An illustrated history of central Oregon embracing Wasco, Sherman, Gilliam, Wheeler, Lake, and Klamath Counties, 1905: Spokane, Wash., Western Historical Publishing Co., 1097 p.

Libby, W.F., 1965, Radiocarbon dating: Phoenix Science Series, Univ. Chicago, 175 p.

Peterson, N.V., and Groh, E.A., 1969, The ages of some Holocene volcanic eruptions in the Newberry Volcano area, Oregon: Ore Bin, v. 31, no. 4, p. 73-84.

Russell, Israel C., 1905, Preliminary report on the geology and water resources of central Oregon: U.S. Geol. Survey Bull. 252, p. 115.

Sheppard, J.C., 1975, A radiocarbon dating primer: College of Engineering, Washington State Univ. Bull. 338, 77 p.

Wilcox, Ray E., 1965, Volcanic-ash chronology, *in* Quaternary of the United States, VII Congress of the Internat. Assn. for Quaternary Research: Princeton, N.J., Princeton Univ. Press, p. 807-816.

Williams, Howel, 1942, The geology of Crater Lake National Park, Oregon: Carnegie Inst. Washington Pub. 540, 162 p.

_____, 1957, Reconnaissance geologic map of the central portion of the High Cascade mountains: Oregon Dept. Geol. and Mineral Indus.

EDWARD A. GROH

Edward A. Groh

Ed Groh, co-author of this month's feature article and longtime friend of the Department, died September 15, 1977. His main geologic interest was the volcanic history of Oregon, primarily Holocene volcanic landforms around Bend; and he cooperated with Department geologists in writing Bulletins 57 and 89 as well as numerous Ore Bin articles on volcanic features such as Hole-in-the-Ground, Diamond Craters, Cove Palisades, Crack-in-the-Ground, Newberry Volcano, and Metolius Springs. Recently he had been working in the development of Oregon's geothermal potential and had been consulting in the Newberry Volcano area.

Although never a member of the Department's staff, he had contributed much to the Department's publications. His presence and work will be missed, both by geologists who worked with him personally and by readers who learned about Oregon's volcanic history through his articles.

NOTICE
MINING CLAIM OWNERS

Your Mining Claim Will be Void . . .

unless you file a copy of your location certificate with the Bureau of Land Management (BLM)* as well as the county recorder.

If You Located a Mining Claim After October 21, 1976 . . .

you have 90 days to file with BLM.

If You Located a Mining Claim Before October 22, 1976 . . .

you have until October 21, 1979 to file with BLM.

You Are Required to File with BLM . . .

1. A copy of the notice of location recorded in the county records;
2. A statement providing the legal description, indicating Township, Range, Meridian, State, Section, and Quarter Section;
3. A map showing the survey or protraction grids on which is depicted the location of the claim; and
4. A $5.00 service fee for each claim.

Mining Claims in Oregon-Washington Are Filed at . . .

Mining Claim Recordation Office
Bureau of Land Management
729 NE Oregon Street
P.O. Box 2965
Portland, Oregon 97208
(Telephone: 503-234-3361)

(Complete instructions may be obtained by contacting the above Recordation Office.)

*If your claim is within a National Park, you must record it with the National Park Service.

COLOR GEOLOGIC MAP OF EASTERN OREGON IS HERE

The U.S. Geological Survey has released its Map I-902, "Geologic Map of Oregon East of the 121st Meridian," a 42x44-inch map of Oregon east of the Cascade Range. The map is lithographed in seven colors and is on a scale of 1:500,000 (1 inch equals about 8 miles).

In addition to serving as an educational tool and giving an overview of part of the State's geology, the map should provide a useful framework for future environmental and geologic studies. The region is currently being explored by industry and federal and state agencies to determine its potential for development of geothermal energy and selected mineral resources, notably uranium and zeolites.

George G. Walker, geologist with the USGS Menlo Park, California, research center, prepared the map as a companion to Map I-325, "Geologic Map of Oregon West of the 121st Meridian," which covers the remainder of Oregon on the same scale.

Copies of both maps are now available from the Department's Portland, Baker, and Grants Pass offices. To order either of the maps by mail, see centerfold, page iii, for Map I-902 and the inside back cover for Map I-325.

* * * * *

MINING ASSOCIATION TO MEET IN SPOKANE

Theme of the Northwest Mining Association 83rd Annual Convention, which meets December 2 and 3 at the Davenport Hotel in Spokane, Washington, is "Mining at the Crossroads." The convention will focus on the effects of government policy on the industry, looming energy shortages, new exploration techniques, changes in commodity markets, and changes in mineral industry education. A short course will precede the convention.

Registration materials for the convention may be obtained from Northwest Mining Association, West 1020 Riverside Avenue, Spokane, Wash. 99201. (Telephone: 509-624-1158).

* * * * *

USGS SELLS OPEN-FILE REPORTS BY MAIL

Anyone can now order USGS open-file reports by mail from Open-File Services Section, Branch of Distribution, U.S. Geological Survey, Box 25425, Federal Center, Denver, Colo. 80225. (Telephone: 303-234-5888).

This facility will stock only open-file reports. Specify series and number as well as complete title, and prepay by check or money order.

SCHWABE APPOINTED TO GOVERNING BOARD

John L. Schwabe, a Portland attorney, has been appointed by Governor Robert W. Straub to serve a four-year term as a member of the Department's Governing Board. Schwabe is a senior partner in the Portland law firm of Souther, Spaulding, Kensey, Williamson, and Schwabe.

* * * * *

DeWEESE RETIRES FROM GOVERNING BOARD

R.W. "Bill" deWeese, Portland businessman, has retired from the Department's Governing Board after serving the two-term maximum. DeWeese was appointed by the then governor, Tom McCall, in April 1969. He owns and operates Odyssey Productions, Inc., a commercial film-making organization. DeWeese has devoted much time and effort while serving on the Board, acting as its chairman for the last five years.

DeWeese's many other public services have included memberships in the Oregon Office of Emergency Planning, the Portland Chamber of Commerce, and Portland Public School District No. 1, often in the role of chairman or director. He has been a director on the boards of over half a dozen industrial or commercial organizations located in the State, as well as National Director of the Association Internationale des Étudients en Sciences Économiques et Commerciales.

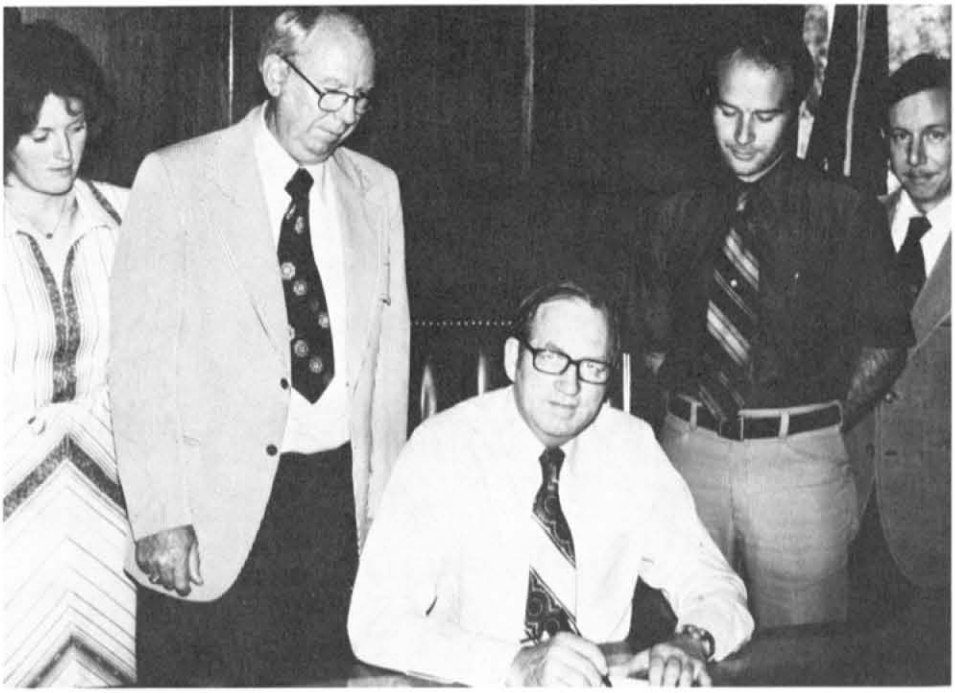
* * * * *

STAFF GEOLOGIST HONORED

Herbert G. Schlicker, an engineering geologist for the Department, has been awarded a Certificate of Appreciation by the Association of Engineering Geologists. The award stems from Schlicker's participation on the A.E.G. Geologic Hazards Committee study of the seismic susceptibility of the Auburn Dam on the American River, California. The Committee became concerned over the methodology used in calculating probable earthquake damage to the concrete, thin-arch, 685-foot-high structure.

Because the August 1975 Oroville earthquake, which occurred only 50 miles from the dam site, developed a horizontal acceleration of 0.12 g, committee members believed that the Auburn Dam design should be based on acceleration values greater than this to ensure an acceptable margin of safety. As a direct result of the A.E.G. committee's concern, the U.S. Bureau of Reclamation ordered a restudy of the dam's design, even though construction had already begun.

* * * * *



GOVERNOR SIGNS GEOLOGIST REGISTRATION BILL

On July 21, 1977, Governor Bob Straub signed the Geologist Registration Bill (HB 2288). Shown here witnessing the event are geologists Mavis Kent, Herbert Schlicker, John Beaulieu, and Rick Kent, all of whom campaigned long and hard for passage of the bill. This photograph was taken by Senator Walt Brown, who also took a personal interest in the bill.

The registration bill becomes law in October and will be administered by the State Department of Commerce, 428 Labor and Industries Building, Salem, Oregon 97310. After the State Board of Geologist Examiners has been appointed, application forms will become available to geologists. The cost of registration will be dependent upon the number of registrants, so it is recommended that each geologist intending to register write immediately to the Department of Commerce and indicate his intention to register.

The registration act contains an engineering geologist specialty, and the Board will entertain requests for additional specialties. A "grandfather" clause will be in effect for one year. Registration may also be by reciprocity.

* * * * *

INVEST 9¢ IN A POST CARD to notify the Department when you have a new address. Then you won't miss any copies of your ORE BIN.

AVAILABLE PUBLICATIONS

(Please include remittance with order; postage free. All sales are final - no returns.
A complete list of Department publications, including out-of-print, mailed on request.)

BULLETINS	Price
26. Soil: Its origin, destruction, and preservation, 1944: Twenhofel	$ .45
33. Bibliography (1st suppl.) geology and mineral resources of Oregon, 1947: Allen	1.00
35. Geology of Dallas and Valsetz quadrangles, Oregon, rev. 1964: Baldwin	3.00
36. Papers on Tertiary foraminifera: Cushman, Stewart and Stewart, 1949: v. 2,	1.25
39. Geol. and mineralization of Morning mine region, 1948: Allen and Thayer	1.00
44. Bibliog. (2nd suppl.) geology and mineral resources of Oregon, 1953: Steere.	2.00
46. Ferruginous bauxite deposits, Salem Hills, 1956: Corcoran and Libbey	1.25
49. Lode mines, Granite mining district, Grant County, Oregon, 1959: Koch	1.00
53. Bibliog. (3rd suppl.) geology and mineral resources of Oregon, 1962: Steere, Owen	3.00
57. Lunar Geological Field Conf. guidebook, 1965: Peterson and Groh, editors	3.50
61. Gold and silver in Oregon, 1968: Brooks and Ramp	8.00
62. Andesite Conference guidebook, 1968: Dole	3.50
63. Sixteenth biennial report of the Department, 1966-1968	1.00
64. Mineral and water resources of Oregon, 1969: USGS with Department.	3.00
65. Proceedings of Andesite Conference, 1969: [copies]	10.00
67. Bibliog. (4th suppl.) geology and mineral resources of Oregon, 1970: Roberts	3.00
68. Seventeenth biennial report of the Department, 1968-1970	1.00
71. Geology of selected lava tubes in Bend area, Oregon, 1971: Greeley	2.50
72. Geology of Mitchell quadrangle, Wheeler County, 1971: Oles and Enlows	3.00
75. Geology and mineral resources of Douglas County, 1972: Ramp	3.00
76. Eighteenth biennial report of the Department, 1970-1972	1.00
77. Geologic field trips in northern Oregon and southern Washington, 1973	5.00
78. Bibliog. (5th suppl.) geology and mineral resources of Oregon, 1973: Roberts	3.00
79. Environmental geology inland Tillamook and Clatsop Counties, 1973: Beaulieu	7.00
80. Geology and mineral resources of Coos County, 1973: Baldwin and others	6.00
81. Environmental geology of Lincoln County, 1973: Schlicker and others	9.00
82. Geol. hazards of Bull Run Watershed, Mult., Clackamas Counties, 1974: Beaulieu	6.50
83. Eocene stratigraphy of southwestern Oregon, 1974: Baldwin	4.00
84. Environmental geology of western Linn County, 1974: Beaulieu and others	9.00
85. Environmental geology of coastal Lane County, 1974: Schlicker and others	9.00
86. Nineteenth biennial report of the Department, 1972-1974	1.00
87. Environmental geology of western Coos and Douglas Counties, 1975	9.00
88. Geology and mineral resources of upper Chetco River drainage, 1975: Ramp	4.00
89. Geology and mineral resources of Deschutes County, 1976	6.50
90. Land use geology of western Curry County, 1976: Beaulieu	9.00
91. Geologic hazards of parts of northern Hood River, Wasco, and Sherman Counties, Oregon, 1977: Beaulieu.	8.00

GEOLOGIC MAPS	
Geologic map of Galice quadrangle, Oregon, 1953	1.50
Geologic map of Albany quadrangle, Oregon, 1953	1.00
Reconnaissance geologic map of Lebanon quadrangle, 1956	1.50
Geologic map of Bend quadrangle and portion of High Cascade Mtns., 1957	1.50
Geologic map of Oregon west of 121st meridian, 1961	2.25
Geologic map of Oregon east of 121st meridian, 1977	3.75
Geologic map of Oregon (9 x 12 inches), 1969	.25
GMS-2: Geologic map of Mitchell Butte quadrangle, Oregon, 1962	2.00
GMS-3: Preliminary geologic map of Durkee quadrangle, Oregon, 1967	2.00
GMS-4: Oregon gravity maps, onshore and offshore, 1967 [folded]	3.00
GMS-5: Geologic map of Powers quadrangle, Oregon, 1971	2.00
GMS-6: Prelim. report on geology of part of Snake River Canyon, 1974	6.50
GMS-7: Geology of the Oregon part of the Baker quadrangle, Oregon, 1976	in press

EXPIRATION
Dec. 1977_____
Dec. 1978_____
Dec. 1979_____
Other:

The ORE BIN
1069 State Office Bldg., Portland, Oregon 97201

Second Class Matter
POSTMASTER: Form 3579 requested

The Ore Bin

Available Publications, Continued:

		Price
THE ORE BIN		
Issued monthly - Subscription	[Annual]	$ 3.00
	[3-year]	8.00
Single copies of current or back issues	[Over the counter]	.25
	[Mailed]	.35
OIL AND GAS INVESTIGATIONS		
1. Petroleum geology, western Snake River basin, 1963: Newton and Corcoran		3.50
2. Subsurface geology, lower Columbia and Willamette basins, 1969: Newton		3.50
3. Prelim. identifications of foraminifera, General Petroleum Long Bell #1 well.		2.00
4. Prelim. identifications of foraminifera, E.M. Warren Coos Co. 1-7 well, 1973		2.00
5. Prospects for natural gas prod. or underground storage of pipeline gas		5.00
SHORT PAPERS		
18. Radioactive minerals prospectors should know, 1976: White, Schafer, Peterson.		.75
19. Brick and tile industry in Oregon, 1949: Allen and Mason		.20
21. Lightweight aggregate industry in Oregon, 1951: Mason		.25
24. The Almeda mine, Josephine County, Oregon, 1967: Libbey		3.00
25. Petrography, type Rattlesnake Fm., central Oregon, 1976: Enlows		2.00
MISCELLANEOUS PAPERS		
1. A description of some Oregon rocks and minerals, 1950: Dole		1.00
2. Oregon mineral deposits map (22 x 34 inches) and key (reprinted 1973):		1.00
4. Laws relating to oil, gas, & geothermal exploration & development in Oregon		
Part 1. Oil and natural gas rules and regulations, 1977.		1.00
Part 2. Geothermal resources rules and regulations, 1977		1.00
5. Oregon's gold placers (reprints), 1954		.50
6. Oil and gas exploration in Oregon, rev. 1965: Stewart and Newton		3.00
7. Bibliography of theses on Oregon geology, 1959: Schlicker		.50
Supplement, 1959-1965: Roberts		.50
8. Available well records of oil and gas exploration in Oregon, rev. 1973: Newton		1.00
11. Collection of articles on meteorites, 1968 (reprints from The ORE BIN)		1.50
12. Index to published geologic mapping in Oregon, 1968: Corcoran		.50
13. Index to The ORE Bin, 1950-1974		1.50
14. Thermal springs and wells, 1970: Bowen and Peterson (with 1975 suppl.)		1.50
15. Quicksilver deposits in Oregon, 1971: Brooks		1.50
16. Mosaic of Oregon from ERTS-1 imagery, 1973		2.50
18. Proceedings of Citizens' Forum on potential future sources of energy, 1975		2.00
MISCELLANEOUS PUBLICATIONS		
Oregon base map (22 x 30 inches)		.50
Landforms of Oregon (17 x 22 inches),		.25
Mining claims (State laws governing quartz and placer claims)		.50
Geological highway map, Pacific NW region, Oregon-Washington (pub. by AAPG)		3.00
Fifth Gold and Money Session and Gold Technical Session Proceedings, 1975 (including papers on gold deposits, exploration, history, and production		5.00
Color postcard, GEOLOGY OF OREGON	[each]	.10
	[3]	.25
	[7]	.50
	[15]	1.00