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THE ORE BIN

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DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

The Ore Bin

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FIELD-ORIENTED GEOLOGY STUDIES IN OREGON DURING 1976

John D. Beaulieu
Geologist, Oregon Dept. Geology and Mineral Industries

During the 1976 field season at least 114 geologic investigations were conducted in Oregon. The list below includes those of which the Oregon Department of Geology and Mineral Industries is aware. For convenience, the State is divided roughly into six geographic sections; and several investigations of more regional extent comprise a seventh category - Regional. Listings within categories are alphabetical according to the investigator's name.

The Department would appreciate receiving information about studies in progress in the State which are not shown here. The summaries received thus far have been invaluable in completing this list, and the compiler is grateful for this assistance.

The Department has no information on completion dates of research or reports listed. Inquiries should be directed to the individuals named. Abbreviations of frequently cited institutions include:

DOGAMI	Oregon Department of Geology and Mineral Industries
OMSI	Oregon Museum of Science and Industry
OSU	Oregon State University
PSU	Portland State University
U of O	University of Oregon
SOSC	Southern Oregon State College
USBM	United States Bureau of Mines
USGS	United States Geological Survey
WRD	Oregon Water Resources Department

Northwestern Oregon

1. Columbia River Basalt in Clackamas River drainage: Jim Anderson, master's cand., PSU
2. Boring lava geochemistry: Darolyn Burch, master's cand., PSU
3. Foraminifers of the type Nestucca Formation: Arden Callender, master's cand., PSU
4. Wickiup Mountain-Big Creek area stratigraphy, sedimentology, and petrology: G. Coryell, master's cand., PSU
5. Post-glacial volcanism of Mount Hood: D.R. Crandell, USGS, Menlo Park

6. Structure of east Portland: J. D. Perttu, master's cand., PSU
7. Ground water of the Newberg area: F.J. Frank, USGS, Portland
8. Fossil woods from the Cascade Locks area: W.J. Fritz, master's cand.(biol.), Walla Walla College
9. Late Quaternary Tillamook Bay sedimentation: W. Frye, master's cand., U of O
10. Estuarine sedimentation of Tillamook Bay: J. Glenn, USGS, Denver
11. Ground water of the Dallas-Monmouth area: J.B. Gonthier, USGS, Portland
12. Johnson Creek geo-hydrology and environmental geology: B. Henderson, master's cand., PSU
13. Keasey biostratigraphy and gastropods: C.S. Hickman, res. assoc., Swarthmore College
14. Western Cascades heat flow: D.A. Hull, DOGAMI, Baker
15. Gravity of southeast Portland: Terry Jones, bachelor's cand., PSU
16. Ground-water pollution evaluation of coastal dunes: K. Mathiot, WRD
17. Bonneville Dam NW 7-1/2' quad geology: M. Moran, master's cand., PSU
18. Quartzville Mining District: S. Munts, master's cand., U of O
19. Columbia River Basalt-strontium isotopes, stratigraphy, and petrogenesis: Dennis Nelson, Ph. D. cand., OSU
20. Lewis and Clark and Youngs Rivers area stratigraphy: M.P. Nelson, master's cand., OSU
21. Natural gas storage structures of the northern Coast Range: V. Newton, DOGAMI, Portland
22. Astoria and Yaquina Formations: A. Niem, prof., OSU
23. North Santiam Mining District: J.P. Olson, master's cand., OSU
24. Columbia River Gorge landslides: L. Palmer, prof., PSU
25. West Cascades geothermal: N. Peterson, DOGAMI, Grants Pass
26. Southern Willamette Valley stratigraphy: W.O. Seeley, Mobil Oil
27. Ground-water monitoring of Sherwood-Wilsonville area, staff, WRD
28. Blue River Mining District: S.G. (Power) Starch, master's cand., OSU
29. Blue Creek District - massive sulfides: C. Taylor, master's cand., OSU
30. Columbia River Basalt of the Bull Run watershed: B. Vogt, master's cand., PSU
31. Detroit region stratigraphy: C. White, master's cand., U of O

Southwestern Oregon

1. Eocene stratigraphy and structure: E. Baldwin, prof., U of O
2. Mount Bailey geology: C. Barnes, master's cand., U of O
3. Land use geology of western Curry County: J.D. Beaulieu, DOGAMI, Portland

4. Land use geology of central Jackson County: J.D. Beaulieu, DOGAMI, Portland
5. Talent quadrangle amphibolites: L. Beskow, master's cand., U of O
6. Briggs Creek amphibolite: R.G. Coleman, USGS, Menlo Park
7. Josephine peridotite (petrology, poidform chromite, josephinite, structure): Henry Dick, Woods Hole Oceanog. Inst.
8. Rogue River stratigraphy between Agness and Illahee: W. Eaton, master's cand., U of O
9. Hornbrooke Formation: Monty Elliot, prof., SOSC
10. Wrangle Gap-Red Mountain peridotites, Talent quadrangle: M. Ferns, Ph. D. cand., U of O
11. Flournoy, Spencer, and Fisher Formations west of Eugene: W. Gandera, master's cand., U of O
12. Aeromagnetic interpretations over ultramafic rocks: A. Griscom, USGS, Menlo Park
13. Erosion at Siletz Spit: P.D. Komar, prof. (oceanog.), OSU
14. Ground-water evaluation of the Brookings area: F. Lissner, WRD
15. Eocene planktonics: G. Miles, Ph. D. cand., U of O
16. Kalmiopsis Wilderness area mineral evaluation: M.S. Miller, USBM, Spokane
17. Igneous petrology of Surveyor Mountain and Hyatt Reservoir quadrangles: H. Naslund, master's cand., U of O
18. Geology of the Medford-Coos Bay 2° sheets: N. Page and others, USGS, Menlo Park
19. Rogue River geologic river log - Grove Creek to Foster Bar: William Purdom, prof., SOSC
20. Curry County mineral resource inventory: L. Ramp, DOGAMI, Grants Pass
21. Dothan Formation reconnaissance: Loren Raymond, prof., SOSC
22. Mount Mazama eruption and geochemistry: J. Ritchey, master's cand., U of O
23. Ground water of the Winston area: J.H. Robison, USGS, Portland
24. Coaledo Formation sedimentation: P. Ryberg, master's cand., U of O
25. Bohemia Mining District: M.P. Schaubs, master's cand., OSU
26. Curry County aggregate resources: H. Schlicker and J. Gray, DOGAMI, Corvallis
27. Nickel laterites of Josephine and Curry Counties: staff, USBM, Spokane
28. Sedimentation of South Slough estuary: R.O. Van Atta, prof., PSU
29. Remote sensing of debris-avalanche-prone terrain: R. Vickers, Stanford Research Inst., for BLM

North-Central Oregon

1. Devonian biostratigraphy: C.T. Amundson, master's cand., PSU
2. High Cascades basaltic petrology and geochemistry between McKenzie Bridge and Three Sisters: B. Baker, prof., U of O

3. Geologic hazards of northern Hood River, Wasco, and Sherman Counties: J.D. Beaulieu, DOGAMI, Portland
4. Cascades Range geophysics: R.W. Couch, prof. (oceanog.), OSU
5. Paleogene plant fossils in Pilot Rock area (Clarno?): B.J. McLarty Elmendorf, master's cand. (biol.), Walla Walla College
6. Clarno palynology: L.H. Fisk, prof. (biol.), Walla Walla College
7. Basalts of Columbia River Basalt south of the Blue Mountain anticline: G. Goles, prof., U of O
8. Newberry rim gravity data: A. Griscom, USGS, Menlo Park
9. Paleobotany of the Clarno Formation: S. Manchester, OMSI
10. John Day Wild River study area mineral investigation: R.W. Morris, USBM, Spokane
11. Geology and mineral resources of Deschutes County: N. Peterson, DOGAMI, Grants Pass
12. Central Cascades geophysics: S. Pitts, Ph. D. cand., U of O
13. Strawberry Volcanics, geology and petrology: T.L. Robyn, Ph. D. cand., U of O
14. Ground-water monitoring of the Ordnance and Butler Creek area, staff, WRD
15. John Day area geology: T. Thayer, USGS, Menlo Park
16. Strawberry Mountain Wilderness Area geology: T. Thayer, USGS, Menlo Park

South-Central Oregon

1. Glacial geology of the southern Cascades: G. Carver, prof., Humboldt State
2. Brothers fault zone heat flow: D.A. Hull, DOGAMI, Baker
3. Geothermal investigations: N. MacLeod, USGS, Menlo Park
4. Geothermal investigations of the Klamath Falls area: N. Peterson, DOGAMI, Grants Pass
5. Northern Summer Lake geology: P. Travis, master's cand., U of O

Northeastern Oregon

1. Structural evolution of the Blue Mountains: H.G. Ave Lallement, prof., Rice U.
2. Sawtooth Ridge and Keating NW 7-1/2' quadrangles, geology: H. Brooks, DOGAMI, Baker
3. Hells Canyon Recreation Area mineral evaluation: T.J. Close, USBM, Spokane
4. Ground water of the Umatilla Indian Reservation: J.B. Gonthier, USGS, Portland
5. Conners Creek area geology, Snake River Canyon: S. Jenkins, master's cand., OSU
6. Tertiary structures of western Crook County: R. Lawrence, prof., OSU
7. Greenhorn area geology: E. Mullin, master's cand., OSU
8. Greenhorn quadrangle geology: J. Perkins, master's cand., U of O

9. Structural petrology of the Sparta quadrangle: D. Phelps, Ph. D. cand., Rice U.
10. Zeolites of Pliocene lacustrine deposits: R.A. Sheppard, USGS, Denver
11. Geology of the Hells Canyon Wilderness study area: G.C. Simmons, USGS, Menlo Park
12. Columbia River Basalt sampling of the Imnaha and Yakima Basalts for isotopic analysis: D.A. Swanson and others, USGS, Menlo Park

Southeastern Oregon

1. Vale-Owyhee geothermal region investigation: R.W. Couch and B.H. Baker, profs. (oceanog.), OSU
2. Sheldon-Antelope Wilderness: R.C. Greene, USGS, Menlo Park
3. Geothermal potential: N. MacLeod, USGS, Menlo Park
4. McDermitt mercury: J. Rytuba, USGS, Menlo Park
5. Grassy Mountain Formation: A. Storm, master's cand., U of O
6. North Beulah Reservoir area: J. Wood, master's cand., PSU

Regional

1. Relative age-dating techniques on Quaternary deposits - development and testing: P.W. Birkeland, prof., U. of Colo.
2. Continental shelf sedimentation dynamics: D. Cacchione, USGS, Menlo Park
3. Geology of the Oregon continental shelf (for EIS): H.E. Clifton, USGS, Menlo Park
4. Cretaceous-Neogene stratigraphic palynology: L.H. Fisk, prof. (biol.), Walla Walla College
5. Plant microfossils in Columbia River Basalt interbeds: L.H. Fisk, prof. (biol.), Walla Walla College
6. Copper and zinc inventory: D.A. Hull, DOGAMI, Baker
7. Guidebook to selected trips in Oregon: J. Hyde, instructor, Tacoma Community College
8. Tectonic settings and volcanic composition - correlations: J. Loëschke, Tübingen, W. Germany
9. Geophysics of Known Geothermal Resource Areas: D.R. Mabey, USGS, Menlo Park
10. Volcanic hazards overview: D.R. Mullineaux, USGS. Menlo Park
11. Nickel in Oregon: Len Ramp, DOGAMI, Grants Pass
12. Cenozoic vertebrates: C.A. Repenning, USGS, Menlo Park
13. Oregon and Washington onshore-offshore structure: P. D. Snavely, USGS, Menlo Park
14. Geologic map of eastern Oregon: G.W. Walker, ed., USGS, Menlo Park
15. Quaternary geochronology and fossil amino acid enantiometric ratios: J.F. Wehmiller, prof., U. of Delaware

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NORTHEAST OREGON MAPS PRINTED

Preliminary geologic maps of the Sawtooth Ridge and Keating NW quadrangles have been published and are available at the three offices of the Department. The maps are black-and-white. Hand-colored copies will be maintained on open file (O-77-1). The maps are at the scale of 1:24,000 (7-1/2 minutes) and cover the northeastern corner of the old Baker 30-minute (1:125,000) quadrangle, mapped by Gilluly in 1937. The maps include the type locality of the Clover Creek Greenstone. Other important map units are intrusive rocks of pre-Upper Triassic age and basalt flows and lake and stream sediments of Tertiary age. The Sawtooth Ridge map was compiled from mapping by H.C. Brooks, R.G. Bowen, D.A. Hull, and R.W. Hammitt. The Keating NW map is by H.C. Brooks. Price is $4.00 per set.

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RECORD NEW MINING CLAIMS

New mining claim recordation regulations have been adopted following public comment on proposed rules. The new regulations are among the first implementations of the Federal Land Policy and Management Act of 1976.

All new mining claims must be filed within 90 days of location, but claims dating prior to passage of the Act need not be recorded until October 21, 1979, according to Roger Dierking, Bureau of Land Management records chief in Portland. An exception is that any mining claim within a unit of the national park system must be recorded by September 27, 1977 with the National Park Service.

Dierking suggests to claim holders, "First, pick up a copy of the regulations to ensure that all filing requirements will be met. Second, since there are 3 years to record older claims, recording backlogs can be avoided if filings are distributed over the entire period."

The new law requires the recording of all unpatented lode or placer mining claims or mill or tunnel sites which are on Federal land or involve minerals retained in Federal ownership. This is done by filing a copy of the official notice of location (as recorded at the local county courthouse) with the Bureau of Land Management.

Federal law also requires filing of evidence of annual assessment work by December 31 of each year after the year of location.

Transfers of interest in claims or sites must also be recorded, and 60 days is allowed a transferee to file such notice without charge.

Failure to record claims, evidence of assessment, or transfers of interest with BLM constitutes abandonment of the claims, according to the new Federal Land Policy and Management Act.

The new regulations will protect the rights of miners and facilitate management of the Federal lands and their mineral resources by providing records which are current, accurate, and accessible, according to BLM officials. The Bureau of Land Management is responsible for administering the mining laws on all Federal lands.

Copies of the new regulations are available at offices of the Bureau of Land Management and Forest Service. All Oregon and Washington claims are to be recorded at the Bureau of Land Management, 729 NE Oregon Street, Portland. Cost of recording is $5.00.

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SOSC OFFERS DEGREE IN GEOLOGY

William B. Purdom, chairman of the Department of Geology at Southern Oregon State College, in Ashland, announces that the college now offers a bachelor of science degree in geology and expects to confer its first degree in June 1977.

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SOUTH MOUNTAIN-JUNIPER MOUNTAIN AREA MAPPED

Reconnaissance Geology and Geochemistry of the South Mountain-Juniper Mountain Region, Owyhee County, Idaho, by Earl H. Bennett, has been published as Pamphlet No. 166 by the Idaho Bureau of Mines and Geology, Moscow, Idaho.

The 68-page report describes a 450-square-mile area situated east of Malheur County, Oregon and south of the Silver City-DeLamar mining region of Idaho. In this area an extensive series of Tertiary volcanic rocks overlies a granitic-metamorphic complex.

Maps accompanying the report show geology, stream-sediment sampling locations, and linears from U-2 imagery.

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GRAVITY SURVEYS ON OPEN FILE

Two open-file reports recently received from the U.S. Geological Survey provide geophysical data on the Breitenbush KGRA. The reports, listed below, can be consulted in the Department's library in Portland.

Open-file report 77-66B (supplement to 76-701D): Telluric survey data for Breitenbush Known Geothermal Resource Area, Oregon.

Open-file report 77-67A: Principal facts for a gravity survey of Breitenbush Known Geothermal Resource Area, Oregon.

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WHAT HAPPENED TO THESE ROCKS?

Upper photo, opposite page.

These highly contorted folds are found on a sea cliff at the north end of Crescent Beach in Ecola State Park, north of the town of Cannon Beach. The folds occur in a 200-foot-thick sequence of rhythmically bedded, micaceous, fine-grained sandstones and silty mudstones that are equivalent in age to rocks of the Miocene Astoria Formation. The rocks were deposited in a marine embayment during lower to middle Miocene time (18 to 26 million years ago). They are described as graded beds because each separate unit contains sediments graded in size from coarse at the base to fine near the top. A sequence of graded beds is called a turbidite sequence; and turbidites form when large amounts of sediments are carried downslope in suspension by dense and rapidly moving turbidity currents which spread the sediments for great distances horizontally until they come to rest on the ocean floor. When the current stops moving, the heaviest sediment settles out first, with finer material settling out above. Foraminifera found in these rocks indicate that the sediments were deposited at a depth of 500 to 1,500 feet in cool water.

While these sedimentary beds were still water-saturated and plastic, they were deformed, either by slumping or by the intrusion of numerous slightly younger basalt dikes and sills (potassion-argon dated at 15.9±0.4 m.y.). One of these sill-like bodies lies at the base of the folds.

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Lower photo, opposite page.

These folded limestone beds form the canyon walls of the Snake River near Big Bar, about 20 km (12.4 miles) north of the town of Oxbow. The folds are plainly visible from the road that follows the east side of the Snake River between Oxbow and Hells Canyon Dam.

The limestone is at least 1,700 feet thick, black on fresh exposure (but weathering to nearly white), and contains many kinds of fossil marine invertebrates. Fossil experts correlate this limestone with the Upper Triassic Martin Bridge Formation, named for thick exposures of limestone at Martin Bridge, on Eagle Creek on the south side of the Wallowas.

A brief history of the outcrop might go as follows: In Late Triassic time (about 190 million years ago) layers of calcareous material accumulated on a shallow sea floor inhabited by reef-building marine animals. Early in Jurassic time (about 170 million years ago) tectonic pressures folded the limestone beds and crushed or fractured the less pliable rocks in the vicinity. Uplift of the region in Late Cretaceous time was followed by the development of a vast erosion surface over which flowed the Miocene lavas of the Columbia River Basalt Formation. In more recent geologic time, deep dissection by the Snake River has carved the present canyon and revealed the ancient folded sea beds.

Folded rocks, northwest Oregon coast.

Folded rocks, northeast Oregon.

METALS AND MINERALS CONFERENCE IN MAY

The 1977 Pacific Northwest Metals and Minerals Conference will be held May 4, 5, and 6 at the Washington Plaza Hotel, Fifth and and Westlake, Seattle, Washington. It will be jointly hosted by the Puget Sound Chapter of the American Society of Metals and the North Pacific Section of the American Institute of Mining, Metallurgical, and Petroleum Engineers. Attendance is expected to exceed 300.

Co-chairmen W.E. Quist, A.S.M., and T.G. Stoebe, A.I.M.E., report the conference general session will be devoted to Minerals, Materials, and Energy, Their Reserves and Utilization. General session speakers include J. Granville Jensen, professor of geography at Oregon State University; John D. Morgan, Associate Director, U.S. Bureau of Mines; Robert S. Shoemaker, Bechtel Corp., San Francisco (1977 President, S.M.E.); and Harry Paxton, Vice President, U.S. Steel, Pittsburgh (1976 President, T.M.S.).

Technical sessions sponsored by the A.S.M., A.I.M.E., the American Ceramic Society, and the American Association of Engineering Geologists will follow, with lectures on Service Failures, Extractive Metallurgy, New Materials Advancements, Mining, New Analytical Techniques and Instrumentation, Geotechnical Aids to Mining, and Resources for Future Supply of Ceramics.

A new feature will be the Industrial Trade Exposition, displaying products and services offered by a variety of organizations. Remaining display space is limited but still available to those companies wishing to publicize their products or services.

Special events will include a social program for the ladies.

For further information on registration, reservations, or display space, contact S.D. Schwarz, c/o Shannon and Wilson, Inc. The address is 1105 N. 38th, Seattle, WA 98103. Telephone number is (206) 632-8020.

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K-FALLS SPACE HEATING REPORTED

The Oregon Institute of Technology (OIT) Geo-Heat Utilization Center at Klamath Falls has issued four reports on its studies of space heating by natural hot waters. The reports are:

1. Klamath Falls Hot Water Well Study, by G.G. Culver, J.W. Lund, and L.S. Svanevik, 1974.
2. Klamath Falls Geothermal Mini-heating District Feasibility Study, by P.J. Lienau, J.W. Lund, G.G. Culver, and D. Ford, 1976.
3. Optimization of Home Heating Systems, by G.G. Culver, 1976.
4. Corrosion of Down-hole Heat Exchangers, by J.W. Lund, J.F. Silva, G.G. Culver, P.J. Lienau, L.S. Svanevik, and S.D. Anderson, 1976.

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MINE NAMES

Apparently Oregon miners and prospectors name their claims for a variety of reasons. Perhaps they are motivated by the same impulses that lead owners of boats, race horses, and summer cabins to attach the wide variety of appellations to their possessions. The origins of some mining claim names are obvious. For instance, the Poverty claim and the Depression Breaker were undoubtedly located during the 1930's, while the Bomb Site (for optical calcite) was of World War II vintage, and the Trail's End property just has to be as far back in the hills as you can get.

Miners and prospectors seem to have preferences for colors as claim name prefixes. In Oregon are the Black Bear, Black Beauty, Black Diamond, Black Channel, Black Jack, Black Prince, Black Velvet, and Blackout. Blue appears in the Blue Mud claim, Blue Mule, Blue Pearl, Blue Ribbon; and, best of all, Blue Goo.

Any number of claims were named for a family member. The Baby claim, for unknown reasons, is also known as the Lamb Tongue. The Daddy Lode recognizes the man of the house, who long ago called the biggest strike of all the Mother Lode.

A menagerie of animal claim names includes Badger, Bald Eagle, Bay Horse, Bear Cat, Baby Elephant, White Elephant, Dodo, Humbug, and Gold Bug. Prospectors' optimism is evidenced in names starting with "big": Big Buck, Big Chief, Big Lode, Big Shot, and Big Sunshine. Easy Money, Hidden Treasure, and Quick Action connote high hopes. The Come and Get It claim, the story goes, was located merely for the purpose of quick sale.

Gold, of course, appears in many claims names, since most claims are located for gold. The Gold Bullion, Gold Chief, Gold Cluster, Gold Coin, Gold Crater, Gold Leaf, Gold Nugget, and Gold Wedge are examples.

Among the downright fanciful names are Moon Anchor, Analulu, Tillicum, and Cumtillie. More down-to-earth are Mud Spring, Potato Patch, Poison Oak, Doodle Bug, and Frog Pond. One miner, at once optimistic and realistic, named his property the Keg of Gold. Attitudes of owners are reflected in the names Last Chance, Bliss, Cloudy Day, and Miser. Expressing the fiercely competitive life of the gold miner is the claim name, Bone of Contention.

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MORE OREGON LAKES DESCRIBED

"Lakes of Oregon, Clackamas County," by M.V. Shulters, is the fourth in the State's inventory of lakes and reservoirs prepared by the U.S. Geological Survey in cooperation with the Oregon State Water Resources Department. Included are illustrations, descriptions, and water-quality data for 55 lakes, most with surface areas of more than 5 acres. The publication is designated as an open-file report dated 1976. A limited number of copies are available from the Oregon State Water Resources Department. Phone: Salem 378-3671.

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U.S. ENERGY INDEPENDENCE REQUIRES VAST AMOUNTS OF MINERALS

Achieving U.S. energy goals projected to 1990 will require the availability of large amounts of a wide variety of metals, minerals, and mineral products, according to a U.S. Geological Survey report.

The report presents estimates of the basic nonfuel materials needed and of supplies now available for five major energy industries - fossil fuels (coal, oil, gas, and oil shale), geothermal, hydroelectric, nuclear, and solar, as well as electric power transmission facilities, over the next 15 years or so.

The report says that minimum estimates of nonfuel mineral raw-material requirements for all energy types indicate that concrete and iron are needed in the largest tonnages, but that "substantial" quantities of other materials, such as aluminum, barite, bentonite, manganese, and nickel, must also be available if the Nation's energy goals are to be reached by 1990.

The report notes that significant increases in production above that of recent years for commodities such as aluminum, barite, bentonite, fluorite, iron ore, and tungsten are needed to satisfy the demand by the energy industries.

In a concluding statement, the report warns that, "Adequacy of mineral supplies for a sustained economy should be a matter of deep concern, particularly in view of the large quantities of minerals and materials required for energy production and the serious consequences in the event of deficiencies." The proposed energy independence of the United States depends upon adequate supplies of nonfuel mineral raw materials.

"As was evident in the 1973 oil embargo, political and economic changes and mineral shortages can occur swiftly," the report notes, adding that, "our mineral inventory developed and ready for immediate extraction is nil in the case of some commodities, and in many cases is not equivalent to projected requirements for a decade of U.S. consumption.

"The United States will not become self-sufficient in all minerals," the report says, "but for most minerals the Nation can become nearly self-sufficient through development of new resources." To achieve this, however, the report says, "Basic geologic research - often overlooked as the foundation on which exploration projects are planned - must be accelerated and continued into the future. Any delay reduces the Nation's flexibility to cope with mineral-supply problems, which are inevitable. Because of the lead-time required, as much as 20 years, crash programs are no substitute."

A few "briefs" abstracted from the report:

- The United States is self-sufficient in bentonite, copper, molybdenum, boron, magnesium metal, scrap mica, silicon, beryllium, hafnium, helium, lithium, and rare earths. Reserves are also considered adequate to meet the national demand to 1990 for barite, iron ore, lead, and zinc.

- The United States has no reserves of chromite, cobalt, manganese, and niobium and is totally dependent for these commodities on imports, supplemented by industry inventories and release from government stockpile.
- Imports provide more than two-thirds of the supply of aluminum (bauxite), fluorite, nickel, and tungsten, for which the energy demand through 1990 will be large, and of asbestos and tin, for which the demand will be much less critical.
- Some commodities for which we are dependent on imports for one-third to two-thirds of our supply are expected to pose no supply problems as long as imports are secure. These include antimony, cadmium, silver, and titanium. Others - barite, zinc, and zirconium - are available in large quantities domestically.
- Averaged over the next 15 years, the quantities of some materials needed for energy will be a large percentage of 1973 production; for example, aluminum (30 percent), barite (100 percent), bentonite (30 percent, fluorite (58 percent), shipping-grade iron ore (26 percent), and tungsten (78 percent).
- A minimum of about 2.5 billion barrels of oil-equivalent may be required to produce 20 selected mineral commodities needed by the energy industries through the next 15 years, and 18.5 billion barrels of oil-equivalent to produce sufficient supply to meet the domestic demand for those minerals during the same period. This amount of energy, equal to more than half of the known U.S. recoverable petroleum reserves, is only a fraction of the energy required to produce the 90 or more mineral commodities used in the total economy. Thus, imports of mineral raw materials and semifabricated or processed material also constitute energy imports. Substitution of domestically produced materials for imports will further stress domestic energy production.

The report, "Demand and Supply of Nonfuel Minerals and Materials for the United States Energy Industry, 1975-90 - A Preliminary Report," is published as USGS Professional Paper 1006-A,B. Copies may be purchased from the U.S. Geological Survey's Branch of Distribution, 1200 South Eads St., Arlington, VA 22202, for $1.70 each, prepaid; checks or money orders payable to the U.S. Geological Survey.

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Topographic maps of the south half of Mt. Hood (scale of 1:24,000) in a new folded pocket-sized edition, complete with plastic carrying pouch, will be available at the Department of Geology and Mineral Industries for $1.50 starting May 1, 1977.

WASHINGTON STATE GEOLOGIST REPORTS*

Ted Livingston

My friend and my former boss, Marshall Huntting, came in the other day. In the course of our conversation, he commented on some basic truths that I believe need to be reiterated until everyone, especially our decision-making leaders, really understand them. The subject was land planning; and Marshall mentioned that the way many leaders are approaching planning is to ask the citizenry this question: "What do you want for the future?" Marshall says this is like setting your family down and asking them to plan what they want to do for the rest of their lives.

Obviously the most important question the family needs to answer is, "What do we need to survive?" The same is true in developing plans for the use of our land. There is no doubt that if this question were asked and answered honestly by the decision makers, the safeguarding of our mineral deposits along with agricultural lands would receive the highest priority. I question if there is a higher, more intensive use for land than mining. As an example, the Bingham copper pit in Utah appears to be about 2 miles across, which would equal about 2,000 acres in area. From that 2,000 acres of land, approximately $6 billion worth of copper has been produced. This means that each acre of land in this pit has contributed $3 million worth of new wealth to the economy. I suspect it will be hard for any other industry or occupation to equal that kind of record. The real point, however, is not necessarily what the dollar value of the copper is but rather what the value has been to mankind in terms of homes, transportation, medicine, appliances, power generation, etc. This value is so large that it probably is incalculable.

All of this points out that in any kind of planning procedure we always need to begin by considering what the necessities are for survival. After we have taken the necessary steps to protect the necessities, we can afford the luxury of asking, "What do we want?" If we let our "wants" take precedent over our "needs," we will certainly experience some severe, and I might add, unnecessary shortages that will bring us very painfully to a realization of how necessary our minerals are and how dependent we are on them.

* Reprinted from Washington Geologic Newsletter, v. 3, no. 4.

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THE MINER'S INCH

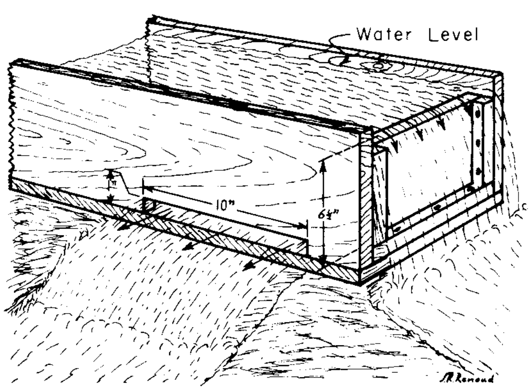
The miner's inch, now used as a measurement for irrigation water, originated back in the old gold mining days when water was as precious for gold washing as it is for farming today. In the spring, plenty of water ran in the streams from the snow melting in the mountains, and there was an ample supply for all. Ditches carried water from the streams to the placers. As the dry season came on, water became scarce; and it became necessary to devise a means of dividing it to suit the needs of the different types of washing - from the rocker which used very little water to the hydraulic giant which required hundreds of gallons per second. The miner's inch was the solution; it has come from yesterday's mining to today's farming as a unit for measuring water.

To get an amount of water in miner's inches, the water is run through a flume or trough. A hole one inch square is cut in the side of the flume four inches below the top level of the water flowing through. A miner's inch is the amount of water discharged from the hole under a given pressure - four-inch pressure in this case. The pressure is determined by the number of inches the hole is from the top of the water's surface. The number of holes in the side of a flume, discharging water, determine the number of miner's inches.

Fifty miner's inches are equal to one cubic foot per second or one second-foot. Twenty-five miner's inches under four-inch pressure, flowing for 24 hours, will release one acre-foot of water or the amount that will cover an acre one foot deep.

Many states do not accept this measurement as standard. The required pressure may vary from three to nine inches according to the state; and there is a difference in a number of miner's inches to a cubic foot in many states. Because of this, it is not considered a legal measurement. Nevertheless, farmers in most of the western states measure irrigation water in miner's inches.

From "DECO TREFOIL"



Sketch of typical flume for measuring water in miner's inches. Opening is designed to provide for 10 miner's inches.

NOTICE TO CONTRIBUTORS

ORE BIN editors welcome manuscripts about Oregon geology, such as field trip guides, descriptions of geology of state parks, results of student or faculty research, and information on interesting mineralogical and paleontological finds.

Although some technical and specialized articles are published, the aim is to emphasize subjects of general interest, written in a language understandable to the knowledgeable layman. Technical terms, when used, should be explained. Interesting geological photographs, along with brief explanations, are also acceptable.

Prospective authors should observe the following guidelines:

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2. In general, one and one-half pages of manuscript fill one ORE BIN page, which measures 5 by 7-1/2 inches. A major article, with accompanying maps, photos, and drawings, usually occupies 10 to 12 ORE BIN pages. (The ORE BIN usually contains 16 pages.)
3. Drawings and maps should be designed to be legible when reduced to fit within the page measurements. Drafted material must be submitted in final form.
4. Photos should be black-and-white glossy prints. Occasionally color prints with good contrast will be considered; but NO slides, please.
5. Supply numbers and captions for all illustrations. All illustrations become the property of the Department except by special arrangement with the author.
6. Standard U.S. Geological Survey form for references is used. Authors are responsible for accuracy and completeness of citations.

Department editors and geologists read each manuscript, and the Department has the privilege of acceptance or rejection. An accepted manuscript is edited and, if necessary, returned to the author for review or alteration before publication.

Authors receive 25 complimentary copies of the issue in which the article appears.

Address manuscripts and accompanying materials to ORE BIN Editor, 1069 State Office Building, Portland, Oregon 97201.

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ERRATUM

In the article, "Mined Land Reclamation" (ORE BIN, January 1977), the sentence beginning in paragraph two, line four, which reads, "Reclamation costs average $150 per acre," should read, "Program administrative costs to the State average about $150 per acre reclaimed."

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