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THE ORE BIN

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DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

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The ORE BIN
Volume 40, No. 4
April 1978

THE GOLDEN YEARS OF EASTERN OREGON*

By Miles F. Potter and Harold McCall

*Reprinted by popular request from the June 1968 ORE BIN

This pictorial article is an abstract of the authors' book, "Oregon's Golden Years," published by Caxton Publishing Company, Caldwell, Idaho, in 1976. The book is already in its third printing.

The article and accompanying pictures remind us of a commonly forgotten fact: The discovery of gold in eastern Oregon had a tremendous impact on the economy and development of the entire region, and this impact is still being felt more than a century later.

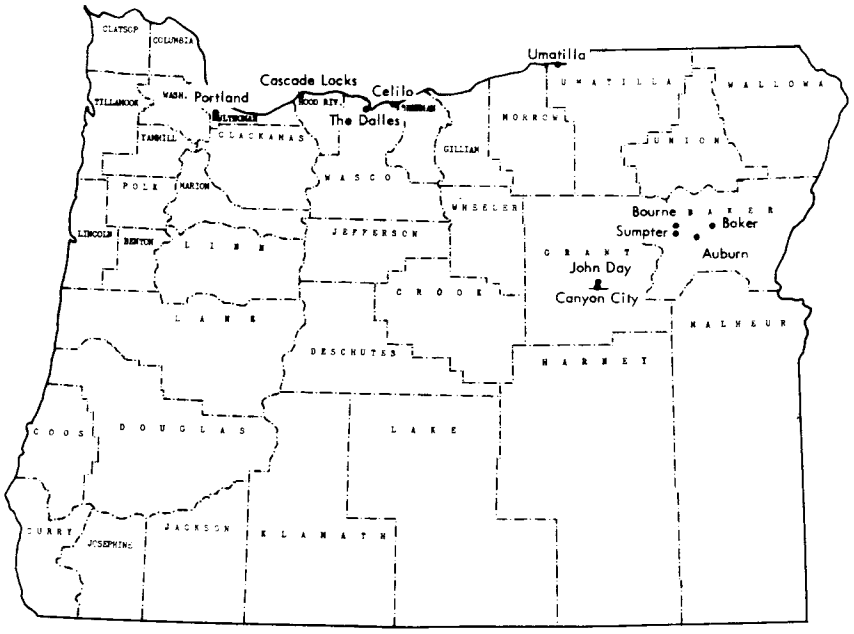
Gold mining was also the mainstay of southwestern Oregon's early economy and played an equally significant role in the development of that area.

Mr. Potter is a long-time resident of eastern Oregon and an amateur historian of some of the early gold camps in Grant and Baker Counties. Mr. McCall, a photographer in Oregon City, has a keen interest in the history of gold mining. The two worked together for a number of years to assemble photographs and data from many sources for their book.

Prior to the start of the Civil War in 1861, the early pioneer wagon trains which traversed the Oregon Country east of The Dalles did not tarry. Instead, they rolled ever westward through eastern Oregon's vast wilderness over the dusty ribbon of the Oregon Trail to the comparative safety and more alluring market area of the Willamette Valley. Contributing to this westward push was a military order by General Wool discouraging settlement in the eastern area by immigrants, or "whites," other than Hudson Bay men and miners [provided that the miners did not molest the Indians and their squaws].

The story of the early settlement of eastern Oregon owes its existence to a particular wagon train known today as the "lost wagon train of 1845" -- so named because its members took an ill-advised short cut through east-central Oregon and lost their way during the process. While they were hunting for the short cut they made a reported discovery of gold somewhere along their route -- a report that resulted quickly in the legend of the Blue Bucket mine.

This legend of the Blue Bucket mine is the reason a party of miners was



Index map of Oregon, showing transportation points along the Columbia River and gold-mining centers in Baker and Grant Counties

in eastern Oregon 16 years later when the Civil War was in progress. The miners had set out to look for the Blue Bucket, but ended up making a demonstrable discovery of gold in their own right. The place: Griffin Gulch, in what is now Baker County. The date: October 1861.

Display of the Griffin Gulch gold in Portland under a large banner saying "The First Gold Discovered in Eastern Oregon" gave rise to a cry that spread like fire in a strong wind. Another discovery of gold on Canyon Creek, in what is now Grant County, in 1862 and an almost simultaneous discovery of the yellow metal near Lewiston, Idaho, started a stampede of thousands of prospectors, miners, merchants, gamblers, and camp followers. Also in the same year, 1862, Congress passed the Homestead Act. Thus many farmers joined the rush, knowing that the mining industries would furnish a market for their products.

During the years immediately following the Griffin Gulch discovery, and indeed for a period of several decades thereafter, gold mining served to stimulate settlement and the establishment of a diversity of related business activities. For instance, even in 1862 steamers out of San Francisco heading north for Portland were sold out weeks ahead of time, and on one trip in that year the steamer "Brother Jonathan" landed more than a thousand people on the docks in Portland. Other shipping records show that 24,500 persons traveled up the Columbia River by boat in 1862. Another 22,000

About 800 people lived in Portland when this picture of Front Street was taken in 1852. Ten years later, when the gold stampede got under way, the population was around 2900, yet during the opening 3-year period of the gold rush it is estimated that 82,000 people passed through Portland en route to the gold fields in eastern Oregon and Idaho. (Oregon Historical Society photograph)

The portage at the Cascades in 1861 (now known as Cascade Locks) was 6 miles long. When steamers from Portland unloaded their up-river freight at the Cascades for transport over the portage during the gold rush, the mule-drawn flat cars were so slow that freight sometimes piled up for days before it could be loaded onto steamers above the rapids for transfer to The Dalles. (Oregon Historical Society photograph)

made the passage in 1863 and 36,000 more did so in 1864 -- all following the rainbow to the pot of gold.

The river boats belonged to the Oregon Steam Navigation Co. and operated originally between Portland and The Dalles, with a portage around the Cascade Rapids. Horse-drawn drays in Portland at times waited for 24 hours with baggage and supplies to be loaded on the up-river steamers, and so great was the traffic at Cascade Rapids that the portage was frequently blocked for days. In fact, steamer records show that 46,000 head of cattle were shipped up river along with additional thousands of horses, mules, hogs, and sheep during the first eight months of 1862.

At the outset, and with no competition, transportation costs on the river to The Dalles varied between $40 and $50 per ton. The passenger fare was $20 with meals extra. The freight on a dozen brooms was a dollar and it was not until 1869, when a trail was opened through the Gorge for cattle and pack trains, that rates were greatly reduced.

The Dalles was the original jumping-off place and the outfitting headquarters for all of what became known as the eastern Oregon gold belt -- an area that is today recognized as extending in a northeasterly direction from the vicinity of Canyon City on the west to the Snake River on the east. The Dalles also served as the "last stop" for the mining camps in Idaho. Nearly every group of men had to outfit there; and $150 was the accepted price for a good mule during at least some of the period. Block-Miller & Co. became for a time the largest general merchandise store in the state and also the leading buyer of gold, averaging $50,000 a month in purchases between 1861 and 1863.

People and supplies heading out from The Dalles to the Oregon gold fields followed one of two routes: either the military road or the Oregon Trail. Those headed for Upper Town (now Canyon City) and for Lower Town (now John Day) moved over the old military trail. In 1862 this was merely a blazed line over much of the route. However, by 1864 it became a road of sorts with a regular stage schedule and relay stops along the way over a distance of 177 miles. The stage trip was made in the fast time of 39 hours. Freight charges averaged around 55 cents a pound. The charge for the first few shipments of gold carried by pack train was equal to 3 percent of the weight of the shipment; that is, 3 ounces of gold for every hundred shipped.

The Oregon Trail served as the route from The Dalles to the gold mines in the Auburn area. By 1863 Wells-Fargo was operating along this route as well as out of Canyon City. However, during 1863 a 15-mile portage road was built around Celilo Falls, after which another group of boats was put in service to ply the upper waters of the Columbia and Snake Rivers as far as Lewiston, Idaho. Thus, in 1863, Umatilla Landing became the port for shipments to the Auburn area, shortening the distance overland from The Dalles to around 150 miles. Gillette (1904) reported that on just one trip up river from Celilo to Lewiston the steamer "Tenino" took in $18,000 from passengers, freight, meals, and berths. By 1865 there were 14 steamers

This small engine, on display at the Union Station in Portland, was named "The Pony." It was built in San Francisco, then shipped to the Cascades in 1862 to help speed up the traffic over the portage. The rails were made of wood covered with strap iron. This was Oregon's first railroad. (Oregon Historical Society photograph)

The Dalles was the jumping-off place and last outfitting headquarters for the gold-seekers heading east, and the "Harvest Queen" pictured here was one of several boats plying the river between the Cascade portage and The Dalles. The famous Umatilla House is in the background. More money reportedly passed over its bar during this period than over any other bar in Oregon. Block Miller & Co., general hardware merchants, are said to have purchased an average of $50,000 in gold each month over a period of 3 years. (Oregon Historical Society photograph)

operating up river from Celilo Falls and between there and Lewiston, Idaho, the traffic reportedly became so great that the boats paid for themselves in a few months.

Not all traffic flowed eastward during the 1860's. Instead, the surface and placer mining was funneling millions of dollars in gold westward over the trails to The Dalles and thence down river by boat to Portland and from there to San Francisco by either ocean steamer or overland express. Lindgren (1901, p. 717) estimated that Canyon Creek in Grant County produced between three to five million dollars a year up to 1865. Following this there was a gradual decline, as the richest of the easiest-to-mine placers became worked out. Even so, Raymond (1870, p. 224) estimated that production in 1865 averaged around $22,000 a week, or more than one million dollars per year.

The flow of gold from the Auburn area presumably moved at a similar rate as that from Canyon City. In any event, the river steamer "Julia" carried $100,000 worth of gold dust down river to Portland on April 28, 1862, and the "Carrie Ladd", followed with a $175,000 shipment on May 20 and another worth $200,000 on June 25.

As for ocean-going steamers, other records show the "Tenino," another vessel with the same name as the river boat mentioned earlier, carried a $200,000 gold shipment from Portland to San Francisco August 5, 1862. On October 27 of the same year the "Sierra Nevada" carried a half-million dollar shipment. During 1863, on three trips the "Sierra Nevada" transported an additional total of slightly more than $931,000 worth of dust. The "Brother Jonathan," also on three trips, conveyed in excess of one million and on one trip, December 4, the "Oregon" is credited with a shipment valued at $750,000. During 1864, these same steamers, plus the "John L. Stephens" and the "Pacific," carried gold cargoes totaling somewhat over $3,100,000 in value, and it is to be borne in mind that these records are without doubt quite incomplete. The reader should also remember that these values represent the old $20.67 price for gold which prevailed at the time, and not the present $35 per ounce price.

Some gold, of course, traveled by overland stages to San Francisco; available records for shipments of bullion from Portland by way of Wells Fargo Express are as follows:

For 1864	$6,200,000
For 1865	$5,800,000
For 1866	$5,400,000
For 1867	$4,001,000

All told, from 1861 to 1867 the Northwest produced $140,000,000 in gold, while during the same period California produced $210,000,000, according to figures cited in "The History of Oregon" by Harvey Scott. This production went a long way towards bolstering the economy of our government during the Civil War.

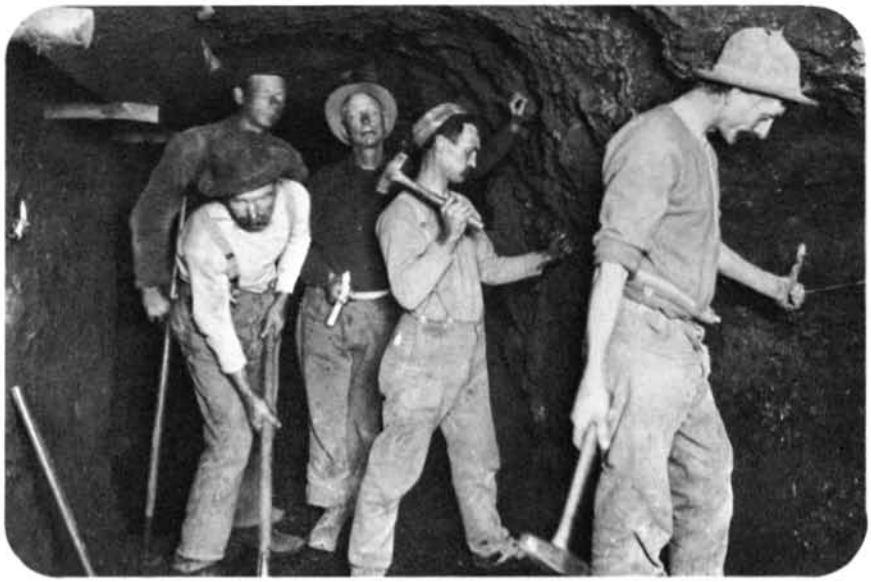
(Text continued on page 70)

The difficulties of the portage above The Dalles and past Celilo Falls were lessened by the construction in 1863 of the 15-mile narrow-gauge "portage" railroad. Built on the Oregon side of the Columbia River at a reported cost of $50,000 per mile and in service until the 1880's, this railroad constituted an important link between the river boats plying the Columbia between Cascade Locks and The Dalles and those plying the up-river run from Celilo to Umatilla Landing and Lewiston. (Oregon Historical Society photograph)

The river steamer "Tenino," on the upper Columbia. With stops at Umatilla Landing, Wallula, and Lewiston, this vessel is credited with having taken in $18,000 on one up-river trip in 1863. (Oregon Historical Society photograph)

Baker City as it appeared around 1867, or about one year after it became the county seat of Baker County. The large, unpainted building in the foreground served as the Court House and the repository of the county records removed from Auburn. With Auburn on the decline, Baker went on to become the Queen City in the eastern Oregon gold belt and the center for all heavy mining equipment. It even boasted a Chinatown population of more than 400 with its own stores and joss house before the end of the century. (Oregon Historical Society photograph No. 92)

Bourne, once known as Cracker City, is situated 6 miles north of Sumpter on Cracker Creek and is surrounded by some of the best mining property in the state -- the North Pole, E & E, Columbia, Golconda, and many other noted lode properties. Founded in 1890, Bourne soon had a population of 1500, with 2 hotels, 4 saloons, 7 general stores, 2 newspapers, 3 restaurants. Today there are only a few summer cabins and some buildings at the E & E mine. New exploration work has been under way in the area for several years; however, this, together with increasing world-wide pressure for a raise in the price of gold, may give the old town a new lease on life.

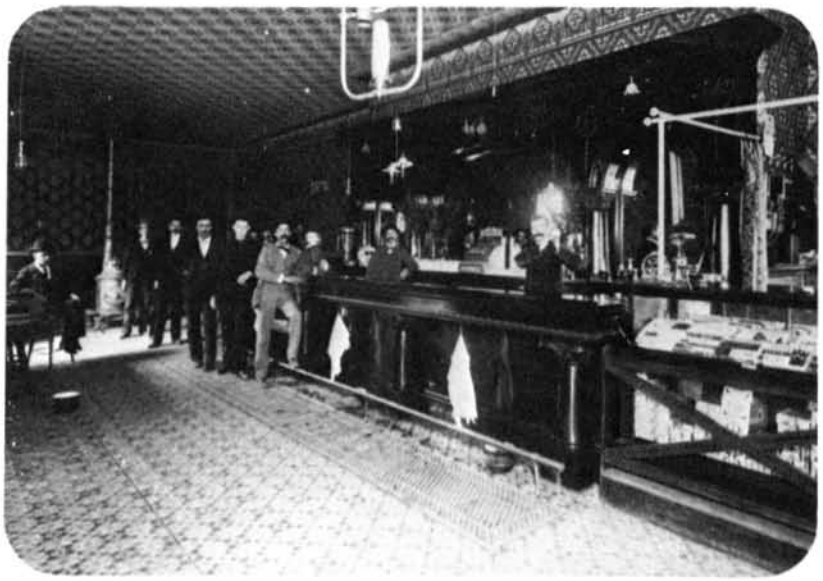


Miners and muckers at the Bonanza mine, 1894. Note use of wax candles and "single jacks" -- 4-pound hammers used with hand-held drill steel. Discovered in 1877 by Jack Haggard, the mine was sold for $350 in 1879 to the Bonanza Mining Co. In 1892 it was purchased by the Geiser Brothers, who took out about $400,000 before selling it to the Pittsburg Mining Co. for $500,000. The mine was eventually worked to a depth of 1200 feet with a production estimated at approximately 1-3/4 million dollars at the old $20.67 per ounce price of gold. Geiser, a town located at the mine, boasted a post office between July 15, 1898 and June 15, 1909.

The old Potosi cabin near Windy Gap in the Greenhorn Mountains, one of the oldest mines in the Greenhorns. Nearby mines included the Ben Harrison, Morris, and the Bi-metallic. Picture taken in July, 1917. Notice snow in background and snow-broken shakes along eaves. Cabin is at an elevation of 7000 feet above sea level.

The small, but rich, Great Northern mine, "on the north side of Canyon Mountain" near Canyon City in Grant County, was discovered by Ike Guker, standing in the center. Man on right, standing on bank, is Frank McBean, old-time stage driver to Winnemucca. It is known that Guker let visitors pick nuggets and keep them. There was $65,000 taken from this little hole. The mine was discovered as late as 1897.

The narrow-gauge Sumpter Valley Railroad's Tipton station, located between Whitney and Austin, was an ore-shipping station for the mines around the town of Greenhorn during the fore part of the present century. The child in the picture is Dick Nokes, now assistant managing editor of the Oregonian.



The bar in the Gem Saloon in Sumpter -- a swanky establishment which featured a "lady orchestra" during the opening decade of the present century. When narrow-gauge rail service came in 1895, Sumpter was only a small mining camp. By 1904, however, the population reached 3500 with a payroll from the surrounding mines supporting two banks, 20 saloons, and the usual contingent of good managers, miners, and loggers along with the inevitable red-light district and its following of gamblers, shyster promoters and other fast-buck characters -- all looking for the "fickle goddess of fortune."

Saloons were not the only impressive establishments in the mining towns at the turn of the century. As the rich placer deposits became depleted, improved mining techniques made the source quartz lodes increasingly attractive targets for development; hence, wealthy investors and mining engineers came to the gold fields from all over the world. Their offices, often adorned with the latest of furnishings, were the headquarters for many planning sessions of far-reaching consequence.

The Cornucopia mine, located 10 miles northwest of Halfway in Baker County, was for a time one of the six largest gold mines in the United States. It also had the longest continuous run of any mine in Oregon. There were 36 miles of tunnels and a depth of 3000 feet. The estimated output is $18,000,000 in combined gold, silver, copper, and lead. About 300 men were employed during its heyday of operation in the late 1930's. This picture obviously was taken earlier, if mustaches and bowlers are any criterion.

The dining room at the Cornucopia mine, sometime after 1922, when the company installed its generating plant. This mine was in operation about 50 years, and before the 8-hour day went into effect the men worked 10 hours a day, 7 days a week. Just think of the food that was served over these tables!

↑Site of the old town of Auburn, located in Baker County south of Griffin Gulch. Nothing remains of Auburn today except fragments of old foundations. The June 1940 issue of "Oregon Mining Review" states that within 6 months after its creation the town had 700 cabins, many tents, and stores, hotels, and gambling houses. Between May and August of 1872, about 1700 mining claims were recorded in the vicinity. A post office was established Nov. 1, 1862. During that year Auburn became the seat of Baker County. If the report is true that Auburn had close to 6000 inhabitants in 1862-1863, it was for a time the largest town in Oregon.

↑Henry Griffin, the man who started it all by discovering gold in Griffin Gulch in 1861, ended up buried in a cemetery located near Auburn, with his name misspelled on his headstone. (Oregon Historical Society photograph)

That gold mining remained an exceedingly important factor in our local economy for many decades is well known. What seems to be too often overlooked, however, is the part this mining played in the settlement of all of the country east of the Cascades. For instance, it was not until the year 1865 that Portland's population reached 6000 persons -- about the reported size of Auburn in the winters of 1862 and 1863. Had it not been for the market the mines created, the settlement of eastern Oregon would undoubtedly have occurred at a far slower rate.

Selected References

Bancroft, Hubert H., 1888, The Works of Hubert Howe Bancroft; History of Oregon Vol. II, Discovery of gold in Oregon, 1850-1852, p. 174-204.

Blue Mountain American: Sumpter, Oregon newspaper.

Carey, Charles Henry, 1922, History of Oregon (Biographical), Vol. I, p. 658-710: The Pioneer Historical Publ. Co.

Corning, Howard M., 1956, Dictionary of Oregon History: Portland, Oreg., Binfords and Mort.

Fuller, George W., 1931, A History of the Pacific Northwest: New York, A. A. Knopf, p. 278-289.

Gillette, Preston W., 1904, Brief History of the Oregon Steam Navigation Company: Oregon Historical Quarterly, vol. 5, p. 120-132.

Hiatt, Isaac, 1893, Thirty-one Years in Baker County: Baker City, Ore., Abbott & Foster, 208 p.

Lindgren, Waldemar, 1901, Gold Belt of the Blue Mountains: U.S. Geol. Survey 22nd Ann. Rept., Part II, p. 551-776.

Lockley, Fred, 1928, History of the Columbia River Valley from The Dalles to the Sea, vol. I: Chicago, S. J. Clarke Publ. Co.

Parrish, Philip H., 1938, Historic Oregon: New York, MacMillan Co., p. 180.

Raymond, Rossiter W., 1870, Statistics of Mines and Mining in the States and Territories West of the Rocky Mountains: U.S. Treas. Dept., 2nd Ann. Rept. of U.S. Commissioner of Mining Statistics.

Schafer, Joseph, 1918, A History of the Pacific Northwest, Ch. XIV, The Northwest and California: New York, MacMillan Co.

Scott, Harvey W., 1924, History of the Oregon Country [Leslie M. Scott, compiler], Vol. I, Compiler's Index, Pioneer stimulus of gold in the Oregon Country, p. 330-338: Cambridge, The Riverside Press.

Winther, Oscar Osburn, 1950, The Old Oregon Country; a history of frontier trade, transportation, and travel: Stanford University Press.

* * * * *

U.S. DOUBLES EARTHQUAKE RESEARCH

Earthquake research by the USGS will more than double this year. Direct appropriations for research on the reduction of earthquake hazards total $30 million for Fiscal Year 1978, an increase of $18 million over Fiscal Year 1977.

The expanded program, aimed at mitigation of potential earthquake losses, is focused on the development of capability to predict earthquakes, evaluation of the potential of large reservoirs to trigger earthquake activity, and evaluation of earthquake hazards and risks in earthquake-prone regions.

Robert M. Hamilton, chief, Office of Earthquake Studies, USGS National Center, Reston, Va., says that the increase in the earthquake research budget reflects heightened concern over the potentially disastrous consequences of future major earthquakes in the United States. "Areas such as the Pacific Coast, Alaska, and the Mississippi and St. Lawrence river valleys that have experienced destructive earthquakes in the past will experience more in the future. Moreover, the increased development and growth in these areas have increased greatly the potential for future injury and destruction," Hamilton explains.

The Earthquake Hazards Reduction Act of 1977, which recognizes the major roles to be undertaken by the U.S. Geological Survey and the National Science Foundation, directs the establishment of a National Earthquake Hazards Reduction Program and authorizes direct appropriation to the two agencies. The Act also provides for the development of an implementation plan to provide for the optimum use of the research results through land use planning, design criteria, building specifications and standards, evaluations of scientific predictions, and warnings to residents.

The combination of research elements by the USGS and the National Science Foundation to provide for balance in the rapid expansion of the earthquake program is based, in large part, on a comprehensive study by an advisory group organized by the Science Advisor to the President.

Among highlights of the expanded earthquake program are:

- A major resurvey by spirit leveling of the southern California uplift area, the so-called "Palmdale Bulge," is being conducted by crews from federal, state, and local agencies, with leveling being coordinated by the National Geodetic Survey, National Oceanic and Atmospheric Administration.
- Hazards evaluation, including seismological studies of both regional and local earthquake activity, and geologic investigations of faults, recent deformations of the earth's crust, landslides, and other forms of ground failure caused by earthquakes, will be focused on eight

major regions, each containing one or more urbanized areas and having an identified seismic risk.

- Major investigations to evaluate hazards in central and southern California are being expanded, and hazard evaluation efforts are being augmented in the Puget Sound, Ogden-Salt Lake City-Provo, and southern coastal Alaska regions.
- Somewhat over half the hazard evaluation effort is being concentrated in the western U.S.; but new or expanded earthquake studies are underway in major regions of the eastern U.S., where earthquakes of the 18th and 19th centuries could cause widespread destruction if they were to occur today.
- Topical studies aimed at developing the capability to make reliable predictions of the time, place, and magnitude of future earthquakes will continue to focus on the seismically active parts of central and southern California.

Copies of "Earthquake Prediction and Hazard Mitigation: Options for USGS and NSF Programs; September 15, 1976," are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 for $1.90 each.

* * * * *

PET ROCK LOSES LIFE

The Pet Rock belonging to Charles H. Hunt, Medford, Oregon, was killed in an accident March 7. Hunt had mailed Pet Rock to the Department for a pedigree, but as no note was found with the rock, it was assumed that a routine mineral identification, which required crushing of the sample, was to be conducted. Pet Rock was crushed, thereby losing his life. Portland Police do not plan to file charges.

Pet Rock, a native of Alaska, was well rounded as a result of his extensive travels. Friends, viewing his body as it lay in state, said that his only real defect was a minor vein of calcite and that although his surface was tarnished he had a heart of (fool's) gold. Pet Rock left a large number of sons and daughters as he passed from life.

Hunt, informed of the tragedy by phone, took the news well. Burial took place immediately after the phone call.

* * * * *

THE POST OFFICE DOES NOT AUTOMATICALLY FORWARD all of your mail when you give notice of address change. To keep your ORE BIN coming, be sure the Department gets your new address.

1978

PACIFIC NORTHWEST METALS & MINERALS CONFERENCE

New Horizons In Metals and Minerals

MAY 15-17, 1978
HILTON CONVENTION CENTER
921 S.W. Sixth Avenue
Portland, Oregon

SUNDAY — MAY 14

Registration — Broadway Lobby — 5:00 - 8:00 p.m.

MONDAY MORNING — MAY 15 9:00 a.m.

"BENEFICATION AND PROCESSING OF PHOSPHATES"

A. R. Rule, Chairman

"Dry Beneficiation of Western Phosphates." F. Hamill, Alumet Co., Soda Springs, ID

"Phosphoria Leaching Mechanisms, Useful for Planning By-Product Recovery." J. Clements, K. Prisbrey, O. Wick, and J. Hartley, Univ. of Idaho, Moscow, ID

"Flotation of Carbonate and Silicate Minerals From Partially Altered Rock." D. C. Dahlin, A. Rule, and A. J. Fergus, Bureau of Mines, Albany, OR

"Absorption of Depressants in the Collophane Calcite System." M. C. Fuerstenau, South Dakota School of Mines, Rapid City, SD

"RARE METALS"

G. J. Dooley and M. B. Siddall, Chairmen

"Substitution of Titanium for Other Materials in Corrosive Environments." J. M. York and G. J. Dooley, Oregon Metallurgical Corp., Albany, OR

"Perturbed Gamma-Ray Correlations — Applications to Hf-Zr Submicroscopic Structure." R. Rasera, Oregon State Univ., Physics Dept., Corvallis, OR

"Application of Surface Techniques to Anodizing in Ti and Al Alloys." J. T. Grant, Univ. Energy Sys., Inc., Medway, OH, and T. W. Haas, AFML, Wright-Patterson, OH

"METALS: RECENT DEVELOPMENTS"

R. Blickensderfer, Chairman

"Stainless Steel — A Multifaceted Material." D. C. Perry, Armco Steel Corp., Middletown, OH

"High Yield Steels." D. C. Little and P. M. Machmeier, General Dynamics, Fort Worth, TX

"Metals Substitution — A Review of the ASM-OTA Meeting." K. J. Sharma, SRI International, Menlo Park, CA

"Hydrogen Embrittlement." N. S. Stoloff, Rensselaer Polytechnic Institute, Troy, NY

WELCOMING LUNCH — 12:00 p.m.

Keynote Speaker — Dr. Tom Falkie, Vice President, Berwind Corp., Philadelphia, PA

MONDAY AFTERNOON — 2:00 p.m.

"NEW DEVELOPMENTS IN EXTRACTIVE METALLURGY"

R. E. Siemens, Chairman

"The Selective Reduction of Nickeliferous Ores In An Electric Furnace." D. Halter and M. A. Warnert, Hanna Nickel Smelting Co., Riddle, OR

"Solvent Extraction of Cobalt From Ammoniacal Laterite Leach Liquors." D. N. Nilsen, R. E. Siemens, S. C. Rhoads, Bureau of Mines, Albany, OR

"Coupled Transport Membranes for Metal Separation." R. W. Baker, W. C. Babcock, H. K. Lonsdale, and D. J. Kelly, Bend Research Inc., Bend, OR

"The Removal of Iron From Aluminum Chloride Leach Liquor by Solvent Extraction." R. T. Sorenson, Bureau of Mines, Boulder City, NV

"Application of Pressure Hydrometallurgy for Metal Production." M. Cantle, Sherritt Gordon Mines, Canada

"Problems Associated With Low-Level Naturally Occuring Radionuclides in Mineral Processing." D. Voit, Teledyne, Wah Chang, Albany, OR

"METALS: RECENT DEVELOPMENTS"

K. Mensah, Chairman

"Materials for High Energy Applications." R. M. Horn, Univ. of California, Berkeley, CA

"Materials Problems of Sulfidization." M. S. Bhat, Univ. of California, Berkeley, CA

"Coatings for High Energy Applications." G. Lea, Gulf Gen. Atomic, San Diego, CA

"GOLD TECHNICAL SESSION"

J. M. West, Chairman

"Enhancing Percolation Rates in Heap Leaching of Gold and Silver Ores." H. J. Heinen, R. E. Lindstrom, and G. McClelland, Bureau of Mines, Reno, NV

"Heap Leaching of Gold at Round Mountain, NV." R. Leone, Smoky Valley Mining Co.

"Gold Operations at the Atlanta Mine, Nevada." P. Hulse, Standard Slag Corp., Reno, NV

"Geology and Gold Operations at the New York Cougar, Independence Mines, Eastern Oregon." J. Young, W. Bowes & Assoc., Steamboat Springs, CO

MONDAY EVENING — 5:00 - 7:00 p.m.

A complimentary beer party with snacks will be held in the industrial exhibit area.

TUESDAY MORNING — MAY 16 — 8:30 a.m.

"GOLD AND MONEY"

V. C. Newton and W. Zwick, Chairmen

Russell Wallace (Session Moderator) Vice President, Homestake Mining Company, San Francisco, CA

"History's Greatest Flight From Paper Money to Gold." J. Exeter, Consultant on International and Domestic Money, Mountain Lakes, NJ

"Challenges Facing American Investors Interested in Gold Shares." J. McFalls, Value-Action Advisory Service, Gold Investment Consultant, Seattle, WA

"Predominance of Credit in the Present Monetary World." P. Simpson, Professor of Economics, University of Oregon, Eugene, OR

"Gold Investments, South Africa." F. J. Rahn, General Mining & Finance Corp., Ltd., Johannasburg, South Africa

(Title to be Announced) — Office of the Assistant Secretary for International Affairs, U. S. Treasury, Washington, D.C.

"NEW WELDING HORIZONS"

D. Wold, Chairman

"Weldability and Sound Welding Decisions." F. Gatto, Puget Sound Naval Shipyard, Bremerton, WA

"Design for Reliability in Welded Structures." G. Teeter, State of Oregon, Bridge Dept. Salem, OR

"Fabrication for Reliability in Welded Structures." L. Thompson, Northwest Scientific, Portland, OR

"Clean Steels for Construction." J. L. Fox, Lukens Steel Co., Burlingame, CA

"GEOTHERMAL"

E. Zais, Chairman

"Cost, Benefit and Risk of Geothermal Energy." A. Grant, Portland General Electric.

"The Mount Hood-Portland Geothermal Project." J. Hook, Consulting Geologist, Salem, OR

"Non-Electric Applications of Geothermal Energy in Klamath Falls, Oregon." J. Lund, Oregon Institute of Technology.

"Exploration for Geothermal Energy in the Pacific Northwest." W. Dolan, Chief Geophysicist and Manager of Geothermal, AMAX Eploration, Denver, CO

"Raft River Geothermal Project and Geothermal Project and Geothermal Applications in Boise, ID" (Speaker to be announced) Idaho National Engineering Laboratory

TUESDAY NOON — 12:00 p.m.

GOLD AND MONEY LUNCH

(Speaker to be announced)

TUESDAY AFTERNOON — 2:00 p.m.

"GEOLOGY OF THE NORTHWEST"

Mr. & Mrs. R. C. Kent, Chairpersons

"Quartsville Mining District." S. Muntz, COMINCO, Inc., Spokane, WA

"Basalt Geology of Eastern Oregon." S. Farooqui, Shannon and Wilson, Inc., Portland, OR

"Geology of Southern Washington Cascades." P. Hammond, Portland State Univ., Portland, OR

Also included:—

A PANEL ON COAL GEOLOGY OF THE NORTHWEST

TUESDAY AFTERNOON — 2:00 p.m.

POSTER SESSION

C. B. Daellenbach, Chairman

"Minerals Needed to Fuel Alternative Energy Resources." R. Tallman, Bonneville Power Admin. Portland, OR

"Investigation in the Chloride Metallurgy of Copper." S. El-Rahaiby, W. Taylor, and Y. Rao, Univ. of Washington, Seattle, WA

"Synthetic Fluorspar from Fluosilicic Acid." S. Bullard, R. Olsen, and W. Gruzensky, Bureau of Mines, Albany, OR

"Advancement in Die Forming for Saw Chain Cutters." A. Hille and J. DeHaven, Omark Industries, Portland, OR

"Cadmium Behavior During Oxidation of Zinc Sulfide Concentrate." H. Leavenworth and D. Yee, Bureau of Mines, Albany, OR

"Fixation of Arsenic-Bearing Flue Dusts." A. Mehta and L. Twidwell, Montana College of Mineral Science and Technology, Butte, MT

"Zeta Potential Studies of Idaho Phosphoria Phosphate." P. Wikoff and K. Prisbrey, Univ. of Idaho, Moscow, ID

"Volatilization of Arsenic During Roasting of Copper Ores." A. Landsberg and J. Mauser, Bureau of Mines, Albany, OR

"Rubber Tired Equipment in Underground Mining." S. Countryman, Wagner Mining Equipment Co., Portland, OR

"NEW WELDING HORIZONS"

W. E. Wood, Chairman

"Investigations of Welding Problems." R. L. Ray, Consulting Metallurgical Engr., Oakland, CA

"Let's Help Each Other." (Discussion on Filler Metal Testing & Purchasing Specifications), Harry Reid, Teledyne McKay Co., York, PA

"Applied Advantages, Bulk Welding Process." T. Jordan, TAPCO Corp., Houston, TX

TUESDAY EVENING — BANQUET, 6:30 p.m.

"Alyeska Pipeline." John Moeller, Past National President AWS, Los Angeles, CA

WEDNESDAY — MAY 17 — 8:30 a.m.

"CHALLENGE OF CHANGE"

A. J. Fergus, Chairman

"Farming Mined Farm Land." J. Gray, State of Oregon, Dept. of Geology and Minerals Ind., Albany, OR

"Overview of the Resources Planning Act: Legislative Intent and the 1980 Plan." J. Butruille, Region 6, Forest Service, Portland, OR

"Economic and Environmental Implications of Recent and Proposed Federal Legislation." W. Cate, Speculative Ventures, Pacifica, CA

"Planning on Open Pit Mine Today: Engineering Geology and Hydrology." R. Howard and D. Ralston, Univ. of Idaho, Moscow, ID

"PYROMETALLURGY"

R. Nafziger and D. Taylor, Chairmen

"Present Smelting Practice at Anaconda, Mont." J. McCoy and C. Partin, Anaconda Company, Anaconda, MT

"Recovery of Iron and Copper from Slags by Carbon Injection." J. Paige, D. Paulson, and W. Hunter, Bureau of Mines, Albany, OR

"Electrical Characteristics of Smelting Slags." J. Persson, Lectromelt Corp., Pittsburgh, PA

"The Application of Real-Time Computer Control to Vacuum Arc Melting of Titanium." D. Mathews and F. Pendleton, Titanium Metals Corp. of America, Henderson, NV

"Magnesium Purification by Use of Iron and Zirconium to Remove Aluminum." M. Siddall, Teledyne Wah Chang, Albany, OR

"PANEL ON ENERGY" — 9:00 a.m.

O. D. Osborne, Moderator

"The Future of Electrical Energy in the Northwest — What It Means for the Metals Industry."

Richard Timm, Oregon Dept. of Energy
Harry Helton, Reynolds Metals
Larry Williams, Oregon Environ. Council
Robert Murray, Energy Consultant
Hugh Hansen, Oregon State University

NOTE: Montana Tech. Alumni Breakfast, Tuesday, May 16, 1978, 7:00 a.m. For reservations, call Al Ekeberg, (206) 573-7440.

PNMMC — PRE-REGISTRATION FORM — MAY 15-17, 1978

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To request application forms to register under the new Oregon Geologist Registration Act and a copy of the Code of Professional Conduct, write to the State Department of Commerce, 403 Labor and Industries Building, Salem, Oregon 97310 (phone 503-378-4294).

Fee for initial registration is $50; annual renewal is $50; initial registration and annual renewal in the engineering geologist specialty is an additional $25. Qualified practicing geologists may obtain licenses without examination before September 30, 1978.

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DOGAMI WILL FILL IN THE BLANKS

A few January and February ORE BINS containing some blank pages were inadvertently mailed. If you received a defective copy, write to the Department for a free replacement.

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(Please include remittance with order; postage free. All sales are final - no returns.
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26. Soil: Its origin, destruction, and preservation, 1944: Twenhofel	$ .45
33. Bibliography (1st suppl.) geology and mineral resources of Oregon, 1947: Allen	1.00
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
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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
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