THE ORE.-BIN

Volume 22, 1960

INDEX TO ORE.-BIN, Vol. 22, 1960

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

****

OREGON'S MINERAL INDUSTRY IN 1959

By

Ralph S. Mason*

Oregon's mineral industries chalked up a remarkable record of productive growth in the decade just ended, with an 84 percent increase in dollar value of raw mineral products produced. Oregon stood head-frame high over all the neighboring states in this respect. Washington increased 27 percent, California 36 percent, Nevada 36 percent, and Idaho declined 15 percent. Preliminary estimates by the U.S. Bureau of Mines for the State's value of minerals produced during 1959 show a total of $39,600,000, a decline of 12 percent from the previous year. The U.S. Bureau of Mines reports only on the raw minerals produced, and the values given are usually cost-of-production figures rather than value at point of sale. The difference between the two would amount to about 100 percent.

Not included in the above figures, but of large and rapidly growing importance to the stabilization of the State's economy are the 17 metallurgical plants shown on the accompanying index map. Seven of these plants were constructed during the past ten years and many of the others have substantially increased their capacity in this same period. Some of these plants beneficiate ores mined within the State (mercury, nickel, uranium); others treat raw or semi-refined ores imported from outside the State (zirconium, titanium, hafnium, columbium, tantalum, molybdenum, tungsten, vanadium, silicon, aluminum). The economic importance of this second group of plants is considerable. A recent article in Mining Congress Journal pointed out that in the nonferrous industry 3 percent of the eventual cost of fabricated metal products is expended in mining, 13 percent in the production of primary metal, and 84 percent in fabrication. The growth of the electro-process industry in Oregon will continue and should be encouraged. The State needs more year-around "unseasonal" industries employing large numbers of skilled workers.

During the past decade there was a 127 percent increase in steel-making capacity in the State, aluminum smelting capacity increased 59 percent, cement about 50 percent, and the production of sand and gravel 38 percent.

The year 1959 saw still more proposed withdrawals of public domain lands by Federal agencies. A total of 21,209 acres in 13 different counties is involved in 12 areas. The U.S. Forest Service requested 7 of the withdrawals.

---

* Mining Engineer, State of Oregon Department of Geology and Mineral Industries.

Electro-Process Products

In ten short years, Oregon's industries based on the use of electric energy for melting and reducing metals have almost doubled in number and have increased many times in volume and variety of products. The reduction and semi-finishing of an array of metals unknown to industry a decade ago is standard practice today in the State. The metallurgical plants at Albany are good examples of this trend - and the positive benefits that can be derived from basic research. Thanks to the U.S. Bureau of Mines Electrodevelopment Station at Albany, two companies, Wah Chang and Oregon Metallurgical, have located nearby. Using imported raw materials, they produce ingots and castings of columbium, tantalum, molybdenum, tungsten, titanium, vanadium, zirconium, and hafnium. Wah Chang produced zirconium and titanium sponge under Government contract, and during the year completed the installation of two electron-beam high-vacuum melting furnaces (The Ore.-Bin, October 1959) for producing high-purity reactive and exotic metals. At year's end the company was also installing rolling mill equipment to provide fully integrated facilities capable of processing ores through to finished products. A research center to study the physical metallurgy of refractive metals is to be set up early in 1960, Wah Chang announced at year's end. Oregon Metallurgical Corporation began producing high-purity vanadium and installed a vertical vacuum-arc centrifugal casting furnace which produces titanium castings. Both Wah Chang and Oregon Metallurgical's operations are characterized by frequent changes and improvements in their procedures and equipment to keep pace with the fast-changing demands for special metals in jets, missiles, and nuclear reactors. Research by the Bureau of Mines at Albany resulted in the first shaped casting of molybdenum and the first production of ductile yttrium. A few years ago the Bureau produced the first ductile zirconium, titanium, and chromium and subsequently made the technique available to industry.

Some of Oregon's Minerals at a Glance
(Preliminary figures)

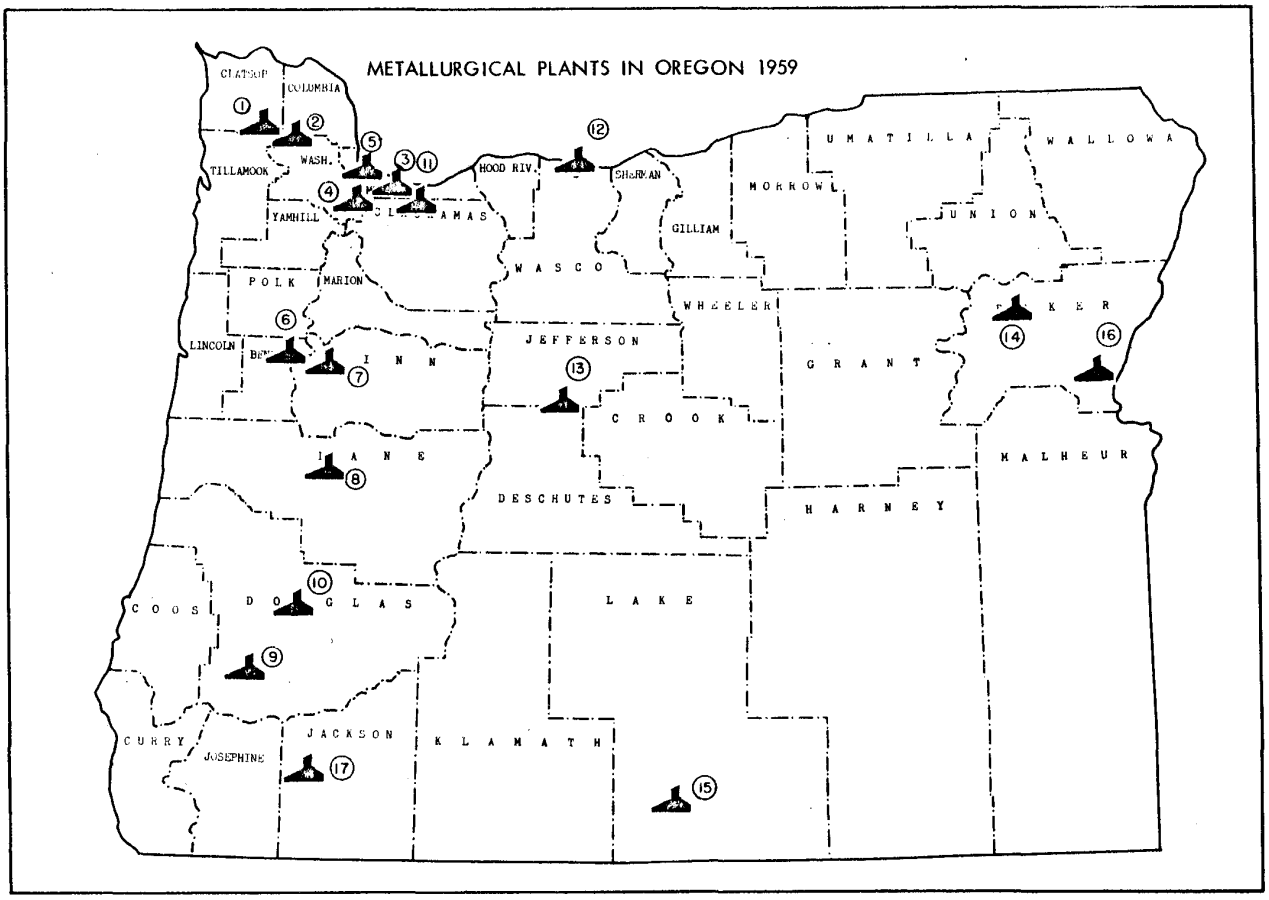
	1958	1959
Chromite	$ 379,000	$ 0 -
Clays	293,000	255,000-
Copper	5,000	0 -
Gold	50,000	15,000-
Mercury	521,000	299,000-
Pumice	331,000	358,000+
Sand and gravel	10,265,000	11,000,000+
Stone	15,621,000	11,000,000-
Undistributed*	18,932,000	17,628,000-
Total	$ 45,190,000	$ 39,600,000-

* Includes cement, diatomite, lime, uranium, etc.
(Symbols indicate relation to 1958.)

At Springfield, National Metallurgical Corporation installed a second electric furnace to make silicon. The new 3000-kilowatt, 16-foot diameter furnace doubles the plant capacity. Silicon is used as an alloy in aluminum, in silicones, as a deoxidizer in steel making, and when ultra refined in transistors. Raw materials include quartz from Nevada, petroleum coke from California, wood chips from nearby lumber mills, and electric power from the Springfield Municipal Power Company. Late in the year the plant was purchased from Apex Smelting Company by Aluminium Limited of Montreal, Canada.

Operations at the only nickel mine in the United States near Riddle were continuous throughout the year. Approximately 1 million tons of ore were mined and trammed down the slopes of Nickel Mountain to the smelter operated by Hanna Nickel Smelting Company where the ore is reduced to ferronickel under Government contract.

The two aluminum reduction plants in the State, Reynolds Metals at Troutdale and Harvey Aluminum at The Dalles, continued operations during the year. The Harvey plant commenced operations late in 1958; the Reynolds plant is 17 years old. Both plants import alumina from outside the State. Harvey unloads bottoms at Portland and rails the shipment to The Dalles.



Metallurgical and Electrometallurgical Plants in Oregon

Map No.	Company and Plant Location	Product
1	Empire Building Materials Co. Sunset Tunnel	Expanded shale
2	Smithwick Concrete Products Co. Vernonia	Expanded shale
3	Pacific Carbide & Alloys Co. Portland	Calcium carbide, acetylene, vinyl acetate
4	Oregon Portland Cement Co. Oswego	Portland cement
5	Electrometallurgical Co. Portland	Calcium carbide, ferroalloys
6	Wah Chang Corp. Albany	Columbium, tantalum, zirconium, hafnium, titanium
7	Oregon Metallurgical Corp. Albany	Zirconium and titanium ingots, forgings and castings
8	National Metallurgical Corp. Springfield	Elemental silicon
9	Hanna Nickel Smelting Co. Riddle	Ferronickel
10	Bonanza Oil & Mine Corp. Sutherlin	Mercury
11	Reynolds Metals Co. Troutdale	Aluminum
12	Harvey Aluminum Co. The Dalles	Aluminum
13	Great Lakes Carbon Corp. Lower Bridge	Diatomite
14	Chemical Lime Co. Baker	Burned lime
15	Lakeview Mining Co. Lakeview	Uranium yellow cake
16	Oregon Portland Cement Co. Lime	Portland cement
17	Ideal Cement Co. Gold Hill	Portland cement

Pacific Carbide & Alloys produced calcium carbide at its plant in North Portland. Limestone is imported from a company-owned quarry near Enterprise in Wallowa County. Construction of a $500,000 vinyl-acetate plant adjacent to existing facilities was commenced during the year. Electrometallurgical Corporation, also located in North Portland, produced calcium carbide and various ferroalloys. Oregon Steel Rolling Mills was in continuous production at its plant in Portland during the year despite the nation-wide steel strike. The plant melts steel scrap in electric furnaces. Electric Steel Foundry, a producer of stainless and other specialty steels in Portland, uses the only privately-owned betatron west of the Mississippi to check for flaws in its castings.

Industrial Minerals

Lightweight aggregates

The State's lightweight aggregate industry continued to expand both in volume and in new applications in 1959. Preliminary figures indicate that pumice increased 8 percent over the previous year. Increases in the production of expanded shale cannot be released since there are but two operators, Smithwick Concrete Products and Empire Building Materials, in the State. In the Bend area two pumice operators, Cascade Pumice Company and Central Oregon Pumice Company, produced various sized fractions of pumice and volcanic cinders principally for concrete block and monolithic concretes. Harney Concrete Tile Company at Burns also produced pumice for block. The Burns pumice is unusually hard and is extensively used as a road metal for logging roads in the area. Lightweight concrete blocks are becoming increasingly popular and, although the standard 8 x 8 x 16 inch block will always be in demand, the production of special architectural shapes and patterns is opening up new fields of use. A special "Centennial" block was extensively used at the Oregon Centennial Exposition for the construction of walls, and pierced block for screen walls was used in several other buildings on the grounds. The new Portland Sheraton Hotel employed the use of over 100,000 lightweight block, many of them containing some design, in the construction of the 11-story building.

Readymix plants used increasing amounts of expanded shale aggregate in 1959 in response to demands for lightweight monolithic concrete pours.

The most interesting development in the use of lightweight aggregate has been the rapid expansion in the use of pre-cast and pre-stressed beams and girders. Architects and structural engineers, working with manufacturers, have produced a whole new concept in modern construction. Ten years ago the thought of using a concrete beam 112 feet long to support a roof, or a beam which could be designed so that it would also be a floor, was unheard of. Today such structural members, while not yet commonplace, are going into buildings in the Northwest. One of the problems peculiar to this development has been the transportation of the finished units to the job site, often a distance of a hundred miles or more. The extreme length of some of the beams plus their weight requires special truck and trailer units equipped with two drivers, front and back, who communicate by closed circuit telephone.

While not new, the use of lightweight aggregate in tilt-up walls, lift-slabs, and poured-in-place roof and bridge decking continued to expand. Most of this type of construction has been used on industrial or commercial buildings but the industry is looking forward to the day when homes will also be made out of modular wall units either delivered ready to place or poured in standard forms on the concrete floor slab at the site. Mechanization of home construction is long overdue. The only significant advances in home construction in the past 100 years have been the use of squared lumber instead of logs and round nails for square ones.

During the year, the J. A. Wiley Company began producing wall units which may well be the forerunner of a new type of house-wall construction. Forms the thickness of the intended wall are constructed on the floor slab at the site and either chunks of rubble or shaped pieces

of building stone are placed in them face down on a bed of dry sand. Reinforcing steel is added and then concrete is poured and screeded off across the top of the form. When cured, the form is stripped and the wall panel is lifted into place. The stone face is swept free of the bedding sand and needs no further work done on it. The savings effected by this type of construction as compared to regular stone masonry are considerable. Its use ought to increase the use of building stone in home construction due to lowered costs.

Not all lightweight aggregates produced in Oregon are used in the construction industry. Crushed pumice is used as a bedding material in nurseries, for poultry litter, and as a conditioner for heavy soils. Volcanic cinders, properly sized, are sold for athletic field tracks and road metal for highways. Empire Building Materials Company announced at year's end that it was to furnish expanded shale aggregate for use in the John Day Dam on the Columbia River. The aggregate will be ground to -325 mesh and added to regular cement for its pouzzolan qualities. Pouzzolan cements are useful in massive concrete structures since they generate less heat while curing than standard cements.

Diatomite

Great Lakes Carbon Company continued production of diatomite from its quarry and plant at Lower Bridge in northern Deschutes County, the only operation of its kind in the State. In Lake County, Archie Matlock of Eugene dug about 150 tons of diatomite and hauled it to a small plant at Irving north of Eugene. Matlock produced poultry-nest material and a litter additive, both of which are said to produce cleaner eggs and a drier floor. A screening and calcining plant for processing the diatomite will be erected near Silver Lake in Lake County this spring. Other markets developed by Matlock include a sweeping compound, cleanser, nursery bedding material, and sawed insulation blocks.

Silica

The Rannells silica deposit, located approximately 35 miles east of Roseburg in Douglas County, was extensively sampled during the year by Hanna Nickel Mining Company. A 400-ton sample was shipped to the Hanna nickel smelter at Riddle for testing and the Department of Geology and Mineral Industries began preliminary geologic studies of the area. Bristol Silica Company at Rogue River in Jackson County continued production of high-grade metallurgical silica as the State's only producer. Bristol will move the plant a few miles east to a new location on the Southern Pacific tracks in the near future. The move was made necessary due to routing of the new U.S. Highway 99 through his plant.

Limestone

Sale of the National Industrial Products Company operation near Durkee, Baker County, to Oregon Portland Cement Company was announced in September. Production at the NIPCO quarry and crushing plant will continue and will provide the cement company with high-grade limestone suitable for use in sugar mills, metallurgical plants, and by the paper industry. In Josephine County, Pacific Northwest Lime, Inc., prepared to open the old Jones limestone quarry near Murphy. Considerable time was lost by the company in fighting a ruling by the Bureau of Land Management which would have imposed a toll of $2\frac{1}{2}$ cents a ton for all stone hauled out over the half-century old road. The ruling was finally set aside after nearly six months of delay, and due to the time lost the company decided to wait until spring.

Limestone was produced by Oregon Portland Cement Company at its two quarries at Lime in Baker County and near Dallas in Polk County to supply its two cement plants at Lime and Oswego. Ideal Cement Company quarried stone at Marble Mountain south of Grants Pass and trucked it to the plant at Gold Hill in Jackson County. Preliminary estimates by the U.S.

Bureau of Mines indicate that shipments of cement from these three plants declined approximately 15 percent from the previous year. The decrease is largely due to no heavy dam concrete construction in the marketing area of the plants during the year. Pacific Carbide & Alloys quarried marble near Enterprise in Wallowa County and railed the rock to its carbide plant at Portland. Chemical Lime Company quarried high-grade limestone west of Baker and trucked it to its kilns at Wingville. Due to the prolonged steel strike the kilns were idle during the fall. The plant resumed operation with one kiln in November.

Salines

The first production of soda from Alkali Lake in many years occurred in 1959. Archie Matlock, who had mined 50 tons from the potholes at the south end of the dry lake bed in 1955, reported that logging companies were experimenting with soda solutions used for killing brush in reforested areas. Apparently the soda has little effect on conifer seedlings but greatly retards growth of broad-leaved plants. The soda is also sold as an additive in steam cleaning, and tests are underway to determine the possible markets for recrystallized soda.

Building stone

At least 14 building-stone quarries were active in Oregon during the year. Most of the stone produced was of volcanic origin and consisted largely of tuffs of many colors and markings. The tuffs work easily, are relatively light in weight, and many have pleasing "warm" colors and interesting color bandings. A few tuffs are gray and are used for either retaining walls or, if quite porous, for insulating blocks in cold rooms and warehouses.

Northwestern Granite quarry at Haines was the only producer of monumental stone in the State. Melvin Parker produced the only sandstone from a quarry near Riddle in Douglas County. Parker also quarried a light-colored siliceous sinter at Kahneeta Hot Springs on the Warm Springs Indian Reservation. The stone, which has an attractive mottled appearance, is used in rubble walls. Quarries that were in operation during the year and have been more or less continuously active for the past few years included the following: Carver, Oregon Tuff Stone, Pacific States Cut Stone, Rainbow Rock, Tetherow Butte, Natural Stone, and Rocky Butte. Stone was also obtained from Dooley Mountain in Baker County, from a quarry owned by Dwane Coble about 50 miles east of Roseburg, from a deposit of "Indian Candy Stone" on the Warm Springs Indian Reservation, and from a site in southern Lake County where A. O. Bartell made some shipments of volcanic agglomerate.

Bentonite

Central Oregon Bentonite Company installed a grinding mill having a 12-ton-per-day capacity at its Prineville plant. Over 800 tons of bentonite were processed during the year and at the end of the year a larger roller mill was on order for installation in 1960. Most of the ground bentonite is sold locally to ranchers and the U.S. Bureau of Land Management for sealing stock reservoirs.

Hot water

At precisely 1:55 p.m. on July 1, 1959, a new source of thermal energy was made available in the State but six months later it was still unused and untamed. A well which had only recently been drilled to a depth of 1684 feet and then abandoned by the Nevada Thermal Power Company, began to spout water in a column 20 inches in diameter and about 200 feet high. Temperature of the water is close to the boiling point and the volume is about 500 gallons a minute. The phenomenon has become quite a tourist attraction but no practical use has been made of the "spouter", partly due to the fact that the well was not cased properly and no shut-off valve was installed. At Lakeview several buildings and the Lakeview uranium mill use hot water from wells. A highway underpass in Klamath Falls is "frostproofed" and numerous homes are heated by hot water.

Carbon dioxide

The Gas-Ice Corporation produced the only commercial "dry ice" in the State at its plant near Ashland which is supplied with water containing carbon dioxide from a series of wells. The Department completed a study of all known carbon dioxide wells and springs in the State and published the results in the November 1959 issue of The Ore.-Bin.

Metals

Gold

Production of gold in Oregon dropped to the lowest point on record. The Buffalo Mine, operated by the Boaz Mining Company at Granite in Grant County, reported no production during the year. The Company was engaged in driving a new lower level and at the end of the year reported that three veins had been crosscut. There was renewed activity at the North Pole and E and E mines at Bourne in Baker County where the E and E flotation mill treated ore from two mines and also retreated tailings from an operation active many years ago. Approximately half of the 420 ounces of gold produced in the State came from 28 placer operations operating seasonally in northeastern and southwestern Oregon. Unusually dry weather late in the year delayed the start of many of the operations.

In mid-year the Department published Bulletin No. 49, "Lode Mines of the Central Part of the Granite Mining District, Grant County, Oregon," by George S. Koch, Jr. The area covered by the bulletin includes one of the important gold mining districts of the State.

Copper

No copper was produced in the State during 1959. Some exploration and development work was carried on at the Standard mine near Prairie City in Grant County. Most of the copper produced in the State in recent years has come from ore mined principally for gold. Copper prospects in the lower Powder River area of Baker County were inspected by several major copper companies. The Department began a detailed study of copper mineralization in the so-called "copper belt" of the southern Wallowa Mountains in Baker County.

Uranium

Lakeview Mining Company, sole producer of uranium in the State, mined ore from the White King mine northwest of Lakeview and trucked it 14 miles to its mill just north of town. Difficulties experienced with underground mining early in the year made it necessary to switch to open-pit operation which was shut down for the winter late in December. The mill operated an average of 22 days per month on a 3-shift basis and processed 6000 tons of ore per month. Ore from the Apex mine in Nevada was shipped to the Lakeview mill the middle of December, according to a news story in the Reese River Reveille published at Austin, Nevada. Solar-X Corporation of Boise explored the Kiska prospect on Pike Creek in Steens Mountain with a 100-foot drift and raise along a mineralized fault.

Mercury

The Bonanza mine near Sutherlin in Douglas County produced approximately 60 percent of the State's total for the year of slightly more than 1300 flasks of mercury, a decline of 42 percent from last year's total production. In Malheur County the Bretz mine, operated by Arentz Comstock Mining Venture, produced intermittently during the year. Some exploratory drilling and shaft sinking were done. A small rotary furnace operated by Dave Chase at the Bonita mine in Jackson County reportedly produced 12 flasks during the summer months. Exploration at the Big Muddy cinnabar prospect in eastern Jefferson County was carried out with the aid of a $24,000 OME contract. This was the only OME contract in force in Oregon during the year.

Western Minerals, Inc., produced a small amount of mercury from a property on Quartz Mt. in Lake County, and minor production was reported from the Mother Lode mine in Crook County operated by the Werdenhoff Mining Company. The old Chisholm quicksilver property in the Meadows district north of Gold Hill, Jackson County, was actively prospected during the year. Steelhead Mines completed a drilling program at a property in Jackson County and planned to install a 25-ton rotary furnace in the near future.

The Department continued its examination of all of the mercury occurrences in the State. Information obtained by the survey will be published in bulletin form sometime in 1961. A paper "Quicksilver in Oregon" was presented by Howard Brooks, Department geologist in charge of the project, at the Northwest Metals and Minerals Conference of AIME in Seattle last spring. A few copies are still available for free distribution.

****

OIL AND GAS EXPLORATION IN OREGON DURING 1959

By

Vernon C. Newton, Jr.*

At the beginning of 1960 Oregon is still among the 17 states that have no oil and gas production; however, increased exploration over the past 15 years indicates that industry has hopes of eventually finding production in the State. Drilling was very slow this year with only three permits issued.

Drilling Permits Issued in 1959

Permit No.	Company	Well Name and Location	Depth (feet)	Status
35	Ross R. Mitchell	Bliven No. 1 NW¼ sec. 15, T. 8 S., R. 5 W. Polk County	1347 T.D.	Abandoned 9/21/59
36	Oregon Oil & Gas Company	Roberts No. 1 SE¼ sec. 25, T. 10 S., R. 8 W. Lincoln County	2630	Idle
37	Ross R. Mitchell	Paige No. 1 SW¼ sec. 11, T. 8 S., R. 5 W. Polk County	600 T.D.	Abandoned 10/31/59

Drilling was continued on Miriam Oil Company's "Elliott No. 1 - deepening" in Polk County the first quarter of the year. The work was abandoned in July after reaching a depth of 1835 feet. Uranium Oil & Gas Company's "Ziedrich No. 1" in Douglas County and Sunnyvale Oil Company, Inc.'s, "Federal-Mitchell No. 1" in Grant County were plugged and abandoned in April 1959. Riddle Gas & Oil Producers suspended drilling on "Aikins No. 1" in January. Total footage drilled in Oregon during 1959 was 5192 feet.

Oil and gas leasing was active throughout the central Willamette Valley in 1959 as a result of oil and gas shows obtained last December in a well drilled by the Linn County Oil Development Company near Lebanon.

The Humble Oil & Refining Company gave exploration activity a big boost this summer when it leased more than 250,000 acres of land in southern Lake County and about 200,000 acres adjacent to Lake County in northern California. This was the first activity in central Oregon since abandonment of the joint venture by Sunray Mid-Continent Oil Company and Standard Oil Company near Prineville in August 1958. Humble has not announced a drilling program as yet for the new leases.

Geologic field parties from three major companies were actively exploring Oregon in 1959 for areas where oil and gas might be found. Several other companies expressed interest during the year in oil and gas prospects of the State and had representatives checking current activities.

Developments in Washington State kept oil interests stirring in the Northwest. The Sunshine Mining Company continued producing its "Medina No. 1" at Grays Harbor at a 6-10 barrel a day rate. Sunshine discovered possible gas production in the same area early in 1959 when it deepened a well which was drilled by the Hawksworth Gas & Oil Development Company in 1951.

* Petroleum Engineer, State of Oregon Department of Geology and Mineral Industries.

During August, the Tideland Oil & Gas Company obtained oil on a formation test at 3400 feet in its "Carlisle-Estate well" 12 miles north of Grays Harbor. Casing has been run in the well but no production obtained as yet.

The total footage drilled per year in Oregon for oil and gas exploration is shown on the graph for the years 1939-1959. The increased drilling activity after 1940 reflects entry of major oil-company exploration in Oregon. Wildcatters have been drilling on a small scale for oil in the State since the early 1900's, but none have been successful in finding production.

All wells that have penetrated more than 5000 feet of section in Oregon are plotted on the accompanying map of the State. The map shows the extent of the major rock areas in Oregon and the relationship of exploration to these areas. Tertiary marine sediments occupy a wide strip along the western coastal region, while Mesozoic-Paleozoic rocks are exposed in large portions of southwestern, central, and eastern Oregon. The rest of the State is buried under a complex mantle of volcanic material and stream and lake deposits of Cenozoic age. It is believed that a considerable area of Mesozoic-Paleozoic marine formations lies beneath these younger nonmarine rocks in central and eastern Oregon. Unfortunately no tool other than the drill has been devised by which the structural deformation and areal extent of these buried formations can be accurately determined. It will take costly deep wells to adequately explore this region.

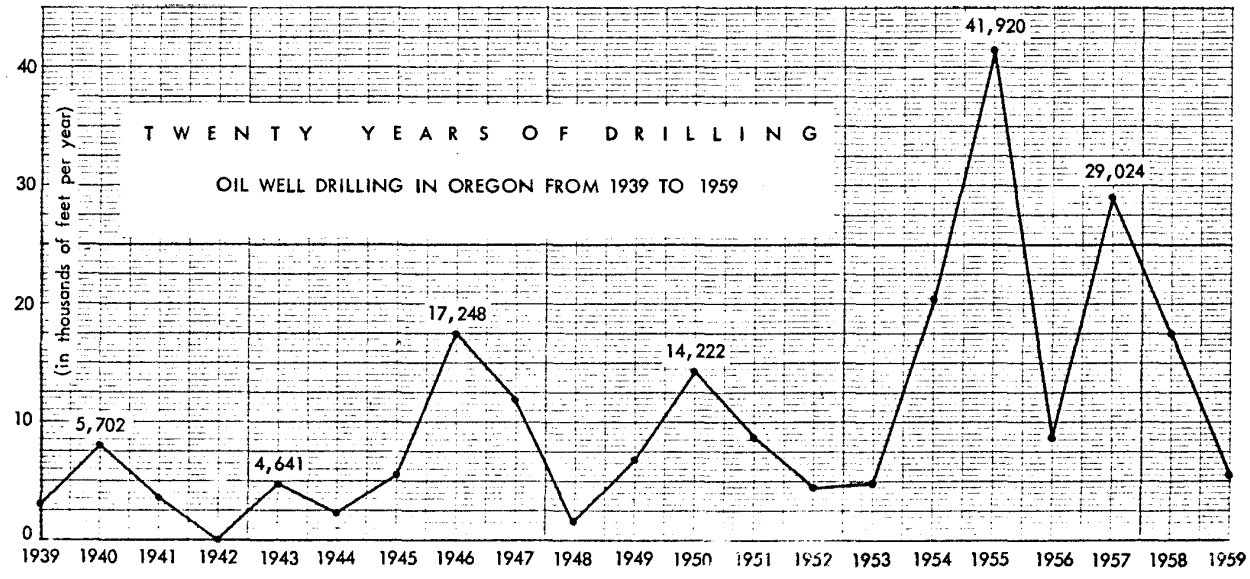
About one-fourth of the State's 95,607 square miles can be considered at least a favorable place to look for oil and gas. The need for more oil and gas reserves and a decreasing number of prospective areas in the United States provide the economic conditions necessary for a greater exploration and development effort in all wildcat areas.

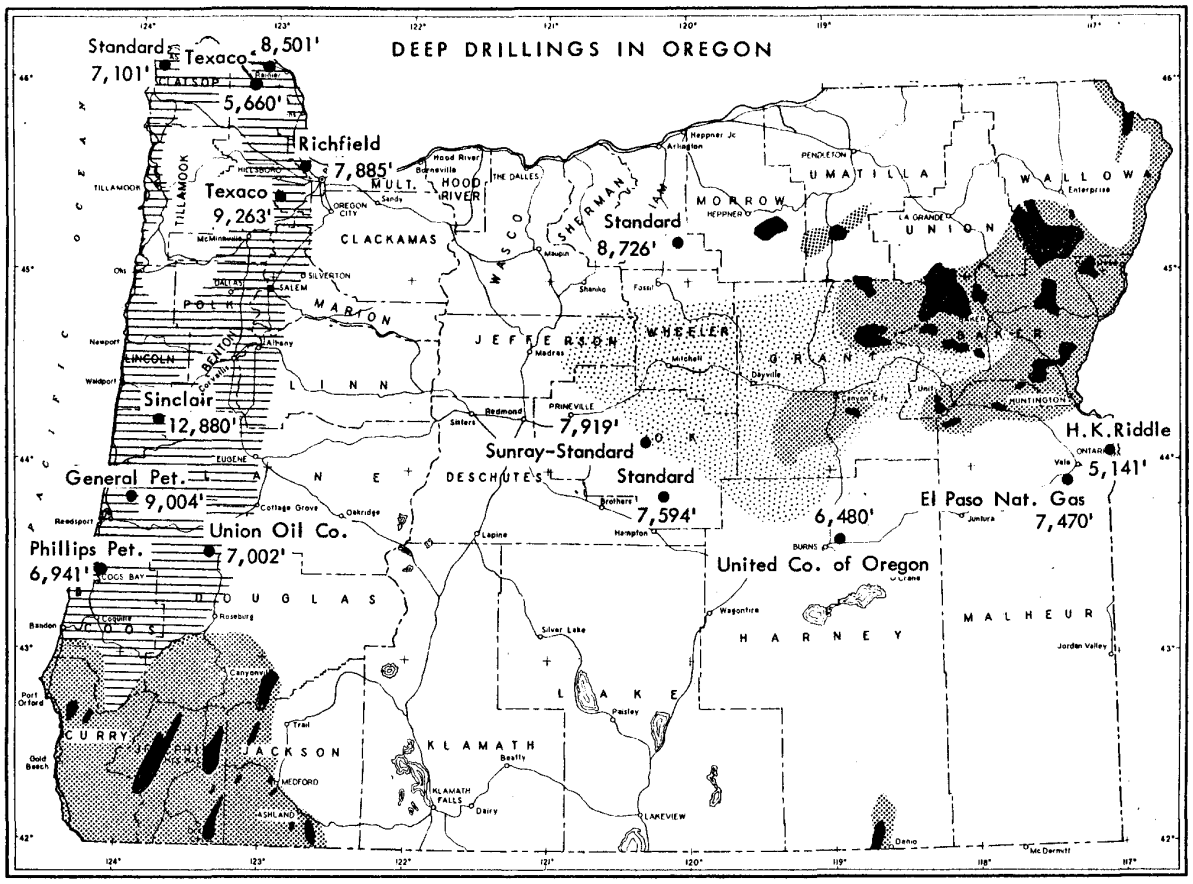
****

Well Records Released from Confidential Files in 1959

Company	Well Name	Location	Total Depth (ft.)	Company	Well Name	Location	Total Depth (ft.)
Oroco Oil & Gas Company	McBride No. 1	SE¼ sec. 19, T. 16 S., R. 46 E. Malheur County	4506	Miriam Oil Company	Bliven No. 1	SW¼ sec. 11, T. 8 S., R. 5 W. Polk County	1300
Oroco Oil & Gas Company	Portland Company No. 1	NW¼ sec. 18, T. 24 S., R. 33 E. Harney County	2247	Miriam Oil Company	Bliven No. 2	SE¼ sec. 10, T. 8 S., R. 5 W. Polk County	506
Standard Oil Company	Kirkpatrick No. 1	NW¼ sec. 6, T. 4 S., R. 21 E. Gilliam County	8726	Sunray Mid-Continent Company	Kappler No. 1	NW¼ sec. 12, T. 2 N., R. 2 W. Multnomah County	1666

****





EXPLANATION

- Quaternary-Tertiary volcanics and non-marine sediments.
- Tertiary marine basin.
- Outcrop area of Mesozoic-Paleozoic marine sediments
- Outcrop area of Mesozoic-Paleozoic metamorphics
- Granitoid intrusive rocks.
- Drillings deeper than 5,000'

El Paso Natural Gas Company
Federal-Spurrier No. 1 (7470' T.D.)
NE¼ sec. 5, T. 20 S., R. 44 E.
Malheur County

General Petroleum Corporation
Long Bell No. 1 (9004' T.D.)
SW¼ sec. 27, T. 20 S., R. 10 W.
Douglas County

Phillips Petroleum Company
Dobbyns No. 1 (6941' T.D.)
SW¼ sec. 28, T. 26 S., R. 13 W.
Coos County

Richfield Oil Corporation
Barber No. 1 (7885' T.D.)
SE¼ sec. 23, T. 1 N., R. 1 W.
Multnomah County

H. K. Riddle
Kiesel Estate No. 1 (5141' T.D.)
SW¼ sec. 8, T. 19 S., R. 47 E.
Malheur County

Sinclair Oil & Gas Company
Federal-Mapleton No. 1 (12,880' T.D.)
SE¼ sec. 12, T. 16 S., R. 10 W.
Lane County

Standard Oil Company of California
Hoagland Unit No. 1 (7101' T.D.)
SE¼ sec. 11, T. 7 N., R. 10 W..
Clatsop County

Standard Oil Company of California
Kirkpatrick No.1 (8726' T.D.)
NW¼ sec. 6, T. 4 S., R. 21 E.
Gilliam County

Standard Oil Company of California
Pexco State No. 1 (7594' T.D.)
NE¼ sec. 36, T. 20 S., R. 20 E.
Crook County

Sunray Mid-Continent Oil Company -
Standard Oil Company of California
Bear Creek Unit No. 1 (7919' T.D.)
NW¼ sec. 12, T. 2 N., R. 2 W.
Crook County

The Texas Company
Clark & Wilson No. 6-1 (8501' T.D.)
SE¼ sec. 19, T. 6 N., R. 4 W.
Columbia County

The Texas Company
Clatskanie No. 1 (5660' T.D.)
NE¼ sec. 36, T. 7 N., R. 4 W.
Columbia County

The Texas Company
Cooper Mt. No. 1 (9263' T.D.)
SE¼ sec. 25, T. 1 S., R. 2 W.
Washington County

Union Oil Company of California
Liles No. 1 (7002' T.D.)
NE¼ sec. 27, T. 25 S., R. 7 W.
Douglas County

United Company of Oregon, Inc.
Weed & Poteet No. 1 (6480' T.D.)
NW¼ sec. 9, T. 23 S., R. 31 E.
Harney County

AIME TO HOLD PACIFIC NORTHWEST METALS AND MINERALS CONFERENCE

The thirteenth annual Pacific Northwest Regional Conference of the American Institute of of Mining, Metallurgical, and Petroleum Engineers will be held at the Sheraton Hotel in Portland on April 28, 29, and 30. More than 40 technical papers will be presented at the various sessions which will include Geology, Physical and Extractive Metallurgy, Iron and Steel, Industrial Minerals, Refractories for the Aluminum Industry, and a special full-day program on Gold and Money at which a panel of speakers of national and international reputation will discuss the future of gold from a monetary standpoint. The American Society for Metals is holding joint meetings with AIME at the Conference for the first time. In addition to two luncheons and a banquet, there will be a reception at the Portland Art Museum where a special showing of the Peschel collection of mining art and the Joy Machinery Company paintings will be held. A complete Conference program will appear in the March issue of The Ore.-Bin.

****

NEHALEM RIVER REPORT IN OPEN-FILE

The U. S. Geological Survey has announced the release of an open-file report on "Waterpower resources in Nehalem River Basin, Oregon, with geology of dam and reservoir sites," by L. L. Young, J. L. Colbert, A. M. Piper, and D. L. Gaskill. The report discusses the possibility of using Nehalem River water for power production at sites within the basin or by diverting it to the Columbia River. The report may be consulted in Portland at the Survey's office, 834 Interior Building.

****

QUARTZBURG COPPER-COBALT REPORT ON OPEN FILE

The Department has just received from the U.S. Geological Survey a copy of "A Preliminary Report on the Copper-Cobalt Deposits of the Quartzburg District, Grant County, Oregon," by J. S. Vhay. This is a 20-page, mimeographed, open-file report with geologic and mine maps. It is available for inspection at the Department's office in Portland and at the Survey's offices in Spokane, San Francisco, and Salt Lake City. The Quartzburg district, which includes the Standard and Copperopolis mines, was investigated because of the strategic shortage of cobalt in the United States. Geology, mineral deposits, and exploration possibilities are discussed.

****

GEOLOGIST JOINS DEPARTMENT STAFF

Richard G. Bowen joined the Department staff as a geologist on January 1. He is a native of St. Helens, Oregon, and graduated from the University of Oregon in 1955, obtaining his Master's Degree in 1956. Mr. Bowen was formerly a geologist with Sohio Petroleum Company, doing field work in British Columbia and subsurface geology in the San Juan Basin, New Mexico.

As a member of the Department staff, Bowen fills a position left vacant since mid-1957. He is presently assigned to the Department's field project on copper occurrences in the State. His work will emphasize geochemical investigations.

****

NEW MERCURY MINERAL DESCRIBED

A new mercury mineral is described by E. H. Bailey and others in the paper "Schuetteite, a new supergene mercury mineral," published in the September-October 1959 issue of The American Mineralogist. The mineral has been found in small amounts in natural occurrences at several quicksilver deposits in arid parts of the West, including the Opalite mine in southern Malheur County, Oregon. It has been named schuetteite after C. N. Schuette, mining engineer and geologist who devoted many years to the study of quicksilver deposits. One of his many reports in this field was the Department's Bulletin 4, "Quicksilver in Oregon," published in 1938, now out of print.

Schuetteite is described as a canary-yellow mineral having the composition of basic mercuric sulfate, $HgSO_4.2H_2O$. It is friable and readily reduces to dust; hardness appears to be about 3. This same material occurs in abundance as a by-product on bricks of old quicksilver furnaces and dumps of furnaced ore. In natural occurrences, it is found as thin films on surfaces of cinnabar-bearing rocks exposed to the sunlight, and is believed by the authors to have formed through direct oxidation of cinnabar by oxygen-bearing surface water, with sunlight providing the energy to cause the reaction.

****

UNIVERSITY OF OREGON OFFERS FELLOWSHIPS IN GEOLOGY

The Department of Geology at the University of Oregon announces three National Defense Graduate Fellowships leading to Ph.D. degrees in geology, beginning September 1960. The fellowships are available only to first-year graduate students who are interested in becoming teachers in institutions of higher education. Each fellowship is a three-year award paying a total stipend of $6600 plus dependent allowance and reduced tuition. For application forms and information write to Prof. Lloyd W. Staples, Head, Department of Geology, University of Oregon, Eugene, Oregon. Application deadline is February 15, 1960.

****

ACADEMY TO MEET

The Oregon Academy of Science will hold its 18th annual meeting in Eugene at Straub Hall on the University of Oregon Campus, Saturday, March 5, 1960. Sessions will be held in Geology and Geography, Biology, Chemistry, and Mathematics and Physics.

Chairman of the Geology and Geography session is Dr. Walter Youngquist, Department of Geology, University of Oregon. Herbert Schlicker, Geologist, State Department of Geology and Mineral Industries, will serve as Co-Chairman. Department members who will present papers include Hollis Dole, Vernon Newton, Norman Peterson, and Len Ramp. Other papers will be given by geologists of the Ground Water Division of the U.S. Geological Survey, U.S. Army Engineers, and the geology departments of the various State colleges and universities. Dean F. A. Gilfillan of the School of Science at Oregon State College is Secretary of the Academy of Science. Attendance by the public is invited.

****

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S.E."H"Street
Grants Pass

****

NOTES FOR THE GOLD AND MONEY SESSION*

By
P. R. Hines**

The following article was intended to serve as a reference for those who attend the Gold and Money session of the forthcoming Pacific Northwest Metals and Minerals Conference. Because it is such a good short review, it is presented below, with the author's permission, in the belief that readers of The Ore.-Bin will find it of value in their approach to the problem of trying to revitalize the West's gold mines.

Mr. Hines, author of the review and chairman of the Gold and Money session, has obtained an outstanding group of experts for the day-long session. The speakers and panel members are:

Donald H. McLaughlin, President, Homestake Mining Company.
M. A. Kriz, Associate Economist, First National City Bank of New York.
O.K.Burrell, Professor of Finance, University of Oregon.
Philip Cortney, President, Coty, Inc.
Oscar L.Altman, Advisor, Research and Statistics Department, International Monetary Fund.
V.C.Wansbrough, Managing Director, Canadian Metal Mining Association.
Panel moderator will be Evan Just, Head, Mineral Engineering Department, Stanford University.

Editor

PURPOSE OF THE SESSION

The object of the Gold and Money session at the Pacific Northwest Metals and Minerals Conference is to bring together economists, bankers, and gold producers for an exchange of expert knowledge in each field. It is believed that a better understanding of these three widely separate fields may stimulate further cooperative effort and be of ultimate benefit to all. While apparently the participants may disagree violently, actually all are sincerely interested in the successful solution of how a sound and flourishing economy can be maintained.

In the paragraphs that follow, the various monetary systems and problems connected with them are reviewed. The subjects for the morning program of the Gold and Money session are then discussed, followed by an outline of the questions for the afternoon panel.

---

* 1960 Pacific Northwest Metals and Minerals Conference, American Institute of Mining, Metallurgical and Petroleum Engineers, Friday, April 29, 1960, Portland, Oregon.

** Mining Engineer, Portland, Oregon.

MONETARY STANDARDS

The large outflow of gold from the United States in 1958 and 1959 has caused general attention to the insecurity of the United States' gold position and the threat to the soundness of the U.S.gold dollar. The inter-relations between domestic and international monetary policies are not well realized. No one is completely satisfied with the present situation and various monetary systems are proposed to right it. Moreover, the domestic monetary system of the United States is radically different from that used for the settlement of international trade balances and payments. The merits and faults of these various monetary systems will be argued at the session, and some of their basic differences are therefore reviewed in these notes.

The monetary standards that will be most frequently mentioned on this program are: gold standard; gold coin standard; gold bullion standard; gold exchange standard; silver standard; bimetallic standard; and managed paper standard.

Gold Standard: A country, to be on the gold standard, must:

(1) Establish a unit of account with a fixed weight of gold at a fixed fineness (purity). As an example, the U.S. gold dollar was fixed at 15 5/21 grains of gold 900 fine, by the President, January 31, 1934, under the authority given him by the Gold Reserve Act of January 30, 1934. Fifteen and 5/21 grains of gold at 900 fineness is exactly 1/35 of a troy ounce of pure gold which fixes the market price of gold at $35.00 an ounce.

(2) The gold standard unit is declared by competent authority to be legal tender for all purposes.

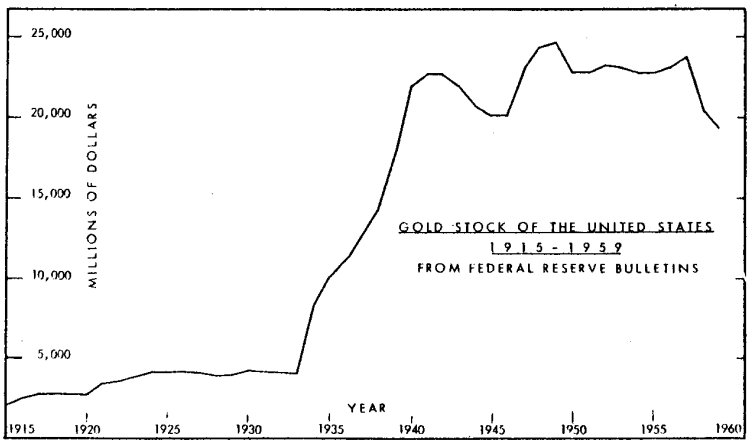
(3) All classes of money or currency in the monetary system must be convertible into gold or vice versa.

(4) The government stands ready to buy or sell gold in an unlimited amount at the fixed market price of gold in both the home and world market, thus maintaining the fixed price of gold and the interchangeability of its standard gold unit with gold bullion.

(5) The government must permit the free flow of gold in both domestic and foreign trade and unrestricted possession for private or personal use.

It has been generally recognized that the gold standard has a set of rules that cannot be substantially violated if the gold standard is to operate successfully. Generally these rules are designed to permit the rather free exchange of gold and goods. (A) The nation on a gold standard must refrain from more than a minimum of interference with the flow of foreign trade. Quotas, bounties, and high tariffs are fundamentally inconsistent with the smooth operation of the standard. (B) The nation on a gold standard must permit free international capital movements and a free foreign exchange market. (C) The nation on a gold standard must be willing to accept the discipline of a flexible internal price and wage structure not marked by either public or private efforts to administer either prices or wages.

Gold Coin and Gold Bullion Standards: The principal difference between the gold coin and gold bullion standards is the free coinage of gold in the former and its use in coins as small as $10 and $20.



The gold bullion standard retains the unit of account fixed by weight and fineness of gold but the gold is no longer coined; instead the smallest unit is a bar weighing close to 400 ounces (approximately 27 lb. avoirdupois) or about $14,000.

Gold Exchange Standard: The gold exchange standard is a compromise frequently made in the hope that the gold coin standard will be adopted later. The reserves of the government or central bank may be largely in foreign exchange or notes of gold standard countries. The unit of account is not directly convertible into gold but instead into the currency of a country having the gold standard. This standard economizes in the use of gold. The reserves may be gold deposited abroad as a working balance or exchange in terms of a currency based on gold, or interest-bearing short-time assets, readily convertible into gold such as short-term obligations of the U.S.Treasury.

Silver Standard: The silver standard operates the same as the gold standard, except that silver is the backing in place of gold. It is not in use at present anywhere.

Bimetallic Standard: The bimetallic standard is based interchangeably upon both gold and silver with a fixed ratio of the weight of each in a dollar. The silver dollar contains approximately 0.77 ounces of silver, which would require a market price of $1.29 an ounce for silver. Silver dollars, silver certificates, and subsidiary silver coin amount to 11-12 percent of the U.S. currency in circulation. The monetary value of the silver certificates rests more upon the credit of the United States than the silver reserve. Roughly two billion dollars of silver certificates are in circulation. The bimetallic standard of the United States, as such, has been allowed to lapse and has been overwhelmed by the size of the gold reserves and gold purchases.

Managed Paper Standard: The managed paper standard is printed paper money which is not convertible into gold or silver. Its value rests upon the strength of the government treasury issuing it. The word "managed" has attached itself to this type, although many authorities say all monetary systems have to be managed. Possibly a better word would be "regulated," as applied to the volume of money and the ease of obtaining it. Despite the paper standard having been involved in some grave national bankruptcies, it is the standard most governments use today.

WAGES

The influence of wages upon inflation, currently, is being studied and analyzed. It has so far not been completely isolated from many other factors. Governmental policy of maintaining full employment introduces a new element. Productivity and new technical discoveries also enter.

Where a country is dependent upon imported raw materials and food, as in the case of Great Britain, any increase in the cost of imports will increase the cost of living and, in turn, set off demands for wage increases. The devaluation of the pound in 1949 did increase the cost of imports. The equalization of agricultural prices with industrial prices by means of subsidies also acts similarly. So the primary cause of wage increases may have several origins.

If wage rates continue to ascend at a faster rate than the increase in productivity per man-hour, there is no end in sight to higher and higher living costs and commodity prices. As yet, no satisfactory brake has been found.

UNITED STATES MONETARY POLICY

The United States has two monetary standards--a paper standard for domestic use and a gold bullion standard for settling international accounts. The monetary policy is administered by three independent agencies: (1) the Federal Reserve System, created by acts of Congress which define its intent and powers; (2) the United States Treasury, which is a part of the administrative branch of the U.S. Government; and (3) the International Monetary Fund, which is an agreement among sixty-eight nations, of which the United States is a member. The voting power is determined by the amount of the member's contribution to the Fund's assets and, as the largest subscriber, the United States has the largest vote.

These three institutions, although independent, have to consult with each other and respect the aims and purposes of the others and avoid conflicting policies. Their respective fields and functions are briefly reviewed herewith:

FEDERAL RESERVE SYSTEM.--The Federal Reserve System was created by an act of Congress as a central bank. Instead of a single bank it was divided into twelve Reserve Districts, each having a District Bank with branches. The whole is controlled by a board of governors located in Washington, D.C. Each district is managed by a president and a board of directors.

The first District Bank opened in September, 1914, at the beginning of World War I. The Reserve System has operated through World War I, the boom of the 1920's, the Depression and the New Deal of the 1930's, World War II, the post-war period of reconstruction, the fighting in Korea, and now into a new era. The Federal Reserve System's functions and authority have been increased and broadened by acts of Congress as knowledge and experience have shown the way.

A Federal Reserve Bank's capital is subscribed by its members. The amount is 6 percent of a member's capital and reserves of which only half has been paid in. The Federal Reserve's greatest power

is its authority to issue Federal Reserve notes, the security for which is now 25 percent in gold certificates issued to it by the U.S.Treasury for gold held by the Treasury, and the balance in qualified commercial paper and government securities. There were $28,557,000,000 Federal Reserve notes outstanding as of October 31, 1959.

Member banks are required to deposit with the Reserve Bank definite reserves in prescribed ratios according to two major classifications: the first depending upon whether the member bank is a Central Reserve City Bank, a Reserve City, or a Country Bank; the second, whether the deposits are demand or time deposits. These several reserve ratios are determined by the board of governors.

MEMBER BANK RESERVE REQUIREMENTS *

[Per cent of deposits]

Effective date of change	Net demand deposits			Time deposits	
	Central reserve city banks	Reserve city banks	Country banks	Central reserve and reserve city banks	Country banks
1917—June 21	13	10	7	3	3
1936—Aug. 16	19½	15	10½	4½	4½
1937—Mar. 1	22¾	17½	12¼	5¼	5¼
May 1	26	20	14	6	6
1938—Apr. 16	22¾	17½	12	5	5
1941—Nov. 1	26	20	14	6	6
1942—Aug. 20	24	.....	.....	.....	.....
Sept. 14	22	.....	.....	.....	.....
Oct. 3	20	.....	.....	.....	.....
1948—Feb. 27	22	.....	.....	.....	.....
June 11	24	.....	.....	.....	.....
Sept. 16, 24	26	22	16	7½	7½
1949—May 1, 5	24	21	15	7	7
June 30, July 1	.....	20	14	6	6
Aug. 1, 11	23½	19½	13	5	.....
Aug. 16, 18	23	19	12	.....	5
Aug. 25	22½	18½	.....	.....	.....
Sept. 1	22	18	.....	.....	.....
1951—Jan. 11, 16	23	19	13	6	6
Jan. 25, Feb. 1	24	20	14	.....	.....
1953—July 1, 9	22	19	13	.....	.....
1954—June 16, 24	21	.....	.....	5	5
July 29, Aug. 1	20	18	12	.....	.....
1958—Feb. 27, Mar. 1	19½	17½	11½	.....	.....
Mar. 20, Apr. 1	19	17	11	.....	.....
Apr. 17	18½	.....	.....	.....	.....
Apr. 24	18	16½	.....	.....	.....
In effect Dec. 1, 1959	18	16½	11	5	5
Present legal requirements:					
Minimum	10	10	7	3	3
Maximum	22	22	14	6	6

* Federal Reserve Bulletin, Dec., 1959

The relation between the member banks and the Federal Reserve Banks is that of customer and banker. A member can borrow from a Federal Reserve Bank. A member bank can discount its customers' commercial paper at a higher rate than the Federal Bank's rate and, in turn, discount it at a profit at the Federal Reserve Bank, although the Federal Bank does not have to accept all paper offered. The latest general policy has been stated as follows: "There has been a strengthening of the view that the Federal Reserve, through wise and timely action, may not only exert a stabilizing influence on business conditions but control price level as well."

Harrod[1] says of the Federal Reserve System, "In 1922 they inaugurated what should be called the system of 'managed currency,' and to this they have adhered. It is totally different from the gold standard system, as previously interpreted by Britain and other gold standard countries. This American departure was of supreme importance as an example to other countries and in its influence on thinking since that time. It should be noted that it was the United States that was the inventor and originator of this far reaching development." The United States was still on the gold standard in 1922, and was just emerging from the requirements of World War I and free to operate normally as first conceived.

The Federal Reserve System may exert its influence upon the trend of business by the following:

(1) The discount or interest rate. The board of governors of the Federal Reserve System raises or lowers the discount rate for the Reserve districts and interest rates for all other types of securities and obligations follow in proportion to their grades. Money is easy or dear to obtain.

(2) Open market operations by buying and selling securities. The Federal Reserve puts money into circulation when it buys securities and withdraws money when it sells.

(3) The board of governors has the power to raise or lower the ratios of reserves deposited with it, to the deposits of the member banks, thus expanding or contracting the loaning capacity of the member banks.

UNITED STATES TREASURY.--The U.S.Treasury is part of the administrative branch of the Federal Government, headed by the President. The Secretary of the Treasury is a member of the President's cabinet. The Secretary supervises the collection of the billions of taxes and revenues of the Federal Government and disburses them according to acts of Congress.

The Secretary's toughest job is the management of the national debt of 290 billion dollars and

1. Harrod, Sir Roy F., Policy against inflation, St. Martin's Press, 1958.

the refunding of these obligations when they become due. He also handles the national budget of more than 70 billion dollars, borrowing if the receipts do not cover the disbursements or, if the opposite, using the surplus to the best advantage. The direction and placement of these billions, whether to the U.S.Treasury, the Federal Reserve Banks, member banks, or the non-banking public, exert an enormous influence upon the credit system and the national economy.

The Secretary of the Treasury is authorized, under the Gold Reserve Act, to buy and sell gold at rates that are most advantageous to the public interest. This same act also authorized the President to fix the weight and fineness of the U.S. gold dollar, which he did at the corresponding price of $35.00 an ounce; but the President's authority to make further change has expired.

The United States obligated itself to maintain the weight and fineness of the U.S. gold dollar at the corresponding price of $35.00 an ounce and also promised to make no change except under an act of Congress when it signed the Bretton Woods agreement. The Treasury maintains the gold price of $35.00 an ounce by buying or selling unlimited amounts to foreign governments and central banks--i.e., at a 1/4 percent premium when selling and a discount of 1/4 percent when buying.

KINDS OF UNITED STATES CURRENCY OUTSTANDING AND IN CIRCULATION *

[On basis of compilation by United States Treasury. In millions of dollars]

Kind of currency	Total outstanding Oct. 31, 1959	Held in the Treasury			Held by F. R. Banks and agents	Currency in circulation		
		As security against gold and silver certificates	Treasury cash	For F. R. Banks and agents		Oct. 31, 1959	Sept. 30, 1959	Oct. 31, 1958
Gold	19,585	19,321	265	.....	.....	.....	.....	.....
Gold certificates	19,321	.....	.....	16,474	2,816	31	31	31
Federal Reserve notes	28,557	.....	88	.....	1,455	27,013	26,952	26,569
Treasury currency—total	5,298	2,411	43	.....	394	4,861	4,866	4,785
Standard silver dollars	488	160	27	.....	8	293	292	274
Silver bullion	2,251	2,251	.....	.....	.....	.....	.....	.....
Silver certificates and Treasury notes of 1890	2,411	.....	.....	.....	299	2,113	2,128	2,154
Subsidiary silver coin	1,509	.....	9	.....	52	1,447	1,441	1,371
Minor coin	540	.....	2	.....	8	529	526	496
United States notes	347	.....	5	.....	26	316	315	315
Federal Reserve Bank notes	107	.....	.....	.....	1	106	108	117
National Bank notes	57	.....	.....	.....	.....	57	57	59
Total—Oct. 31, 1959		21,732	396	16,474	4,665	31,905	.....	.....
Sept. 30, 1959		21,648	377	16,387	4,738	.....	31,848	.....
Oct. 31, 1958		22,558	674	17,290	4,580	.....	.....	31,386

* Federal Reserve Bulletin, Dec., 1959

The Treasury has two controls upon gold reserves--it can require a gold export license; it can also "neutralize" a gold purchase by carrying it as a debit on its books, in which case the purchase is financed by tax collections or selling securities rather than the normal way of issuing a "gold certificate" to the Federal Reserve Bank and thus becoming a part of the gold reserves.

One of the biggest responsibilities of the Treasury is keeping the interest rate on the national debt at the lowest possible point. The "open market" operations of the Federal Reserve System conflict with the Treasury's intentions, and during World War II the Federal Reserve's market operations were directed toward supporting the price of U.S.bonds. The Federal Reserve resumed its independent action from that of the Treasury in 1951 under a mutual understanding.

The Secretary of the Treasury was asked to send a representative to the Gold and Money session in order to state the official view upon some of the problems, but the request was refused. Under the circumstances the next best thing is to give the Secretary's views and opinions, as reported recently in the press, and summarized as follows:

(1) The Secretary stated the gold reserve is safely above the legal reserve requirement of twenty-five percent.

(2) The Secretary's motive behind his battle for a balanced 1960 budget is his conviction that a stable U.S.dollar is necessary to the economic health of the entire free world. The United States has become the world's banker. Preserving the stability of the dollar is a basic obligation to the free world on America's part, just as important as helping underdeveloped countries with foreign aid.

(3) The Secretary has no intention of advocating an increase in the price of gold as this would be inflationary and would shake the faith of the world in United States money.

INTERNATIONAL MONETARY FUND.-- The International Monetary Fund is an international exchange bank "to promote exchange stability, to maintain orderly exchange arrangements among members, and to avoid competitive exchange depreciation." It is not a lending bank, but a pool of international reserves for converting national currencies. Members of the Fund may draw currencies of other countries in exchange for their own. The Fund is essentially a dealer in exchange, selling the currencies of countries whose money is in demand and accepting payment in either gold or currency of the buyer.

Both the International Monetary Fund and the International Bank for Reconstruction and Development were the outcome of the Bretton Woods conference in 1944. The International Bank of Reconstruction and Development was formed to make long-term capital loans to rebuild industry destroyed by the war.

Sixty-eight countries are members of the International Monetary Fund. Each member subscribes the quota assigned to it under the articles of agreement. The subscription is required to be 25 percent in gold, or 10 percent of its net official gold holdings plus United States dollars, whichever is smaller; the balance is payable either in gold or its own currency in the form of a deposit to the credit of the Fund with the member's central bank. A member's voting power in the Fund's administration is roughly proportional to its quota. The subscriptions were raised approximately 50 percent last year, and now the United States has contributed about one-third of the total.

Gold bullion and the U.S.gold dollar were selected as the monetary standards of the Fund; the par value of the other currencies is referred to the U.S.dollar in effect July 1, 1945--i.e., 15 5/21 grains, 900 fine of gold, corresponding to $35.00 an ounce. The United States agreed to maintain the par value of the U.S.dollar by buying all gold offered at $35.00 minus 1/4 percent an ounce and selling to other governments and their central banks all gold required at $35.00 plus 1/4 percent an ounce. It was further agreed the par value of the U.S.dollar could only be changed by the U.S.Congress.

Bretton Woods Agreement: The Bretton Woods agreement of 1944 and the act of July 31, 1945, confirming the United States agreement to it, are frequently mentioned. Often the Bretton Woods agreement is quoted as binding the United States irrevocably to the present par value of the U.S. gold dollar. The Fund does permit a change in parity whenever it is necessary to correct a fundamental disequilibrium, and it has already done so in a number of cases.

The significant fact in the Bretton Woods agreement is the recognition of the gold bullion standard for the settlement of international transactions, which has committed the United States to the gold bullion standard in foreign transactions but not at home. Moreover, the Fund's monetary standard has become a kind of "international dollar-gold standard."

The U.S.gold dollar can be devalued--some countries are urging the United States to do so--but the question is whether it is advisable to do so.

DISCUSSION OF THE GOLD AND MONEY SESSION PROGRAM

The dominant thought back of this program is the wide gap in knowledge of each other's problems: the gold mining industry on one side and the group of bankers, economists, and government officials who manage the monetary systems on the other.

The books on banking, money, and inflation contain little on gold mining except for some statistics and some generalities concerning the lag in gold production behind the growth of trade and commerce.

The valuation of a gold mine depends upon the future monetary standards in use in international trade and payments, and the domestic standards for internal use by various governments. Even a mining engineer who is a student of the present monetary systems must have remarkable foresight to set a definite value for a gold mine today; and if he does, it is with the hope he will not be confronted with his recommendations later if they prove wrong.

THE QUANTITY OF THE WORLD'S MINED GOLD SUPPLY TODAY IS DEPENDENT UPON THE JUDGMENT OF THE SECRETARY OF THE U.S.TREASURY AND UPON THE POLITICAL PRESSURES TO WHICH THE U.S.CONGRESS WILL RESPOND.

One of the current disputes about gold is whether the gold reserves and the newly mined gold supply are adequate. The gold mining industry's condition is growing worse and, unless the rise in costs of labor and supplies are compensated for, the production of newly mined gold will rapidly decline except for by-product gold coming from copper, lead, and zinc mining.

So the first thing necessary is to find out just how much gold potential we have. Also, the

following should be assessed: the amount of newly mined production; how much gold reserves are in the ground for the future; the dependency of this supply on the price of gold, labor, and supplies; how few gold deposits can be mined by low-cost mechanical methods such as are used by the great iron and copper mines; and how the majority of our gold mines are now deep mines with the ore occurring in such a manner as to require a great number of man-hours per ton mined and little chance of bettering the mining cost (particularly how geological occurrence handicaps operations). Accordingly, the first paper in the morning program is a review of the newly mined gold supply of the world by Dr. Donald H. McLaughlin, president of Homestake Mining Company.

Gold is still the preferred medium of exchange in the settlement of international trade balances. The brief notes on the International Monetary Fund and the Bretton Woods agreement are merely to correct common misinterpretation of certain points concerning them. It takes more than a few notes to explain the extent of the U.S. commitments to support the U.S. gold dollar and the worldwide consequences of any change. The second paper, "Gold in International Payments Today," by Dr. Miroslav A. Kriz, associate economist of the First National City Bank of New York, goes into it fully and is a necessary presentation for full appreciation of the afternoon discussions.

The third paper of the morning will be "The Problem of Gold Convertibility" by Professor O.K. Burrell, professor of finance, School of Business Administration, University of Oregon. Professor Burrell understands the basic requirements which are usually overlooked and without which no monetary system will work. His analysis of the present domestic monetary system is a thoughtful introduction to the subject. At least one uninterrupted discussion of the U.S. domestic monetary policy is necessary as a prelude to the afternoon's panel of experts.

Philip Cortney, the speaker at the noon luncheon, is a well-known authority on the gold standard. A return to the gold standard appeals to many people, such as Jacques Rueff, French economic advisor, who has done so much to put France back on a sound program. Again it was considered that a preliminary talk on the gold standard was a better approach than assuming the audience is familiar with all of its workings and the theoretical principles on which it is based.

TIME, in reporting the meeting of the International Monetary Fund and the World Bank in Washington in October, 1959, included the groups that propose raising the price of gold with those that want to return to the full gold standard. Actually, these are two separate issues. Active in proposing an increase in the price of gold are the Union of South Africa, the Transvaal and Orange Free State Chamber of Mines, almost all gold producers, and such economists as Sir Roy F. Harrod of Oxford University, England.

Gold producers want the price of gold increased because their cost of producing an ounce of gold is fast approaching or has exceeded $35.00 an ounce and they will have to shut down. Others point out the need for more gold to keep pace with trade and commerce; they propose to increase the gold value comparable to the rise in prices caused by inflation, thereby increasing the quantity in dollars by devaluation. Some of the advocates of the return to the gold standard believe more gold would then be required, and to secure this increased amount of gold they, too, agree that raising the price of gold is the only way to secure the quantity needed.

QUESTIONS FOR THE PANEL

QUESTION 1: Have we enough gold?

V.C. Wansbrough will give a few brief summaries of the gold produced in the last twenty-five years as follows: (a) Total which has gone to industrial arts, private hoarding, monetary gold stocks, and accumulated monetary gold stocks. (b) The increase of monetary gold stocks as compared with the increase in world trade in the past twenty-five years.

Oscar L. Altman will give his views on the sufficiency of gold for present international payments; particularly if the present distribution of gold is equitable.

M.A. Kriz will give briefly the gold reserves of the U.S. Treasury in relation to present requirements and also possible future events.

O.K. Burrell will analyze the position of the Federal Reserve System's gold requirements.

Philip Cortney will give his opinion on the gold requirements of the United States, if it were to restore the gold standard, for both domestic and international payments.

Donald H. McLaughlin will state again the probably maximum production of gold which could be made by the gold mining industry under several assumptions.

Moderator to ask each panel member: In general, is the world gold supply adequate for our needs?

The following questions will be treated in like manner by panel members:

QUESTION 2: The United States will not change its gold price willingly, but could it be forced to devalue the dollar by a protracted balance-of-payments deficit or a run by foreigners on its gold reserve? What would be the economic consequences if the United States were forced to devalue?

QUESTION 3: What are the effects of past and recent gold inflows and outflows on monetary and economic conditions in the United States?

QUESTION 4: Why do not the United States or western European nations want to re-establish full domestic convertibility of domestic currencies into gold? What are the links of the chain uniting gold, domestic money supply, and monetary and economic policy-making?

QUESTION 5: Is it any more difficult to manage a paper money system wisely than it is to manage a gold standard wisely?

QUESTION 6: How would you maintain gold production if costs continue to increase and the cost becomes higher than $35.00 an ounce? Or would you counsel another standard or system?

QUESTION 7: What should be the policy in the future toward import licensing, foreign exchange control, trade blocs, and other means which have been used for lack of dollar exchange and gold in international trade?

QUESTION 8: Toward which aim do you believe the monetary policy of the United States should be directed: full employment, a stable price level, a mild inflation, a stable U.S.gold dollar, or lower discount and interest rates?

QUESTION 9: Is it your opinion that a meeting of this type, with a comprehensive program of three or more days and representatives from the principal countries including economists, bankers, heads of government agencies, and important gold producers, held at a center such as New York, London, or Geneva, would accomplish a better understanding of the problems discussed today?

SELECTED BIBLIOGRAPHY

Altman, Oscar L., A note on gold production and addition to international gold reserves: International Monetary Fund Staff Papers, April 1958.

Burrell, O.K., The coming crisis in external convertibility in U.S.gold: The Commercial and Financial Chronicle, April 23, 1959.

Chandler, L.V., Benjamin Strong, central banker: The Brookings Institute, Washington, D.C., 1958.

Croston, J.J., Effect of revaluation on the gold-mining industry: AIME Trans., vol.126, p.301-326, 1937.

First National City Bank of New York, The gold outflow: First National City Bank Monthly Letter, p.136, December 1958.

_____, The gold price in perspective: First National City Bank Monthly Letter, p.23, February 1959.

Harrod, Sir Roy F., Policy against inflation: St. Martin's Press, New York, 1958.

_____, Gold's vital role in world trade: The Transvaal and Orange Free State Chamber of Mines, Mining Survey, vol.9, no.1, p.1, 1958.

_____, World money liquidity: Irish Banking Review, March 1959.

Holloway, J.E., Victims of the fixed gold price: The Transvaal and Orange Free State Chamber of Mines, Mining Survey, vol. 10, no.1, p.34, 1959.

Koch, H.C., United States' opposition to higher gold price analyzed: Transvaal and Orange Free State Chamber of Mines, Mining Survey, vol. 9, no.2, p.1, 1958.

Kriz, M.A., Gold in world monetary affairs today: Princeton University, International Finance Section, Essays in International Finance No.34, June 1959.

Mining World, Capitol concentrates: Mining World, p.9, July 1959.

Moulton, Harold G., Can inflation be controlled?: Anderson Kramer Associates, Washington, D.C., p.302, 1958.

Pick, Franz, America's unpleasant gold problem: The Transvaal and Orange Free State Chamber of Mines, Mining Survey, vol. 10, no.1, p.29, 1959.

Time, The gold standard: Time, p.103-104, Oct. 2, 1959.

Williamson, D.R., and Burgin, Lorraine, The price for gold: Colorado School of Mines, Mineral Industry Bulletin, vol. 2, no. 6, November 1959.

THE FOREIGN MINERAL TRADE OF THE U.S.S.R. IN 1958 *

The physical volume of U.S.S.R. mineral exports in 1958 was substantially higher than in 1957. Because of the decline in prices, however, the total value of mineral exports increased less than 5 percent. Because the value of all Soviet exports declined slightly in 1958, the share of minerals in the overall export trade increased to a new high for recent years. On the other hand, the value of mineral imports decreased while total imports, mostly from satellite nations, advanced. As a result, minerals accounted for a smaller share of the total Soviet import trade.

	Million Soviet Rubles**			
	1955	1956	1957	1958
Exports				
Value of all exports	13,874	14,677	17,526	17,190
Value of mineral exports	3,616	4,553	6,079	6,366
Mineral exports as percent of total exports	26.1	31.0	34.7	37.0
Imports				
Value of all imports	12,242	14,453	15,751	17,399
Value of mineral imports	2,854	3,727	3,869	3,789
Mineral imports as percent of total imports	23.3	25.8	24.5	21.8

The Soviet Union exports a variety of products in ever-increasing quantities and has become a significant competitor in some international mineral markets. What are the major factors motivating this trend?

The fulfillment of the Seven-Year Plan, the most ambitious of all to date, and of the commitments made to the satellite nations within the framework of the Communist Council for Mutual Economic Aid has required rapid expansion of Soviet mineral production. Large capital expenditures in development of mineral and metal industries to assure adequate supplies have been made, sometimes with little regard for cost. In 1958 the U.S.S.R. accounted for more than one-sixth of the world's mineral output by value. Estimated 1958 Soviet production of selected mineral commodities and its share of total world output is shown in the table below.

Production of Selected Mineral Commodities, U.S.S.R., 1958
(in 1,000 metric tons, except where noted)

	Production	Share of world total production
Petroleum (crude), (1,000 bbls)	834,225	12.6%
Iron ore (marketable)	88,800	22.0
Pig iron (incl. blastfurnace ferroalloys)	39,600	20.2
Steel ingots and castings	54,900	20.3
Chromite	800	21.7
Manganese ore	5,366	45.3
Molybdenum	4.2	16.4
Tungsten ore (60% WO_3 basis)	7.5	13.0
Nickel (content of ores)	50	22.4
Copper (smelter)	425	11.9
Lead (smelter)	310	13.8
Zinc (smelter)	365	13.4
Tin (smelter)	13.5	8.4
Cadmium	0.5	5.2
Bismuth	0.1	4.6
Mercury (76 lb. flasks)	25,500	10.3
Gold (1,000 troy ounces)	10,000	24.7
Silver (1,000 troy ounces)	25,000	10.6
Platinum group metals (1,000 troy ounces)	250	28.3

Since the end of World War II, the Soviet Union has turned from a position of many shortages to one of moderate to substantial surpluses in a number of commodities. In recent years these surpluses have been sold in free world markets to earn foreign exchange.

* Excerpts from a report prepared by Alexander Gakner, East European Specialist, Division of Foreign Activities of the Bureau of Mines, and appearing in U.S. Bureau of Mines Mineral Trade Notes, special supplement, January 1960.

** Four Soviet rubles equal $1.00 U.S. currency.

Soviet foreign trade with the free world depends to a great extent on "overflow" from intrabloc needs. The quantities available for exportation are, therefore, not subject to frequent and rapid adjustments to meet the demand set in free, competitive markets. With an expanding economy and the Communist government continuously pressing for larger and more efficient production, the U.S.S.R. probably would not tell its coal mine managers to reduce output or close a few mines (and let the workers stay home) just because there is no market for coal. The government also probably would not favor maintaining large and ever-increasing stockpiles, except for strategic commodities. These factors account for the frequent spotsales at reduced prices which occur whenever undesirable surpluses burden the domestic economy. Trade experts from the Soviet Union insist that they are trying to earn as much foreign exchange as possible. However, in order to make products competitive in markets prejudiced against Soviet commodities, Soviet goods must be offered at reduced prices.

****

TURKISH CHROME MINES RECEIVE U.S. HELP

Turkish chrome mines have recently received help from the United States through a barter arrangement whereby United States surplus wheat will be exchanged for Turkish metallurgical-grade chrome. The announcement by the U.S.Department of Agriculture, which appeared in the January 14, 1960, E & MJ Metal and Mineral Markets, states:

"The exchange wheat will be delivered to Turkey by June 1, 1960. The quantity of chromite involved in the transactions will be such as to insure the export to Turkey of approximately 80,000 metric tons of wheat. Chromite received in exchange must be delivered to CCC (Commodity Credit Corp.) within one year from the dates of individual barter commitments. Chromite to be delivered under these transactions will be incorporated into the Supplemental Stockpile authorized by the Agricultural Trade Development and Assistance Act of 1954, as amended."

****

CHROMIUM IN JAPAN

The production of chromium increased from 507 metric tons in 1957 to 1,234 tons in 1958. The Tekkosha Company is the only Japanese company producing commercial quantities of chromium. With a Commodity Credit Corporation (CCC) contract ensuring a market, Tekkosha has expanded its monthly output of electrolytic chromium to 100 tons. Delivery of a total 1,500 tons to the CCC was expected to be completed by September 1959.

Almost all of the chromite processed in Japan is imported. In 1957, 250,000 tons was imported, but only 75,000 tons was imported in 1958. The Philippines were the chief source of supply with 141,000 tons in 1957, and the U.S.S.R. followed with 38,000 tons. There were no imports from the U.S.S.R. in 1958. By comparison, domestic production of both high- and low-grade concentrates was 46,000 tons in 1957 and 42,000 tons in 1958. (From U.S. Bureau of Mines Mineral Trade Notes, Jan.1960.)

****

ROGUE GEM AND GEOLOGY CLUB EXHIBIT

A colorful exhibit of gem-stone material is being shown at the Department's office in Portland by the Rogue Gem and Geology Club of Grants Pass, Oregon. The exhibit contains beautiful hand-made jewelry, crystals, petrified wood, thundereggs, polished cabachons, and spheres of various sizes and colors. Included in the exhibit are agatized materials of local origin such as Medfordite, Rogueite, and Oregonite. The exhibit is expected to be on display until about the middle of March.

****

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S.E."H" Street
Grants Pass

****

AIME TO HOLD CONFERENCE IN PORTLAND

The American Institute of Mining, Metallurgical, and Petroleum Engineers will hold its thirteenth annual Northwest Regional Conference this year in Portland on April 28,29, and 30. Headquarters for the Conference will be at the Sheraton Hotel in the vicinity of the new Lloyd Center in the northeastern part of the city. Most of the Conference activities will be held at the Sheraton.

The Conference program, which appears in abbreviated form on the next three pages, emphasizes the wide range of activities in which AIME members are engaged. For the first time, the Northwest chapters of the American Society for Metals are holding a joint meeting with AIME and are cooperating in four of the technical sessions. Mr. Carleton C. Long, President of the Metallurgical Society of AIME, and Mr. Walter Crafts, President of the American Society for Metals, will attend the Conference and speak at the two Iron and Steel sessions.

A total of 37 technical papers will be presented at the Conference, in addition to which there will be a panel discussion by national and international experts on gold. Thursday noon Mr. E.C.Babson, Manager, Foreign Operations, Union Oil Company of California, will speak on "The Oil Industry Today." At the Friday luncheon Mr. Philip Cortney, President, Coty, Inc., is to speak on "Monetary Policy and the Price of Gold." Rounding out the Conference activities scheduled at the Sheraton Hotel will be a banquet on Friday evening at which Dr. Joseph L. Gillson, President of AIME, will talk on "Pre-Columbian Ruins."

A tour of the Omark Industries plant is scheduled for 4:30 Thursday afternoon, and a three-hour tour of the Port of Portland will be held Saturday morning, starting at 9:00 a.m. Shorter tours are planned to visit points of interest in the vicinity of Lloyd Center. One of the highlights of the Conference will be a reception at 8:00 Thursday evening in the Portland Art Museum, where both the Peschel collection of early German mining art and the Joy Machinery Company paintings will be on display.

Activities of special interest to the ladies attending the Conference include a luncheon and fashion show, a trip to the Oregon Museum of Science and Industry and the new zoo, the reception and art show at the Art Museum, and an evening of dancing following the banquet Friday night.

Registration for the Conference is $5.00 for members of AIME and ASM, $7.50 for non-members, $1.00 for ladies, and no charge for students. For those who wish to attend only the two Gold and Money sessions, there is a special registration fee of $5.00 (price includes the luncheon ticket).

The Conference this year is headed by Hollis M.Dole, Director of the State of Oregon Department of Geology and Mineral Industries, with John Anderson, Production Engineer of The Carborundum Company, Vancouver, Washington, acting as co-chairman. They are assisted by nine technical session chairmen and eleven chairmen of the various service committees.

R.S.M.

Refractories for the Aluminum Industry Session

9:00 — 11:30 Thursday

Chairman: Charles McVicker, E. J. Bartells Company, Portland, Oregon.

"Evaluation of High Alumina Brick for Aluminum Melting Furnaces." James E. Lorenz, Research Engineer, Department of Metallurgical Research, Kaiser Aluminum & Chemical Corporation, Spokane, Washington.

"Properties of Special Refractories with Regard to Their Use in the Aluminum Industry." W. L. Peskin, Assistant Manager, Technical Branch, Refractories Division, The Carborundum Company, Perth Amboy, New Jersey.

12:00 Thursday

Luncheon: West Ballroom

1:30 - 4:30 Thursday

Chairman: Charles McVicker.

"The Effect of Operating Variables and Practices on Refractory Life in Aluminum Melting Furnaces." James E. Dore, Chief, Process Metallurgy Branch, Olin Mathieson Chemical Corporation, New Haven, Connecticut.

"Refractories for the Carbon Bake." C. F. Wenrich, Harbison-Walker Refractories Company, San Francisco, California.

"The Effects of Processing and Composition Variables on Refractories Used in the Aluminum Industry." W. J. Meid, President, Engineered Ceramics, Associate of Lindberg Engineering Company, Chicago, Illinois.

4:30 — 6:30 Thursday

Plant Tour: Omark Industries

8:00 — 10:00 p.m. Thursday

Reception: Portland Art Museum

Geology Session

9:00 — 11:30 Thursday

Co-Chairmen: F. W. Libbey, Consulting Mining Engineer, Portland, Oregon, and Lloyd W. Staples, Department of Geology, University of Oregon, Eugene, Oregon.

"Geology of the Lakeview, Oregon, Uranium Area." Norman V. Peterson, Geologist, State of Oregon Department of Geology and Mineral Industries, Grants Pass, Oregon.

"Recent Developments in the Mining Laws." Irving Rand, Attorney, Portland, Oregon.

"Scenes of Helicopter Mineral Exploration in Alaska." John P. McKee, Chief Geologist, Fremont Mining Company, Duluth, Minnesota.

"Structural Control of Alpine Mineral Deposits." Elmar A. Walter, Assistant Professor of Geology, University of Oregon, Eugene, Oregon.

12:00 Thursday

Luncheon: West Ballroom

1:30 — 4:30 Thursday

Co-Chairmen: F. W. Libbey and Lloyd W. Staples.

"Pacific Northwest Oil and Gas Exploration." Robert J. Deacon, Consulting Geologist and Editor, Northwest Oil Report, Portland, Oregon.

"Research at P. P. & L. in the Natural Resource Field of the Northwest." James B. Ward, Director of Research, Pacific Power and Light Company, Portland, Oregon.

"IBM Processing of Mine Assay Data." George S. Koch, Jr., Assistant Professor of Geology, and Richard F. Link, Associate Professor of Statistics, Oregon State College, Corvallis, Oregon.

"Aerial Mapping and Construction of Topographic Maps." Leonard Delano, Delano Studios, Portland, Oregon.

4:30 — 6:30 Thursday

Plant Tour: Omark Industries

8:00 - 10:00 p.m. Thursday

Reception: Portland Art Museum

Extractive Metallurgy Session

(In cooperation with the American Society for Metals)

9:00 — 11:30 Thursday

Chairman: Emmons Coleman, Hanna Nickel Smelting Company, Riddle, Oregon.
Honorary Co-Chairman: Matthew Gray, Chairman, Vancouver Island Chapter ASM, Sidney, British Columbia.

THEME: Process Metallurgy

"The Current Status of the Direct Reduction of Iron Ore." H. W. Lownie, Jr., Chief, Process Metallurgy Division, Battelle Memorial Institute, Columbus, Ohio.

"Recent Developments in the Strategic-Udy Processes." Murray C. Udy, Research Director, Strategic-Udy Processes, Inc., Niagara Falls, New York.

"Production of Ferronickel at Riddle, Oregon." Emmons Coleman, Manager, Hanna Nickel Smelting Company, Riddle, Oregon, and D. N. Vedensky, Vice President, The Hanna Mining Company, Cleveland, Ohio.

"Recovering Alumina from Ferruginous Bauxite." Lloyd H. Banning, Project Coordinator, Albany Metallurgy Research Center, U. S. Bureau of Mines, Albany, Oregon.

12:00 Thursday

Luncheon: West Ballroom

Iron and Steel Session

1:30 — 4:30 Thursday

Chairman: Harry Czyzewski, Metallurgical Engineers, Inc., Portland, Oregon.
Honorary Co-Chairman: F. W. DeMoney, Chairman, Inland Empire Chapter ASM, Spokane, Washington.
Remarks by Carleton C. Long, President, The Metallurgical Society of AIME, Monaco, Pennsylvania.

THEME: New Fabrication Techniques

"Explosive Impact Hardening of Manganese Steel." S. S. Jenkins Jr., Technical Representative, E. I. duPont de Nemours and Company, Seattle, Washington.

"Recent Studies in the Explosive Working of Metals." John Pearson, Head, Detonation Physics Group, U. S. Naval Ordnance Test Station, China Lake, California.

"Latest Developments in the Chemical Milling Field." James D. Barton, Technical Service Representative, Chem-Mill Division of Turco Products, Inc., Wilmington, Calif.

4:30 - 6:30 Thursday

Plant Tour: Omark Industries

8:00 - 10:00 p.m. Thursday

Reception: Portland Art Museum

Physical Metallurgy Session

(In cooperation with the American Society for Metals)

9:00 — 11:30 Friday

Chairman: O. G. Paasche, Mechanical Engineering Department, Oregon State College, Corvallis, Oregon.
Honorary Co-Chairman: Robert Kemper, Jr., Chairman, Columbia Basin Chapter ASM, Richland, Washington.

THEME: Melting and Casting Exotic Metals

"The Production of Refractory Metals Using the Electron-Beam Melting Technique." E. F. Baroch, Metallurgist, Wah Chang Corporation, Albany, Oregon.

"Dingot Quality Vacuum Remelted Uranium Metals from Ceramic Coated Graphite Crucibles." J. C. Tverberg, Research Metallurgist, General Electric Company, Hanford Atomic Products Operation, Hanford, Washington.

"A Laboratory Casting Furnace for High Melting Point Metals." P. G. Clites and E. D. Calvert, Melting Laboratory, Albany Metallurgy Research Center, U. S. Bureau of Mines, Albany, Oregon.

"A Liquid Cooling System for Consumable Electrode-Arc Furnaces." D. E. Cooper and E. Don Dilling, Development Engineering Division, Technical Department, Titanium Metals Corporation of America, Henderson, Nevada.

12:00 Friday

Gold and Money Luncheon: Ballroom

Iron and Steel Session

1:30 — 4:30 Friday

Chairman: William Rice, Electric Steel Foundry Company, Portland, Oregon.
Honorary Co-Chairman: Earl Roberts, Chairman, Puget Sound Chapter ASM, Seattle, Washington.
Remarks by Walter Crafts, President, American Society for Metals, Niagara Falls, New York City.

THEME: Heat Resistant Alloys

"Classification and Application of Heat Resistant Alloys." E. A. Schoefer, Executive Vice President, Alloy Castings Institute, Garden City, New York.

"Heat Resistant Alloy Properties." Dean Burgan, Physical Metallurgist, and Eugene Hall, Metallurgist, Electric Steel Foundry Company, Portland, Oregon.

"Fabrication of Heat Resistant Alloys." M. D. Bellware, Supervisor, Mechanical Engineering, International Nickel Company, Inc., New York City.

6:00 — 11:30 p.m. Friday

Social Evening: Ballroom

Industrial Minerals Session

9:00 — 11:30 Friday

Co-Chairmen: Thomas J. Waters, Manager, Pacific Carbide & Alloys Company, Portland, Oregon; and Patrick B. O'Rourke, Assistant Vice President, Northwest Natural Gas Company, Portland, Oregon.

"Percentage Depletion." Glen R. McDaniel, Partner, Haskins & Sells, Certified Public Accountants, Portland, Oregon.

"Facilities, Imports, and Exports of the Commission of Public Docks." Thomas P. Guerin, General Manager, Commission of Public Docks, Portland, Oregon.

"Manufacture of Lime in Eastern Oregon." Hans Leuenberger, General Manager, Chemical Lime Company, Baker, Oregon.

12:00 Friday

Gold and Money Luncheon: Ballroom

1:30 — 4:30 Friday

Co-Chairmen: Thomas J. Waters, Manager, Pacific Carbide & Alloys Company, Portland, Oregon; and Eugene Andrews, Manager, Industries Department, Portland Chamber of Commerce, Portland, Oregon.

"Beneficiation of Southwest Oregon Beach Sands by High Tension and Magnetic Dry Processing." J. F. Hunt, Assistant to the President, Carpco Manufacturing, Inc., Jacksonville, Florida.

"Gypsum Deposits Along the Great Northern Railway in Central Montana." Thomas P. Wollenzien, Assistant Geologist, Mineral Research and Development Department, Great Northern Railway Company, Lewistown, Montana.

"Industrial Mineral Potential of the Northwest." Richard M. Foose, Chairman, Earth Sciences Department, Stanford Research Institute, Menlo Park, California.

6:00 — 11:30 p.m. Friday

Social Evening: Ballroom

Gold and Money Session

9:00 — 11:30 Friday

Co-Chairmen: Pierre Hines, Consulting Mining Engineer, Portland, Oregon, and Evan Just, Head, Mineral Engineering Department, Stanford University, Stanford, California.

"Review of the Gold Problem by World and Countries, and Relationship to Gold Production and Reserves." Donald H. McLaughlin, President, Homestake Mining Company, San Francisco, California.

"Gold in the International Monetary System Today." M.A. Kriz, Associate Economist, First National City Bank of New York, New York City.

"The Problem of Gold Convertibility." O. K. Burrell, Professor of Finance, University of Oregon, Eugene, Oregon.

12:00 Friday

Gold and Money Luncheon: Ballroom
Speaker: Philip Cortney, President, Coty, Inc., New York.
"Monetary Policy and the Price of Gold."

Introduced by C. B. Stephenson, President, The First National Bank of Oregon, Portland, Oregon.

1:30 — 4:30 Friday

Experts' Panel on Gold

Moderator: Evan Just, Head, Mineral Engineering Department, Stanford University.

Oscar L. Altman, Advisor, Research and Statistics Department, International Monetary Fund, Washington, D. C.

O. K. Burrell, Professor of Finance, University of Oregon.

Philip Cortney, President, Coty, Inc., New York.

M. A. Kriz, Associate Economist, First National City Bank of New York.

Donald H. McLaughlin, President, Homestake Mining Company, San Francisco.

V. C. Wansbrough, Managing Director, Canadian Metal Mining Association, Toronto.

Summary: Oscar L. Altman

6:00 — 11:30 p.m. Friday

Social Evening: Ballroom

OREGON PLACE NAMES

Listed below are Oregon place names officially accepted by the U.S. Board on Geographic Names, in decisions rendered from January through August, 1959 (Decision lists no. 5902 and 5903).

Anthony Creek: stream about 5 miles long, heading in sec. 1, T.20 S., R.2 W. and flowing northeastward to Lost Creek about 2.5 miles southwest of Lowell; Lane County; Grant 46, T.19 S., R.1 W., Willamette meridian; 43°53'55" N., 122°49'20" W. Not: Dexter Creek.

Bald Butte: butte with an elevation of about 3,940 feet, about 13 miles southwest of the village of Culp Creek; Lane County; sec. 24, T.23 S., R.3 W., Willamette meridian; 43°33'00" N., 123°00'05" W. Not: Buck Mountain.

Barth Falls: rapids on the North Fork Klaskanine River about 7.5 miles south of Svensen; Clatsop County; sec.28, T.7 N., R.8 W., Willamette meridian; 46°03'45" N., 123°41'10" W.

Bays Creek: stream about 3.5 miles long, partly in Siuslaw National Forest, heading in sec.6, T.3 S., R.8 W. and flowing generally southward to the Nestucca River; Tillamook County; sec. 24, T.3 S., R.9 W., Willamette meridian; 45°17'12" N., 123°44'15" W. Not: Bay Creek.

Bearbones Mountain: mountain with an elevation of about 4,915 feet, on the boundary between Willamette and Umpqua National Forests in the Calapooya Mountains, about 29 miles southeast of Lowell; Lane County; sec. 25, T.23 S., R.2 E., Willamette meridian; 43°32'45" N., 122°31'00" W. Not: Bear Bones Mountain.

Beneke Creek: stream about 5.6 miles long, heading near the north edge of sec.10, T.6 N., R.7 W. and flowing generally 1.5 miles southeastward, 1.2 miles southward, and again 2.9 miles southeastward to Walker Creek (q.v.), 2.5 miles north of Jewell; Clatsop County; sec. 25, T.6 N., R.7 W. Willamette meridian; 45°58'00" N., 123°29'30" W.

Big Dry Creek: stream about 3 miles long, heading in sec. 3, T.23 S., R.2 W. and flowing generally northeastward to Mosby Creek, about 6.2 miles southwest of the village of Culp Creek; Lane County; sec. 26, T.22 S., R.2 W., Willamette meridian; 43°37'27" N., 122°54'05" W. Not: Dry Creek.

Briem Creek: stream about 2.5 miles long, flowing generally southwestward from the southeast slope of Hehe Mountain to Platt Creek near its mouth, in Willamette National Forest; named for Alfred J. Briem who was the District Forest Ranger in this area 17 years; Lane County; sec. 18, T.18 S., R.4 E., Willamette meridian; 44°01' N., 122°22' W.

Budworm Creek: stream about 3 miles long, flowing northeastward into Deer Creek about 1.5 miles above its mouth, in Willamette National Forest; Lane and Linn Counties; unsurveyed sec. 14, T.15 S., R.6 E., Willamette meridian; 44°15'35" N., 122°03'45" W.

Carpenter Creek: stream about 2 miles long, heading on Carpenter Mountain and flowing eastward to Deer Creek about 0.5 mile upstream from County Creek, in Willamette National Forest; Linn County; unsurveyed sec. 9, T.15 S., R.6 E., Willamette meridian; 44°17'00" N, 122°05'50" W.

Cascade Creek: stream about 1.6 miles long, in Willamette National Forest, heading near 43°58'55" N., 122°06'20" W. and flowing south-southwestward to the South Fork McKenzie River about 15 miles south-southeast of the village of McKenzie Bridge; Lane County; 43°57'34" N., 122°06'50" W.

County Creek: stream about 3 miles long, flowing generally northeastward to Deer Creek about 3.5 miles above its mouth, in Willamette National Forest; Linn County; unsurveyed sec. 9, T.15 S., R.6 E., Willamette meridian; 44°16'45" N., 122°05'30" W.

East Fork South Fork Trask River: stream about 10.5 miles long, heading in sec. 32, T.2 S, R.6 W. and flowing generally northwestward to the South Fork Trask River; Tillamook and Yamhill Counties; sec. 1, T.2 S, R.8 W., Willamette meridian; 45°25'00" N., 123°36'15" W. Not: East Fork Trask River, Rock Creek (q.v.).

East Fork Steamboat Creek: stream about 3 miles long, in Umpqua National Forest, heading in sec. 6, T.24 S., R.3 E. and flowing generally westward to Steamboat Creek about 3 miles southwest of Bearbones Mountain; Lane County; sec. 3, T.24 S., R.2 E., Willamette meridian; 43°30'55" N., 122°33'30" W.

Fern Hill: settlement about 3.8 miles west of Svensen; Clatsop County; sec. 24, T.8 N., R.9 W., Willamette meridian; 46°10'00" N., 123°44'15" W.

Fir Creek: stream about 2 miles long in Willamette National Forest, heading near 43°59'00" N, 122°05'30" W. and flowing south-southwestward to the South Fork McKenzie River about 15.5 miles south-southeast of the village of McKenzie Bridge; Lane County; 43°57'23" N., 122°06'15" W. Not: Cascade Creek (q.v.).

Fisher Island Channel: reach about 2 miles long, in the main channel of the Columbia River, south of Fisher Island; Cowlitz County, Washington, and Columbia County, Oregon; from 46°09'10" N., 123°03'00" W. to 46°10'00" N., 123°05'00" W.

Little Dry Creek: stream about 1.4 miles long, heading in sec. 2, T.23 S., R.2 W. and flowing generally northward to Mosby Creek about 6.5 miles south-southwest of the village of Culp Creek; Lane County; sec. 36, T.22 S., R.2 W., Willamette meridian; 43°36'52" N., 122°53'15" W.

Little North Fork Wilson River: stream about 10.5 miles long, heading in sec. 10, T.1 N., R.8 W. and flowing generally southwestward to the Wilson River; Tillamook County; sec. 24, T.1 S., R.9 W., Willamette meridian; 45°28'24" N., 123°44'15" W. Not: North Fork Wilson River.

Miller Sands: bar and bar beach in the Columbia River about 5.7 miles north of Svensen; Clatsop County; 46°15' N., 123°39' W. Not: Snag Island Spit.

Misery Creek: stream about 3 miles long, heading west of Mount Bruno and flowing generally northward to the North Santiam River about 1.5 miles upstream from Marys Creek, in Willamette National Forest; Linn County; sec. 19, T.10 S., R.7 E., Willamette meridian; 44°41'15" N., 122°00'30" W.

Rattlesnake Butte: hill with an elevation of about 1,361 feet, about 5.4 miles west of Lowell; Lane County; sec. 12, T.19 S., R.2 W., Willamette meridian; 43°56'10" N, 122°53'00" W.

Rock Creek: stream about 3 miles long, heading in sec. 31, T.2 S., R.6 W. and flowing generally northwestward to the East Fork South Fork Wilson River; Tillamook County; sec. 26, T.2 S., R.7 W., Willamette meridian; 45°21'42" N., 123°30'54" W. Not: East Fork Trask River.

Sevenmile Canal: canal about 6 miles long formed by the diversion of Sevenmile Creek at 42°38'45" N., 122°03'00" W. and flowing southeastward to Agency Lake; Klamath County; sec.9, T.34 S., R.7½ E., Willamette meridian; 42°35'00" N., 121°58'00" W. Not: Sevenmile Creek (q.v.).

Sevenmile Creek: stream about 12 miles long, heading near 42°40'30" N., 122°09'00" W., in Rogue River National Forest, and flowing northeastward, and then southward, to its point of diversion into Sevenmile Canal; Klamath County; sec. 6, T.34 S., R.7½ E., Willamette meridian; 42°38'45" N., 122°03'00" W.

Steamboat Creek: stream about 22 miles long, in Umpqua National Forest, heading in sec.22, T.23 S., R.2 E. and flowing generally southwestward to the North Umpqua River about 8.5 miles west of Illahee Rock; Douglas and Lane Counties; sec. 32, T.25½ S., R.1 E., Willamette meridian; 43°20'40" N., 122°44'10" W. Not: East Fork (q.v.).

* Switzler Island: an island about 1 mile long in Columbia River in sec. 33, T.6 N., R.30 E., and in sec. 4, T.5 N., R.30 E., Willamette meridian, Umatilla County. Decision of 1941 VACATED.

* Techumtas Island: an island in Columbia River in sec. 12, T.5 N., R.29 E., and in secs. 5, 6, 7, and 8, T.5 N., R.30 E., Willamette meridian, Umatilla County. Not: Hoodoo Island, Switzler Island. Decision of 1941 VACATED.

Walker Creek: stream about 12 miles long, heading in sec. 3, T.6 N., R.7 W. and flowing eastward, then generally southwestward to the Nehalem River, east of Jewell; Clatsop County; sec. 12, T.5 N., R.7 W., Willamette meridian; 45°55'50" N., 123°29'30" W. Not: Beneke Creek (in part; q.v.).

Williams Butte: hill with an elevation of about 1,171 feet, about 3 miles west of Lowell; Lane County; secs. 17 and 20, T.19 S., R.1 W., Willamette meridian; 43°54'30" N., 122°50'30" W. Not: Rattlesnake Butte (q.v.).

Note: An asterisk (*) precedes each name that represents a change in an earlier decision. Former decisions no longer in force are listed, without underscoring, starred, and marked "VACATED."

****

NEW EDITION OF MINERAL FACTS AND PROBLEMS TO BE PUBLISHED

The U.S.Bureau of Mines is presently issuing preprint chapters of the 1960 edition of its Bulletin 585, "Mineral Facts and Problems." This valuable reference volume of 88 chapters, which first appeared in 1956, is being republished with new statistics and other up-to-date information. Publication date of the volume will be announced later. Some of the preprint chapters so far available are as follows:

Aluminum	Cesium	Hafnium
Antimony	Chromium	Indium
Asbestos	Columbium	Iodine
Barium	Diamond (industrial)	Lithium
Bismuth	Gallium	Mercury
Boron	Garnet	Nitrogen compounds
Bromine	Gem stones	Potassium compounds
Cadmium	Graphite	Talc, soapstone, and pyrophyllite

Prices and titles of available preprint chapters of Bulletin 585 may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

****

FOSSILS ON EXHIBIT

An outstanding collection of fossils belonging to Michael Brown, a senior at Washington High School, is now on display in the Department's Portland office. The exhibit consists of more than 60 kinds of fossil plants and animals ranging in age from Cambrian through Pleistocene and coming from various parts of North America. Among the specimens on display are the tiny skull, leg, and foot of the little 3-toed Oligocene horse, Mesohippus. Michael Brown's display won him the Barclay Senior Trophy for the best fossil exhibit at the National Gem and Mineral Show last year. The exhibit may be seen at the Department through April.

****

CONGRESSIONAL LEGISLATION

H.R.10638: $35-PER-OUNCE SUBSIDY ON NEWLY MINED GOLD -- Baring (Nev.), Committee on Banking and Currency. Would (1) permit the free marketing of gold in the United States and (2) direct the Secretary of the Treasury "to pay an incentive of $35 per fine ounce above the established monetary value for all gold domestically mined and tendered to the Treasury subsequent to the enactment of this Act."

Identical bill: H.R.10844, Chenoweth (Colo.).

H.R.9723: REGULATION OF DEALERS IN PUBLIC LAND RESOURCES -- Aspinall (Colo.). Favorably reported, with amendments, February 26 by Interior Subcommittee on Public Lands. Now before full Committee.

Would require dealers in public land resources to obtain state real estate license if they advertise their services and profit therefrom (amended to exempt attorneys at law). Action by full Committee postponed pending consideration of amendments to exempt mining engineers and other professional people.

S.1123: NATIONAL WILDERNESS PRESERVATION SYSTEM -- Humphrey (Minn.) and 17 others. Senate Interior Committee, following discussion of several proposed amendments February 16, scheduled another meeting for February 23. However, the latter meeting was canceled and no further date for consideration has been announced.

Would establish an extensive national wilderness preservation system composed of federally owned or controlled land and water areas, within which virtually all commercial enterprise--including mining except under unusual circumstances--would be banned.

S.2033: PERMIT PATENTING OF MILL SITES ADJACENT TO PLACER CLAIMS -- Bible and Cannon (Nev.). Awaiting President's action following House passage March 7. Would amend the mining laws to permit a millsite of not more than five acres located on nonmineral public land to be patented simultaneously with the mineral lands embraced within a placer mining claim, with payment at the rate applicable to the purchase of the mineral land within the claim.

(Excerpt from American Mining Congress Legislative Bulletin No. 14, March 10, 1960.)

****

RECORD STEEL IMPORTS IN 1959

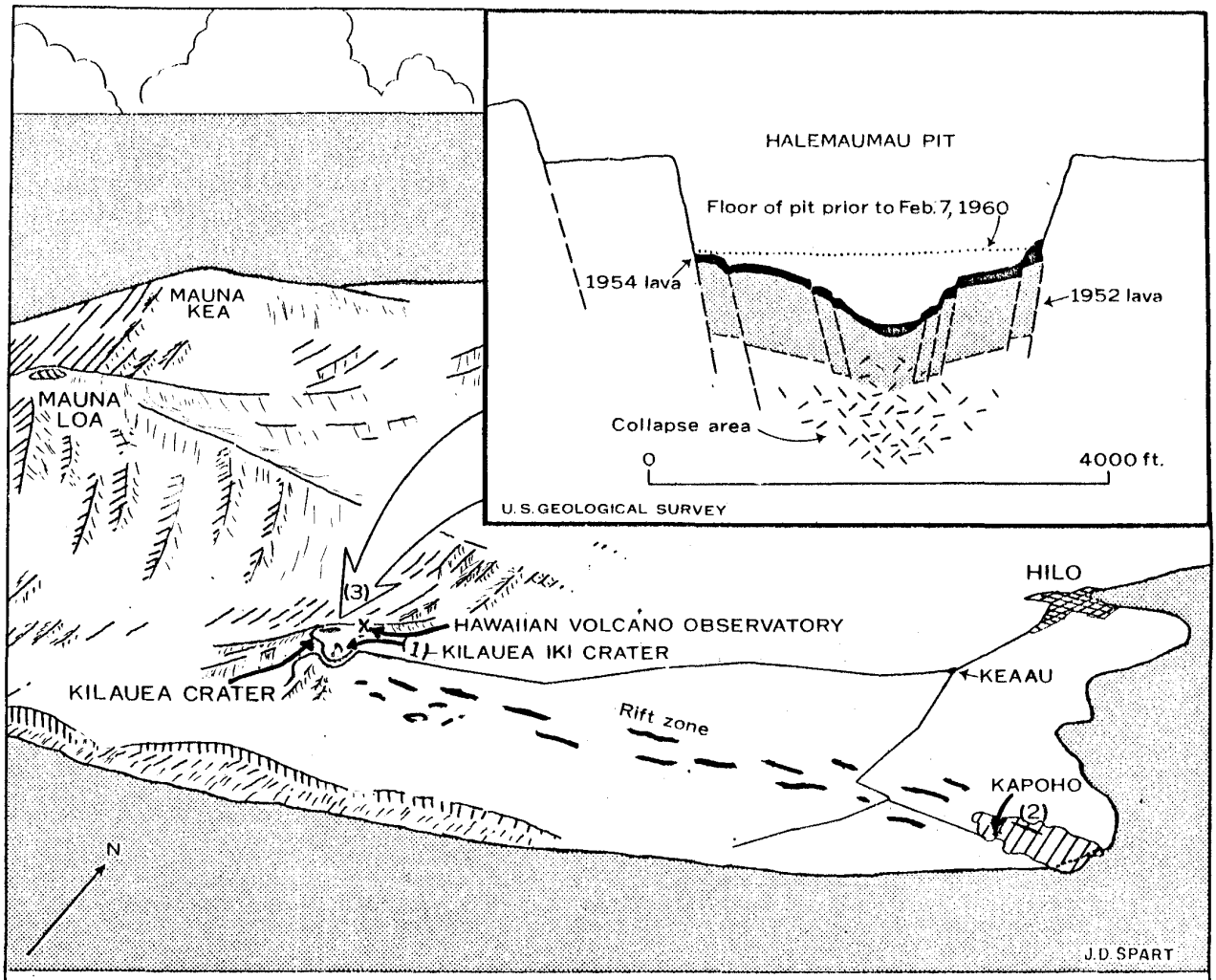
A record approaching 4.4 million tons of steel mill products, valued at about $515 million, was imported into the United States last year, according to preliminary Department of Commerce estimates. Each of those totals is more than 2¼ times the former records both of which were set during 1958. The tonnage of imports was large enough--in effect-- to saturate several normal markets for American steel. For example, the 4.4 million tons of steel brought in was a greater amount than average annual domestic shipments, during the past four years, to all the following markets: agriculture, shipbuilding and marine equipment, aircraft, oil and gas drilling, mining, quarrying and lumbering, ordnance and other military.

During 11 months of 1959 (the most recent period for which detailed data are available), foreign steel imports were increased about 150 percent over the same period of the prior year. The increase amounted to 2.4 million tons. On the West Coast, nearly 670,000 tons of foreign steel was received, compared with 280,000 in the 11-month period of 1958.

The top five customs districts through which foreign steel was imported during 11 months of 1959 were, in order: Galveston, 699,000 tons; New York, 424,000 tons; Los Angeles, 354,000 tons; Florida, 300,000 tons; and New Orleans, 273,000 tons. (From STEEL FACTS, No. 159, February 1960).

****

COLLAPSE OF HALEMAUMAU RELIEVES HAWAIIAN LAVA PRESSURE



Sketch showing location of successive events in the Hawaiian volcano activity, on the flank of Mauna Loa. (1) November 14: eruption of Kilauea Iki crater, on the floor of Kilauea Volcano, with lava fountain reaching 2,000 feet in height, forming a 55-million cubic yard lava lake in the crater, and covering roads and forests with a 100-foot blanket of volcanic ash. (2) January 13: outbursts of lava at Kapoho, 20 miles eastward, in a three-quarter mile curtain of fire, erupting with thunderous steam explosions and a lava fountain up to 1,700 feet high. Shows village and farmland buried in lava, and new land built up at seashore. The lava had migrated eastward through underground channels in the rift zone. (3) February 7: collapse of floor of Halemaumau Pit, on floor of Kilauea Crater, due to eastward draining of lava. Inset shows cross section of collapsed pit. Geological Survey's Hawaiian Volcano Observatory is shown on rim of Kilauea Crater. (From U.S.Geological Survey press release, February 22, 1960.)

KEEPING UP WITH K

Soviet universities are producing 12,000 geologists a year, and Russia, in its drive to achieve self-sufficiency in all vital minerals, employs 35,000 graduate geologists. The U.S., which produces far more minerals but is not self-sufficient, trains about 3,000 geologists a year and employs about 20,000. (Courtesy of NEWSWEEK, December 21, 1959, p. 45.)

****

MERCURY IN 1959

Mercury production in the United States in 1959 declined for the first time since 1950; output during the year totaled 30,750 flasks -- the lowest since 1956. All of the principal mercury-producing states, except Alaska, shared in the lower output in 1959. Production fell 47 percent in Oregon, 25 percent in Idaho, 24 percent in California, and 9 percent in Nevada. Output increased 11 percent in Alaska. Of the total amount produced, California supplied 56 percent, Nevada 22 percent, Alaska 12 percent, Idaho 6 percent, and Oregon 4 percent (Bretz mine in Malheur County and Bonanza mine in Douglas County). Small quantities came from Arizona, Texas, and Washington.

General imports of mercury totaled 30,260 flasks in 1959, 2 percent less than in 1958. Although imports in 1958 and 1959 included metal received through barter (6,000 flasks in 1959 and 10,000 flasks in 1958), receipts of mercury were the lowest since 1955. Spain and Italy supplied 78 percent of the total imports in 1959. Mercury was received from Turkey for the first time since 1956, and from Australia and New Zealand since import data by countries became available in 1922.

Exports of 640 flasks of mercury in 1959 were double the 1958 shipments; and re-exports totaled 553 flasks.

Consumption of mercury rose slightly to 53,100 flasks. Installation of a new chlorine and caustic soda plant at Deer Park, Texas, and expansions at similar plants at Anniston, Ala., and Calvert City, Ky., helped maintain the high rate of consumption.

(From the U.S.Bureau of Mines Mercury Report No. 133.)

****

WELL RECORDS RELEASED

The following oil well records, which have been held for two years in the Department's confidential file as prescribed by law, were released during March, 1960:

Company	Well Name	Location	Total Depth
General Petroleum Corporation	Long Bell No.1	SW¼ sec.27, T.20 S, R.10 W. Douglas County	9,004 ft.
Miriam Oil Company	Bliven No. 3	SE¼ sec. 10, T.8 S, R.5 W. Polk County	1,801 ft.

****

CONDON LECTURES BY GLACIAL EXPERT

The Condon Lectures this year will be given by Robert P. Sharp of the California Institute of Technology. Dr. Sharp, well-known authority on glaciers, will deliver two lectures, the first of which will be "Streams of Ice," and the second, "The Blue Glacier of Washington." The lecture series starts at the University of Oregon in Eugene March 29 and 31. It will be repeated at Oregon State College in Corvallis April 5 and 7, and again at the Portland State College auditorium April 11 and 12, at 8 p.m. Condon Lectures, designed for the nonspecialist, are open to the public and free of charge.

****

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S.E."H" Street
Grants Pass

****

PROGRESS OF GEOLOGIC STUDIES IN OREGON

Compiled by Herbert G. Schlicker*

The number of geologists doing field work in Oregon has noticeably increased in recent years. This can be accounted for by the greater number of graduate students working for degrees in geology and the concentrated efforts by the U.S.Geological Survey and the State of Oregon Department of Geology and Mineral Industries to complete the State mapping project. It is probable that during the summer of 1960 more than one hundred geologic field studies will be underway. If the number appears to be excessive, it should be realized that only about two-thirds of Oregon's 96,000 square miles have been geologically mapped, and at least half of this mapping has been reconnaissance. Furthermore, the stratigraphic and mineral-deposit studies so far completed are relatively few compared to the many that must be accomplished before Oregon's resources are adequately known.

This paper is intended to show, by means of lists and index maps, the subjects and areas currently selected for geologic study by schools, government agencies, and individuals. Even though an effort was made to include all such geologic studies in the compilation, it is quite possible that a few have been overlooked.

The studies have been separated into lists A, B, C, and D, the first three of which are accompanied by index maps. List A and its corresponding index map show areas of geologic mapping by graduate students for college theses, including those theses completed since 1958 but not appearing in the Department's Miscellaneous Paper No. 7, Bibliography of theses on Oregon geology.

List B and its index map show areas of geologic mapping in progress or contemplated by State and Federal agencies and by persons working privately or under research grants. It also includes a few theses areas already shown on Map A, indicating that these theses and their maps are being prepared for publication.

List C and its index map show areas of special studies such as paleontology, stratigraphy, mineral investigations, and geology of local interest. This work is also being done by government agencies, graduate students in geology, and private researchers.

List D consists of special studies similar to those indicated on List C, but covering too broad a distribution to show on an index map.

It should be pointed out that most of the titles assigned to the projects listed are as yet only approximate. Definitely known titles of completed studies are indicated by quotation marks. In compiling the material for this report, the writer received much valuable information from the geologists contacted regarding their forthcoming field work, and it is regretted that space did not allow printing of more than a very brief statement about each project. The fine cooperation shown by the many persons who contributed to the compilation is greatly appreciated.

If a record of this type is found to be of sufficient interest to geologists, the Department will continue to obtain and periodically publish such information.

---

* Geologist, State of Oregon Department of Geology and Mineral Industries, and former champion DOGAMI bridge player. How about a game?

LIST "A": GEOLOGIC MAPPING BY GRADUATE STUDENTS FOR COLLEGE THESES

(1) Arndt, John R., Geology of the southwestern part of the Mitchell quadrangle, Ore. Oregon State College master's thesis. In progress.

(2) Bateman, Richard L., Geology of T.20 S., R.28 E., Burns No. 2 quadrangle, Oregon. University of Oregon master's thesis. In progress.

(3) Beeson, Marvin H., Geology of T.19 S., R.28 E., Burns No. 2 quadrangle, Oregon. University of Oregon master's thesis. In progress.

(4) Blair, Frank H., Geology of the southwestern quarter of the Alvord Lake No. 3 quadrangle, Oregon. Oregon State College master's thesis. In progress.

(5) Bristow, Milton M., "The geology of the northwestern third of the Marcola quadrangle, Oregon." University of Oregon master's thesis, 1959.

(6) Carnahan, Gary L., Geology of the southwestern part of the Eagle Cap quadrangle, Oregon. Oregon State College master's thesis. In progress.

(7) Cochran, David O., Cenozoic geology of the Pueblo Mountains, Oregon and Nevada. University of Washington doctoral thesis. In progress.

(8) Crowley, Karl C., Geology of the southeastern quarter of the Canyon City No. 3 quadrangle, Oregon. University of Oregon master's thesis. In progress.

(9) Dodds, R.Kenneth, Geology and stratigraphy of the western half of the Svenson quadrangle, Oregon. University of Oregon master's thesis. In progress.

(10) Greene, Frank F., Geology of the northeastern corner of the Sparta quadrangle, Oregon. Oregon State College master's thesis. In progress.

(11) Gregory, Cecilia Dolores, Geology of the Drewsey area, Oregon. University of Oregon master's thesis. In progress.

(12) Haddock, Gerald H., "Geology of the Cougar Peak volcanic area, Lake County, Oregon." Washington State College master's thesis, 1959.

(13) Hoover, Linn, "Geology of the Anlauf and Drain quadrangles, Douglas and Lane counties, Oregon." University of Washington doctoral thesis, 1959.

(14) Howard, John K., General geology of the Cape Sebastian-Gold Beach area, Oregon. University of Wisconsin master's thesis. To begin summer 1960.

(15) Johnson, George D., "Geology of the northwest quarter of the Alvord Lake No. 3 quadrangle, Oregon." Oregon State College master's thesis, 1960.

(16) Kaiser, William, Petrology of basement rocks and sediments in the Port Orford region. University of Wisconsin master's thesis. To begin summer 1960.

(17) Kittleman, L.R., Geological study of the area bordering the southern half of the Owyhee Reservoir. University of Oregon doctoral thesis. In progress.

(18) Koch, John G., Geology of Humbug Mountain area, Oregon. University of Wisconsin master's thesis. To be completed May 1960.

(18a) _____, Mapping of Humbug Mountain area to be extended south and east for doctoral thesis. To begin summer 1960.

(19) Lawrence, John K., Geology of the southern third of the Sutherlin quadrangle, Oregon. University of Oregon master's thesis. In progress.

(20) Lindsley, Donald H., Geology and paleomagnetism of the Spray quadrangle, Oregon. Johns Hopkins University doctoral thesis. In progress.

(21) Maloney, Neil J., Geology of the eastern half of the Beatty Butte No. 4 quadrangle, Oregon. Oregon State College master's thesis. In progress.

(22) Nolf, Bruce O., Structure and stratigraphy of the Wallowa Mountains, Oregon. Princeton University doctoral thesis. In progress.

(23) Oregon, University of, Northern third of the Dixonville quadrangle, Oregon. Area to be assigned.

(23a) _____, Southern third of the Glide quadrangle, Oregon. Area to be assigned.

(24) Patterson, Peter V., Geology of the northern third of the Glide quadrangle, Oregon. University of Oregon master's thesis. In progress.

(25) Payton, Clifford C., Geology of the middle third of the Sutherlin quadrangle, Oregon. University of Oregon master's thesis. In progress.

(26) Peck, Dallas L., Geology of the Cascade Range in Oregon north of latitude 43°. Harvard University doctoral thesis. To be completed June 1960.

(27) Prostka, Harold, Geology of the Sparta quadrangle, Oregon. Johns Hopkins University doctoral thesis. In progress.

(28) Pyle, Charles A., Geology of the northwestern third of the Roseburg quadrangle, Oregon. University of Oregon master's thesis. In progress.

(29) Schnaible, Robert H., Geology of the middle third of the Glide quadrangle, Oregon. University of Oregon master's thesis. In progress.

(30) Smedes, Harry W., "Geology of part of the northern Wallowa Mountains, Oregon." University of Washington doctoral thesis, 1960.

(31) Trantham, Charles I., Geology of the southwestern fourth of the Canyon City No.3 quadrangle, Oregon. University of Oregon master's thesis. In progress.

(32) Taylor, Edward M., Geology of the northwestern part of the Mitchell quadrangle, Oregon. Oregon State College master's thesis. In progress.

(33) Vigrass, Laurence W., Geology of the Suplee area, Crook, Grant, and Harney counties, Oregon. Stanford University doctoral thesis. In progress.

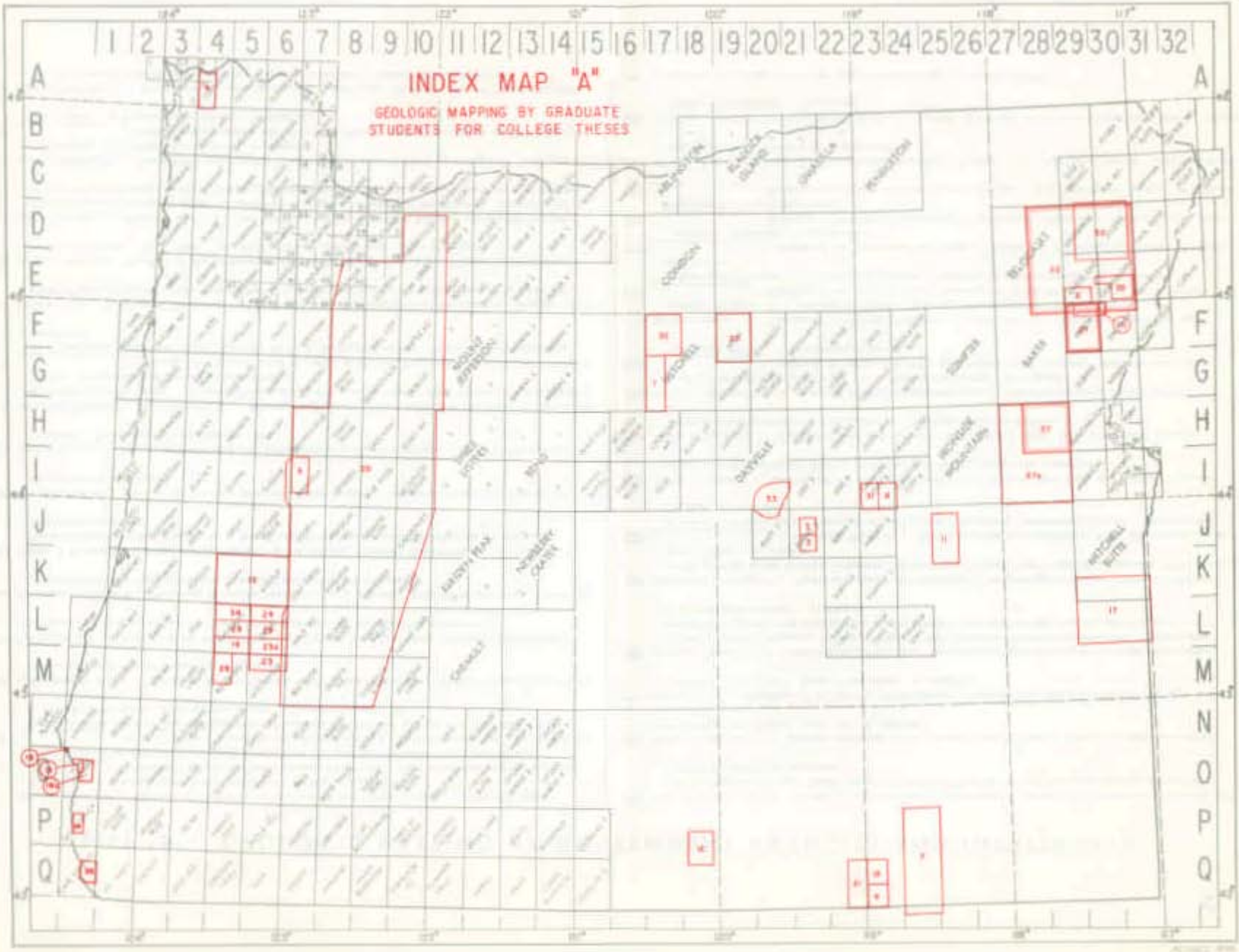
(34) Westhusing, James K., "The geology of the northern third of the Sutherlin quadrangle, Oregon." University of Oregon master's thesis, 1959.

(35) Wetherell, Clyde E., "Geology of part of the southeastern Wallowa Mountains, northeastern Oregon." Oregon State College master's thesis, 1960.

(36) Widmier, John M., Stratigraphy and structure of the Brookings-Cape Ferrelo region, Oregon. University of Wisconsin doctoral thesis. To begin summer 1960.

(37) Wolff, Ernest N., "The geology of the upper Willow Creek-Cow Creek valley area of northern Malheur County, Oregon." University of Oregon master's thesis, 1959.

(37a) _____, The geology of the Caviness quadrangle, Oregon. University of Oregon doctoral thesis. In progress.


INDEX MAP "A"
GEOLOGIC MAPPING BY GRADUATE STUDENTS FOR COLLEGE THESES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
A B C D E F G H I J K L M N O P Q

LIST "B": GEOLOGIC MAPPING BY GOVERNMENT AGENCIES AND INDIVIDUALS

(1) Baldwin, Ewart M., Revision of the Dallas and Valsetz geologic maps, Oregon. State of Oregon Department of Geology and Mineral Industries. To begin August 1960.

(2) _____, Geologic map of the lower Umpqua River area. Work completed and being edited for publication by the U.S.Geological Survey as an Oil and Gas Investigation series OM map.

(3) _____, et al., Proposed cooperative geologic mapping venture between the U.S.Geological Survey and the State of Oregon Department of Geology and Mineral Industries in the Camas Valley-Dutchman Butte region, southwestern Oregon. Expected to begin 1961.

(4) Buddenhagen, H.J., Geology of the pre-Tertiary inlier of central Oregon. State of Oregon Department of Geology and Mineral Industries. In progress.

(5) Corcoran, R.E., Geology of the Mitchell Butte quadrangle, Oregon. State of Oregon Department of Geology and Mineral Industries. Field work completed and manuscript in preparation.

(6) Dickinson, William R., Petrology of marine Mesozoic clastic volcanic rocks in the Izee area, including chemical and mineralogical aspects. Stanford University. In progress.

(7) Dodds, R.Kenneth, Geology and stratigraphy of the Astoria, Svenson, Cannon Beach, and Saddle Mountain quadrangles, Oregon. U.S.Army Corps of Engineers. Unaffiliated study. Field work 50 percent completed.

(8) Donath, Fred A., Basin-range structure of south-central Oregon. Columbia University. Manuscript in preparation for publication.

(9) Dott, R.H., Jr., Eocene sedimentation and paleogeography around Coos Bay, Oregon. University of Wisconsin. Field work to be completed 1960.

(10) Hampton, Eugene R., and Brown, R.G., Geology and ground-water resources of the upper Grande Ronde River basin, Union County, Oregon. To be published as a Water Supply Paper by the U.S.Geological Survey. Field work and manuscript completed.

(11) _____, Geology and ground water resources of the Fort Rock basin, Lake County, Oregon. To be published as a Water Supply Paper by the U.S.Geological Survey. Field work and manuscript completed.

(12) Hoover, Linn, Geology of the Anlauf and Drain quadrangles, Douglas and Lane counties, Oregon. Completed and submitted for publication by the U.S.Geological Survey. Unedited version on open file.

(13) Howell, Paul W., Geology of the northeastern part of the Willamette Valley, Oregon, with emphasis on the stratigraphy. U.S. Army Corps of Engineers. Unaffiliated study. In progress.

(14) Koch, George S., Bowen, Richard G., and Prostka, Harold, Geologic mapping and preliminary geochemical investigations for copper in northeastern Oregon. Mapping of Baker No.1, Telocaset No. 4, and Sparta quadrangles. State of Oregon Department of Geology and Mineral Industries. In progress.

(15) Lewis, Richard Q., Compilation and mapping Oregon part of A.M.S.Baker quadrangle for State geologic map project. U.S.Geological Survey. In progress.

(16) _____, Field-checking eastern half of A.M.S.Bend quadrangle, Oregon, for State geologic map project. U.S.Geological Survey. In progress.

(17) Lowry, Wallace D., Geology of the Ironside Mountain quadrangle, Oregon. State of Oregon Department of Geology and Mineral Industries. Mapping completed, manuscript in preparation.

(18) Peck, Dallas L., et al, Geologic reconnaissance of the Western Cascades of Oregon north of latitude 43°. U.S.Geological Survey. Report completed and submitted for review; to be published as a Bulletin. Open-file report to be released.

(19) Peterson, Norman V., Geologic mapping in the Lakeview area, Oregon. State of Oregon Department of Geology and Mineral Industries. In progress.

(**) Sargent, S.C., Geology of The Dalles, White Salmon, Wishram, and Wasco quadrangles, Oregon and Washington. U.S.Army Corps of Engineers. In progress.

(20) Snavely, Parke D., Jr., and Wagner, Holly C., Detailed geologic mapping of the Cape Foulweather, Euchre Mountain, Yaquina, Toledo, Waldport, and Tidewater 15-minute quadrangles, Oregon, and related stratigraphic and petrographic studies in the central part of the Oregon Coast Ranges. U.S.Geological Survey. In progress.

(21) Taubeneck, William H., Series of papers to be published in the Geological Society of America Bulletin on the geology of the Elkhorn Mountains, northeastern Oregon. (Part 1 published February 1957.) Oregon State College. In progress.

(22) _____, and Nolf, Bruce O., Series of papers to be published in the Geological Society of America Bulletin on the evolution of the Wallowa Mountains, northeastern Oregon. Oregon State College. In progress.

(23) Thayer, Thomas P., Geology of the Aldrich Mountain, Mt. Vernon, John Day, and Prairie City quadrangles. U.S.Geological Survey. Mapping completed, manuscript in progress.

(24) Trimble, Donald E., Geology of Portland, Oregon, and adjacent areas. U.S.Geological Survey. Manuscript being edited for publication as a Geological Survey Bulletin.

(25) Walker, George W., In charge of State geologic map project. Presently mapping eastern half of A.M.S.Klamath Falls quadrangle. U.S.Geological Survey. In progress.

(26) _____, Mapping to continue in Adel quadrangle, which includes Steens Mountain and Pueblo Mountains. U.S.Geological Survey.

(27) Waters, Aaron C., Geology of the Ochoco Reservoir, Lookout Mountain, Eagle Rock, and Post quadrangles, Oregon. U.S.Geological Survey. Map and manuscript near completion.

(28) _____, Geology of the Madras, Dufer, eastern part of the Mt. Hood, and Mt. Jefferson quadrangles, Oregon. U.S.Geological Survey. Mapping 95 percent completed, manuscript in preparation.

(29) _____, Geology of the Columbia River Gorge, Oregon. U.S.Geological Survey. Mapping completed, manuscript in preparation.

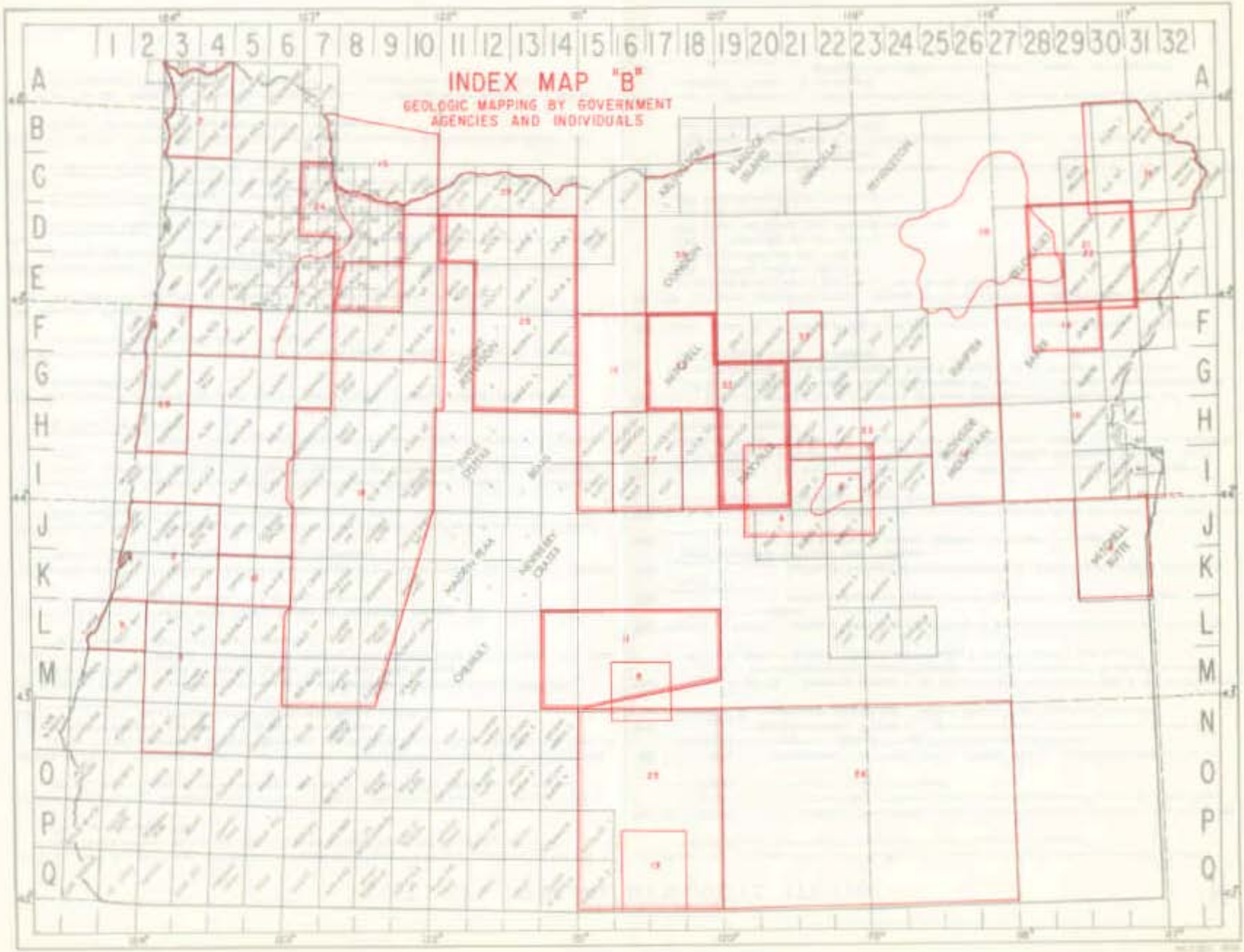
(30) _____, Geology of the Condon and Arlington quadrangles, Oregon. U.S.Geological Survey. Mapping 90 percent completed.

(31) _____, Geology of northern Wallowa County, Oregon. U.S.Geological Survey. In progress.

(32) Wilcox, R.E., Geology of the Monument quadrangle, Oregon. U.S.Geological Survey. Mapping to be completed 1960. Manuscript in preparation.

(33) Wilkinson, W.D., Geology of the Mitchell, Dayville, Richmond, and Picture Gorge quadrangles, Oregon. Oregon State College. In progress.

(**) Information received too late for areas to be outlined on INDEX MAP "B".


INDEX MAP "B"
GEOLOGIC MAPPING BY GOVERNMENT AGENCIES AND INDIVIDUALS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
A B C D E F G H I J K L M N O P Q

LIST "C": SPECIAL GEOLOGIC STUDIES

(1) Dole, Hollis M., and Bowen, Richard G., Structural and petrographic study of welded tuff in the Malheur canyon between Juntura and Harper. State of Oregon Department of Geology and Mineral Industries. To begin 1960.

(2) Goodspeed, G.E., "The igneous and metamorphic rocks at Cornucopia, Oregon." To be published in the Geological Society of America Bulletin. University of Washington. Manuscript in progress.

(3) Hay, Richard L. Diagenetic alterations of the volcanic materials of the Clarno and John Day formations in the Mitchell quadrangle, Oregon. Secondary zeolites, feldspars, and "clay" minerals have received particular emphasis. University of California. In progress.

(4) _____, Area of future study of Clarno and John Day formations.

(5) Hogenson, G.M., Ground-water resources of the east Portland area. Coordinated with USGS Map GQ-104 (Trimble). U.S.Geological Survey. Water Supply Paper in progress.

(6) _____, Geology and ground-water resources of the Umatilla River Basin, Oregon. U.S.Geological Survey. Water Supply Paper in progress.

(7) Hotz, Preston E., Klamath nickel studies, Oregon and California. Recessed 1958. Mapping of Riddle nickel deposit, 1960 field season. U.S.Geological Survey.

(8) Jarman, Gary D., Foraminifera and associated sediments of the coastal waters in the vicinity of Newport, Oregon. Oregon State College master's thesis. In progress.

(9) Johnson, Arvid M., Stratigraphic study of the Deer Butte formation, Owyhee Reservoir area, Mitchell Butte quadrangle, Oregon. University of Oregon master's thesis. To begin summer 1960.

(10) Jones, David L., Cretaceous rocks and fossils in the Ashland-Medford area, Oregon. U.S.Geological Survey. In progress. Possible future work will extend to Port Orford-Gold Beach, and Myrtle Creek areas.

(11) _____, Collecting Cretaceous fossils in the Mitchell area in conjunction with W.E.Wilkinson of Oregon State College.

(12) Jones, Robert W., "Lower Tertiary foraminifera from Waldport, Oregon." Oregon State College master's thesis, 1960.

(13) Kleck, Wallace D., Study of zeolites in the vicinity of Eugene, Coburg, and Springfield, Oregon. University of Oregon master's thesis. In progress.

(14) Newcomb, Reuben C., Geologic and hydrologic factors that govern the occurrence of ground water in the Columbia River basalt. U.S.Geological Survey research project. In progress.

(15) Peterson, Norman V., Study of the Bear Creek uranium occurrence. State of Oregon Department of Geology and Mineral Industries. In progress.

(16) _____, Study of the Lakeview uranium deposits. State of Oregon Department of Geology and Mineral Industries. In progress.

(17) _____, Study of the Powell Butte uranium occurrence. State of Oregon Department of Geology and Mineral Industries. In progress.

(18) _____, Steens Mountain and Pueblo Mountains uranium occurrences. State of Oregon Department of Geology and Mineral Industries. In progress.

(19) Pigg, John H., Stratigraphic study of the lower Tertiary sediments in the Pilot Rock and Heppner area, Oregon. University of Oregon master's thesis. In progress.

(20) Price, Donald, Detailed reconnaissance mapping of the surficial geology of the French Prairie part of the Willamette Valley, Oregon. U.S.Geological Survey ground-water study. To begin 1961.

(21) Ramp, Len, Geology of the Quartz Mountain silica deposit, Quartz Mountain quadrangle, Oregon. State of Oregon Department of Geology and Mineral Industries. In progress.

(22) Rau, Weldon W., Basic studies of the microfauna of the Newport embayment, Newport, Oregon. Also, foraminifera of the Nye formation. Extended studies include Tertiary microfauna of the Coast Range of Oregon. U.S.Geological Survey. In progress.

(23) Sceva, Jack E., Ground-water study of Cow Valley, Malheur County, in order to determine the ground-water recharge rate. State of Oregon Water Resources Department.

(24) _____, and Bartholomew, William S., Ground-water study of The Dalles area in order to determine the ground-water recharge rate. State of Oregon Water Resources Department.

(25) Schlicker, Herbert G., Economic geology of the intrusive rocks in the central part of the Coast Ranges of Oregon. State of Oregon Department of Geology and Mineral Industries. To be published as Part 2 of Department bulletin. (Part 1, see Snavely, P.D., Jr., et al.) In progress.

(26) Shotwell, J.Arnold, Studies of mammalian paleontology in the northern Great Basin area. University of Oregon. In progress.

(27) _____, Studies of Barstovian mammals in the Great Basin. University of Oregon. To begin 1960.

(28) _____, Studies of the fauna of the Clarno formation. University of Oregon. Field work largely completed; laboratory work in progress.

(29) _____, Study of Pliocene faunas. University of Oregon. In progress.

(30) Smith, W.C., Mineralogy and geologic setting of the borate-bearing playas or marshes. Includes Alvord Lake, Oregon. U.S.Geological Survey. Reports in progress.

(31) Snavely, Parke D., Jr., et al., Intrusive rocks in the central part of the Coast Ranges of Oregon. U.S.Geological Survey and State of Oregon Department of Geology and Mineral Industries. To be published as Part 1 of Department bulletin. (Part 2, see Schlicker, Herbert G.) Field work completed. Manuscript in progress.

(32) Stuart, D.J., Reconnaissance gravity survey with some aeromagnetic traverses of the area from 123° W. longitude to the Pacific Ocean and between 44° and 45° N. latitude. Geophysical data to be correlated with the geology by Stuart, Parke D. Snavely, Jr., R.W.Bromery, and others. U.S.Geological Survey. In progress.

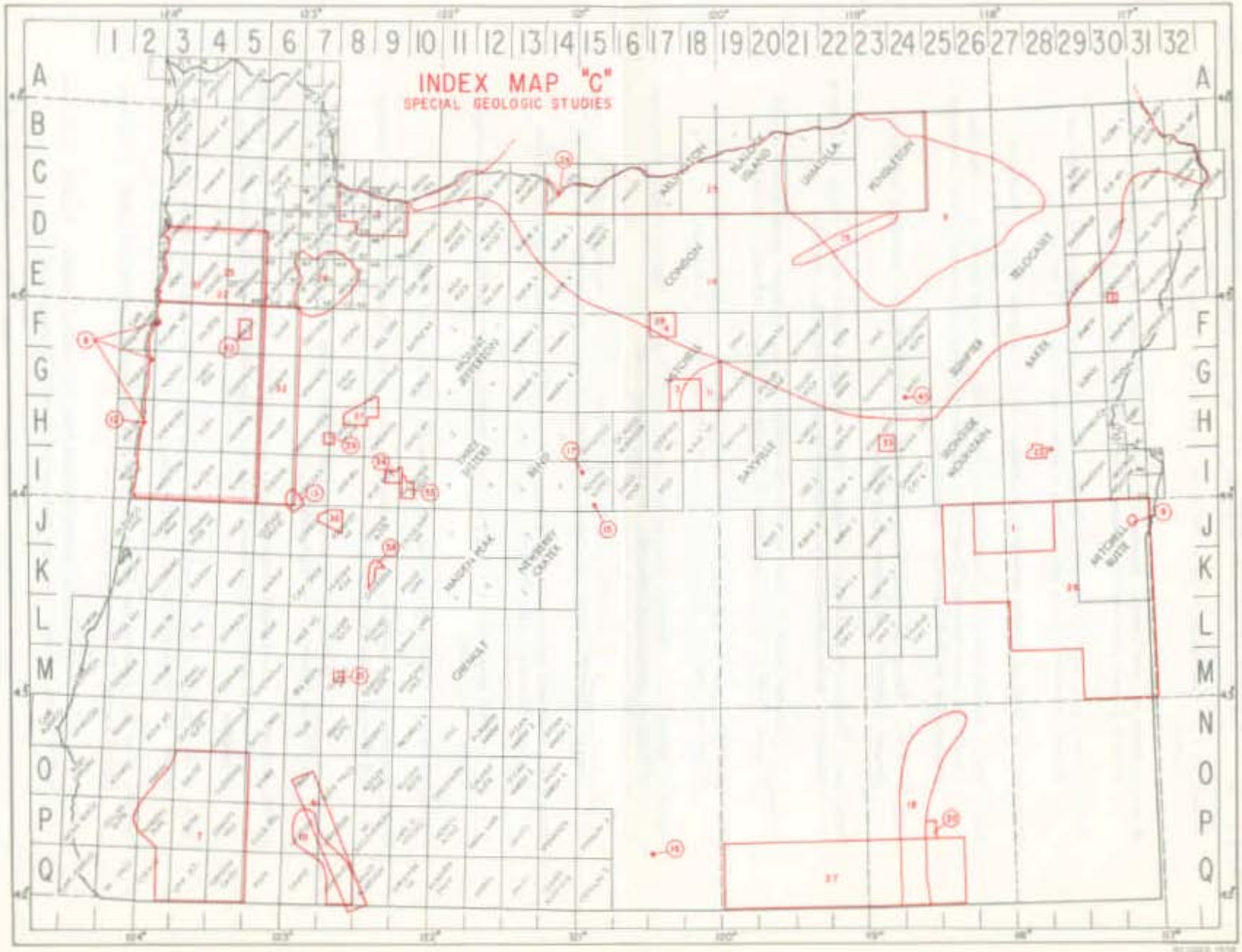
(33) Thayer, Thomas P., Chromite studies in the John Day area. U.S.Geological Survey. In progress.

(34 - 39) U.S.Army, Corps of Engineers, Geology of the dam sites in the Cascade Range. Reports and maps in the files of the Corps of Engineers, Pittock Block, Portland, Oregon.
- (34) Blue River dam site and vicinity.
- (35) Cougar dam site and vicinity.
- (36) Fall Creek dam site and vicinity.
- (37) Foster and Green Peter dam sites and vicinity.
- (38) Hills Creek dam site and vicinity.
- (39) Holly Reservoir dam site and vicinity.

(40) Vhay, J.S., Geology and geochemical experimentation, Quartzburg district, Grant County: a revision. U.S.Geological Survey. In progress.
"The copper-cobalt deposits of the Quartzburg district, Grant County." U.S. Geological Survey open-file report released January 1960.

(41) Wisconsin, University of, Cretaceous stratigraphy from Hilt, California, northward into the Medford quadrangle, Oregon. To be assigned.

(42) _____, Geology of the Dallas limestone deposit, Oregon. To be assigned.


INDEX MAP "C"
SPECIAL GEOLOGIC STUDIES
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
A B C D E F G H I J K L M N O P Q
COMBON
BELOCAST
BAKER
DAYVILLE
MITCHELL BUTTE
CRESCENT

LIST "D": SPECIAL GEOLOGIC STUDIES (NOT SHOWN ON INDEX MAP)

Allison, Ira S., Continuing studies of Pleistocene lakes in Lake County and environs. Oregon State College.

Bostwick, David A., and Wagner, Norman S., Paleontological studies of the Paleozoic of Oregon. State of Oregon Department of Geology and Mineral Industries. In progress.

Brooks, Howard C., Study of mercury in Oregon. State of Oregon Department of Geology and Mineral Industries. To be published as a Department bulletin. In progress.

Imlay, Ralph, Study of Jurassic ammonites of Oregon. U.S.Geological Survey. In progress.

Kelly, Hal J., Harris, Henry M., and Schlicker, Herbert G., Study of nepheline syenite from Lincoln and Lane counties, Oregon. U.S.Bureau of Mines and State of Oregon Department of Geology and Mineral Industries. In progress.

Lund, Ernest H., Petrographic and stratigraphic study of welded tuffs and rhyolites in southeastern Oregon. University of Oregon. In progress.

Ramp, Len, Chromite in southwestern Oregon. State of Oregon Department of Geology and Mineral Industries. To be published as a Department bulletin. Manuscript completed.

_____, Geologic study of select areas in the sediments of the Applegate group in southwestern Oregon. State of Oregon Department of Geology and Mineral Industries. In progress.

Sahu, Basanta K., Theoretical and laboratory investigation of beach and dune sands between Port Orford and Coos Bay. University of Wisconsin doctoral thesis. In progress.

Schlicker, Herbert G., Landslide study of the Portland Hills, Oregon. State of Oregon Department of Geology and Mineral Industries. To begin summer 1960.

_____, Engineering geology of the Willamette Valley, between Portland and Eugene, Oregon. State of Oregon Department of Geology and Mineral Industries. To begin 1961.

Scott, R.A., General paleobotany, collecting, and study of fossil woods and other plants from Oregon, Wyoming, and Colorado. U.S.Geological Survey.

_____, Fossil wood and fruits from the Clarno formation (Eocene) of Oregon. U.S.Geological Survey. In progress.

Staples, Lloyd W., Continuing investigation of zeolites. University of Oregon.

Steere, Margaret L., Fossil localities of western Oregon. State of Oregon Department of Geology and Mineral Industries. In progress.

_____, Geology of the state parks of Oregon. State of Oregon Department of Geology and Mineral Industries. To begin 1960.

Stewart, Roscoe E., Stratigraphic implications of some fossil foraminifera in Oregon. State of Oregon Department of Geology and Mineral Industries. To be published as a Department bulletin. In progress.

Taylor, D.W., Studies of the nonmarine Tertiary gastropods of the Snake River plains, Oregon and Idaho. U.S.Geological Survey. In progress.

Trumbull, Ellen J., Research and field work on late Tertiary mollusks of the West Coast. U.S.Geological Survey. In progress.

_____, Middle Miocene marine mollusks from the Astoria formation. Oregon. U.S.Geological Survey. Manuscript completed and being edited for publication.

Youngquist, Walter, Lexicon of stratigraphic terms applied in Oregon. University of Oregon. In preparation.

KROLL TO RECEIVE GLASGOW AWARD

Word has just been received that Dr. W.J.Kroll, internationally known metallurgist and resident of Corvallis, Oregon, is to receive the Castner Gold Medal from the Society of Chemical Industry in Glasgow, Scotland, in April. Dr. Kroll, who developed and patented the Kroll process for producing titanium metal, introduced this process in 1947 for the production of ductile zirconium at the Albany, Oregon, laboratory where he was metallurgical consultant for the Bureau of Mines. Dr. Kroll has received a number of previous awards, one of which was the James Douglas Gold Medal presented in 1954 by the AIME for outstanding contributions to nonferrous metallurgy.

****

AEROMAGNETIC MAP OF PART OF JOSEPHINE AND CURRY COUNTIES PUBLISHED

The U.S.Geological Survey has just issued "Aeromagnetic map of the Kerby and part of the Grants Pass quadrangles, Josephine and Curry counties, Oregon," by J. R. Balsley, R. W. Bromery, E. W. Remington, and others, as Map GP-197 under the Geophysical Investigations Series. Map GP-197 may be obtained for 50 cents from the U.S.Geological Survey, Denver Federal Center, Denver, Colorado.

This is a contour map of magnetic intensity reflected by the ultrabasic rocks (peridotite and serpentine) that underlie the Kerby and adjacent Grants Pass quadrangles. The aeromagnetic survey was begun in 1950 as a follow-up of field mapping of ultrabasic rocks in southwestern Oregon by F. G. Wells, whose work on the Kerby quadrangle was published in 1949 as the State of Oregon Department of Geology and Mineral Industries Bulletin 40. Aeromagnetic mapping of the Kerby quadrangle compares favorably with surface geologic mapping and can be used to trace subsurface features as an aid to mineral exploration.

****

MINING LAW CHANGE

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section 2337 of the Revised Statutes of the United States (30 U.S.C. 42) is amended (1) by adding "(a)" after "Sec. 2337.", and (2) by adding at the end thereof a new subsection as follows:

"(b) Where nonmineral land is needed by the proprietor of a placer claim for mining, milling, processing, beneficiation, or other operations in connection with such claim, and is used or occupied by the proprietor for such purposes, such land may be included in an application for a patent for such claim, and may be patented therewith subject to the same requirements as to survey and notice as are applicable to placers. No location made of such nonmineral land shall exceed five acres and payment for the same shall be made at the rate applicable to placer claims which do not include a vein or lode."

Public Law 86-390. 74 STAT. 7. Approved March 18, 1960.

****

NORTHWESTERN MINING COUNCIL NAMES OFFICERS

The Northwestern Mining Council, Inc., with headquarters in Medford, Oregon, has announced the election of the following officers, all of whom live in Medford: President, W.H.Holloway; Vice President, Del Boyd; Secretary, Mrs. Truman Bishop; Correspondence Secretary, Mrs. Russ Mitchell; and Treasurer, Glenn Hall.

****

MIOCENE FLORAS OF COLUMBIA PLATEAU PUBLISHED

"Miocene Floras of the Columbia Plateau," by Ralph W. Chaney and Daniel I. Axelrod, has been published as Monograph 617 by the Carnegie Institution of Washington. The work represents a complete re-study of the three chief Miocene floras of eastern Oregon, namely, the Mascall, Blue Mountains, and Stinking Water floras, all of which lived at approximately the same time, during the closing stages of Miocene volcanic activity. Geologic occurrence, composition, and paleoecology of the three floras are discussed by Chaney in Part I of the monograph, and systematic descriptions, followed plates of illustrations, are given by Chaney and Axelrod in Part II.

This 8½ x 11-inch volume, containing 229 pages and 44 plates, and obtainable in cloth binding ($4.75) or paper binding ($4.25), may be purchased from the Carnegie Institution of Washington, 1530 P Street Northwest, Washington 5, D.C.

****

FEDERAL OIL AND GAS LEASING REGULATIONS CHANGED

The Department of the Interior announces that the U.S. Geological Survey, under recently amended Federal regulations, will publish maps or diagrams of "structures defined" on oil and gas fields located on Federal lands, and will distribute these records to local land offices of the Bureau of Land Management. Notice will be filed in the Federal Register. Although formal maps and diagrams for determinations of "structures undefined" will not be made and distributed, a memorandum of each such determination will be filed at the appropriate land office and will be available for public inspection upon request.

One of the functions of the Geological Survey is to determine whether public lands are or are not within any known geologic structure of a producing oil and gas field. This is done to insure appropriate administration of leasing. In making these determinations, the Survey employs the two terms mentioned above, "structures defined" and "structures undefined." "Structures defined" is used when there is sufficient accumulation of technical data to warrant publication of a map depicting structure boundaries. "Structures undefined" is used in an area of a first discovery when an immediate determination is needed in administering leases; or in areas where amount and rapidity of drilling outdate information accumulated.

In addition, the Interior Department has adopted new lease-description rules, according to the American Mining Congress Bulletin Service of April 1, 1960. The new rules will require all future applications for mineral leases and permits in unsurveyed areas to cover rectangular tracts of land with boundaries running due north-south and east-west. This will bring lease descriptions into conformity with the "protracted survey" system now employed by the Bureau of Land Management to facilitate oil and gas leasing of unsurveyed public lands. The protracted survey system of following lines drawn on maps will replace the more intricate language of metes and bounds.

****

NEW DRILLING PERMIT

Permit No. 38 was issued April 11, 1960, to the Reserve Oil and Gas Company to drill an oil test. The surveyed location is 2334' south and 1855' west from the NE corner of Sec. 31, T. 6 S., R. 4 W., Polk County. Ground elevation is 346.30'. The drilling will be located approximately 8 miles northeast of Dallas. Principals in the company are Jasper W. Tulley, president, and Harold F. Green, secretary. Address of the company is 64 Pine Street, San Francisco 11, California. The land on which the drilling is to be done is owned by D. B. Roy, and the well name is Roy L. and G. Bruer No. 1.

****

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S.E."H" Street
Grants Pass

* *

A SUMMARY OF ASSESSMENT REGULATIONS

By
N.S.Wagner*

During recent years, Congress has enacted two important laws relating to assessment work. One is Public Law 85-876 (Sept.2, 1958), allowing assessment credit for expenditures covering performance of certain types of technological survey work. The other is Public Law 85-736 (Aug.23, 1958), changing the date of the assessment year.

In themselves, both laws are readily understandable. Unfortunately, however, their enactment at a time when prospectors were still bewildered by Public Law 167 (July 23, 1955), and its maze of procedural requirements, resulted in confused interpretations on the part of many. For this reason an attempt has been made here to clarify the problem by summarizing and discussing assessment regulations.

History:

Federal laws governing the rights of a discoverer with respect to mineral resources on the public domain were first enacted on a comprehensive scale by Congress on May 10, 1872. These laws included requirements for the performance of assessment work as a condition for the holding of unpatented mining claims.

Few changes have been made in the original statutes dealing with assessment. For this reason present-day assessment regulations represent the original law as it has been extended, modified, and clarified by years of judicial rulings. The original law has been tested to the extent that conflicting interpretations have been explored quite thoroughly and resolved to the point wherein the finer details are now defined by a multitude of court decisions.

Original Law:

The portion of the original 1872 statutes dealing with assessment requirements (Section 2324, Title XXXII, Chapter 6, Revised Statutes, as quoted from General Land Office Circular 430) states:

> "On each claim located after the tenth day of May, eighteen hundred and seventy-two, and until the patent has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made by the tenth day of June, eighteen hundred and seventy-four, and each year thereafter, for each one hundred feet in length along the vein until a patent has been issued therefor; but where such claims are held in common, such expenditure may be made upon any one claim; and upon a failure to comply with these conditions the claim or mine upon which such failure occured shall be open to relocation in the same manner as if no location of the same had ever been made, provided that the original locators, their heirs, assigns, or legal representatives, have not resumed work upon the claim after failure and before such location."

---

* Geologist, State of Oregon Department of Geology and Mineral Industries.

In view of the punctuation in the second sentence of the above quotation, there appears to be room to wonder if the right to group claims and the right to validate inactive claims by the resumption of assessment work were not originally intended as special provisions applicable only to old claims already in existence at the time the 1872 laws were enacted, and applicable even then only during the special grace period ending June 10, 1874. However, assessment regulations as they are written today specifically accept each of these provisions as applicable to all claims regardless of the date of their location.

Another portion of the 1872 statutes contains the stipulation that the miners of each district may make regulations of their own choosing governing the location, manner of recording, and the amount of assessment work necessary to hold possession of a mining claim, provided such regulations are not in conflict with the laws of the United States, or with the laws of the state or territory in which the district is situated.

Oregon Law:

Under the provisions which enable local mining districts to make regulations of their own choosing, the State of Oregon has formulated laws pertaining to assessment work as follows:

> REVISED STATUTE 517.210. RECORDATION OF AFFIDAVIT OF ANNUAL LABOR. Within 30 days after the performance of labor or making of improvements, required by law to be annually performed or made upon any mining claim, the person in whose behalf such labor was performed or improvement made, or someone in his behalf, knowing the facts, shall make and have recorded in the mining records of the county in which the mining claim is situated, an affidavit setting forth:
>
> (1) The name of the claim or claims if grouped and the book and page of the record where the location notice of each such claim is recorded.
> (2) The number of days' work done and the character and value of the improvements placed thereon, together with their location.
> (3) The dates of performing the labor and making the improvements.
> (4) At whose instance or request the work was done or improvements made.
> (5) The actual amount paid for the labor and improvements, and by whom paid, when the same was not done by the claim owner.
>
> REVISED STATUTE 517.220. AFFIDAVIT OR LACK THEREOF AS EVIDENCE: RECORDING FEE. The affidavit described in ORS 517.210, when so recorded, or a duly certified copy thereof, is prima facie evidence of the facts therein stated. Failure to file such affidavit within the prescribed time is prima facie evidence that such labor has not been done. The fee for recording the affidavit is $1. All claims constituting one group belonging to the same person, persons, association may be included in one affidavit without additional charge.

Other Oregon statutes pertaining to assessment work deal with the performance of this work by co-owners, the failure of co-owners to contribute their share of assessment expense, and the procedures by which other co-owners can protect themselves under such circumstances. For these and other considerations, the reader is referred to "Mining Laws of the State of Oregon," (Oregon Department of Geology and Mineral Industries, 1954). It should be noted, however, that Oregon law does not stipulate the amount of assessment work that should be done, or its nature, or location, or the date of performance. For these details the federal laws and their related administrative regulations and court decisions take precedence.

Annual Expenditure:

The performance of assessment work in the amount of $100 per claim, or $10 per hundred linear feet for claims located prior to May 10, 1872, still holds as called for in the laws of 1872. However, the concept of what constitutes acceptable work, the question of how and where it may be done, and practices with respect to claim grouping are matters which have been dealt with and clarified by a succession of rulings. For this reason, the Department urges that

the advice of accredited legal counsel be sought whenever the claim owner has doubts concerning the validity of procedural practices.

Assessment Year:

Since 1872, the assessment year has been changed several times. The most recent change occurred August 23, 1958, with the enactment of Public Law 85-736. This law changed the deadline for annual assessment work on unpatented claims from July 1 to September 1 of each year, beginning with the work year ending in 1959. As quoted in The Ore.-Bin (vol. 21, no.5, p.49, May 1959), Public Law 85-736 reads:

> An Act: To amend section 2324 of the Revised Statutes, as amended, to change the period for doing annual assessment work on unpatented mineral claims so that it will run from Sept. 1 of one year to Sept. 1 of the succeeding year, and to make such change effective with respect to the assessment work year commencing in 1959.
>
> BE IT ENACTED BY THE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA IN CONGRESS ASSEMBLED, That section 2324 of the Revised Statutes, as amended (30 U.S.C.28), is amended by striking out "1st day of July" and inserting in lieu thereof "1st day of September."
>
> Sec.2. Notwithstanding the amendment made by the first section of this Act, the period commencing in 1957 for the performance of annual assessment work under section 2324 of the Revised Statutes, as amended, shall end at 12 o'clock meridian on the 1st day of July 1958, and the period commencing in 1958 for the performance of such annual assessment work shall commence at 12 o'clock meridian on the 1st day of July 1958, and shall continue to 12 o'clock meridian on September 1, 1959.

Failure to Perform Annual Assessment Work:

Federal regulations, as stated in the U.S.Bureau of Land Management Circular No.1941, "Lode and Placer Mining Regulations as Amended to and Including November 1, 1955," stipulate: "Failure to make the expenditure or perform the labor required upon a location made before or since May 10, 1872, will subject the claim to relocation unless the original locator, his heirs, assigns, or legal representatives have resumed work after such failure and before relocation." In this connection attention is redirected to section 517.220 of the State of Oregon Revised Statutes, previously quoted, which stipulates that failure to record the required affidavit describing the assessment work, as called for in ORS 517.210, constitutes "prima facie evidence that such work was not done."

Acceptable Assessment Improvements:

Public Law 85-876, as enacted Sept.2, 1958, allows the cost of geological, geophysical, and geochemical work to be credited as a valid assessment labor requirement on unpatented mining claims. Such surveys must be conducted by qualified experts and "verified by a detailed report filed in the county office in which the claim is located which sets forth fully (a) the location of the work performed in relation to the point of discovery and the boundaries of the claim, (b) the nature, extent and cost thereof, (c) the basic findings therefrom, and the (d) name, address, and professional background of the person or persons conducting the work" (30 U.S.C.A. S28-1 & 2). Such surveys may not be credited for more than two consecutive years or for more than a total of five years on any one claim, and no survey may be repetitive of any previous survey on the same claim. Surveys are also limited to those made "on the ground."

Because of its newness this law has not yet been subjected to the rigors of court interpretation. For this reason some question exists as to exactly what is meant by the clause limiting surveys to those made "on the ground." Presumably it was the intent of Congress to distinguish between surveys made in the field as against those made exclusively in the laboratory as by the study of aerial photographs, for example. If this is so, the use of airborne geophysical instruments

as a means of measuring magnetic and radioactive conditions in the ground would be an acceptable form of geophysical work inasmuch as operational procedure by airborne instruments is a long-established geophysical technique. Likewise, the phrase, "on the ground," would presumably include as acceptable work done outside the bounds of a claim (1) in accordance with the established precedent of permitting other conventional types of work to be done outside claim boundaries under certain conditions, and (2) in recognition of the fact that geophysical study must generally be made on a regional scale in order to produce meaningful results. It should be emphasized again, however, that it is impossible to predict the court interpretations which may be sought relative to this clause, or the rulings given on them.

Prior to the passage of Public Law 85-876 assessment work was interpreted as being work of a sort that directly benefited, or improved, the claim. As far back as the horse and candle days this was described by Ricketts (1943, secs.484-485) as follows:

> "------ the labor may be done upon the vein or lode or in a tunnel or upon or below the surface. Work done upon the vein or lode is something more than taking rock therefrom, from time to time, and testing it for the purpose of finding pay ore. Work may consist of unwatering the claim or in the erection of a flume to carry away water or waste, or in the introduction of water or the turning of a stream. The erection of machinery and other works or of a building, if of benefit to the claim and not too distant therefrom, or the building of a road or trail or the clearing of brush from a mining claim to facilitate the work thereon, may be sufficient. Reasonable compensation may be allowed for the use or for the sharpening of tools used, but not the purchase price thereof. The value of powder, fuse, candles, rails, and timber actually used, but not the cost of transporting them, may be counted. Reasonable compensation for the daily use of horses employed in drawing cars or in raising ore, etc., but not their cost; livery hire, feed or shoeing, may be treated as labor performed. Reasonable value of meals furnished to men while employed in 'assessment work,' but not the cost of tableware, house furnishing, provisions, nor tobacco, may be counted ------.
>
> "Diamond drill holes on lode claims and drill tests on placer claims in connection with dredging operations upon adjoining land and the searching for lodes within placer claims have been held to be sufficient compliance with the law.
>
> "The services of a watchman are sufficient, if necessary to preserve the excavations, the structure erected to work the claim, or to preserve personal property; but they are not sufficient when he merely lives upon the claim or warns others from locating it. Negotiations, traveling, preparations for work, contracts and the like, can in no sense be said to be work done on the claim. Personal expenses incurred and the time spent for the purpose of getting water to operate the mill or the services of a person whose time is spent in endeavoring to obtain means for the development of property are, also, in no sense labor performed upon the claim."

Van Nuys (1940) illustrates examples of proper and improper assessment work as follows:

Proper work:

"Prospecting work: Open cuts; prospecting tunnel; diamond drillings; shafts; etc.
Development work: Mine timbering; shaft or tunnel following vein; blocking out ore; etc.
Mining: Stoping; removing ore from mine or to mill; etc.
Miscellaneous: Trails and roads; tramways; mine rails, candles, fuse, powder used; mine machinery, including transportation and installation, if for permanent use; powder house, tool house, blacksmith shop, ore bins, etc. ------"

Illustrations of work not allowed as assessment work:

"Buildings not strictly necessary for development or mining; such as a miner's cabin, bunk house, boarding house, etc.
Tools and other loose equipment; but their current rental value may be counted.
A mill or smelter, and repairing same; ore crushing and treatment being a manufacturing process.
Traveling; services of engineer or geologist; gathering samples and assaying; all being too remote." (Editor's note: This last sentence is in part modified by Public Law 85-876.)

Assessment Evaluation:

Regarding the value of assessment work, Lindley (1914, sec.635) states that according to the Supreme Court of Montana an approved method of arriving at the value is as follows:

> "In determining the amount of work done upon a claim, or improvements placed thereon for the purpose of representation, the test is as to the reasonable value of the said work or improvements ------ not what was paid for it or what the contract price was, but it depends entirely upon whether or not the said work or improvements were reasonably worth the said sum of one hundred dollars."

In more detail, Lindley writes in the same section:

> "In estimating the value of the labor performed the jury should consider the distance of the mine from the nearest point where labor could be procured, the cost of maintaining men while the labor was being performed, the current rate of wages, and any other necessary and reasonable expense which might be incurred in the performance of the said labor."

Ricketts (1943, sec.491) writes on sufficiency of performance:

> "The test of the sufficiency of the annual expenditure is the reasonable value and not what was paid nor the contract price, but whether the expenditure tends to facilitate the development or actually promotes or directly tends to promote the extraction of mineral from or improve the property or be necessary for its care or the protection of the mining works thereon or pertaining thereto."

Place of Performance:

Section 185.16 in the Bureau of Land Management Circular No.1941 states: "Where a number of contiguous claims are held in common the aggregate expenditure that would be necessary to hold all the claims, may be made upon any one claim." An additional provision states: "Cornering locations are held not to be contiguous." In "Federal Placer Mining Laws and Regulations," Johnson (1938) voices the same conclusion with the added remark that such grouping is acceptable provided that the expenditures "will benefit or develop each claim of the group." The opinion of Ricketts (1943, secs.488 and 490) on this question is as follows:

> "A general system may be adopted for the improvement and working of contiguous claims held in common. In such case the expenditure required under the law may be made upon any one of them, or upon adjacent patented lands, or upon public lands, but the expenditure of money or labor must be equal in value to that which would be required on all the claims if they were separate and independent. The claims must be contiguous, and each location thus associated must, in some way, be benefited by the work done or money expended as labor performed or improvements made upon or for a location therein. Assessment work which has no reference to the development of all the locations will not be sufficient. It is not necessary for a claimant to prepare plans and specifications with regard to how he intends to develop his location. A court should not substitute its judgment for that of the claimant as to the wisdom and expediency of the 'plan.' Yet it remains a question whether the requirement of the law has been fulfilled, i.e., that the work is such that, if continued, it will lead to a discovery and development of the veins or ore bodies that are supposed to be in the locations, or, if these are known that the work will facilitate the extraction of the ores, or be necessary for the care and protection of the property ------.
>
> "The natural and reasonable presumption is that all work is done as a part of the 'plan' or system, and, as such applicable to all the locations within the group; still the burden of proof as to the sufficiency of the expenditure rests with its claimants."

Also in this connection Lindley (1914, sec.631) states:

> "Obviously, a tunnel, the portal of which is situated at a higher elevation than some of the claims in a group and projected in a direction away from them, could hardly aid in the development of such lower claims.

"As water is essential to the development and working of placers, expenditures made in constructing ditches, flumes, and pipe-lines, for the purpose of conducting water to the property for use on such property, will undoubtedly satisfy the law. The cost of a survey preliminary to the location of a ditch for the development of the claim will not, however, be credited on the required statutory expenditure, where the ditch has not been dug."

Under certain circumstances acceptable assessment work may be done outside the boundary of a claim or group of claims. On this point Ricketts (1943, sec.486) can again be quoted:

"Work done in good faith outside of the limits of a mining claim for the purpose of prospecting or working it, will hold the claim the same as if done within the boundaries of the location itself. But it must be made to appear that the work is of value to the claim upon which it is sought to apply such work. The work may be done at a distance from the property and may consist, say, in the turning of a stream, or the introduction of water, or the construction of a flume to carry off the debris or waste material, or the construction of a road or trail outside of the limits of the claim, or the construction of a tunnel made solely with reference to the development of the claim, or the sinking of a shaft and running drifts therefrom."

From Lindley (1914, sec.631) we have the additional observations that:

"Work done outside of the claim upon another patented claim, if for the benefit of the one unpatented, may be considered as work done upon it. In cases of consolidation of claims, it is not necessary, in order to have its due share of such work or improvements credited to each claim, that such group of claims should all be embraced in the same proceedings for patent: If the mining laws are complied with in other respects, such claims may be applied for and entered singly or otherwise, and at different times, without in any way impairing the right to have the value of such share credited to them respectively. But where improvements not situated upon the claim are alleged to have been made for the development of such claim, it must be clearly demonstrated that such improvements have a direct tendency to such development. They must have direct relation to the claim, or be in reasonable proximity to it."

Assessment on Placer Claims:

Annual assessment is required on placer claims much the same as it is on lodes. However, an associated placer is considered as a single entity for assessment purposes, and not as a group of individual 20-acre tracts. Because of this, the required annual expenditure of $100 for labor and improvements applies to both single claims and associated placers without regard to the differences in acreage. "In other words," Ricketts (1943, sec.490-a) states, "no greater annual expenditure is required upon an association claim of 160 acres, or less, than upon an individual location of 20 acres, or less." Although this seems inconsistent with the assessment regulations for lode groups, where an expenditure of $100 is required for each individual claim, it is nevertheless an accepted practice. As Van Nuys (1953, p.55) explains it, "An association placer claim is legally one and not several claims, for which reason only one discovery is required and only $100 annual assessment work is required."

Claims on O. and C. Lands:

Holders of mining claims on Oregon and California railroad revested lands and Coos Bay wagon road grant lands of western Oregon must file a proof of annual assessment work with the recorder of the county in which the claims are located, and also with the U.S. District Land Office, 1001 N.E. Lloyd Blvd., Portland, Oregon, according to a provision in the law which re-opened these revested lands to exploration, location, entry, and disposition under the general mining laws. This provision reads as follows:

"The owner of any unpatented mining claim located upon O. and C. lands must file for record in the United States district land office of the land district in which the claim is situated, within sixty days after the expiration of any annual assessment year, a statement as to the assessment work done or improvements made during the previous assessment year, or, as to compliance in lieu thereof, with any applicable relief Act." (U.S. Bureau of Land Management, Circular No. 1941, Section 185.37C).

O.and C. lands were made up originally of odd-numbered sections. There have been some exchanges and therefore these lands now contain certain even-numbered sections. A claim owner who is not certain whether or not his claim lies within these revested lands should request information concerning the status of his claim from the Bureau of Land Management.

Special Considerations:

Assessment work can be done at any time during the assessment year. Furthermore, a claim owner is protected against the relocation of his claim by another party even though he may have put off doing the required work until so late in the year that the bulk of the performance is carried out during the opening days of the following assessment year. For such protection to be realized, however, the work must have been begun during the assessment year for which it is required, and must then be pursued thereafter with diligence and without undue delay.

Large expenditures made on a claim in any one year cannot be credited to assessment work in the ensuing years. In other words, if a greater amount of work is done in the one year than is required by statute, the excess cannot be applied to the succeeding year or years. However, two years' work can be performed as one continuous job if so desired by scheduling the work to begin at the close of the current assessment year and then continuing it past noon of September 1st.

Annual work may be done by the locator or owner, or by a contractor or lessee. In fact, a stockholder may do the work on claims held by his company. However, work done by a trespasser or a stranger to the title cannot be credited to the benefit of the claimant.

Assessment work is not required for mill sites or tunnel locations.

SELECTED BIBLIOGRAPHY

Fletcher, G.D., 1959, Mining laws of the State of Idaho: State Inspector of Mines, Boise, Idaho.

Johnson, Fred W., 1938, Federal placer-mining laws and regulations: U.B.Bureau of Mines Tech. Paper 591 (sec.1).

Lindley, Curtis H., 1914, Lindley on mines: Bancroft-Whitney Co., San Francisco, 3rd ed.

Norman, L.A., 1952, Legal guide for California prospectors and miners: California Div.Mines.

Oregon Department of Geology and Mineral Industries, 1954, Mining laws of the State of Oregon: Oregon Dept. Geol. and Mineral Indust.Bull.1, 4th rev.

_____, 1959, Public Law 85-736: The Ore.-Bin, vol. 21, no.5, p.49.

Ricketts, A.H., 1943, American mining law; California Div. Mines Bull. 123.

U.S.Bureau of Land Management, 1955, Lode and placer mining regulations as amended to and including Nov.1, 1955: U.S.Bureau of Land Management Circular No.1941.

Van Nuys, M.H., 1940, An outline of mining laws in the State of Washington: Washington Dept. of Conservation and Development.

_____, 1953, An outline of the mining laws of the State of Washington (rev.): Washington Div. of Mines and Geology Bull. 41.

Verity, Victor H., 1957, Laws and regulations governing mineral rights in Arizona: Arizona Dept. of Mineral Resources, 4th ed.

* * * * *

BUREAU OF MINES CHROMITE STUDIES PUBLISHED

"Utilization Studies on Chromite from Seiad Creek, California," by W.L.Hunter and G.V.Sullivan, published as Report of Investigations 5576 by the U.S.Bureau of Mines, describes the methods developed for producing commercial-grade ferrochromium from Seiad ore. Report of Investigations 5576 (37 pages) may be obtained free of charge from the Publications Distribution Section, U.S.Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa. The summary, which appears on the first two pages of the report, is reproduced below:

Summary

This report describes results of beneficiation and smelting studies conducted by the Federal Bureau of Mines on chromite samples from the Emma Belle and Seiad Creek prospects in the Seiad Creek area, northern California. Samples were chosen from this area because the ore is typical of disseminated types that represent a sizable domestic reserve.

The two samples were similar in composition, and both responded in like manner to gravity beneficiation. As the ore was banded, considerable coarse gangue was rejected in laboratory sink-float from a minus-3/4-inch, plus-6-mesh fraction without excessive chromium loss at a medium density of 3.32. An average of 85.6 percent of the chromium was recovered in the sink product, which analyzed 35 percent chromic oxide (Cr_2O_3). Tabling yielded concentrates containing 49 percent or more Cr_2O_3; however, recoveries, ranged from only 33 to 45 percent. A combination of tabling and electrostatic separation of the table middlings showed that the chromium recovery could be increased to about 73 percent; the composite concentrate averaged 53 percent Cr_2O_3.

Flotation studies demonstrated that chromite could be selectively concentrated by flotation in the presence of slimes. The use of fuel oil in a preconditioning step permitted flotation of the chromite from the flocculated siliceous gangue slimes, thus eliminating the high chromium losses in the slime fraction. Concentrates containing as much as 45 percent Cr_2O_3 were obtained with recoveries of 83 to 91 percent. A combination of flotation of the minus-200-mesh fraction and electrostatic treatment of the plus-200-mesh fraction showed that 75.4 percent of the chromium could be recovered in a product containing 53.5 percent Cr_2O_3.

Magnetic separation was not as satisfactory as other methods, and chromium recoveries did not exceed 62 percent; magnetic concentrates graded from 41 to 42 percent Cr_2O_3. Separation by electrostatic methods gave high-grade concentrates that contained 52.7 to 53.9 percent Cr_2O_3; however, chromium recoveries were only about 59 percent.

In batch-smelting tests on raw ore, high-carbon ferrochromium containing 46.9 to 51.2 percent Cr was produced with chromium recoveries of as much as 86.3 percent. Some iron was preferentially reduced at low stoichiometric carbon additions.

The high-carbon ferrochromium obtained when smelting raw ore in an experimental submerged-arc furnace analyzed about 46 percent Cr with a chromium recovery of 79.9 percent. Electrical-energy consumption was 9.15 kw.-hr. per pound of chromium contained in the alloy. The smelting of sink-float concentrates yielded a high-carbon ferrochromium containing 52.0 to 58.2 percent Cr; chromium recovery in the alloy was 71.8 percent. Energy consumption was lower than in the preceding tests, 5.65 kw.-hr. per pound of chromium, and the rate of alloy production was materially higher.

Ferrochromium produced from ore containing 48 percent or more Cr_2O_3 with a Cr/Fe ratio of 3:1 usually contains from 68 to 72 percent chromium. Ferrochromium produced from lower grade material may contain as little as 50 percent chromium, in which case the product sells for a few cents less per pound of contained chromium. These studies show that commercial-grade ferrochromium can be produced by a combination of beneficiation and smelting.

* * * * *

MOLLARD APPOINTED TO GOVERNING BOARD

Earl S.Mollard of Riddle, Oregon, has been appointed by Governor Mark Hatfield as a member of the Department's Governing Board for a term beginning May 9, 1960, and ending March 15, 1964. He succeeds Lester R.Child of Grants Pass, whose term of office expired as of March 16, 1960.

Mr. Mollard has been connected with the Hanna Mining Company and the M.A.Hanna Company for more than 25 years. Prior to 1952, he held the positions of general superintendent and assistant general manager for Hanna operations in Minnesota. In 1952, he came to Riddle, Oregon, as general manager of the Hanna Nickel Smelting Company and the Hanna Mining Company operation in Oregon, which position he still holds. Mr. Mollard is a member of AIME, and is a vice-president of both the Associated Oregon Industries and the First National Bank of Roseburg.

* * * * *

ROCK PAINTINGS ON DISPLAY

An unusual and original kind of hobby in which rocks and minerals are used for painting pictures is now on display at the Department's office in Portland. The artist is Mrs. Barbara O'Neil, member of the Oregon Trail Gem and Mineral Society of Pendleton. Her display consists of four attractive and colorful paintings and 48 samples of the rocks and minerals she uses for her work. Most of the materials are from Oregon and Washington. Her method of painting is, briefly, to crush and pulverize the materials, mix them with glue, and apply this mixture to a design drawn on masonite. Mrs. O'Neil's rock paintings will be on display until the end of June.

* * * * *

OFFICE OF MINERALS EXPLORATION REPORTS ON PROGRAM

The Office of Minerals Exploration, which succeeded the Defense Minerals Exploration Administration, is a permanent agency of the Department of the Interior and participates with private industry in exploration for critical and strategic minerals. According to its third semi-annual report, OME received 12 applications for minerals exploration assistance, entered into five new contracts with mine operators for exploration assistance, and certified discoveries on 12 projects during the last half of 1959. Public interest in the exploration assistance program is somewhat less than shown in pervious periods. The following are the totals for the OME program as of December 31, 1959:

Received more than 2,000 requests for information.

Received 69 applications for financial assistance on exploration work estimated to cost $3,927,931 in searching for 20 minerals in 20 states.

Denied 34 applications.

Withdrew 14 applications.

Executed 13 contracts for a total estimated cost of $397,000, of which the government's share was $198,500.

Eight applications in process.

In keeping with Senate committee recommendations to reduce the cost of administrative and technical services, changes in the field organization of OME have gone into effect. Field officers replace executive officers, who prior to this change had been selected from the staffs of the Bureau of Mines and the Geological Survey to direct OME work in their respective regions. Acting Field Officer D.R.MacLaren has succeeded Executive Officer A.E.Weissenborn in the Spokane office, headquarters for Region 1 of OME.

* * * * *

STEEL IMPORTS EXCEED EXPORTS IN 1959

The United States was a net importer of steel-mill products during 1959 for the first time in 56 years, Department of Commerce data show.

An average of more than 6 out of every 100 tons of steel-mill products available to consumers in the United States last year consisted of imports. That ratio was higher than in any other recent year. Nearly 62 percent of all barbed wire, 44 percent of nails and staples, and 36 percent of woven wire fence originated in foreign countries. More than 28 percent of the supply of concrete reinforcing bars, 16 percent of semifinished steel, and 11 percent of heavy steel structural shapes was of foreign origin. (From Steel Facts, April, 1960).

* * * * *

GROUND WATER STORAGE IN COLUMBIA RIVER BASALT

"Storage of Ground Water behind Subsurface Dams in the Columbia River Basalt," by R.C.Newcomb, has been issued as an open-file report by the U.S.Geological Survey. Mr. Newcomb's study has shown that ground water is impounded behind fault zones in basalt underlying semiarid parts of the Columbia Plateau in Oregon, Washington, and Idaho, forming natural water-storage systems. Some of these reservoirs are already in use and many more may be available as a source of additional water for irrigation and public supply when streams are low. Pending publication as a water-supply paper, the report may be consulted at a limited number of places, including the Department's office in Portland, the Geological Survey's offices in Portland, Spokane, and Tacoma, the State Engineer's office in Salem, and at the larger public libraries in the area under study.

* * * * *

PATENT EXPIRED

Process for treating high-alumina chromite ores, such as masiloc ore of the Philippines, to produce chromium, aluminum, and ferrochromium: Ore is crushed, ground, mixed with Na_2CO_3 and Al_2O_3, the mixture roasted, and the calcine leached with hot water. $Al(OH)_3$ is precipitated, separated, dried, and calcined to produce metallurgical alumina. The chromium-containing solution is dried, calcined, and leached to produce $Cr(OH)_3$ which is dried and calcined. E.M.Hawk, vested in Alien Property Custodian, Apr.13, 1943. No.2,316,330. (From Engineering and Mining Journal, April, 1960.)

* * * * *

WILDERNESS AREA VISITS LOW

Wilderness areas, which account for nearly eight percent of the national forest acreage, had only eight tenths of one percent of the overall recreation visits in 1958, according to a report by R.E.McArdle, chief of the U.S.forest service.

The 14 million wilderness acres received 556,100 visitors, which represents a four percent increase over 1957. There are 82 wilderness areas on 73 national forests in 13 states. California has the largest number of wilderness visits, with 197,400; Minnesota was second with 104,000. Each of the other 11 states, including Oregon, tallied less than 50,000 visits.

While Oregon has some 909,773 acres of wilderness areas administered by the U.S. forest service, which is about six percent of its national forest acreage, the recreational use of these areas was less than seven-hundredths of one percent of the total number of recreation visits made in 1958. (From The Forest Log, April 1, 1960).

* * * * *

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S.E."H" Street
Grants Pass

* *

INDEX TO PUBLISHED GEOLOGIC MAPPING IN OREGON

In recent years, published geologic mapping in Oregon has increased by leaps and bounds, to the point where it can no longer be depicted on one small index map as was done in the past. The present version, reproduced on the following pages, consists of four index maps with facing references.

Published geologic mapping in Oregon had its beginnings in 1898 with J.S.Diller's Roseburg folio, which was issued by the U.S.Geological Survey. This map was soon followed by the Coos Bay (1901) and Port Orford (1903) folios, also by Diller. Another early map, published in 1901, was done by Waldemar Lindgren to accompany his report on the gold belt of the Blue Mountains of Oregon for the Survey's 22nd annual report. These famous old works are still the basis for all geologic studies in those areas.

Although all of the earliest geologic maps were the products of the U.S.Geological Survey, in 1914 maps began to be issued by the Oregon Bureau of Mines, predecessor to the Department; and by 1940 they were being published by colleges, scientific organizations, and various public agencies, including this Department.

In 1940, the Department began its periodic printing of a small index map (8½ x 11 inches) showing the extent of published geologic mapping, accompanied by a list of the titles of the reports in which the maps appeared and the names of the authors. The first of these index maps showed 43 areas; by 1950 there were 73 areas. By 1956, the total number of areas to be included on the index map was 105, necessitating the use of two sheets. The division was based upon whether the map was small scale (reconnaissance) or large scale (detailed).

By the end of 1959, the number of published maps had increased to 126. For the sake of clarity, the information is now arranged on four sheets as follows: 1) large-area, or reconnaissance, maps published up to 1940; 2) those published after 1940; 3) small-area maps, or spot-locality and road-log maps; and 4) quadrangle maps.

As shown by the index maps, only about one-sixth of the total area of Oregon remains uncovered by some type of published geologic mapping. The larger remaining areas are: a section of western Douglas County between Drain and Reedsport and extending south into eastern Coos County; northern Morrow County and a strip extending south into Grant County; a long, narrow strip running east from Brothers in Deschutes County to Juntura in Malheur County; and all of Malheur County south of Juntura. Parts of these areas, however, are already covered by unpublished maps and reports in manuscript form (See April 1960 Ore.-Bin and Miscellaneous Paper No. 7).

One of the common goals of this Department and the U.S.Geological Survey is to complete and publish a state geologic map. To this end, all areas in the state which are as yet unmapped, or have received only broad reconnaissance treatment, have been assigned to geologists for field study. Already a preliminary geologic map of the western part of the state has been compiled and awaits publication by the Survey. Compilation of the state map as a whole is a long-range project, however, that requires filling in many gaps and correlating an unwieldy assemblage of information gleaned over the past 60 years of geologic mapping.

PUBLISHED GEOLOGIC MAPPING: LARGE-AREA MAPS TO 1940
(See Index Map 1)

Butler, G.M. (and Mitchell, G.J.), Preliminary survey of the geology and mineral resources of Curry County, Oregon: Oreg. Bur. Mines & Geol. Min. Res. of Oregon, vol.2, no.2, 1916.

Callaghan, E., (and Buddington, A.F.), Metalliferous mineral deposits of the Cascade Range in Oregon: U.S. Geol. Survey Bull. 893, 1938.

Collier, A.J., The geology and mineral resources of the John Day region: Oreg. Bur. Mines & Geol. Min. Res. of Oregon, vol. 1, no. 3, 1914.

Darton, N.H., Structural materials in parts of Oregon and Washington: U.S. Geol. Survey Bull. 387, 1909.

Diller, J.S., (1) Mineral resources of southwestern Oregon: U.S. Geol. Survey Bull. 546, 1914; (2) (and Patton, H.B.), The geology and petrography of Crater Lake National Park: U.S. Geol. Survey Prof. Paper 3, 1902.

Lindgren, W., The gold belt of the Blue Mountains of Oregon: U.S. Geol. Survey 22nd Ann. Rpt., pt. 2, p. 551-776, 1901.

Moore, B.N., Nonmetallic mineral resources of eastern Oregon: U.S. Geol. Survey Bull. 875, 1937.

Pardee, J.T., Beach placers of the Oregon coast: U.S. Geol. Survey Circ. 8, 1934.

Piper, A.M., (1) Geology and ground-water resources of The Dalles region, Oregon: U.S. Geol. Survey Water-Supply Paper 659-B, 1932; (2) (and Robinson, T.W., and Park, C.F.), Geology and ground-water resources of the Harney basin, Oregon: U.S.Geol. Survey Water-Supply Paper 841, 1939.

Ross, C.P., (1) Geology of part of the Wallowa Mountains, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 3, 1938.

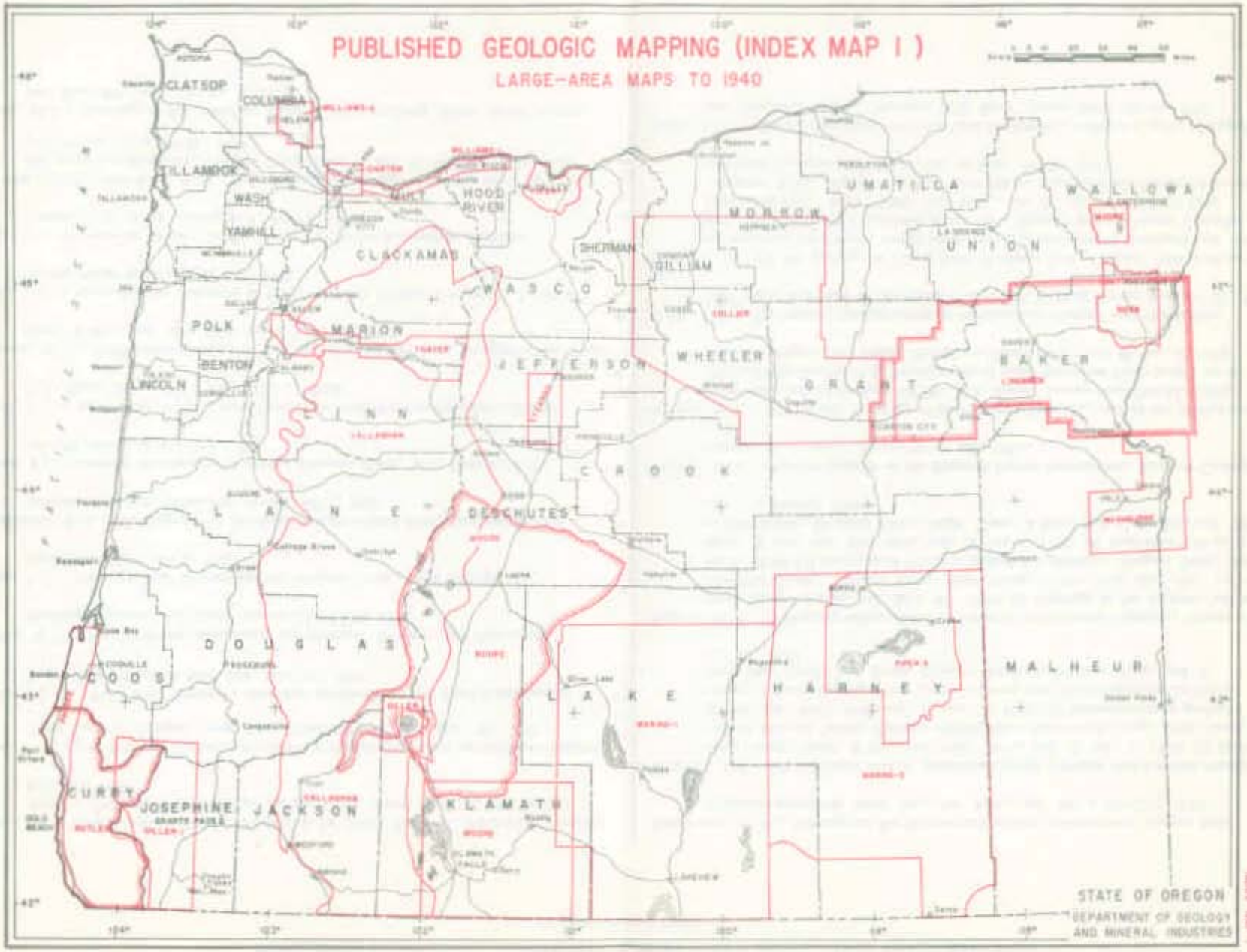
Stearns, H.T., Geology and water resources of the Middle Deschutes River basin, Oregon: U.S. Geol. Survey Water-Supply Paper 637-D, 1931.

Thayer, T.P., Geology of the Salem Hills and North Santiam River basin, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 15, 1939.

Waring, C.A., (1) Geology and water resources of a portion of south-central Oregon: U. S. Geol. Survey Water-Supply Paper 220, 1908; (2) Geology and water resources of the Harney basin region, Oregon: U.S.Geol. Survey Water-Supply Paper 231, 1909.

Washburne, C.W., Gas and oil prospects near Vale, Oregon, and Payette, Idaho: U.S. Geol. Survey Bull. 431-A, 1911.

Williams, I.A., (1) The Columbia River Gorge - its geologic history interpreted from the Columbia River Highway: Oreg. Bur. Mines & Geol. Min. Res. of Oregon, vol.2, no. 3, 1916; (2) (and Parks, H.M.), The limonite iron ores of Columbia County, Oregon: Oreg. Bur. Mines & Geol. Min. Res. of Oregon, vol. 3, no. 3, 1923.


PUBLISHED GEOLOGIC MAPPING (INDEX MAP 1)
LARGE-AREA MAPS TO 1940
CLATSOP
COLUMBIA
TILLAMOOK
WASH.
YAMHILL
MULT.
HOOD RIVER
CLACKAMAS
SHERMAN
GILLIAM
MORROW
UMATILLA
WALLOWA
UNION
WASCO
POLK
MARION
JEFFERSON
WHEELER
GRANT
BAKER
BENTON
LINCOLN
LINN
CROOK
LANE
DESCHUTES
DOUGLAS
COOS
LAKE
HARNEY
MALHEUR
CURRY
JOSEPHINE
JACKSON
KLAMATH
STATE OF OREGON
DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES

PUBLISHED GEOLOGIC MAPPING: LARGE-AREA MAPS, 1940 THROUGH 1959
(See Index Map 2)

Allen, J.E., Columbia River Gorge: Guidebook for Geol. Soc. Am. field trip excursions: Univ. of Oregon, 1958; Field guidebook: Oreg. Dept. Geol. & Min. Ind. Bull. 50, 1959.

Allen, R.M., Jr., Geology and mineralization of the Morning mine and adjacent region, Grant County, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 39, 1948.

Baldwin, E.M., Field trip, Eugene to Coos Bay via Reedsport (in: Field Guidebook): Oreg. Dept. Geol. & Min. Ind. Bull. 50, 1959.

Griffin, W.C., (et al), Water resources of the Portland, Oregon, and Vancouver, Washington, area: U.S.Geol. Survey Circ. 372, 1956.

Hodge, E.T., Geologic map of north central Oregon: Oreg. State College Mon., Studies in Geol., no.3, 1942.

Hundhausen, R.H., Investigation of Shamrock copper-nickel mine, Jackson County, Oregon: U.S. Bur. Mines Rpt. Invest. 4895, 1952.

Lupher, R.L., Jurassic stratigraphy of central Oregon: Geol. Soc. America Bull., vol. 52, no. 2, p.219-269, 1941.

Moore, R.C., and Vokes, H.E., Lower Tertiary crinoids from northwestern Oregon: U.S. Geol. Survey Prof. Paper 233-E, 1953.

Peterson, N.V., Preliminary geology of the Lakeview uranium area, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 21, no. 2, 1959.

Piper, A.M., Ground-water resources of the Willamette Valley, Oregon: U.S. Geol. Survey Water-Supply Paper 890, 1942.

Ross, C.P., Quicksilver deposits in the Steens and Pueblo mountains, southern Oregon: U.S. Geol. Survey Bull. 931-J, 1942.

Schlicker, H.G., and Dole, H.M., Reconnaissance geology of the Marcola, Leaburg, and Lowell quadrangles, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 19, no. 7, p.57-62, 1957.

Steere, M.L., Geology of the John Day country, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 16, no. 7, 1954.

Taubeneck, W.H., Geology of the Elkhorn Mountains, northeastern Oregon; Bald Mountain batholith: Geol. Soc. Am. Bull., vol. 68, p.181-238, 1957.

Treasher, R.C., (1) Geologic map of Josephine County (Oregon Metal Mines Handbook): Oreg. Dept. Geol. & Min. Ind. Bull. 14-C, vol. 2, sec. 1, 1942; (2) Geologic map of Jackson County (Oregon Metal Mines Handbook): Oreg. Dept. Geol. & Min. Ind. Bull.14-C, vol. 2, sec. 2, 1943; (3) Reconnaissance geologic survey in Curry County along Coast Highway from Gold Beach to California State line: Geol. Soc. Oreg. Country Geological News Letter, vol. 9, no. 13, 1943.

Wagner, N.S. (1) Ground-water studies in Umatilla and Morrow counties, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 41, 1949; (2) Geology of the southern half of Umatilla County, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol.16, no.3, 1954; (3) Summary of Wallowa Mountains geology, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 17, no.5, 1955; (4) Important rock units of northeastern Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 20, no. 7, p.63-68, 1958.

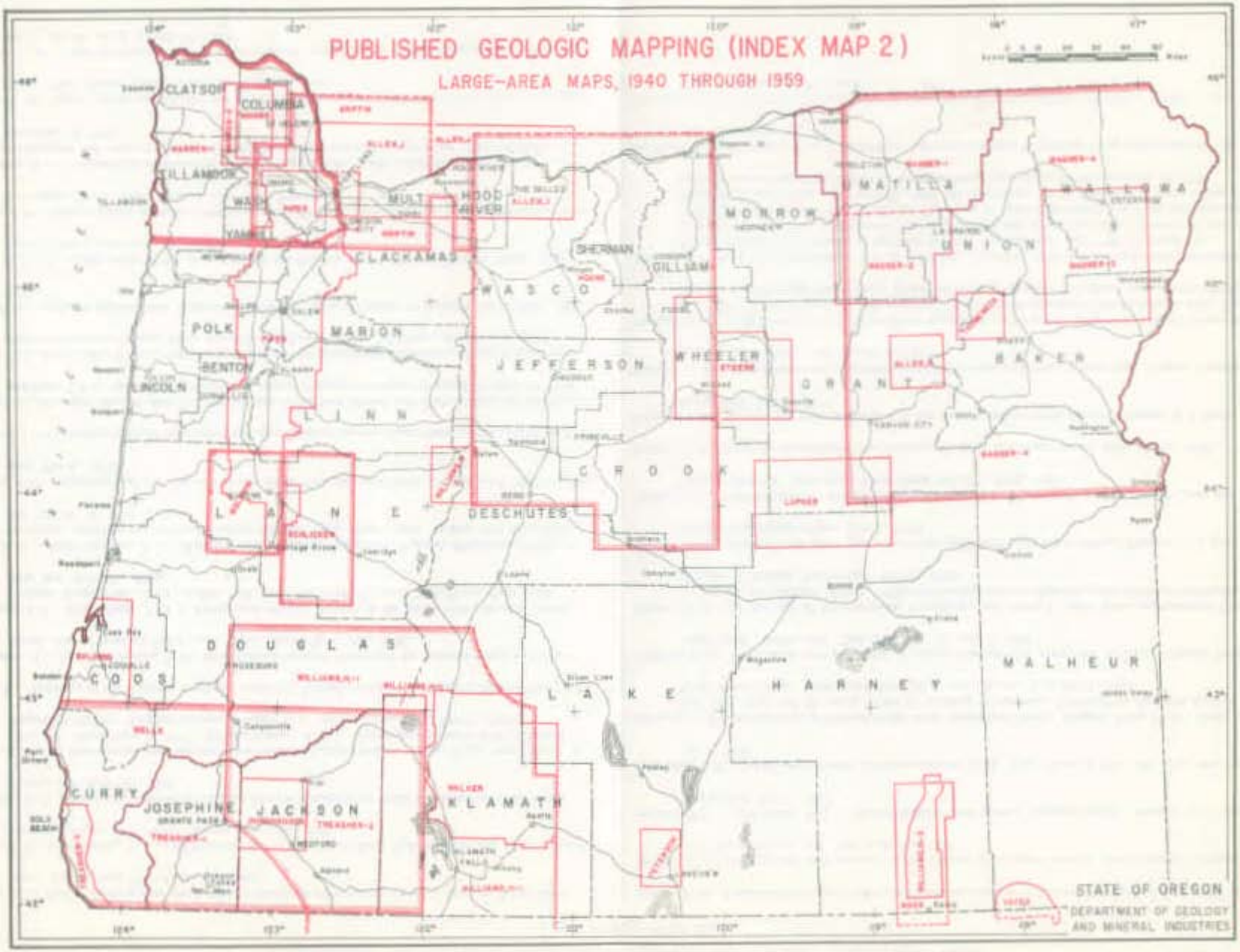
Walker, G.W., Pumice deposits of the Klamath Indian Reservation, Klamath County, Oregon: U.S. Geol. Survey Circ. 128, 1951.

Warren, W.C., (1) (et al), Geology of northwestern Oregon, west of the Willamette River and north of latitude 45°15': U.S. Geol. Survey Map OM 42, 1945; (2) (and Norbisrath, H.), Stratigraphy of upper Nehalem River basin, northwestern Oregon: Am. Assoc. Petroleum Geol. Bull., vol.30, no. 2, 1946.

Wells, F.G., Preliminary geologic map of southwestern Oregon west of meridian 122° west, and south of parallel 43° north: U.S. Geol Survey Map MF 38, 1955.

Williams, H., (1) The geology of Crater Lake National Park, Oregon, with a reconnaissance of the Cascade Range southward to Mount Shasta: Carnegie Inst. Wash. Pub. 540, 1942; (2) Volcanoes of the Three Sisters region, Oregon Cascades: California Univ. Dept. Geol. Sci. Bull., vol.27, no. 3, 1944; (3) (and Compton, R.R.) Quicksilver deposits of Steens Mountain and Pueblo Mountains, southeast Oregon: U.S. Geol. Survey Bull. 995-B, 1953.

Yates, R.G., Quicksilver deposits of the Opalite district, Malheur County, Oregon, and Humboldt County, Nevada: U.S. Geol. Survey Bull. 931-N, 1942.


PUBLISHED GEOLOGIC MAPPING (INDEX MAP 2)
LARGE-AREA MAPS, 1940 THROUGH 1959
CLATSOP
COLUMBIA
TILLAMOOK
WASH
YAMHILL
MULT
HOOD RIVER
CLACKAMAS
SHERMAN
GILLIAM
MORROW
UMATILLA
WASCO
UNION
WALLOWA
POLK
MARION
BENTON
LINCOLN
JEFFERSON
WHEELER
GRANT
BAKER
LINN
CROOK
LANE
DESCHUTES
DOUGLAS
COOS
LAKE
HARNEY
MALHEUR
CURRY
JOSEPHINE
JACKSON
KLAMATH
STATE OF OREGON
DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES

PUBLISHED GEOLOGIC MAPPING: SMALL-AREA MAPS THROUGH 1959
(See Index Map 3)

Allen, J.E., Perlite deposits near the Deschutes River, southern Wasco County, Oregon: Oreg. Dept. Geol. & Min. Ind. Short Paper 16, 1946.

Allen, V.T., Loofbourow, J.S., and Nichols, R.L., The Hobart Butte high-alumina clay deposit, Lane County, Oregon: U.S. Geol. Survey Circ. 143, 1951.

Bostwick, D.A., Field trip, Corvallis to Depoe Bay via Newport (in: Field Guidebook): Oreg. Dept. & Min. Ind. Bull. 50, 1959.

Brown, R.E., (1) Some manganese deposits in the southern Oregon coastal region: Oreg. Dept. Geol. & Min. Ind. Short Paper 9, 1942; (2) (and Waters, A.C.), Quicksilver deposits of the Bonanza-Nonpareil district, Douglas County, Oregon: U.S. Geol. Survey Bull. 955-F, 1951.

Bryan, K., Geology of the Owyhee irrigation project: U.S. Geol. Survey Water-Supply Paper 597-A, 1929.

Callaghan, E., (and Buddington, A.F.), Metalliferous mineral deposits of the Cascade Range in Oregon (Geol. map of Bohemia dist.): U.S. Geol. Survey Bull. 893, 1938.

Corcoran, R.E., (and Libbey, F.W.), Ferruginous bauxite deposits in the Salem Hills, Marion County, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 17, no. 4, 1955; Oreg. Dept. Geol. & Min. Ind. Bull. 46, 1956.

Dole, H.M., (and Corcoran, R.E.), Reconnaissance geology along U.S. Highway 20 between Vale and Buchanan, Malheur and Harney counties, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 16, no. 6, 1954.

Duncan, D.C., Geology and coal deposits in part of the Coos Bay coal field, Oregon: U.S. Geol. Survey Bull. 982-B, 1953.

Gilchrist, F.G., Clackamas River field trip: Geol. Soc. Oregon Country Geol. News Letter, vol. 18, no. 9, 1952.

Gilluly, J., (1) Copper deposits near Keating, Oregon: U.S. Geol. Survey Bull. 830-A, 1933; (2) (and Reed, J.C. and Park, C.F.), Some mining districts of eastern Oregon: U.S. Geol. Survey Bull. 846-A, 1933.

Grant, U.S., (and Cady, G.H.), Preliminary report on the general and economic geology of the Baker district of eastern Oregon: Oreg. Bur. Mines & Geol. Min. Res. of Oreg., vol. 1, no. 6, 1914.

Hotz, P.E., Limonite deposits near Scappoose, Columbia County, Oregon: U.S. Geol. Survey Bull. 982-C, 1953.

Koch, G.S., Jr., Lode mines of the central part of the Granite mining district, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 49, 1959.

Libbey, F.W., Some mineral deposits in the area surrounding the junction of the Snake and Imnaha rivers in Oregon: Oreg. Dept. Geol. & Min. Ind. Short Paper 11, 1943.

Livingston, D.C., A geologic reconnaissance of the Mineral and Cuddy Mountain mining districts, Washington and Adams counties, Idaho (adjacent to Snake River): Idaho Bur. Mines & Geol. Pamphlet 13, 1925.

Lowry, W.D., Tyrrell manganese deposit and other similar properties in the Lake Creek district, Oregon: Oreg. Dept. Geol. & Min. Ind. Short Paper 10, 1943.

Merriam, C.W., (and Berthiaume, S.A.), Late Paleozoic formations in central Oregon: Geol. Soc. Am. Bull., vol. 54, no. 2, p. 145-171, 1943.

Moore, B.N., Nonmetallic mineral resources of eastern Oregon: U.S. Geol. Survey Bull. 875, 1937.

Pardee, J.T., Faulting and vein structure in the Cracker Creek gold district, Baker County, Oregon: U.S. Geol. Survey Bull. 380, p. 85-93, 1909.

Pecora, W.T., (and Hobbs, W.S.), Nickel deposits near Riddle, Douglas County, Oregon: U.S. Geol. Survey Bull. 931-I, 1942.

Peterson, N.V., Lake County's new continuous geyser: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 21, no. 9, 1959.

Ramp, L., (1) Geologic map of Chrome Ridge area, Josephine County, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 18, no. 3, 1956; (2) Geology of the lower Illinois River chromite district: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 19, no. 4, p. 29-34, 1957.

Schafer, Max, Occurrence and utilization of carbon-dioxide-rich water near Ashland, Oregon: Oreg. Dept. Geol. & Min. Ind. Ore.-Bin, vol. 17, no. 7, 1955.

Shenon, P.J., (1) Geology of the Robertson, Humdinger, and Robert E. gold mines, southwestern Oregon: U.S. Geol. Survey Bull. 830-B, 1923; (2) Geology and ore deposits of the Takilma-Waldo district, Oregon: U.S. Geol. Survey Bull. 846-B, 1933.

Stearns, H.T., Geology and water resources of the upper McKenzie River Valley, Oregon: U.S. Geol. Survey Water-Supply Paper 597-D, 1929.

Taber, J.W., A reconnaissance of lode mines and prospects in the Bohemia mining district, Lane and Douglas counties, Oregon: U.S. Bur. Mines Inf. Circ. 7512, 1949.

Thayer, T.P., Chromite deposits of Grant County, Oregon: U.S. Geol. Survey Bull. 922-D, 1940.

Waters, A.C., (et al), Quicksilver deposits of the Horse Heaven mining district, Oregon: U.S. Geol. Survey Bull. 969-E, 1951.

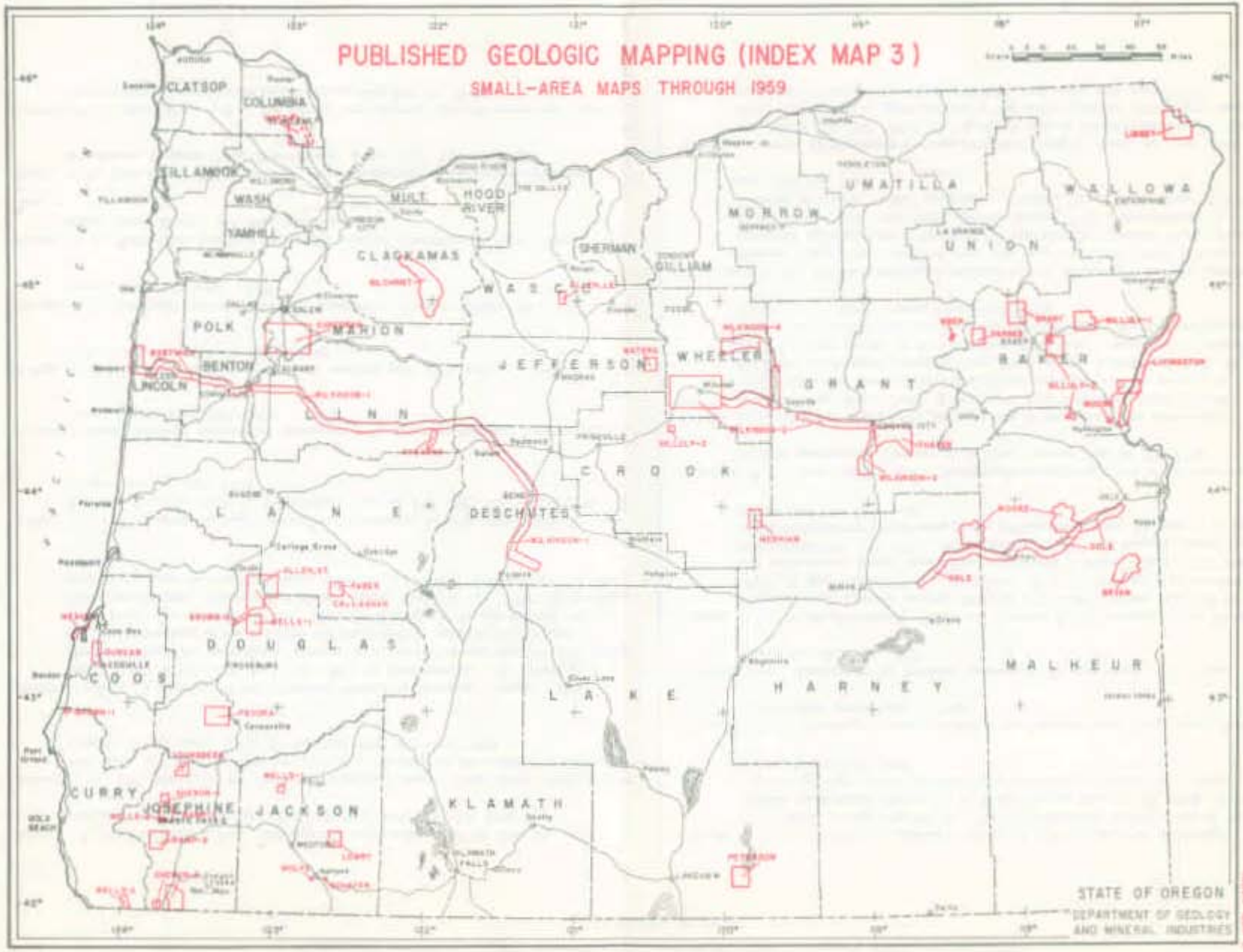
Weaver, C.E., Stratigraphy and paleontology of the Tertiary formations at Coos Bay, Oregon: Washington Univ. Pub. in Geol., vol. 6, no. 2, 1945.

Wells, F.G., (1) (and Waters, A.C.), Quicksilver deposits of southwestern Oregon: U.S. Geol. Survey Bull. 850, 1934; (2) (and Page, L.R., and James, H.L.), Chromite deposits in the Sourdough area, Curry County, and the Briggs Creek area, Josephine County, Oregon: U.S. Geol. Survey Bull. 922-P, 1940.

Wilkinson, W.D. (1) (and Schlicker, H.G.), Field trip, Corvallis to Prineville via Bend and Newberry Crater (in: Field Guidebook): Oreg. Dept. Geol. & Min. Ind. Bull. 50, 1959; (2) Field trip, Prineville to John Day via Mitchell (in: Field Guidebook): Oreg. Dept. Geol. & Min. Ind. Bull. 50, 1959; (3) (and Thayer, T.P.), Field trip, John Day to upper Bear Valley (in: Field Guidebook): Oreg. Dept. Geol. & Min. Ind. Bull. 50, 1959; (4) (and Allen, J.E.), Field trip, Picture Gorge to Portland via Arlington (in: Field Guidebook): Oreg. Dept. Geol. & Min. Ind. Bull. 50, 1959.

Wolfe, H.D., (and White, D.J.), Preliminary report on tungsten in Oregon: Oreg. Dept. Geol. & Min. Ind. Short Paper 22, 1951.

Youngberg, E.A., Mines and prospects of the Mount Reuben mining district, Josephine County, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 34, 1947.


PUBLISHED GEOLOGIC MAPPING (INDEX MAP 3)
SMALL-AREA MAPS THROUGH 1959
CLATSOP
COLUMBIA
TILLAMOOK
WASH
YAMHILL
MULT
HOOD RIVER
CLACKAMAS
SHERMAN
GILLIAM
MORROW
UMATILLA
WALLOWA
UNION
POLK
MARION
BENTON
LINCOLN
JEFFERSON
WHEELER
GRANT
BAKER
LINN
CROOK
LANE
DESCHUTES
DOUGLAS
COOS
LAKE
HARNEY
MALHEUR
CURRY
JOSEPHINE
JACKSON
KLAMATH
STATE OF OREGON
DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES

Allen, J.E. (and Baldwin, E.M.), Geology and coal resources of the Coos Bay quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 27, 1944.

Allison, I.S., (1) Geology of the Albany quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 37, 1953; (2) (and Felts, W.M.), Geology of the Lebanon quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Map with text, 1956.

Baldwin, E.M., (1) Geology of the Dallas and Valsetz quadrangles, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 35, 1947; (2) (and Roberts, A.E.) Geology of the Spirit Mountain quadrangle, Oregon: U.S. Geol. Survey Map OM 129, 1952; (3) (et al) Geology of the Sheridan and McMinnville quadrangles, Oregon: U.S. Geol. Survey Map OM 155, 1955; (4) Geology of the Marys Peak and Alsea quadrangles, Oregon: U.S. Geol. Survey Map OM 162, 1955; (5) Geologic map of the lower Siuslaw River area, Oregon: U.S. Geol. Survey Map OM 186, 1956;

Diller, J.S., U.S. Geol. Survey Atlas series: (1) Roseburg folio (no.49), 1898; (2) Coos Bay folio (no.73), 1901; (3) Port Orford folio (no.89), 1903; (4) (and Kay, G.F.), Riddle folio (no.218), 1924.

Gilluly, James, Geology and mineral resources of the Baker quadrangle, Oregon: U.S. Geol. Survey Bull. 879, 1937.

Griggs, A.B., Chromite-bearing sands of the southern part of the coast of Oregon: U.S. Geol. Survey Bull. 945-E, 1945.

Hodge, E.T., Geologic map of the Madras quadrangle, Oregon: Oregon State Coll. Mon., Studies in Geol., 1941.

Pardee, J.T., Preliminary geologic map of the Sumpter quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Map with text, 1941.

Smith, W.D. (and Allen, J.E.), Geology and physiography of the northern Wallowa Mountains, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 12, 1941.

Snavely, P.D. (and Vokes, H.E.), The coastal area between Cape Kiwanda and Cape Foulweather, Oregon: U.S. Geol. Survey Map OM 97, 1949.

Thayer, T.P., (1) Preliminary geologic map of the Aldrich Mountain quadrangle, Oregon: U.S. Geol. Survey Map MF 49, 1956;(2) Preliminary geologic map of the Mt. Vernon quadrangle, Oregon: U.S. Geol. Survey Map MF 50, 1956; (3) Preliminary geologic map of the John Day quadrangle, Oregon: U.S. Geol. Survey Map MF 51, 1956.

Treasher, R.C., Geologic history and map of the Portland area: Oreg. Dept. Geol. & Min. Ind. Short Paper 7, 1942.

Trimble, D.E., Geology of the Portland quadrangle, Oregon-Wash.: U.S. Geol Survey Map GQ 104, 1957.

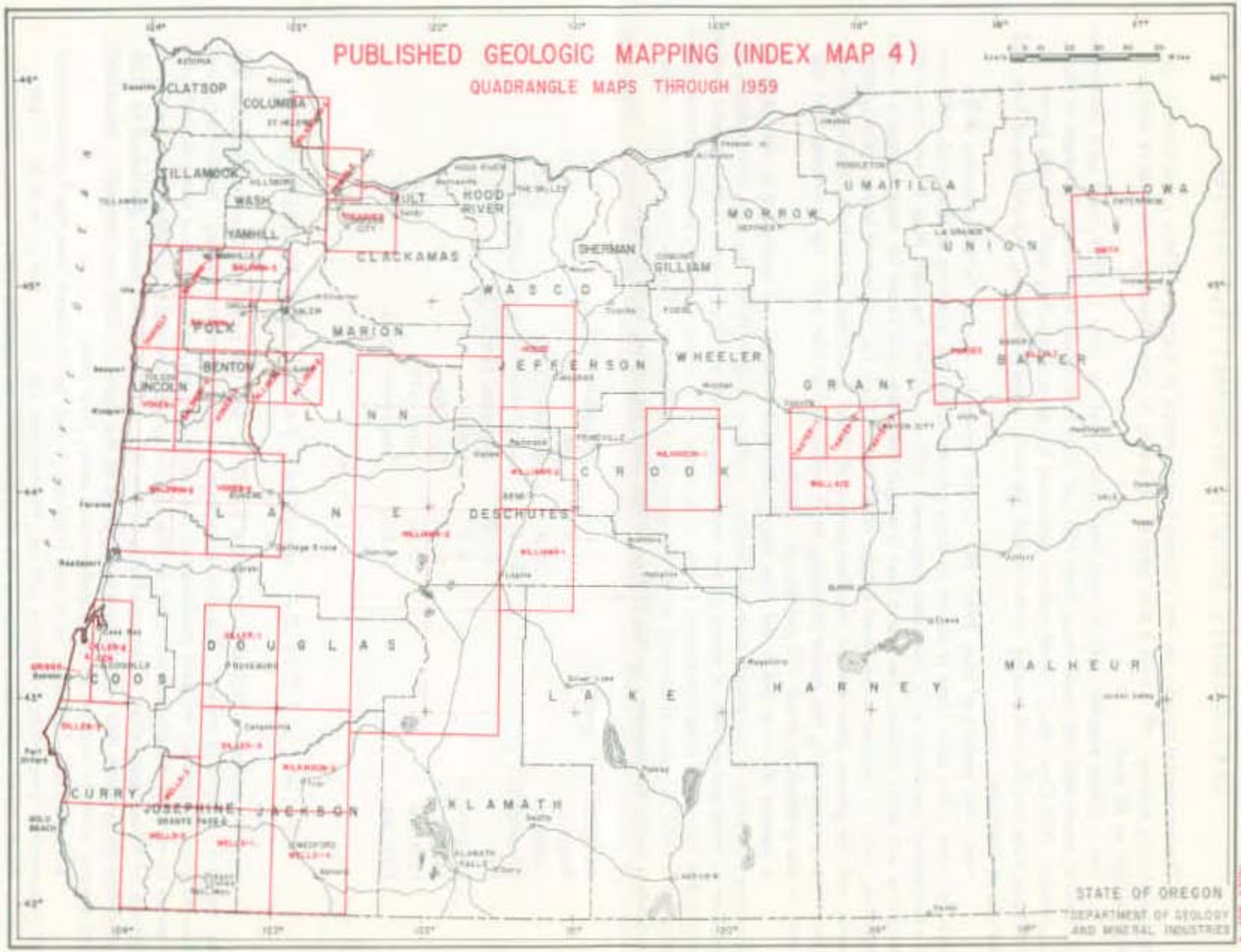
Vokes, H.E. (1) (and Norbisrath, Hans, and Snavely, P.D), Geology of the Newport-Waldport area, Lincoln County, Oregon: U.S. Geol. Survey Map OM 88, 1949; (2) (and Snavely, P.D., and Myers, D.A.), Geology of the southern and southwestern border areas of the Willamette Valley, Oregon: U.S. Geol. Survey Map OM 110, 1951; (3) (and Myers, D.A., and Hoover, Linn), Geology of the west-central border area of the Willamette Valley, Oregon: U.S. Geol. Survey Map OM 150, 1954.

Wallace, R. E. (and Calkins, J.A.), Reconnaissance geologic map of the Izee and Logdell quadrangles, Oregon: U.S. Geol. Survey Map MF 82, 1956.

Wells, F.G. (1) (et al) Preliminary geologic map of the Grants Pass quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Map with text, 1940; (2) (and Hotz, P.E., and Cater, F.W.) Preliminary description of the geology of the Kerby quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 40, 1949; (3) (and Walker, G.W.) Geology of the Galice quadrangle, Oregon: U.S. Geol. Survey Map GQ 25, 1953; (4) Geology of the Medford quadrangle, Oregon: U.S. Geol. Survey Map GQ 89, 1956.

Wilkinson, W.D., (1) Reconnaissance geologic map of the Round Mountain quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Map with text, 1940; (2) Reconnaissance geologic map of the Butte Falls quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Map, 1941; (3) (and Lowry, W.D., and Baldwin, E.M.), Geology of the St. Helens quadrangle, Oregon: Oreg. Dept. Geol. & Min. Ind. Bull. 31, 1946.

Williams, Howel, (1) Newberry Volcano of central Oregon: Geol. Soc. Am. Bull., vol. 46, p.253-304, 1935; (2) A geologic map of the Bend quadrangle, Oregon, and a reconnaissance geologic map of the central portion of the High Cascade Mountains: Oreg. Dept. Geol. and Min. Ind. Maps with text, 1957.


PUBLISHED GEOLOGIC MAPPING (INDEX MAP 4)
QUADRANGLE MAPS THROUGH 1959
CLATSOP
COLUMBIA
TILLAMOOK
WASH
HAMHILL
CLACKAMAS
HOOD RIVER
SHERMAN
GILLIAM
MORROW
UMATILLA
WALLOWA
UNION
BAKER
WASCO
POLK
MARION
JEFFERSON
WHEELER
GRANT
BENTON
LINCOLN
LINN
CROOK
LANE
DESCHUTES
DOUGLAS
COOS
LAKE
HARNEY
MALHEUR
CURRY
JOSEPHINE
JACKSON
KLAMATH
STATE OF OREGON
DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES

LAKE COUNTY SPOUTER BECOMES TRUE GEYSER

The hot-water spouter on the Charles Crump ranch in Warner Valley, Lake County, is again making history. It is now a true geyser, erupting at approximately two-minute intervals to a height of 60 feet.

The original spouter, which burst forth from a well on July 1, 1959, sent up a continuous column of steam and hot water more than 150 feet high (see report by Norman Peterson in the September 1959 Ore.-Bin). That action continued for several months, until vandals threw boulders into the 20-inch casing at the top of the well, greatly reducing the volume of flow and height of eruption.

About the middle of May 1960, Mr. Crump noticed a change in the behavior of the spouter, and a few days later it began its truly geyser action by erupting at intervals. William Bartholomew, geologist with the State Engineer's office, visited the well May 19 and timed the eruptive and quiet phases. He found that it erupts hot water and steam for approximately twenty seconds, until it reaches a maximum height of 60 feet. Then the column of water quickly falls away and the geyser goes into an inactive period of about 2 minutes, 5 seconds, during which time steam, apparently not under pressure, rolls gently out of the well. He estimates that the well is now producing about 100 gallons per minute.

A sample of water collected from the Crump well in April was analyzed by the State Sanitary Authority. Compared with the analysis made in August 1959, the new report shows increases in parts per million of many of the constituents. Of particular note is the arsenic content, which has increased from the August figure of 0.5 ppm to 1.4 ppm. Public Health Service standards set a limit for arsenic content in drinking water at 0.05 ppm. The recent analysis, made available to the Department by the Office of the State Engineer, is as follows:

Ammonia Nitrogen (N)	0.63	Phosphate (PO_4)	1.37
Arsenic	1.4	pH	8.81
Calcium	14.8	Sulfate (SO_4)	244.0
Chloride (Cl^-)	252.0	Total Alkalinity ($CaCO_3$)	113.0
Iron	0.05	Hardness ($CaCO_3$)	51.6
Magnesium	3.57	Color	4
Manganese	0.11	Turbidity	16
Nitrates	0.24	Total solids	444
Nitrites	0.072	Suspended solids	29

* * * * *

NEW EDITION OF "MINERAL FACTS AND PROBLEMS"

A new edition of "Mineral Facts and Problems" has just been published as Bulletin 585 by the U.S. Bureau of Mines. The thousand-page volume covers the history, technology, and uses of every important mineral produced in the United States, and describes many recent advances in mineral development. Each of the eighty-seven commodity chapters is written by a Bureau of Mines specialist. The popularity of the first edition of this book, published in 1956, prompted its revision this year in commemoration of the Bureau's 50th anniversary. Henceforth, the Bureau plans to publish an up-dated version every five years.

Bulletin 585, "Mineral Facts and Problems," may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. The price is $6.00 per copy. Preprints of individual chapters are also available at nominal cost.

* * * * *

CORCORAN REJOINS DEPARTMENT STAFF

Raymond E. (Andy) Corcoran has rejoined the Department staff after three years in bauxite exploratory work for Harvey Aluminum Company. Corcoran, who holds degrees from the University of California at Los Angeles and the University of Oregon, was for several years a geologist with Union Oil Company. He first joined the Department in 1953, remaining until 1957. During this time he collaborated with F.W.Libbey on Bulletin 46, "Ferruginous bauxite deposits of the Salem Hills, Marion County, Oregon." Now that he is again with the Department, Corcoran will be doing reconnaissance mapping in southeastern Oregon and will be in charge of stratigraphic correlations for the state geologic map.

* * * * *

HEARINGS ON CHROME SUPPORT BILL

Hearings on HR 5023 were held by the House Committee on Interior and Insular Affairs June 20. Authors and department officials were heard but industry representatives were not present. Congressman Al Ullman (Oregon) has notified the Department of Geology and Mineral Industries that arrangements have been made to keep the hearings open until the end of June.

HR 5023, introduced by Ullman, and its companion bill, S.1245, introduced by Senator Morse, are bills designed to promote mining and development research for beryl, chromite, and columbium-tantalum from domestic mines. Regarding chrome, the bill states that incentive payments shall be made at the following rates:

> For commercial-grade metallurgical chromite (46 per centum basis), $46 per long dry ton for the first 1,000 long dry tons produced each year by each producer, and $35 per long dry ton for each additional long dry ton produced in such year by such producer, with premiums and penalties as set forth in the regulations issued pursuant to this Act. Incentive payments shall not be made for production in any one year of more than 50,000 long dry tons by all producers or more than 5,000 long dry tons by any one producer.

The Department of Interior notified Senator James E. Murray, chairman of the Committee on Interior and Insular Affairs, May 3, that the Department favored enactment of the bill, subject to the following amendments: that the maximum incentive payment be $35 per long dry ton, and that the 5,000-ton limitation from any one producer be increased to 10,000 tons.

Persons interested in support of this bill should contact Congressman Al Ullman, House of Representatives, Washington, D.C., immediately.

* * * * *

EDEN RIDGE COAL TO BE TESTED

A 60-ton sample of coal for laboratory testing was mined at Eden Ridge in Coos County and shipped to the Colorado School of Mines in June by the Pacific Power and Light Company. PP&L started extensive geological explorations of the Eden Ridge area three years ago, when it also began investigating the possibilities of a hydroelectric development on the South Fork of the Coquille River. The company has been studying the feasibility of using the Eden Ridge coal to fuel a 100,000-kilowatt steam-electric plant which would be operated in combination with the proposed 89,000-kilowatt hydroelectric project. Laboratory tests on the coal will investigate by-products from the combustion of the coal and possible use of the coal as an industrial raw material as well as fuel.

* * * * *

MULTIPLE-USE BILL SENT TO PRESIDENT

H.R.10572 - National Forest Multiple Use - Grant (Ala.). Passed House June 2 and Senate June 8. Now awaiting President's action.

Would establish as national policy that national forests be administered for "outdoor recreation, range, timber, watershed, and wildlife and fish purposes." Senate approved a House amendment providing that "Nothing herein shall be construed so as to affect the use or administration of the mineral resources of national forest lands or to affect the use or administration of Federal lands not within national forests." (From AMC Bulletin Service, June 10, 1960.)

* * * * *

PUBLIC LAND WITHDRAWAL PROPOSED

The Bureau of Land Management has announced the proposed withdrawal (No.60-6) of public lands along the John Day and Columbia Rivers by the U.S.Army, Corps of Engineers, in connection with the John Day project. Land involved lies in parts of T.3 N., R.17 E., and T.2 N., R.18 E. in Sherman and Gilliam counties; and in T.5 N., R.26 E. in Morrow County. The withdrawal would exclude the land from mineral leasing and location of mining claims.

* * * * *

INTERIOR ISSUES NEW MINERAL SALES REGULATIONS

The Department of the Interior has adopted new regulations for the sale of common varieties of sand, stone, and gravel from lands administered by the Bureau of Land Management. The new regulations were published in the May 24 issue of the Federal Register.

Under the new regulations, sales of minerals having an appraised value of $1,000 or over must be made competitively and for not less than the appraised value. The performance bond of not less than 20 percent of the total contract price will be required for contracts of sale of $2,000 or more. The regulations also provide a procedure whereby the government can make additional timber available for on-site mining needs in instances where the government has sold timber from valid mining claims. (From AMC Bulletin Service, June 2, 1960.)

* * * * *

NEW DRILLING PERMITS ISSUED

Permit No.39 - The Department issued a new drilling permit to Ross R. Mitchell on May 25, 1960. The drilling, which is to be a shallow test, will be made on the Bliven farm about three miles south of the town of Dallas in the SE¼ sec.10, T.8 S., R.5 W., Polk County. Ross Mitchell's address is given as Box 926, Canby, Oregon.

Permit No.40 - The Department issued a new drilling permit to John T. Miller on June 6, 1960. The proposed shallow test hole will be drilled on the Charles Sullenger farm near Dallas in the NE¼ sec.18, T.8 S., R.5 W., Polk County. Mr. Miller's address is given as Box 42, Hubbard, Oregon.

* * * * *

WELL RECORDS RELEASED FROM CONFIDENTIAL FILES

The Department released records on the R.A.Stamey "Russell No.1" from its confidential files on June 26, 1960. The well was drilled in the SE¼ sec.14, T.19 S., R.44 E., Malheur County. Total depth was 4336 feet.

* * * * *

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S.E."H" Street
Grants Pass

* *

FOSSIL WOODS OF OREGON

By
Wallace Eubanks*

Oregon is noted for its abundance of fossil wood, or petrified wood, as it is commonly called. This silicified material is scattered through Tertiary volcanic and alluvial rocks; some of it is in place and some has been transported from its original source. Until fairly recently, interest in fossil wood was focused on its use as a decorative rock for gem stones and building materials. But with the increased appreciation for the value of fossil plants as an aid in dating geologic formations, the identification of fossil woods has taken on a new significance.

Many persons who visit the Department offices ask for information on how to identify fossil wood, and are usually disappointed to find that not only are there no books on the subject, but that it is a specialist's field requiring microscopic study and a knowledge of botany and wood structure. Consequently it seems desirable to call on one of the few fossil-wood specialists in this area to supply some basic information on fossil woods and their identification.

Mr. Wallace Eubanks, who is a forester by profession, has made the study of fossil woods a serious hobby. As a result, he has become something of an authority in the field, and his opinion on identification and age of fossil wood is sought by many. In this report he introduces the methods of wood identification and describes fossil woods he has identified from the Thomas Creek area in Linn County. Future studies by Mr. Eubanks on fossil woods in Oregon will be published in similar reports in THE ORE.-BIN. (Editor)

Identifying Fossil Woods

The purposes of identifying fossil woods are to aid in geological dating; to verify and supplement identification of fossil leaves, fruits, and flowers; to trace the movement of plant associations through time and across land areas; and to satisfy the curiosity of man.

Fossil wood, to be identifiable, must show clear and undistorted cell structure. Much of the fossil wood commonly collected in Oregon shows poor structure because the cells have been either crushed during geological changes in the earth or destroyed by chemical processes. In general, the ordinary grey-brown woods of western Oregon, as well as the black carbonized woods, have good cell structure. But most of the colorful eastern Oregon woods, which are usually highly agatized or opalized, have lost their identifiable characteristics. The wood best suited to polishing is usually the poorest for identification.

It should be pointed out at the start that identification of fossil woods is based entirely on comparison with living woods. No book on fossil-wood identification has as yet been published.

* Supervisor of Timber Appraisals, Oregon State Tax Commission, Salem, Oregon.

Identifying fossil woods is a painstaking job and sometimes frustrating because many fossil woods have no exact living counterpart. Furthermore, they lack the useful characteristics of living woods, such as weight, color, odor, taste, and hardness.

Since the system of plant classification and nomenclature established for living plants is also used for fossil plants, standard textbooks of botany will supply this basic information. In addition, books on living woods will furnish detailed descriptions of wood anatomy and nomenclature (see bibliography).

Although it is possible, with a little practice, to recognize a few types of fossil woods without a microscope, comprehensive work requires magnification ranging from 30 to 400 power. The reason for this is that woods are differentiated on the basis of certain cell types and arrangements, and these features are visible only under considerable magnification. For example, the woods of Acer (maple) and Cornus (dogwood), which are very similar, can be distinguished only by examining the cells of the rays. Likewise, Pinus (pine) and Picea (spruce), which also look very much alike, can be distinguished only by observing the nature of the epithelial cells around the resin ducts.

In order to study the features of fossil wood with a microscope, it is first necessary to prepare thin sections of the three standard views of wood structure; namely, the cross, radial, and tangential sections (Fig.1). Orienting the cuts to obtain these three views of the cell structure is the most difficult part of making the thin sections. The cut sections are ground to a thickness of only one or two cells so that light will pass through and the details of each kind of cell will be made visible. All three views are then placed on one slide.

The next step is to determine whether the wood is hardwood or conifer by inspecting it under low magnification (Fig.2). After this distinction has been made, the minute details of cell arrangement are studied under the microscope. For most hardwoods, a microscope with 150 power is adequate, but for conifers, 350 to 400 power is necessary for observation of the cross-field pitting.

By means of keys to the features of wood anatomy, together with published descriptions and photomicrographs of known woods, it is possible to arrive at an identification of a particular piece of fossil wood. As a general rule, however, fossil-wood identification is limited to determination of genera only.

Fossil Woods of the Thomas Creek Area

The Thomas Creek area includes the Thomas Creek drainage and the Jordan Creek drainage above the confluence of those two streams in Ts.9 and 10 S., Rs.1 and 2 E., Linn County, Oregon (see map, p.68).

Fossil wood in this area is unique in that most of it is in place where it grew some thirty million years ago. Many stumps and logs ranging from 1 to 4 feet in diameter are imbedded in tuff exposed by erosion of the covering material. Some are carbonized while others are silicified or partly opalized. The stumps and logs occur as single scattered specimens and also in groups of two or three. In the bed of Thomas Creek there is one unusual group of 17 stumps.

A study of the fossil woods in this area has revealed 13 genera, 3 of which are conifers (Pinus, Sequoia, and Tsuga), while the remainder are hardwoods. They are listed below in alphabetical order with the common names added.

1. Alniphyllum - (Japanese)
2. Carpinus - hornbeam
3. Carya - hickory
4. Cinnamomum - cinnamon
5. Diospyros - persimmon
6. Fagus - beech
7. Fraxinus - ash
8. Pinus - pine
9. Platanus - sycamore
10. Quercus - oak
11. Reptonia - gargura (Indian)
12. Sequoia - redwood
13. Tsuga - hemlock

CROSS SECTIONS OF FOSSIL WOODS

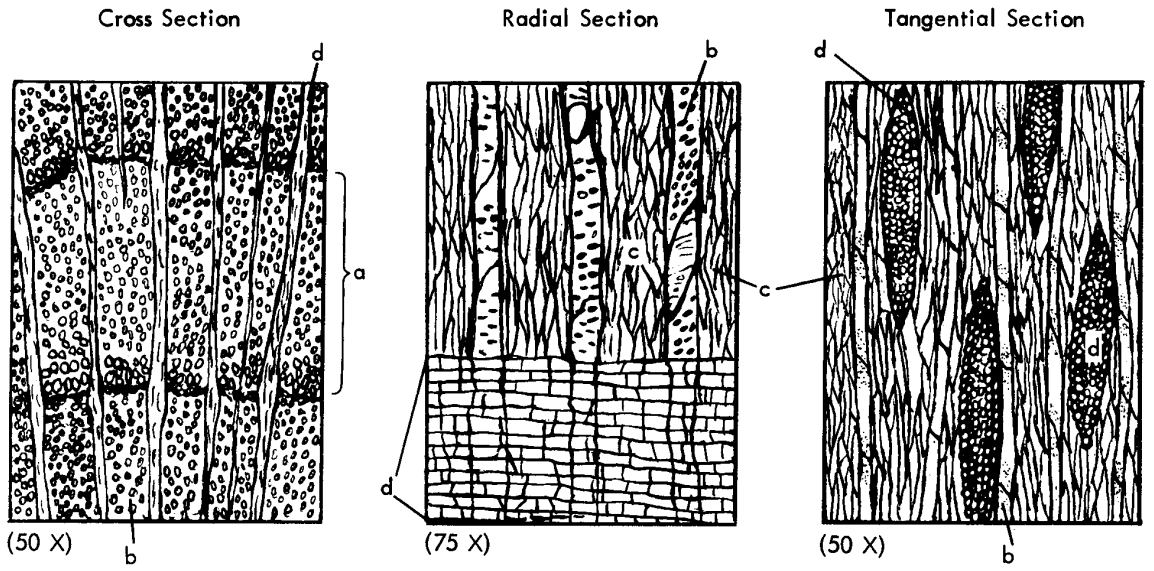


FIGURE 1: - Three standard views of Platanus (sycamore) wood: a) annual growth; b) vessel; c) fiber; d) multiseriate ray.

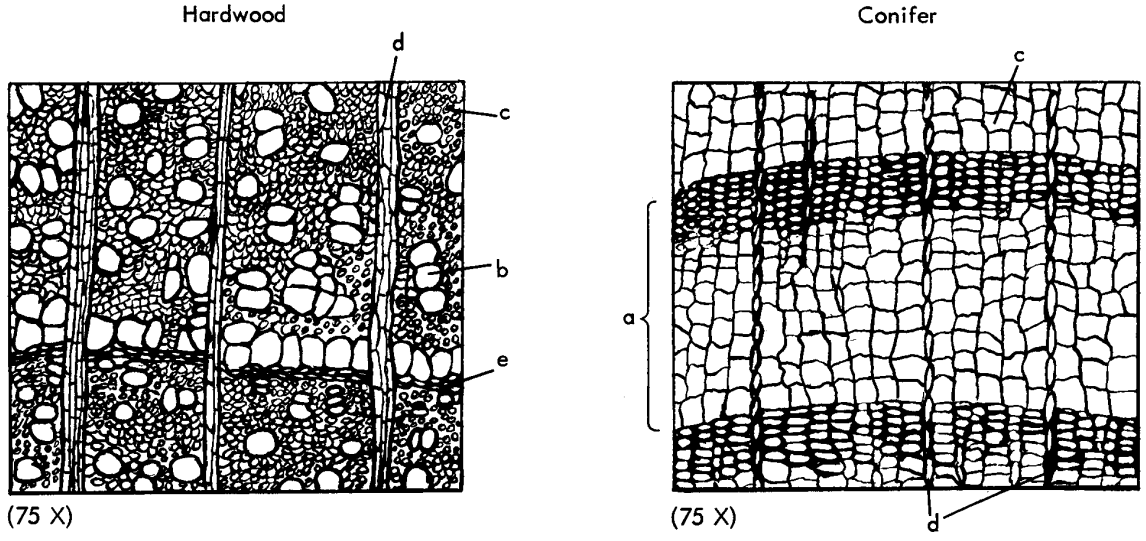
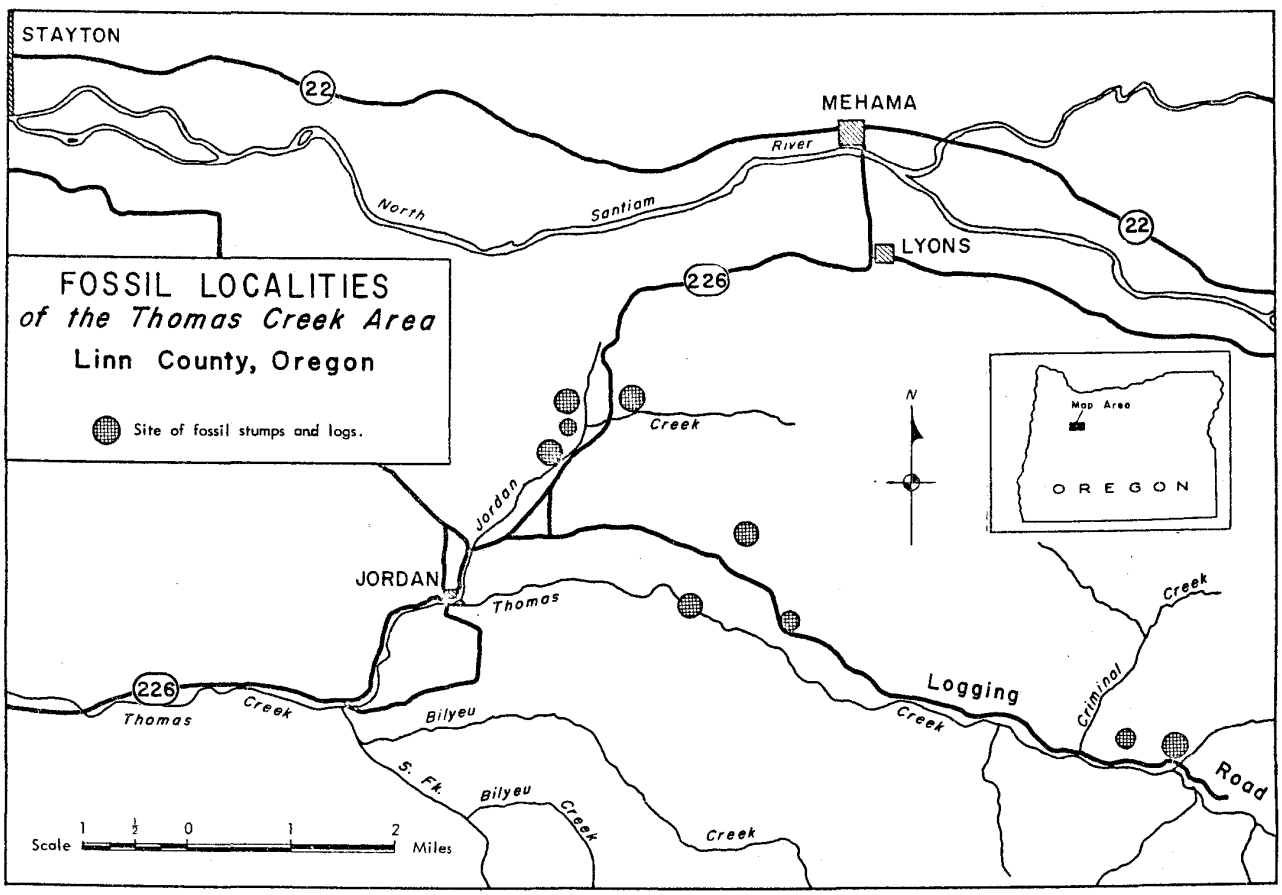


FIGURE 2: - Cross sections of typical conifer and hardwood: a) annual growth; b) vessel; c) fiber; d) multiseriate ray; e) parenchyma.



In addition to the genera listed, several other kinds of wood were found that could not be identified because of poor cell structure or because of lack of comparable living woods. Most of these are believed to be conifers.

The most abundant fossil woods in the Thomas Creek area are Sequoia and Platanus. Indeed, it is a rare plant locality in western Oregon that does not produce these two woods. It should be noted, however, that the specimens of fossil wood identified as Sequoia may be instead Metasequoia, or dawn redwood, as the distinctive needles and cones of Metasequoia are frequently found in the fossil leaf beds of this region. The living woods of these two trees are nearly identical, and the fossil forms are rarely distinguishable. Although ginkgo leaves occur in the area, no fossil ginkgo wood was found among the identifiable material.

A significant change has occurred in the forests of the Thomas Creek area since the time when the fossil plants were growing there. Of the genera listed above, only ash, oak, and hemlock are now present in the Thomas Creek area; the remainder grow in other regions, some very distant. Metasequoia, the fossil remains of which are abundant in Oregon, lives today only in remote parts of China. Sequoia, or coast redwood, a common fossil in the western margin of the Cascade Range of Oregon, now grows only in the fog belt of northern California and extreme southwestern Oregon. The majority of the hardwoods listed now live in warm-temperate to semi-tropical climates, although there is considerable latitude in their natural habitat, depending on species. As a whole, the fossil woods of the Thomas Creek area indicate a mild, moist climate averaging somewhat warmer than at the present time.

Smith (1958) has studied the geology of part of the Thomas Creek area and has mapped the plant-bearing tuff as part of the Mehama formation of Oligocene to Miocene age. His dating was based on fossil leaf assemblages and stratigraphic relationships of the rocks. The present study of the fossil woods offers no reason to dispute this age interpretation.

Selected Bibliography

Brown, H.P., and Panshin, A.J., "Commercial Timbers of the United States," McGraw-Hill Book Company, Inc., New York, 1940, 1949.

Chaney, Ralph W., "Ancient Forests of Oregon," Oregon State System of Higher Education, Condon Lecture, 1948.

Jane, F.W., "The Structure of Wood," Adam and Charles Black, Ltd., London, England, 1956.

Kanchira, R., "Atlas of Formosan Timbers," Government of Taiwan Forest Exp. Sta., 1939.

Kribs, D.A., "Commercial Foreign Woods on the American Market," Edwards Bros., Ann Arbor, Mich., 1950, 1959.

Metcalfe, C.R., and Chalk, L., "Anatomy of the Dicotyledon," Oxford University Press, Oxford, England, 2 vol., 1950.

Pearson, R.S., and Brown, H.P., "Commercial Timbers of India," Government of India, 1932.

Sanborn, Ethel, "The Scio Flora of Western Oregon," Oregon State College Monograph, Studies in Geology No. 4, 1947.

Smith, Raymond I., "The Geology of the Northwest Part of the Snow Peak Quadrangle, Oregon," Oregon State College Master's Thesis, 1958.

Willis, J.C., "Dictionary of Flowering Plants and Ferns," Macmillan Company, New York, 1925. (Out of print.)

* * * * *

MINERS BEWARE

Two bills recently introduced into the Senate will be detrimental to the mining industry if passed. The bills, quoted from the American Mining Congress Legislative Bulletin for July, are as follows:

S. 3791 - Rights of Way over National Forest Lands - Magnuson (Wash.). Committee on Public Works. Would authorize the Secretary of Agriculture to (1) require payment of fees for use and maintenance of national forest roads and trails; (2) grant easements for specified periods of time or otherwise in, upon, across, and over lands administered by the Forest Service for rights of way for roads upon such terms and conditions as he may deem are in the public interest; and (3) enter into agreements to exchange hauling rights or rights of way and easements for roads with those who own, control, or use lands intermingled with or adjacent to lands administered by the Forest Service and where mutual needs for access exist and notwithstanding any other provisions of law, to condition the grant of any right of way or permission to cross Forest Service lands upon the granting to the United States of rights or permission to cross lands owned, controlled, or used by the applicant to the extent the Secretary deems necessary and to make or receive reasonable compensation for such rights or permission.

S. 3809 - Establish National Wilderness Preservation System - Murray (Mont.). Committee on Interior and Insular Affairs. Somewhat similar to S. 1123 by Senator Humphrey (Minn.) and 17 others, but incorporates various amendments offered during Committee consideration of S. 1123. Would establish a National Wilderness Preservation System "for the permanent good of the whole people" composed to a large extent of national forest areas which are now open to prospecting and mining under the general mining laws.

As in previous versions of Wilderness legislation, would provide that generally "no portion of any area constituting a unit of the Wilderness System shall be used for any form of commercial enterprise....within national forest areas included in the Wilderness System....the President may within a specific area and in accordance with such regulations as he may deem desirable, authorize prospecting (including exploration for oil and gas), mining (including the production of oil and gas)....upon his determination that such use or uses in the specific area will better serve the interests of the United States and the people thereof than will its denial."

* * * * *

VACATIONERS WARNED ABOUT ABANDONED MINE WORKINGS

With the advent of the summer vacation period, Marling J. Ankeny, Director of the U.S. Bureau of Mines, cautions adventuresome persons to avoid exploratory trips into abandoned mines, regardless of type or location. Abandoned or idle mines can harbor pockets of dangerous gases and deep pools. They also can be deficient in life-giving oxygen and sometimes are frequented by poisonous snakes seeking refuge from the heat. Another hazard is that unsupported rock may give way without warning, injuring or trapping the unwary.

* * * * *

NEW DRILLING PERMITS ISSUED

The Department issued drilling permit No. 41 to Ross R. Mitchell and Associates on July 5, 1960. The well will be another shallow test and the third drilling by Mitchell on the Bliven farm south of the town of Dallas. The surveyed location of the well site was given as 1290 feet north and 140 feet west from the southeast corner of sec. 10, T.8 S., R.5 W., Polk County.

Permit No. 42 was issued by the Department to the Humble Oil and Refining Company on July 6, 1960. The company will drill on a large block of land in southern Lake County which is combined into a Unit Lease Agreement. The drilling will be in the NE$\frac{1}{4}$ sec. 18, T.36 S., R.18 E., Lake County, and will be called Thomas Creek Unit, Block III, well No. 1.

Permit No. 43 was issued to Ross R. Mitchell and Associates on July 12, 1960. The drilling is a continuation of Mitchell's shallow exploration program. It will take place on the Raymond H. and Millie L. Adams property. The survey shows the location to be 3725 feet west and 475 feet south from the northeast corner of sec. 15, T.8 S., R.5 W., Polk County, and is called the Adams - Bliven No. 4.

* * * * *

OPEN-FILE REPORT ON GEOLOGY OF WESTERN CASCADES

The Department has recently received an unpublished open-file report from the United States Geological Survey entitled "Geologic reconnaissance of the Western Cascades in Oregon north of latitude 43 degrees," by Dallas L. Peck. The report has 232 typewritten pages, a geologic map, cross sections, and numerous figures and tables. It may be consulted at the Department's office, 1069 State Office Building.

The project of mapping the Western Cascades is part of a long-range cooperative program between the USGS and the Department to prepare a geologic map of Oregon. Field work was done between 1954 and 1957 by Peck and others, utilizing parts of earlier geologic mapping where such was available. Mr. Peck's detailed report, which covers stratigraphy, structure, economic geology, petrography, and other aspects of the Western Cascades rocks, served also as his doctoral thesis at Harvard University.

In the summary of his report, Peck outlines the geology of the area as follows: "The volcanic rocks of the Western Cascades consist of deformed and partially altered continental flows and pyroclastic rocks, the ages of which range from late Eocene to late Miocene, as determined chiefly from fossil plants from more than 50 localities. The volcanic rocks overlie or interfinger westward with marine sedimentary rocks, and in the southwestern part of the map area overlie pre-Tertiary plutonic and metamorphic rocks of the Klamath Mountain province."

Persons consulting this report may find the terminology somewhat confusing because well-established formational names such as Fisher, Mehama, and Rhododendron have been replaced by the less familiar names of Colestin, Little Butte, and Sardine.

* * * * *

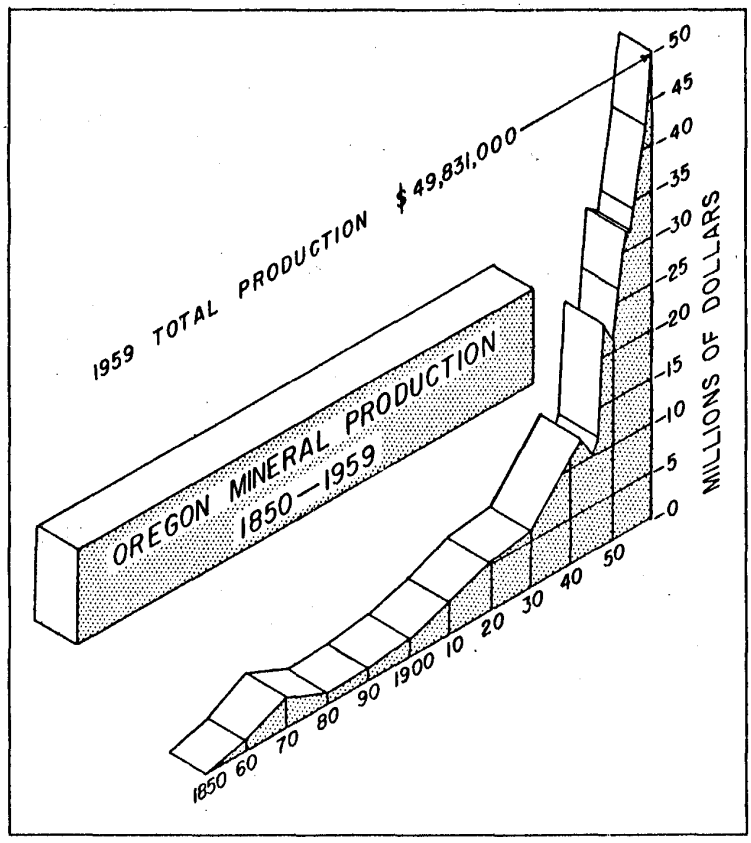
STATE MINERAL PRODUCTION CONTINUES TO RISE

By Ralph S. Mason*

The value of Oregon's mineral production in 1959 increased a healthy 10 percent over the previous year, figures just released by the U.S.Bureau of Mines reveal (see Table 1, next page). This is in sharp contrast to the decline reported by the federal bureau at year's end. The revised total of $49,800,000 raises the value of the mineral industry in the state to the highest point ever.

Bureau personnel, in explaining the $10,000,000 discrepancy between the two figures, pointed out that several state and federal agencies which were large users of crushed stone, rip-rap, fill material, and sand and gravel for dam and highway construction during the year did not report their consumption figures until after the Bureau had published its preliminary annual report in mid-December.

A 73-percent increase in the use of sand and gravel pushed the state total output of this commodity to slightly over 18 million tons valued at $15½ million, an increase of $5.3 million over 1958. Dam construction by the U.S.Army Corps of Engineers was largely responsible for the increase. Production of stone, while decreased in tonnage, showed a gain of $600,000 due to increased cost of production. This trend was in contrast to that reported for sand and gravel, which showed a decrease in unit value of over 12 percent. Use of large quantities of low-cost fill material in dam construction reported as sand and gravel accounts for the decreased value per ton.



Employment in the mining and metallurgical industries in the state during 1959 was 10,191, the Oregon Employment Department reported (see Table 2, next page). This figure does not represent the entire number of persons engaged in these industries, however, as it includes only those covered by unemployment compensation in job classifications such as miners, muckers, and mill men. The total number of workers who earn their living directly from the mining and metallurgical industry is not known, but it would be much larger than the figures reported. If the wages of those workers who are indirectly employed by the industry were also added, the total would be nearer $100 million than the $61,431,000 reported for 1959.

A breakdown of the Employment Department figures for last year shows that employment payrolls in mining decreased about 6 percent; production of stone, clay, cement, and similar products increased 10 percent; smelting, rolling, and finishing of primary metals increased 15.6 percent; and the state total gained 10.8 percent.

---

* Mining Engineer, State of Oregon Department of Geology and Mineral Industries.

In reviewing the above figures the Department realizes that an apparent disparity exists between the value of the state's mineral production of nearly $50 million and the reported total payrolls figure of $61.4 million. One reason for this lies in the fact that the figure for mineral production does not include the value of any metals or electric furnace products processed in the state, while the payroll total includes a portion of the workers engaged in producing these materials. Products falling into this category are nickel, aluminum, silicon, hafnium, zirconium, tantalum, columbium, titanium, uranium yellow cake, calcium carbide, and ferrosilicon. The Department also believes that the value figures released by the Bureau of Mines are more nearly preresentative of raw costs than value at point of use or point of sale. A more realistic picture of the state's mining and metallurgical industry would be presented if the latter values were used.

Table 1

Mineral Production in Oregon, 1958 - 1959 1/

Mineral	1958 Short tons (unless otherwise stated)	1958 Value (thousands)	1959 Short tons (unless otherwise stated)	1959 Value (thousands)
Chromite - gross weight	4,133	2/	-	-
Clays - thousand short tons	252	$293	294	$308
Copper (recoverable content of ores, etc.)	10	5	-	-
Gold (recoverable content of ores, etc.) - troy ounces	1,423	50	686	24
Lead (recoverable content of ores, etc.)	1	3/	-	-
Mercury - 76-pound flasks	2,276	521	1,224	278
Nickel (content of ore and concentrate)	12,697	2/	12,374	2/
Pumice and volcanic cinder - thousand short tons	138	331	2/	2/
Sand and gravel - thousand short tons	10,464	10,265	18,087	15,506
Silver (recoverable content of ores, etc.) - troy ounces	2,728	2	242	3/
Stone - thousand short tons	4/ 15,077	4/ 15,621	13,341	16,126
Value of items that cannot be disclosed: Carbon dioxide, cement, diatomite, gem stones, iron ore (pigment material) 1959, lime, uranium (1959), and values indicated by footnote 2.		19,311		18,596
Total 5/		4/ 45,190		49,831

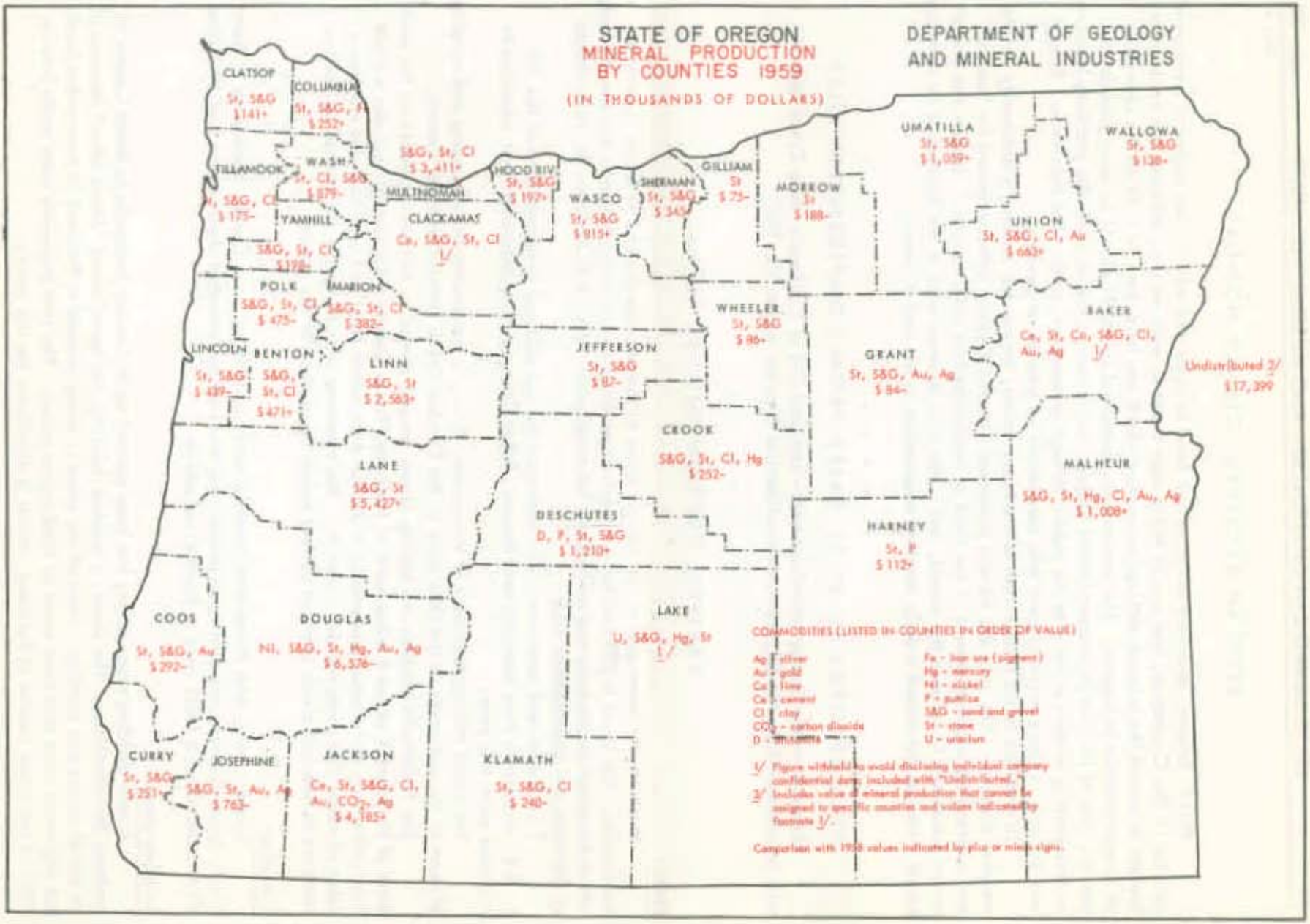
1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
2/ Figure withheld to avoid disclosing individual company confidential data.
3/ Less than $500.
4/ Revised figure.
5/ Total adjusted to eliminate duplicating value of clays and stone.

Table 2

Oregon Mineral Industry Employment and Payrolls*

	1958 Employment	1958 Payrolls	1959 Employment	1959 Payrolls
Mining	1,330	$7,381,000	1,227	$6,955,000
Mineral manufacturing	2,500	13,140,000	2,552	14,341,000
Primary metals	5,023	30,814,000	5,650	35,586,000
Miscellaneous	736	4,089,000	762	4,549,000
Totals	9,589	$55,424,000	10,191	$61,431,000

* Oregon State Unemployment Compensation figures.


STATE OF OREGON
MINERAL PRODUCTION
BY COUNTIES 1959
(IN THOUSANDS OF DOLLARS)
DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES
CLATSOP
St, S&G
$141+
COLUMBIA
St, S&G, P
$252+
S&G, St, Cl
$ 3,411+
TILLAMOOK
WASH.
St, Cl, S&G
$ 879-
MULTNOMAH
HOOD RIV.
St, S&G
$ 197+
WASCO
St, S&G
$ 815+
SHERMAN
St, S&G
$ 345
GILLIAM
St
$ 75-
MORROW
St
$ 188-
UMATILLA
St, S&G
$ 1,059+
WALLOWA
St, S&G
$ 138-
St, S&G, Cl
$ 175-
YAMHILL
CLACKAMAS
Ca, S&G, St, Cl 1/
UNION
St, S&G, Cl, Au
$ 663+
S&G, St, Cl
$ 198+
POLK
S&G, St, Cl
$ 475-
MARION
S&G, St, Cl
$ 382-
WHEELER
St, S&G
$ 86+
BAKER
Ca, St, Co, S&G, Cl, Au, Ag 1/
LINCOLN
St, S&G
$ 439-
BENTON
S&G, St, Cl
$ 471+
LINN
S&G, St
$ 2,563+
JEFFERSON
St, S&G
$ 87-
GRANT
St, S&G, Au, Ag
$ 84-
Undistributed 2/
$ 17,399
CROOK
S&G, St, Cl, Hg
$ 252-
LANE
S&G, St
$ 5,427+
MALHEUR
S&G, St, Hg, Cl, Au, Ag
$ 1,008+
DESCHUTES
D, P, St, S&G
$ 1,210+
HARNEY
St, P
$ 112+
COOS
St, S&G, Au
$ 292-
DOUGLAS
Ni, S&G, St, Hg, Au, Ag
$ 6,576-
LAKE
U, S&G, Hg, St 1/
CURRY
St, S&G
$ 251+
JOSEPHINE
S&G, St, Au, Ag
$ 763-
JACKSON
Ca, St, S&G, Cl, Au, CO_2, Ag
$ 4,785+
KLAMATH
St, S&G, Cl
$ 240-
COMMODITIES (LISTED IN COUNTIES IN ORDER OF VALUE)
Ag - silver
Au - gold
Ca - lime
Ce - cement
Cl - clay
CO_2 - carbon dioxide
D - diatomite
Fe - iron ore (pigment)
Hg - mercury
Ni - nickel
P - pumice
S&G - sand and gravel
St - stone
U - uranium
1/ Figure withheld to avoid disclosing individual company confidential data; included with "Undistributed."
2/ Includes value of mineral production that cannot be assigned to specific counties and values indicated by footnote 1/.
Comparison with 1958 values indicated by plus or minus signs.

BROGAN RECEIVES SCIENCE HONORS

Phil F. Brogan, associate editor of The Bend Bulletin and well-known author of geological articles in The Oregonian, was one of thirty west-coast science writers, editors, and broadcasters invited to attend the science writing conference which was held June 16 - 18 on the University of Oregon campus in Eugene. The conference, sponsored by the National Science Foundation, was the first of its kind in western United States. Its objective was to study the problems involved in interpreting modern science to the public through newspapers, radio, and television. Brogan was the only science writer present who specializes in articles on geology.

In addition to his recognition as a science writer, Brogan has become a nationally known weather observer. On July 22, he was presented with the Thomas Jefferson award for "unusual and outstanding accomplishment in the field of meteorological observations." Brogan was one of seven volunteers to receive the award, and is the only observer west of the Rockies to be so recognized. He has not missed a daily weather observation in the past 37 years.

* * * * *

WELL RECORDS TO BE RELEASED FROM CONFIDENTIAL FILES

Records on the Sunray Mid-Continent - Standard Oil of California "Bear Creek Unit No. 1" will be released from the Department's confidential files on August 13, 1960.

* * * * *

EASTERN OREGON MINING NEWS

Gold:

Work on the lower adit at the Buffalo Mine in the Granite District of Grant County is continuing. The level is 250 feet below previous workings and is being driven to tap the ore body which has supplied shipping and milling ore for many years. Mr. J.P.Jackson, Jr, is in charge of the mine and development work.

T.D.French and associates, who revamped the old mill and reopened some of the old E. & E. and North Pole workings near Bourne, Baker County, have indicated their intention to continue work this year.

The Regal Mining Company of Vancouver, B.C., is continuing the reopening and sampling of some of the old works at the Ibex mine in the Cracker Creek District of Baker County.

The McDonald brothers are testing placer ground owned by Milton Steinmetz on the west bank of Pine Creek about 6 miles north of Halfway, Baker County. Equipment includes a slack line cable-way and slusher powered by a double drum diesel hoist and a grizzly and sluiceway setup of about 500 yards per day capacity. The operators plan to sample the ground by cutting trenches to bedrock which is about 65 feet below the surface of the gravels.

Cinnabar:

Robert Hulin, who discovered cinnabar early in 1959 on Cave Creek, a tributary of Burnt River, Baker County, has continued prospecting and now has cinnabar showings on 9 of 10 claims distributed along a fault zone in Burnt River schists.

Building stone:

A new building stone quarry has been opened up on Dooley Mountain in Baker County by Anthony Brandenthaler. The stone, a banded rhyolite, has been named "Moon Mesa" because of its pastel colors and banding. Most of the stone is being trucked to Portland in twenty-ton loads, but shipments have also been made to Washington points. The first shipments were made late in 1959 to the Stone Center in Portland, which is distributor for the quarry.

* * * * *

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S.E."H" Street
Grants Pass

* *

GOLD PLACER MINING IN SOUTHWESTERN OREGON

By
Len Ramp*

Production

Placer mining for gold in southwestern Oregon today is very much limited as compared to the activity before World War II, when more than 100 placers were in operation. During the 1959-1960 season, 29 small placers were worked in Douglas, Jackson, and Josephine counties (see map and Table 2). The total gold production for the entire state of Oregon in 1959 dropped to an all-time low of 686 ounces; approximately 70 percent of this amount was produced from placers (Fulkerson et al, 1960).

Table 1 - PLACER PRODUCTION BY MINING DISTRICTS, 1940
(Minerals Yearbook, Review of 1940, pp.429-430, 1941)

County and District	No. Operators	Production Fine Oz.
Coos County:		
Coos Bay Area	*	7
Johnson Creek	3	78
Curry County:		
China Diggings	*	4
Gold Beach	*	55
Sixes	4	57
Douglas County:		
Green Mountain	2	39
Riddle	9	1,392
Jackson County:		
Ashland	*	18
Elk Creek	*	15
Gold Hill	22	6,629
Jacksonville	4	395
Upper Applegate	22	8,672
Josephine County:		
Galice	10	740
Grants Pass	8	555
Greenback	10	657
Illinois River	8	285
Lower Applegate	1	18
Waldo	14	3,558

* Output from property not classed as a mine

The peak of gold production for Oregon came in 1940, when 23,174 fine ounces of placer gold valued at $811,090 were produced in southwestern Oregon alone. The leading producing area at that time was the Upper Applegate district in Jackson county, which furnished 8,672 ounces of gold from 22 properties (see Table 1). During 1940, fifty-six dredges of various types operated in the state, 9 of which were in southwestern Oregon as follows: one in Douglas County, seven in Jackson County, one on Althouse Creek in Josephine County. Dredged areas in Jackson and Josephine counties are shown on the accompanying map. Although most of the areas had been dredged by 1940, a "doodle bug"** dredge was worked for a short time in 1959 on the Johnson placer (No.9) in Jackson County.

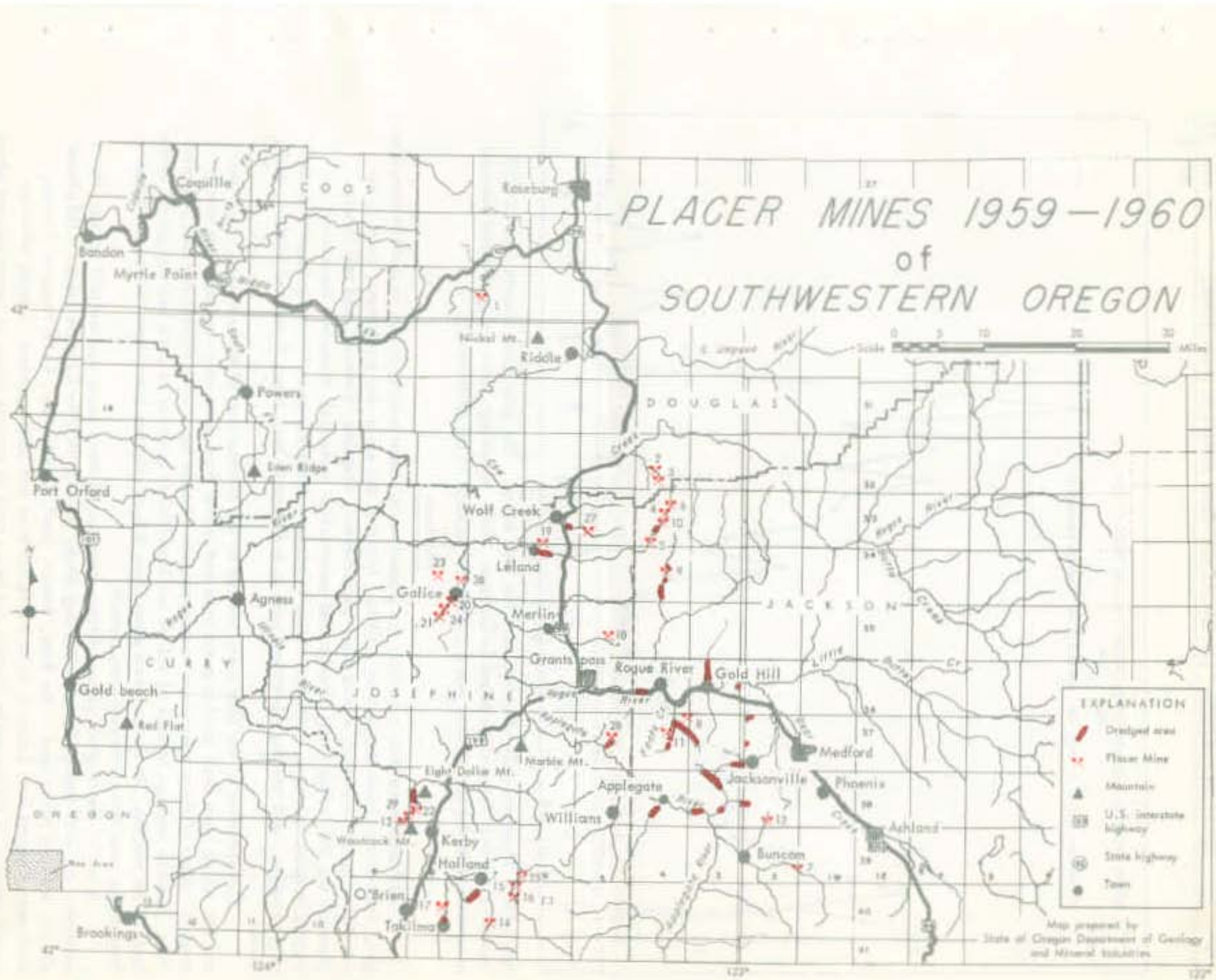
Placer mine production (see graph, p.78) has played a significant part in the area's economy. The production rise in 1934-1935 was due to the increase in the price of gold from $20.67 to $35.00 per fine ounce by presidential proclamation January 31, 1934. This price is still in effect. The sharp drop in production during 1941 and 1942 was due to the war-time inflationary economy and difficulties in obtaining materials

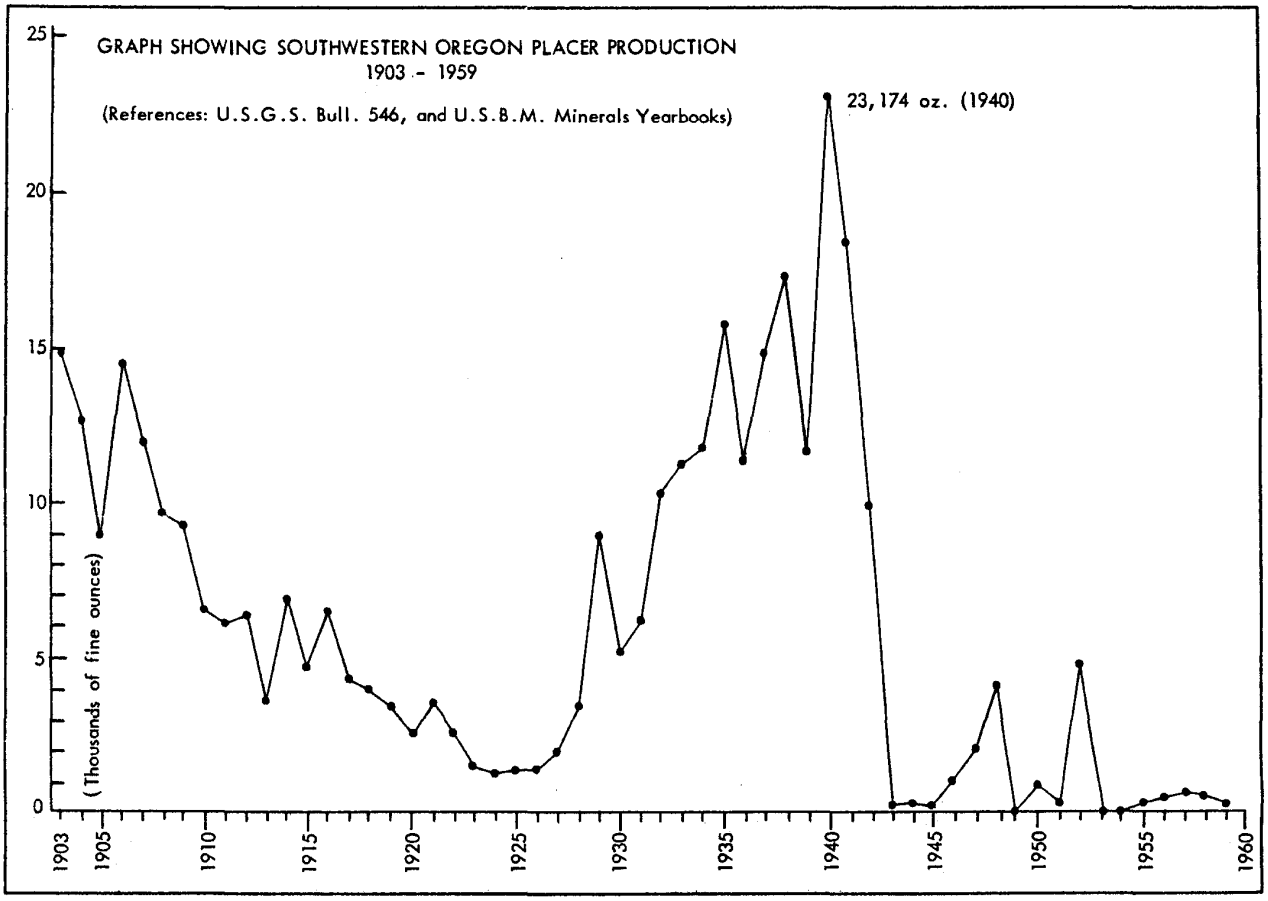
* Field Geologist, State of Oregon Department of Geology and Mineral Industries.

** The "doodle bug" dredge contains pump, trommel, sluices, and stacker on floating platform. It is fed by a separate dragline.

Table 2 - PLACER MINES ACTIVE DURING 1959-1960

Map No.	Name	Location Sec.	T. S.	R. W.	Operator	Address	Equipment	Bedrock	Type Deposit
						Douglas County			
1	Coarse Gold Creek	20	29	7	H. Thurber	Roseburg	dozer, pump, sluice	conglom. & shale	creek placer
2	Hogum Creek	21	32	4	A. A. Robbins	Riddle	giants and sluice	Galice slate	cemented bench
3	Upper Hogum	28	32	4	Henry Speaker	Wolf Creek	giants and sluice	slate & metavols.	bench & hillside
						Jackson County			
4	Anderson placer	15	33	4	Tom Yarem	Sunny Valley	dragline, pump, sluice	serp. & metavols.	creek placer
5	Baker Flat placer	32	33	4	John E. White	Grants Pass	dragline, pump, sluice	sandstone	creek placer
6	Buddy placer	15	33	4	Jack Lewis	Central Point	pump and sluice	slate & metavols.	creek placer
7	Can Can placer	25	39	2	Victor Nordgreen	Jacksonville	pump and sluice	metavolcanics	creek placer
8	DeJanvier placer	1	37	4	Glenn DeJanvier	Gold Hill	giant and sluice	Applegate metasediments	creek & hillside
9	Johnson placer	15	34	4	H.Commers - C.A.Reinke	Rogue River	dozer and sluice	decomposed granite	creek placer
10	King placer	21	33	4	Ted King	Sunny Valley	sluice and diving	metavols. & serpentine	creek placer
11	Shoemaker placer	15	37	4	Jack N. Shoemaker	Gold Hill	dozer (?) and sluice	Applegate ms. & granite	creek placer
12	Sterling placer	33	38	2	A.C. & Ivan Rock	Jacksonville	giants and sluice	Applegate ms. & metavols.	low bench
						Josephine County			
13	Bear placer	36	38	9	George Foster	Kerby	drifting	serpentine	cemented bench
14	Brown placer	28	40	7	Al Brown	Holland	giants and sluice	Applegate ms.& serpentine	low bench-hillside
15	California bar	1	40	7	Thomas Bros.	Cave Junction	back-hoe, loader, truck, trommel	metavolcanics	river bar
16	Edmonds placer	12	40	7	Joe & Lou Edmonds	Cave Junction	diversion ditch, sluice, stacker	serpentine & metavols.	creek placer
17	Esterly placer	22	40	8	Journeys End, Inc.	Cave Junction	shovel, screens, jigs	serpentine & metavols.	tails (gravel-plain)
18	Forest Queen	28	35	5	Orville Snavely	Grants Pass	giants, sluice, elevator	Applegate metaseds.	low bench & creek
19	Goff placer	5	34	6	E.Cantwell - R.Smith	Sutherlin	giants and sluice	Galice sediments	bench placer
20	Golden Bar placer	2	35	8	Bob Pancost	Galice	giants and sluice	Galice sediments	low bench & creek
21	Golden Lyon placer	10	35	8	Cole Grisel & Sons	Grants Pass	pump and sluice	Galice sediments	low bench & creek
22	Gold Nugget placer	30	38	8	Archie Rhoten	Kerby	giants and sluice	serpentine	low bench & creek
23	Lucky Strike	22	34	8	Paul E. Jonas	Merlin	hand operation, sluice	amphibole gneiss	creek & hillside
24	Maloney placer	10	35	8	Bert Pankey	Galice	giants and sluice	Galice sediments	low bench & creek
25	Oregon Bar placer	31	39	6	Fritz Johnson	Cave Junction	giants, sluice, pelton	metavolcanics	river bar
26	Rocky Gulch placer	25	34	8	N.L.Lewis	Galice	giants and sluice	Galice sediments	bench placer
27	Ruble placer	30	33	5	Fitzpatrick & Inman	Canyonville & Grants Pass	giants and sluice	Galice sediments	creek placer
28	Schaffer placer	22	37	5	J.B.Schaffer	Grants Pass	giants and sluice	serpentine & metavols.	creek placer
29	Sutter placer	36	38	9	Graham & Peyton	Klamath Falls	dozer, back-hoe, sluice	serpentine	bench & hillside


PLACER MINES 1959—1960
of
SOUTHWESTERN OREGON
Coquille
Bandon
Myrtle Point
Roseburg
Riddle
Powers
Port Orford
Wolf Creek
Leland
Agness
Gallice
Merlin
Grants Pass
Rogue River
Gold Hill
Gold Beach
Red Flat
Medford
Jacksonville
Phoenix
Ashland
Applegate
Williams
Kerby
Holland
O'Brien
Takilma
Buncom
Brookings
Marble Mt.
Eight Dollar Mt.
Woodcock Mt.
Nickel Mt.
Siskiyou Mts.
COOS
DOUGLAS
JACKSON
CURRY
JOSEPHINE
OREGON
EXPLANATION
Dredged area
Placer Mine
Mountain
U.S. interstate highway
State highway
Town
Map prepared by
State of Oregon Department of Geology
and Mineral Industries



and labor. Most seriously affected were the lode mines. The gold mine closure order L-208, issued by the War Production Board in October, 1942, requiring closure of gold mines deemed nonessential to the war effort, was a substantial setback to all gold mining.

Methods

Although more than a century has passed since placer mining began in southwestern Oregon, the methods have changed very little. Much of the early-day equipment, such as the monitor or giant, elevator, sluice box, undercurrent, dragline, trommel, and self shooter (boomer) are still being used. Design and construction materials, however, have been improved in some instances. Mechanization in placer mining has been limited primarily to digging, loading, and hauling equipment such as bulldozers, back hoes, front-end loaders, and trucks.

Development of the sand pump has led to the construction of various types of suction dredges which have been used to pump sand and gravel from deep holes and crevices along streams. Most of these operations in southwestern Oregon have been short-lived and unprofitable, possibly because of lack of values and insufficient quantity of gold-bearing gravel in the beds of the streams. In the past few years some skin-diving has been done, but so far it has been little more than a recreational pursuit.

A few of the original placer ditches constructed many years ago are still in use; for example, the well-known 30-mile Sterling ditch, built in 1872 by Chinese labor. Old placer ditches are also being used at the Bear, Brown, Goff, Golden Bar, Gold Nugget, Hogum, Maloney, Oregon Bar, Rocky Gulch, Ruble, Schaffer and Sutter placers. Large, efficient pumps capable of lifting water cheaply are being used to operate giants at bench placers where water can not be supplied by gravity ditches.

One of the difficulties encountered in placer mining operations is the working of cemented gravels. In the oxidized zone (above the ground water table) iron oxide (rust) generally cements sand and gold particles to the pebbles and boulders so that ordinary washing through sluice boxes fails to free the gold completely. Without further treatment a portion of the gold is not reclaimed. The lower, unoxidized zone of the gravel deposit is commonly called "blue gravel". The "blue gravel", being closer to bedrock, is usually richer and, because it is less firmly cemented, yields a greater percentage of its values.

For some of the old bench-gravel deposits that are well cemented by clay, calcite, and/or limonite, blasting and periods of weather-slacking are used to break up the gravel and free the gold.

Most placer mining operations are of necessity seasonal, because of lack of water during summer months. The past season was especially dry, so that few of the operations were able to pipe for more than one month and some had water for even shorter periods.

Classification of Placer Deposits

The placer deposits of southwestern Oregon have been classified (see Table 2) according to the definition given by Brooks (1914) for the various types of placers in Alaska. These definitions are given below. Not all of the Oregon placers fit exactly into these categories. For example, a few occurrences of cemented bench-type gravels lying less than 50 feet above the present streams are arbitrarily classified as "low bench" deposits. Some of the placer materials appear to be combinations of these classifications and are designated as such in Table 2.

Creek placers- Gravel deposits in beds and intermediate flood plains of small streams.

Bench placers- Ancient stream gravels standing from 50 to several hundred feet above the present streams.

Hillside placers - Gravel deposits lying between creek and bench placers where bedrock is sloping. (This category may include normal mantle or the eluvial-type placers weathered out of veins located up the slope from the deposits.)

River-bar placers - Placers on gravel flats in or adjacent to the beds of large streams.

Gravel-plain placers- Placers found in gravels of coastal or other lowland plains. (This category may be applied to deposits such as those in the upper Illinois Valley near Takilma, Holland, Kerby, and O'Brien.)

Sea-beach placers- Reconcentrations of coastal-plain gravels by waves along shore.

Ancient beach placers- Deposits found on coastal plain along a line of elevated benches. (Black sand deposits on terraces along the Oregon coast.)

Lake-bed placers- Gravels accumulated in beds of present or ancient lakes that may have been dammed by landslides or glacial deposits.

Bibliography

Brooks, A. H., The mineral deposits of Alaska; Mineral resources of Alaska, 1913, U. S. Geo. Survey Bull. 592, pp. 25-32, 1914.

Fulkerson, F. B., Kingston, G. A., and Peterson, N. S., The mineral industry of Oregon in 1959, Bureau of Mines Area Report, B-76, June 24, 1960.

U. S. Bureau of Mines production records, Mineral Year Books.

* * * * *

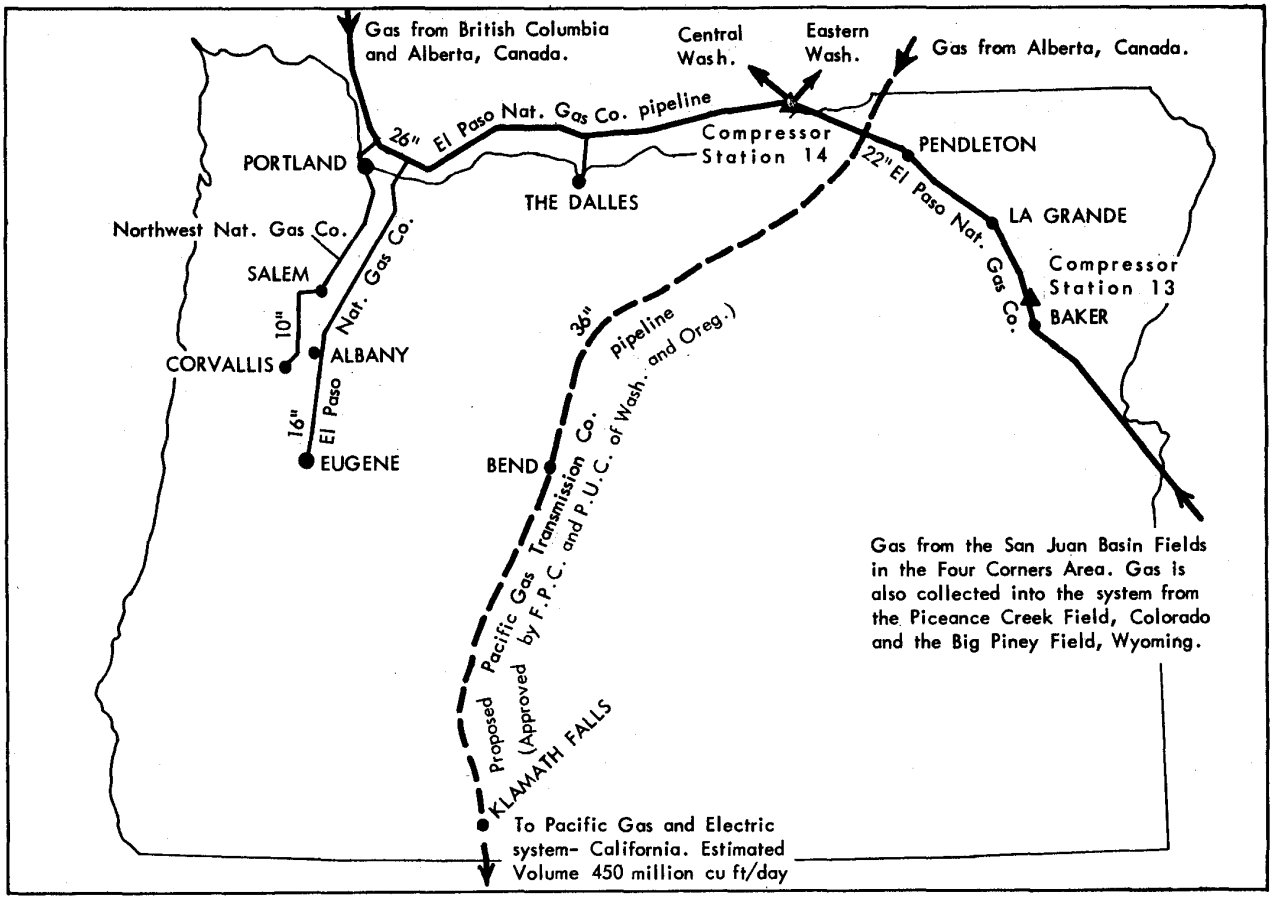
OREGON ASSURED OF AMPLE SUPPLY OF NATURAL GAS

Natural gas was made available to many cities in Oregon during 1956 when the Northwest Pipeline Corporation completed a pipeline to the Northwest from gas fields in the Four Corners area of New Mexico, Colorado, Utah, and Arizona (see map below). The pipeline system is now owned by El Paso Natural Gas Company. Canadian gas was first imported into the northwestern states through El Paso's system in 1957 and now is an integral part of the supply. Gas from the Peace River district of British Columbia and Alberta is piped 500 miles to the United States-Canadian border and there taken into the El Paso system near Sumas, Washington.

Natural gas from northern and southern sources flows into the 1487-mile main pipeline of El Paso Natural Gas Company, making ample supplies of gas available to industrial areas of the Northwest. Gas from Big Piney Field, Wyoming, Piceance Creek Field, Colorado, and several other small gas fields in the Rocky Mountains is gathered into the pipeline along its route northward from New Mexico.

Gas for the Portland area and Willamette Valley is taken off the mainline at points near Vancouver and Washougal, Washington. The 16-inch lateral crossing the Columbia River near Vancouver carries up to 120 million cubic feet per day, and the 20-inch line crossing at Washougal, 170 million cubic feet per day. (170 million cubic feet of gas is sufficient to heat 150,000 homes for an entire year.)

A plan to construct a 36-inch pipeline from gas fields in Alberta, Canada, to San Francisco, California, has been approved by the Federal Power Commission and awaits only the ratification of the California Public Utilities Commission. Cost of the project will be about $340 million. The plan calls for importing 600 million cubic feet of gas per day from Alberta: 150 million cubic



NATURAL GAS PIPELINES IN OREGON

feet per day to go to Washington, Idaho, and Oregon; and 450 million cubic feet per day to northern California.

Gas for the new pipeline will be taken at the United States-Canadian border near Kingsgate, British Columbia, by Pacific Gas Transmission Company and delivered to El Paso Natural Gas Company in northern Idaho and Pacific Gas & Electric Company at the California-Oregon border.

Application has been made to the Federal Power Commission by El Paso Natural Gas Company to take gas off the new pipeline at Bend and Klamath Falls for distribution in central Oregon. The cities of Madras, Redmond, Prineville, Medford, Ashland, and those in the Rogue River Valley will receive gas from the new system.

V. E. Newton

* * * * *

AMERICAN MINING CONGRESS AT LAS VEGAS

The 1960 American Mining Congress will be held October 10 through October 14 at the Convention Center in Las Vegas, Nevada. Twenty sessions will be devoted to discussions of the mining industry's problems, progress, and future trends. The subjects will include national mineral policies; taxation; labor-management relations; public lands; gold, silver, and monetary policies; the future outlook for metals and minerals; exploration and geology; and the practical operating problems of underground and open-pit mining and processing of mineral resources. One of the features of the program will be the Exposition, at which the latest developments in mining and mineral processing machinery and equipment will be shown by more than 200 manufacturers. On October 14, trips will be conducted to mines and plants in the Las Vegas area and to the Kennecott Copper operations. Subjects of particular interest to Oregon people will be discussed at the following sessions:

Welcoming Ceremonies; National Mineral Policies - Monday, October 10, at 10:00 A. M.

"The minerals platform of the Republican Party"

"The minerals platform of the Democratic Party"

Public Lands Session - Tuesday, October 11, at 10:00 A. M.

"The implications of wilderness legislation." One of the speakers will be William D. Hagenstein, Secretary of Resources Development Council, Portland, Oregon.

"Problems under the multiple use laws." Speakers will be Hon. Edward P. Cliff, Assistant Chief, U. S. Forest Service, and Hon. Edward Woozley, Director, Bureau of Land Management.

State of the Mining Industries Session - Thursday, October 13, at 10:00 A. M.

"Special metals and rare earths", by Steven Yih, Vice President, Wah Chang Corporation, Albany, Oregon.

"Strategic minerals", by S. H. Williston, Executive Vice President, Cordero Mining Company, Palo Alto, California.

Gold, Silver, and Monetary Policies Session - Thursday, October 13, at 3:00 P. M.

"Gold, silver, and monetary problems", by Dr. Elgin Groseclose, Economist, Groseclose, Williams & Associates, Washington, D. C.

* * * * *

POLICY STATEMENT ON FEDERAL LAND USE

The following statement of policy on multiple use of federal lands, with special reference to United States forest lands, was adopted by the Department's Governing Board at its meeting on June 10, 1960:

The initial premise of the mining industry is that minerals and materials extracted from the ground are absolutely essential to the maintenance, development, and progress of our economy. Advances in industry and in living conditions will be directly related to the cost and availability of mineral products.

The source of our minerals to date has been the "high grade" and easily discovered deposits; that is, those mineral deposits of relatively high value, cropping out at the earth's surface or located very near the surface. Today those deposits have been, in large part, found and are either exhausted or in the process of being exploited in the United States.

Mineral deposits of the so-called "underdeveloped countries" are, in general, still being discovered, with the result that the economy of the United States is becoming more dependent on these overseas imports. As the underdeveloped countries achieve a higher level of economy and as a greater number of people live on this world of ours, the easily discovered mineral deposits of other nations will soon reach the stage of development now found in the United States.

Continued advancement in the world will depend on utilization of the known lower-grade mineral deposits and improved prospecting methods to discover deposits which are hidden or difficult of access. Undoubtedly, grades of ore in the future will be but a fraction of what is considered low-grade ore today. If these mineral deposits are to be mined and new deposits discovered, land must be open to prospecting.

Mineral deposits, even of a low-grade nature, are found only at certain places. The deposits cannot be moved. When land is withdrawn for special purpose or even for multiple use of the surface resources, and administered by an agency not concerned with mining, potential mineral deposits may be lost to the world.

There are sufficient laws in force today to allow for both multiple surface use of land and subsurface extraction of materials from that land with a minimum amount of conflict. In many instances it would be for the welfare of the people to move surface uses in order to utilize the nonmovable subsurface mineral deposits. Because there is already sufficient protection to the surface users, more emphasis should be placed on keeping land open to prospecting and mining.

The principal agencies who have control and management of federal land are persons trained in forestry, agriculture, recreation, or other surface usages. It is not surprising that these administrators do not recognize or concern themselves with the many problems connected with the search for mineral deposits. Therefore, it would seem to be of public benefit to place on the staff of every surface-use control agency an expert in mining and mineral economics. This person should not be merely a "policeman" or "workman" for the administrators of the national lands. He should be one who can enter into policy-making at the staff level, so as to protect the legitimate interests of the miners. Perhaps advisory boards from the various communities or states could take the place of the staff mineral expert. In any event, greater recognition of the subsurface resources of national lands should become paramount in the thinking of agencies who now have control of federal lands.

It is recognized that some persons have in the past attempted to use the mining laws as a pretext to gain control over areas of public domain and exploit them for nonmineral purposes. No doubt others will attempt to do this in the future. Such abuses are to be condemned, and the appropriate government agencies should be left free to stamp them out wherever they are found to exist. However, these occasional offences should not be used as an excuse for either legislation or policies so restrictive as to seriously hamper the legitimate activities of the serious miners. It is neither necessary nor desirable to seal off the entire building in order to get rid of a few rats in the basement.

Adopted
June 10, 1960

Governing Board, State of Oregon
Department of Geology and
Mineral Industries:

Hollis M. Dole
Secretary to the Board
and Director of the Department

William Kennedy, Chairman, Portland
Harold Banta, Baker
Earl S. Mollard, Riddle

* * * * *

VANDALISM KILLS CRUMP GEYSER

The Crump continuous "geyser" (Ore.-Bin, Sept. 1959) which had such a spectacular beginning on July 1, 1959, is now inactive. Vandals succeeded in plugging the "geyser" in February and again in March by piling large boulders and debris in and around the casing of the well.

Despite the obstruction lodged in the casing and hole, the "geyser" spouted continuously until about June 1, 1960. It then became a true geyser erupting for about 30 seconds every two minutes (Ore.-Bin, June 1960). This interval increased steadily and on July 5 was about one hour. By July 20, eruption had ceased. Now there is only the rumbling of boiling water down in the hole.

Hot spring activity adjacent to the now defunct geyser has increased. Springs are again flowing and the original Crump geyser, a 100-foot-deep well just to the north, has blown the debris from its orifice and is again active, spouting a 75 to 100-foot column of steam and water for 5 minutes every 12 hours.

* * * * *

ALASKA TO SHIP URANIUM TO LAKEVIEW

Alaska will again produce uranium. The JOT Mining Company, under new management, is planning to mine and ship several thousand tons of ore this summer from the Kendrick Bay Mining Company pit and adjacent claims at Bokan Mountain. The ore will be shipped to Lakeview, Oregon. Bokan Mountain is on the southern part of Prince of Wales Island. The first shipment of ore is scheduled for August 30.

* * * * *

OREGON PLACE NAMES

Listed below are some of the Oregon names officially accepted by the U. S. Board on Geographic Names, in decisions rendered from September through December, 1959 (Decision list No. 5904). The list will be continued as space permits in future issues of The Ore.-Bin.

Little Owyhee River: stream heading near 42°06'30" N., 117°35'00" W. and flowing generally eastward about 12 miles, then north-northeastward about 30 miles to the Owyhee River (q.v.) about 35 miles southeast of Rome; Malheur County; sec. 4, T. 36 S., R. 47 E., Willamette meridian; 42°27'10" N. 117°12'30" W.

Middle Fork Owyhee River: stream about 17 miles long heading in T. 12 S., R. 5 W., Boise meridian, near 42°24'40" N., 116°54'30" W., Idaho, and flowing generally northwestward to the North Fork Owyhee River (q.v.) about 0.7 mile upstream from the Owyhee River (q.v.); Owyhee County, Idaho, and Malheur County, Oregon; sec. 35, T. 34 S., R. 45 E., Willamette Meridian; 42°32'40" N., 117°09'30" W.

North Fork Owyhee River: stream about 27 miles long, heading on the southern slopes of the Owyhee Range in Idaho, near 42°41' N., 116°48' W., and flowing generally west-southwestward to the Owyhee River (q.v.) about 31 miles southeast of Rome; Owyhee County, Idaho, and Malheur County, Oregon; sec. 35, T. 34 S., R. 45 E., Willamette meridian; 42°32' 30" N., 117°10'00" W.

Owyhee River: stream, partially in Humboldt National Forest, heading in T. 42 N., R. 55 E., Mount Diablo meridian, near 41°30' N., 115°45' W., Nevada, and flowing northwestward about 175 miles through southwestern Idaho into Oregon, then north-northwestward about 80 miles to the Snake River about 5 miles south-southwest of Nyssa; Owyhee County, Idaho, Elko County, Nevada, and Malheur County, Oregon; sec. 30, T. 20 S., R. 47 E., Willamette meridian; 43°48'35" N., 117°01'50" W. Not: East Fork Owyhee River, South Fork Owyhee River (q.v.).

* * * * *

ASSESSMENT WORK

Have you done your assessment work? The current assessment year is September 1, 1959, to August 31, 1960. If you haven't completed your work and your claims are in a fire-hazard area, the following directive from the Bureau of Land Management will be of interest to you:

> "It has been recently brought to our attention that in many sections of the Western states, due to the extreme dry weather and the critical fire conditions, the performance of annual assessment work by mining claimants, which involves blasting, use of heavy equipment and establishment of temporary camps, is considered to be extremely hazardous and conducive to additional fire potential. We have been further advised that in certain localities the conditions are so extreme that entry has been denied either by the agency administering the land or under State fire prevention regulations.
>
> "Where such conditions exist, the Land Office Manager, under 43 CFR 185.96, is authorized to grant a deferment of assessment work. The granting of such a temporary deferment should be done only after the mining claimant has submitted satisfactory proof either of denial of access or proof of exclusion from the area. This authority is not to be looked upon as an unrestricted deferment, as such deferred work must be performed during the next assessment year, nor is it to be used by the mining claimant as an excuse for nonperformance of required work. It can, however, serve a very real purpose by preventing unnecessary litigation and 'claim jumping' for the mining industry, as well as safeguard valuable surface resources of the United States.
>
> "When claims are located within national forests it would appear advisable to verify statements made requesting deferment with local Forest Service officials. Final authority, however, for granting or rejecting such requests and all actions pertaining thereto is the responsibility of this Bureau."

* * * * *

HAINES GRANITE PLANT BURNS

The Northwestern Granite Company's plant located two miles east of Haines, and one of Baker County's oldest businesses, burned to the ground on the morning of July 23. Cause of the fire was unknown. Loss to the owners S. E. and Stanley Ingram was in excess of $50,000 and not covered by insurance. Burned besides the structure were the stone cutting, sand-blasting, and polishing machines, compressors and pneumatic equipment, overhead hoist, drafting equipment, machine shop and much granite stock. According to The Baker Record Courier (July 28, 1960), the Company announced immediately that it will remain in the granite and monument business.

The Haines quarry, which has operated since about 1902, has produced granite for most of the public buildings in Baker. The stone was rated highest of the gray granites in the country for strength, and won awards at a number of world fairs. Since the decline of the use of stone in buildings, the firm has dealt extensively in fine monuments.

* * * * *

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S. E. "H" Street
Grants Pass

* *

ACTIVE MINES AND MILLS IN OREGON IN 1960

The following list of active mines, mills, and metallurgical plants in Oregon presents a concise view of the industry for 1960. As compared to the 1958 listing (The Ore.-Bin, August, 1958), the picture has changed in some respects due to the ever increasing demand for industrial minerals and processed materials. The mines and mills (see next page) are arranged alphabetically by name under each commodity, with the name and address of owner or manager in the left-hand column and the location of the operation in the right-hand column.

Oregon building stone quarries have increased in number in the past year in response to a persistent demand from out-of-state customers. At the present time 18 quarries are producing, and by the end of the year at least three more will have been opened. Originally all of the quarries were individually owned and operated, but now some of them are being consolidated under a single management, and many of the others are selling their stone to wholesalers rather than directly to the customer.

There has been little change in the lightweight aggregate field in the state for several years. Two companies produce expanded shale, and five others quarry pumice, scoria, and cinders. Large quantities of volcanic cinders are quarried by state, county, and federal agencies for road metal, but their operations have not been included as mining companies. One diatomite quarry continues steady production.

No sand and gravel operations are included in this list despite the fact that this commodity accounts for a large percentage of the state's total mineral production.

The number of limestone producers has remained almost static for many years in spite of steadily increasing production. Most of the state's limestone is mined by cement companies for their own use. The remainder is quarried for agricultural, metallurgical, and chemical use.

One new silica producer appears on this year's list, the first addition to this commodity in more than 20 years. Other additions to the list of miscellaneous nonmetallics include salines, crushed marble for roofing granules, and coal for possible use in a proposed steam hydroelectric power plant.

In the metals field, gold-mining activity has increased over the past few years, but total production is still very limited as compared to former times. With the exception of one eastern Oregon property, operations at lode mines consist chiefly of intermittent development work. Individual initiative still persists among the placer miners who operate seasonally along the creeks and high bars, which have been yielding gold continuously for over a century. Oregon, like many of the western mining states, would see a resurgence of mining activity if gold were recognized again as a necessary metal.

Mercury mines continue a test of survival against ing costs and a wavering price structure. During the past year several small prospects were explored and several small furnaces were installed. Mining and development work continue in uranium, copper, molybdenum, and nickel.

Metallurgical plants in Oregon are producing a wide variety of products. Raw materials are obtained from local deposits and from points located half way around the earth, and the products may in turn be used locally or flung out into orbit in a space vehicle.

LIST OF ACTIVE MINES AND MILLS IN OREGON IN 1960

NONMETALLICS

Building Stone

Banasco Quarry Joseph Banasco Plush, Oregon	Lake County Sec. 8 T. 37 S., R. 24 E.
A. O. Bartell (Scoria) Portland, Oregon	Lake County Quartz Mt. District
Carver Quarry A. Faoro & Sons Portland, Oregon	Clackamas County Sec. 18 T. 2 S., R. 3 E.
Cinder Hill Quarry (Cinders and scoria) Leroy E. Grote Prineville, Oregon	Deschutes County Sec. 33 T. 14 S., R. 13 E.
Hawaiian Travertine Quarry (Rhyolite) Melvin Parker Grants Pass, Oregon	Wasco County Sec. 20 T. 8 S., R. 13 E.
Moon Mesa Stone Quarry (Rhyolite) Anthony Brandenthaler Baker, Oregon	Baker County T. 11 S., R. 40 E.
Natural Stone Company (Sandstone) Mary Johnson Portland, Oregon	Malheur County T. 32 S., R. 41 E.
Northwestern Granite Co. (Monument stone) S. E. and Stanley Ingram Haines, Oregon	Baker County Sec. 27 T. 7 S., R. 39 E.
Ochoco Stone Quarry (Platy Lava) William Durfee Redmond, Oregon	Deschutes County Sec. 14 T. 15 S., R. 12 E.
Oregon Emerald Quarry (Tuff) Operator Oregon Quarries, Inc.	Crook County T. 14 S., R. 16 E.
Oregon Quarries, Inc. (Tuff) N. D. Kile The Dalles, Oregon	Operating following quarries (which see) Oregon Emerald Pacific States Cut Stn Rainbow Rock
Oregon Tuff Stone Co. Fred Franklin Sublimity, Oregon	Marion County Sec. 29 T. 8 S., R. 1 E.
Pacific States Cut Stone Co. (Tuff) Operator Oregon Quarries, Inc.	Jefferson County Sec. 9 T. 9 S., R. 15 E.
Rainbow Rock Quarry (Tuff) Operator Oregon Quarries, Inc.	Wasco County Sec. 11 T. 6 S., R. 11 E.
Red Rock Mine (Scoria) Roberts & Hurrle Portland, Oregon	Deschutes County Sec. 29 T. 14 S., R. 13 E.
Rocky Butte Quarry (Basalt) Joe Marston Portland, Oregon	Multnomah County Quarry at Rocky Butte
Sahara Tan Quarry (Tuff) William Durfee Redmond, Oregon	Deschutes County Sec. 21 T. 14 S., R. 13 E.
Snow Bird Quarry (Tuff) Duane Coble Roseburg, Oregon	Douglas County Sec. 24 T. 27 S., R. 1 E.
Stayton Flatrock Quarry Oliver Juel & Son Stayton, Oregon	Marion County Sec. 10 T. 9 S., R. 1 W.

Lightweight Aggregate

Cascade Pumice Corp. Ralph H. Young Bend, Oregon	Deschutes County Sec. 5, T. 18 S., R. 12 E., & Sec. 36, T. 16 S., R. 11 E.
Central Oregon Pumice Co. W. E. Miller Bend, Oregon	Deschutes County Sec. 7, T. 17 S., R. 12 E., & Sec. 7 T. 18 S., R. 12 E.
Cinder Hill Quarry (Cinders & Scoria) Leroy E. Grote Prineville, Oregon	Deschutes County Sec. 33 T. 14 S., R. 13 E.
Deschutes Concrete Products Co. (Pumice) Chester T. Lackey Redmond, Oregon	Deschutes County Sec. 30, T. 16 S., R. 12 E., and Sec. 33 T. 14 S., R. 13 E.
Great Lakes Carbon Corp. (Diatomite) Dicalite Dept. Lower Bridge, Oregon	Deschutes County Sec. 16 T. 14 S., R. 12 E.
Harney Concrete Tile Co. (Pumice) Don Robbins Burns, Oregon	Harney County Sec. 3 T. 24 S., R. 30 E.
Northwest Aggregates, Inc. (Expanded shale) Portland, Oregon	Washington County Sec. 24 T. 3 N., R. 5 W.
Red Rock Mine (Cinders) Roberts & Hurrle Portland, Oregon	Deschutes County Sec. 29 T. 14 S., R. 13 E.
Smithwick Concrete Products Co. (Expanded shale) Portland, Oregon	Washington County Sec. 8 T. 3 N., R. 4 W.

Limestone

Chemical Lime Co. (Burnt lime) Baker, Oregon	Baker County Plant at Wingville
Dewitt's Polk County Lime Co. Dallas, Oregon	Polk County S. W. of Dallas
Ideal Cement Co. Gold Hill, Oregon (Quarry at Marble Mt.)	Josephine County Sec. 30 T. 37 S., R. 6 W.
Greely Lime Co. Portland, Oregon (Quarry near Enterprise)	Wallowa County Sec. 19 T. 2 S., R. 44 E.
Oregon Portland Cement Co. Portland, Oregon (Quarries at Lime, Nelson & Dallas; plants at Lime and Oswego)	Baker & Polk Counties Secs. 26, 27, 34, 35 T. 13 S., R. 44 E. and Sec. 12 T. 8 S., R. 6 W.

Miscellaneous Nonmetals

Alkali Lake Sodium (Salines) A. M. Matlock Eugene, Oregon	Lake County Alkali Lake
Big Quartz Mine (Silica) G. D. Rannells Aurora, Oregon	Douglas County Sec. 2 T. 28 S., R. 1 E.
Bristol Silica Company (Quartz) F. I. Bristol Rogue River, Oregon	Jackson County Sec. 30 T. 36 S., R. 3 W.
Eden Ridge Coal Pacific Power & Light Co. Portland, Oregon	Coos County T. 32 S., R. 11 W.
Gas-Ice Corporation (Dry ice) Portland, Oregon	Jackson County Sec. 7 T. 39 S., R. 2 E.
Leverett Marble (Granules) R. D. Johansen Grants Pass, Oregon	Josephine County Sec. 15 T. 38 S., R. 5 W.
Wilhoit Coal Mine T. G. Mandrones Portland, Oregon	Clackamas County Sec. 15 T. 6 S., R. 2 E.

METALS

Gold Lode Mines

Ashland Mine Van Curler Bros. Ashland, Oregon	Jackson County Sec. 7 T. 39 S., R. 1 E.
Buffalo Mine J. P. Jackson, Jr. Granite, Oregon	Grant County Sec. 14 T. 8 S., R. 35½ E.
Cobalt Gold Mine Cobalt Gold Mines, Inc. H. F. Stevens Boise, Idaho	Grant County Sec. 11 T. 12 S., R. 33 E.
Columbia North Pole Lode T. D. French & Assoc. Bourne, Oregon	Baker County Sec. 32, 33 T. 8 S., R. 37 E.
Ducharme No. 6 Willard Ducharme & O. P. Beekman Grants Pass, Oregon	Jackson County Sec. 13 T. 36 S., R. 4 W.
Greenback Mine Wes Pieren Grants Pass, Oregon	Josephine County Sec. 32 T. 33 S., R. 5 W.
Humdinger Mine Earle Young & Walter Lonnon Grants Pass, Oregon	Josephine County Secs. 21, 16 T. 38 S., R. 5 W.
M. C. Claim McTimmonds & Adams Grants Pass, Oregon	Curry County Sec. 1 T. 39 S., R. 10 W.
Oro Grande Les Hudson & Frank Kolkow Grants Pass, Oregon	Josephine County Sec. 28 T. 33 S., R. 5 W.
Reno Mine Quinton Stone Grants Pass, Oregon	Josephine County Sec. 34 T. 33 S., R. 8 W.
Snow Bird (Tip Top) George Slade Williams, Oregon	Josephine County Sec. 20 T. 38 S., R. 5 W.
Warner Mine Frank Gelhaus Rogue River, Oregon	Jackson County Sec. 4 T. 33 S., R. 4 W.

Gold Placers

Anderson Placer Tom Yarem Sunny Valley, Oregon	Jackson County Sec. 15 T. 33 S., R. 4 W.
Baker Flat Placer John E. White Grants Pass, Oregon	Jackson County Sec. 32 T. 33 S., R. 4 W.
Buddy Placer Jack Lewis Central Point, Oregon	Jackson County Sec. 15 T. 33 S., R. 4 W.
Bear Placer George Foster Kerby, Oregon	Josephine County Sec. 36 T. 38 S., R. 9 W.
Brown Placer Al Brown Holland, Oregon	Josephine County Sec. 28 T. 40 S., R. 7 W.
California Bar Thomas Bros. Cave Junction, Oregon	Josephine County Sec. 1 T. 40 S., R. 7 W.
Can Can Placer Victor Nordgreen Jacksonville, Oregon	Jackson County Sec. 25 T. 39 S., R. 2 W.
Coarse Gold Creek H. Thurber Roseburg, Oregon	Douglas County Sec. 20 T. 29 S., R. 7 W.
Crump Placer W. D. Crump Baker, Oregon	Baker County Sec. 23 T. 11 S., R. 38 E.
DeJanvier Placer Glenn DeJanvier Gold Hill, Oregon	Jackson County Sec. 1 T. 37 S., R. 4 W.
Edmonds Placer Joe and Lou Edmonds Cave Junction, Oregon	Josephine County Sec. 12 T. 40 S., R. 7 W.
Esterly Placer Journeys End, Inc. Cave Junction, Oregon	Josephine County Sec. 22 T. 40 S., R. 8 W.
Forest Queen Orville Snavely Grants Pass, Oregon	Josephine County Sec. 28 T. 35 S., R. 5 W.
Goff Placer Cantwell and Smith Sutherlin, Oregon	Josephine County Sec. 5 T. 34 S., R. 6 W.
Golden Bar Placer Bob Pancost Galice, Oregon	Josephine County Sec. 2 T. 35 S., R. 8 W.
Golden Lyon Placer Cole Grisel & Sons Grants Pass, Oregon	Josephine County Sec. 10 T. 35 S., R. 8 W.
Gold Nugget Placer Archie Rhoten Kerby, Oregon	Josephine County Sec. 30 T. 38 S., R. 8 W.
Hogum Creek A. A. Robbins Riddle, Oregon	Douglas County Sec. 21 T. 32 S., R. 4 W.
Johnson Placer Commers and Reinke Rogue River, Oregon	Jackson County Sec. 15 T. 34 S., R. 4 W.
King Placer Ted King Sunny Valley, Oregon	Jackson County Sec. 21 T. 33 S., R. 4 W.
Last Chance Placer James A. Burgen Galice, Oregon	Josephine County Sec. 26 T. 34 S., R. 8 W.
Lucky Strike Paul E. Jonas Merlin, Oregon	Josephine County Sec. 22 T. 34 S., R. 8 W.
Maloney Placer Bert Pankey Galice, Oregon	Josephine County Sec. 10 T. 35 S., R. 8 W.
Oregon Bar Placer Fritz Johnson Cave Junction, Oregon	Josephine County Sec. 31 T. 39 S., R. 6 W.
Rocky Gulch Placer N. L. Lewis Galice, Oregon	Josephine County Sec. 25 T. 34 S., R. 8 W.
Ruble Placer Fitzpatrick and Inman Canyonville, Grants Pass	Josephine County Sec. 30 T. 33 S., R. 5 W.
Schaffer Placer J. B. Schaffer Grants Pass, Oregon	Josephine County Sec. 22 T. 37 S., R. 5 W.
Shoemaker Placer Jack N. Shoemaker Gold Hill, Oregon	Jackson County Sec. 15 T. 37 S., R. 4 W.
Sterling Placer A. C. and Ivan Rock Jacksonville, Oregon	Jackson County Sec. 33 T. 38 S., R. 2 W.
Sutter Placer Graham and Peyton Klamath Falls, Oregon	Josephine County Sec. 36 T. 38 S., R. 9 W.
Upper Hogum Henry Speaker Wolf Creek, Oregon	Douglas County Sec. 28 T. 32 S., R. 4 W.

Mercury

Bonanza Mine Bonanza Oil & Mine Corp. Sutherlin, Oregon	Douglas County Sec. 16 T. 25 S., R. 4 W.
Bretz Mine Arentz-Comstock Mining Venture McDermitt, Nevada	Malheur County Sec. 3 T. 41 S., R. 41 E.
Maury Mountain Mine F.D. & H.W.Eickemeyer Prineville, Oregon	Crook County Secs. 10, 15 T. 17 S., R. 19 E.
Mother Lode Mine Werdenhoff Mining Co. Prineville, Oregon	Crook County Secs. 20, 29 T. 14 S., R. 20 E.
Towner Quicksilver Mine Frank Towner Post, Oregon	Crook County Sec. 10 T. 17 S., R. 19 E.
War Eagle Mine David Chase Medford, Oregon	Jackson County Sec. 17 T. 34 S., R. 2 W.

Miscellaneous Metals

Bear Creek Mining Company (Uranium) James Marier Idleyld, Oregon	Crook County Sec. 13 T. 18 S., R. 16 E.	Lakeview Mining Company (Uranium) Lakeview, Oregon	Lake County T. 37 S. Rs. 18, 19 E.	Standard Mine (Copper, cobalt) Ray Summers John Day, Oregon	Grant County Sec. 12 T. 12 S., R. 33 E.
Hanna Nickel Smelting Co. (Nickel) Riddle, Oregon	Douglas County Nickel Mountain T. 30 S., R. 6 W.	Sage Hollow Mine (Uranium) Forest J. Kennady Glide, Oregon	Crook County Sec. 13 T. 18 S., R. 16 E.	Twin Mountain Mining Co. (Molybdenum) Robert Hulin Baker, Oregon	Baker County Sec. 5 T. 8 S., R. 37 E.

METALLURGICAL PLANTS

Electro Metallurgical Co. (Carbide, ferroalloys) Div. Union Carbide Co. Portland, Oregon	Multnomah County Plant in St. Johns	Oregon Metallurgical Corp. (Zirconium, titanium) Albany, Oregon	Linn County Albany	Reynolds Metals Co. (Aluminum) Troutdale, Oregon	Multnomah County
Harvey Aluminum Co. The Dalles, Oregon	Wasco County	Oregon Steel Mills 5200 N. W. Front Avenue Portland, Oregon	Multnomah County	Supreme Perlite N. Suttle Road Portland, Oregon	Multnomah County Plant in N. Portland
Industrial Processing Co. (Calcium hydrate) 5005 N. W. Front Ave. Portland, Oregon	Multnomah County	Owens-Illinois Glass Co. 5535 N. E. 101 Avenue Portland, Oregon	Multnomah County	Vermiculite-Northwest Inc. 2303 N. Harding Portland, Oregon	Multnomah County
National Metallurgical Corp. (Silicon) Springfield, Oregon	Lane County Springfield	Pacific Carbide & Alloys Co. (Carbide, vinyl acetate) N. Columbia Blvd. & Hurst Portland, Oregon	Multnomah County Plant in N. Portland	Wah Chang Corp. (Reactive metals) Albany, Oregon	Linn County Albany

* * * * *

THE FOREST THAT MOVED*

This is the story of the forest that migrated. It is something new and original and somewhat startling. It came into the office of the state forester a few days ago in the shape of a requested change in a logging permit.

It was from the Snellstrom Lumber company of Eugene. It simply asked that the $NW\frac{1}{4}NW\frac{1}{4}$ Section 24, Township 20 South, Range 9 West be included in the logging permit which had been issued the company in January of this year.

Then the writer of the letter had added the simple notation that the reason for the request was the fact that a huge landslide had moved the timber over to this 40-acre tract.

This land is located on a tributary of Twin Sister creek which runs into Smith river down in western Douglas county near the Lane county line. The country is exceedingly rough and underlaid with sandstone. It is given to landslides during wet weather.

*Reprinted from The Forest Log, July, 1960

* * * * *

CHROMITE ORES TESTED BY BUREAU OF MINES

"Flotation of Pacific Northwest chromite ores" by G. V. Sullivan and W. A. Stickney has just been published by the U. S. Bureau of Mines as Report of Investigations 5646. The report describes experiments by the Bureau of Mines at Albany, Oregon, on chromite ores from three areas in the Pacific Northwest, namely the John Day area of Grant County, Oregon, the Twin Sisters area in Washington, and the Mouat deposits in Montana. Results of the tests proved that flotation can be used to recover chromite from most fine-grained disseminated chromite ores without prior desliming of the ground pulp.

Report of Investigations 5646 may be obtained free of charge from: Publications Distribution Section, U. S. Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pa.

* * * * *

EXPLORATION COSTS OF SMALL MINES*

By
H. E. Krumlauf**

This information is for small mine operators and those who might become interested in small mines. At the outset it must be realized that seldom will cost figures, as given, fit exactly a given mine; they are presented to help the potential operator make reasonable estimates of the capital needs and the operating expenses involved in exploration and development of small mines.

For discussion purposes let us assume that the prospector has found a promising outcrop, mineralized zone, or geological structure, indicating the possibility of an ore deposit; and that he has properly located and recorded a claim or claims to cover the area. Also, that the prospector has sampled the outcrop or zone by taking samples from trenches or test pits that have been dug into the solid rock of the outcrop or zone of mineralization.

If the samples show that ore has been found a development program can be planned; and, if capital is available, this plan can be put into operation.

At this point many prospectors make a serious error by believing that the material found is ore. The United States Geological Survey defines ore as follows: "Ore is a natural aggregation of one or more minerals from which useful metals may be profitably extracted". It requires considerable mining and metallurgical experience to determine if the valuable minerals found can be "profitably extracted" and if the material is actually "ore".

The wise prospector, before he proceeds further, will obtain the services of a competent mining engineer or mining geologist. While the cost of obtaining such professional services may seem high, the advice given the operator in most cases will save many times the cost of the service.

When the preliminary work they recommend has been completed, such as trench sampling, test pitting, and minor drilling, the information obtained must be carefully appraised. If the drilling has shown that no valuable minerals are likely to be found, the claims should be abandoned. Only when the results indicate ore should the next step be planned.

The accompanying table gives a rough estimate of the "break even" grade of material for small mines. If the exploration indicates material of better grade for any single metal than is shown in the table, the mine might be profitable.

"Break Even" Ore Values for Small Mines

Type of Ore	Grade %	Total Value	Return to Shipper*
Gold-Silver		$22.00	$ 16.00**
Copper (at 32c/lb.)	4	25.60	16.00
Lead (at 12c/lb.)	15	36.00	16.00
Zinc (at 13c/lb.)	25	65.00	16.00

*Freight paid by smelter.
**Mining cost at $12.00 per ton plus miscellaneous costs at $4.00 per ton.

Small Mine Pay Scale

Worker	Base Pay	Actual Cost *
Miner	$ 15.00	$ 18.69
Mucker	14.00	17.44
Foreman	16.00	19.93

*Cost to the mine operator is figured as follows:

Miner's base pay		15.00
Add 1/6 of weekly overtime		1.25
Payroll wage per day		$ 16.25
Social Security (3%)	$0.49	
Unemployment (3%)	0.49	
Industrial ins. (9%)	1.46	2.44
Actual cost per shift		$ 18.69

The "break even" grade of ore for the small mine operator, as shown in the above table, must return $12 per ton to cover direct mining costs; $1.60 for royalty at 10 per cent of the smelter or ore buyer's return; approximately $1.50 for trucking from mine to railroad; and a balance of $0.90 out of the total of $16.00 may be used for taxes, insurance, exploration, legal costs, and surveying.

Under very favorable conditions, a small mine operator may be able to produce and ship for less than $16 per ton, whereas the cost of other operations having less favorable conditions may exceed $16.00 per ton. The final cost figure will depend upon such items as width of vein, strength of the ore and wall rocks, cost of transportation, royalty, ability of the mine operator, type of labor, and cost of supplies. The values given above are for estimating purposes only. An ore buyer or smelter representative should be consulted for detailed information.

* Reprinted from August, 1960, issue of PAY DIRT, official publication of the Arizona Small Mine Operators Assoc., Phoenix, Arizona.

** Professor of Mining Engineering, College of Mines, University of Arizona, Tucson. From a talk before the Tucson Council, Arizona Small Mine Operators Association.

If, however, the gross value of the material discovered by the exploration thus far is equal to or greater than shown in the above table (after adjusting for changes in market value) the next step can be planned and executed. That is, a general plan for underground exploration.

The base pay of mine employes is only part of the cost of labor to the operator. Substantial amounts in the form of insurance and taxes must be added to the base pay. These include:

1. Overtime at the rate of 1.5 times the base pay for the sixth day. This overtime, for accounting purposes, is distributed equally to each of the six days to obtain the so-called "payroll wage". All insurance and taxes are computed from the payroll wage and not the base pay.

2. Federal Insurance Contributions ACT (F.I.C.A.), commonly called Social Security, at the rate of 3 per cent..

3. Industrial Insurance (industrial accident and occupational disease insurance) at the rate of 9 per cent.

4. Unemployment compensation - state and federal - which adds another 3 per cent.

Other possible benefits could include paid vacations and holidays, shift differentials, group insurance, etc., all of which would increase the actual cost from the figures shown above.

At this point, plans must be made for the mine surface-plant. The type and size of this plant will vary somewhat. For example, if the headframe to be built is for sinking and exploring with a sinking bucket, it would cost less than one designed for a vertical or inclined shaft with a skip. However, this latter type of headframe can be used more efficiently for production.

The cost of a semi-permanent installation which can be used, with some additions, for production is estimated at $3,490. A temporary plant could be installed at a lower cost but must be replaced if the mine produces. Also, the cost of roads for access and other purposes must be added to the total. Distribution of the costs for a mine surface plant are shown in the following table. The estimates provide for a hoist, shop and storage shed to be a 12-foot by 30-foot building, costing $4.00 per square foot.

MINE SURFACE PLANT

Headframe	$ 800.00
Buildings:	
Ore bin (15 tons)	600.00
Hoist, shop & Storage shed	1,440.00
Compressor shed	150.00
Powder house, etc.	150.00
Leveling ground, installing hoist, track and pipe	350.00
Total	$ 3,490.00

SHAFT SINKING

Labor	Cost Per Shift
1 Working Foreman	$ 19.93
1 Miner	18.69
1 Mucker	17.44
1 Topman (Hoisting, etc.)	18.69
Labor Cost Per Shift	$ 74.75
Miscellaneous Costs	49.83
Total Cost Per Shift	$ 124.58

The next step in the exploration program is the sinking of an exploration shaft to examine the mineralized area at depth. This shaft should be put down in the ore body or mineralized zone wherever possible. A satisfactory small mine shaft, whether vertical or inclined, is 6 feet by 9 feet in rock cross section, giving two compartments 4 feet by 4½ feet and 3 feet by 4½ feet, inside timbers. Costs for this job may be figured as shown in the table to the right above.

The figure of $49.83 for miscellaneous costs is based on experience which indicates that for small mines the labor cost will average 60 per cent of the total and miscellaneous costs will average 40 per cent of the total cost. Therefore, $74.75 divided by 60 times 40 equals $49.83.

The cost of sinking a 100-foot shaft will depend upon the advance possible per shift, and for the four-man crew would vary as shown below. For a small mine, the usual size of a drift is 5 feet wide by 7 feet high. This will allow for a track with 18-inch gage, a ditch, and pipes for air, water, and ventillation. However, when working in bad ground the drift should be driven 6 feet by 8 feet in rock section to allow for timbers.

COST OF SHAFT SINKING

Advance Per Shift	Cost Per Foot*	Total Cost 100-Foot Shaft
1.0 ft.	$124.58	$12,500.00
1.5	82.98	8,300.00
2.0	62.29	6,200.00

*Includes all operating costs: labor, supplies, etc.

DRIFTING IN GOOD GROUND

Crew	Heading	Advance Per Shift	Cost Per Foot
4	1	4 ft.	$ 31.15
5	2	5 ft.	24.92

DRIFTING IN BAD GROUND

4	1	3 ft.	$ 41.53

These costs include the laying of track and pipe, etc.

Equipment to Be Purchased
Used

	Estimated Cost
3 mine cars (18 cu. ft.)	$ 300.00
1 pump (air driven duplex)	100.00
1 truck (1 ton)	1,500.00
1 mine fan (10" gas engine drive)	300.00
Auxiliary hoisting equipment - skip, sheave, cable, etc.	400.00
Total	$ 2,600.00

Equipment to be Rented

Item	Cost New	Rent Per Month
Hoist for skip or bucket		
2600 lb. rope pull	$ 1,662.00	$ 120.00
1000 lb. rope pull	1,000.00	80.00
Compressor - rotary		
125 c. f. m. gas	4,900.00	210.00
250 c. f. m. gas	8,900.00	300.00
365 c. f. m. Diesel	14,360.00	575.00
Drilling Machines		
2 - 45 lb. Airleg (Each)	1,080.00	83.00
1 - 100 lb. Stoper	1,250.00	75.50
Air Receiver	Installed	200.00

Supplies

Miscellaneous Supplies	Estimated Cost
Track:	
2 tons 12-lb. rails, used	$ 360.00
Ties, Plates, Spikes, etc.	150.00
Pipe	
500 feet 2½ inch black iron at 98 cents per foot (new) for compressed air line	490.00
500 feet 1 inch galvanized at 32 cents per foot (new) for water pipe	160.00
Fittings, valves, unions, etc.	200.00
Ventilation:	
450 feet 10-inch galvanized sheet metal pipe	675.00
Pipe fittings	60.00
Drilling:	
2 - 50-foot lengths of 1-inch air hose and fittings	75.00
2 - 50-foot lengths ½-inch water hose and fittings	55.00
2 - Line oilers	50.00
General Tools:	
Shovels, picks, saws, wrenches, anvil, forge, etc.	500.00
Miscellaneous:	
Surveying, assaying, etc.	300.00
TOTAL	$ 3,075.00

Summarizing the above outline of costs gives the following:

Summary of Costs

Item	Estimated Cost
Surface Plant	$ 3,490.00
Shaft	
100 feet at $82.98	8,300.00
Drifts	
300 feet at $31.15	9,350.00
Equipment Purchases	2,600.00
Miscellaneous supplies	3,075.00
TOTAL	$ 26,815.00

For drifting and crosscutting, the basic costs for labor with a four-man crew will be identical with the costs in shaft-sinking i.e., $74.75 per shift for labor, and $49.83 for supplies, etc., for a total cost per shift of $124.58. When working in good rock with two headings open, an extra mucker at $17.44 per shift may be used to advantage, thereby lowering the cost per foot of advance.

In reasonably good ground, the crew of four should advance 4 feet per shift. In ground requiring timbering, the advance for the four-man crew would be 3 feet or less. However, if two drifts are being advanced, a mucking crew of two men can be working in one drift, while the miner, with the foreman's help if needed, can be drilling in the other drift. These various conditions would give the above costs.

The amount of drifting needed to prove or disprove the value of the property will vary greatly. In some instances it will be necessary only to check diamond drilling results; in case of small but high-grade ore shoots, considerable drifting may be required. Unless a definite amount of drifting can be determined in the beginning of the underground exploration, about 300 feet tentatively may be planned.

Raising is usually done while other phases of mining are being carried on. Thus the cost per foot is materially reduced, since supervision and hoisting are available without much additional cost. In good ground a two-man crew should advance a 4-foot by 7-foot raise 3 feet per day. The total cost would be approximately $60 per day, or $20 per foot. Chute raises, 12 feet long, will cost upwards of $15.00 per foot, not including cost of the chute.

The major equipment items for small mines may be rented or purchased. During the exploration stage it is advisable to rent this equipment and thereby materially reduce the initial capital outlay. Furthermore, equipment may be obtained on a rental-purchase agreement in which 75 per cent of the rent may be applied to the purchase price.

The accompanying tables list the equipment which may be rented and that which should be purchased, together with the cost of each.

Supplies that are consumed during the operation, such as powder, fuse, detonators, bits, drill rods, and timber, were included in the cost of shaft sinking, drifting and raising, as presented in the preceding computations. The supplies which are part of the capital expenditures, and have not been included in the previous costs, are given in the table headed "Supplies".

Under good supervision and favorable conditions, the total costs may be reduced substantially. However, under poor supervision or adverse conditions, the costs will be considerably higher. These cost figures are given only as guides to the small mine operator or the investor in small mine exploration. No two explorations are exactly alike, and no two operators have identical costs; therefore, the above cost figures, although derived in part from actual small mine operations, will correspond to a given exploration only by chance.

Many good small mines fail because there is not enough capital available for development, equipment, payroll, and supplies. This capital must be sufficient to meet the costs outlined above, plus a working capital of at least $5,000.00 additional, to permit the mine to carry through the early stages to the period of profitable returns. This means that adequate financing should be assured before exploration or mining starts.

* * * * *

PORTLAND HARBOR HANDLES LARGE TONNAGE OF MINERALS

Portland has long been noted as one of the United States' leading bulk cargo ports. Tremendous amounts of import and export bulks pass through the harbor annually, strengthening the port's hold on the number one spot as the leading dry-cargo seaport on the entire Pacific Coast of the United States.

The leading cargoes handled via Portland are ores and ore concentrates, approximately 200,000 tons of which were imported in 1959. Portland has invested millions of dollars in the construction of specially designed facilities for handling these cargoes and effecting their rapid transshipment to their final destination. These special facilities, together with favorable overland freight rates to the interior and efficient, low-cost handling, have more than tripled the amounts of ores being imported through Portland in the past few years.

Most of the ores moving through Portland are destined for large smelters in Idaho and Montana. Alumina, the greatest single bulk imported, moves primarily to Harvey Aluminum near The Dalles, Oregon. This cargo is handled at a specially built floating dock owned by Harvey. The alumina, arriving from Japan, is vacuumed from the ships' holds at the rate of several hundred tons per hour, automatically weighed, and dropped directly into rail cars for transshipment.

Lead and silver ore from Bolivia, lead and zinc concentrates from Peru and other South American countries and from Australia, are other large-volume mineral imports. A copious amount of other minerals, such as fertilizers, salts, and petroleum products also move through Portland's harbor. One of the port's greatest coast-wise cargoes is petroleum, moving both in and out of this area. Approximately 34,000,000 barrels of petroleum products were received at Portland during 1959. Nearly all of the fuels and oils used in this vicinity are imported by water and almost all major oil companies maintain docks in the harbor, both for handling inbound and outbound products and for providing bunkers for ocean-going vessels.

Portland's docks are a major terminus for barges plying the Columbia and Willamette rivers, loaded with petroleum and other mineral products. Barges carrying sulphur to nearby paper mills, fertilizer to Pasco and other upper-Columbia-River ports, and salts to Portland chemical plants constitute a great amount of the traffic moving to special commodity docks throughout the area.

Imports of these materials have a direct and tremendous impact not only upon the economy of Portland and of Oregon as a whole, but upon consumers of the finished manufactured materials made from them. Low-cost handling means lower costs to the final consumer. Portland is ranked high on the list of economy-minded ports ready to handle great quantities of raw materials such as ores and minerals. Oregon's manufacturing plants, including some smelters, rely heavily upon Portland's harbor for the import of their raw materials and likewise for the export of their finished products.

The Dock Commission's Terminal No. 4 is geared for handling these commodities. The largest and most diversified of the port's marine facilities, Terminal No. 4 is the site of the nation's largest tidewater grain elevator west of the Mississippi, a dependable, efficient bulk outloading pier (which, in 1957, made Portland the country's third ranking coal-export port), and open storage area for holding dry bulks, such as ores.

Now under construction at this terminal is a giant bulk unloading pier, destined for completion in early 1961. When put into service, this pier will be the most modern and efficient on the Pacific Coast. A giant travelling bulk unloading tower, costing in the neighborhood of $4,000,000 and constructed by Pittsburg's Dravo Corporation, will scoop up dry bulks from the holds of ships and deposit them into rail gondolas, trucks, or open stockpile at the rate of 900 tons per hour.

At present, ore imports are handled at Terminal No. 4 with the use of two large gantry cranes located on Pier No. 2. These cranes operate at a peak efficiency of about 150 tons per hour in unloading and loading directly onto trucks or rail cars. The Pier No. 4 unloading tower, designed to more than triple their unloading ability, will free these cranes for the loading of increasing amounts of outbound scrap metal and other exports.

Each ton of ores and ore concentrates that passes through Portland brings into the city $3. At this rate, 1959 saw a total of $600,000 derived from the import of this commodity alone. Increasing needs for foreign ores and minerals place great demands upon the maritime industry to keep abreast of new technological changes in handling concepts. Portland's harbor has undergone great change to meet these new needs in recent years, and currently plans a new program of construction and modernization that will place the port in an even better position for handling this cargo. Included in a planned improvement program is a new bulk loader to handle outbound cargoes.

A list of the major 1959 imports of ores and other dry bulks reflects the importance of Portland's harbor to the economy of the region:

Alumina	116,000 tons
Bauxite	3,700 tons
Lead ore	7,539 tons
Lead & silver ore	3,771 tons
Lead concentrate	34,017 tons
Zinc concentrate	29,258 tons
Crude salts	35,607 tons
Sand, zircon	2,192 tons

A portion of the minerals that were exported to foreign countries through Portland in 1959 includes:

Infusorial earth	1,252 tons
Fertilizers	15,532 tons
Ores	1,000 tons

Future prospects for Portland's harbor show a predicted 60 percent increase in overall tonnage handling by the year 1980. A large measure of this increase is in raw materials such as ores. Portland's facilities will be ready to handle them, and to handle them at greater savings than at any other Pacific Coast port, passing on the benefits to the entire region served by this city.

* * * * *

E. B. MacNAUGHTON

Mr. E. B. MacNaughton, noted civic leader and former member of the department's governing board, died on August 23 at the age of 79. During his 56 years as a Portlander, Mr. MacNaughton held many positions. He was president and board chairman of The First National Bank, interim president at Reed College, director of The Oregonian Publishing Company, and president of various civic organizations concerning civil liberties. He was also the recipient of a number of honorary awards.

In 1937, when the Department of Geology and Mineral Industries was organized, Mr. MacNaughton was appointed to its governing board by Governor Martin. He resigned in 1943, but was reappointed by Governor Snell in 1946 and remained with the board until 1949. During the years he served the department, he devoted much attention to promoting the development of Oregon's mineral resources.

* * * * *

MINED-OUT LAND BROUGHT BACK TO LIFE*

"Strip mining kills the land!" All too often in history this has been true. But experiments by a group of Hawaiian scientists, led by Dr. G. Donald Sherman of the University of Hawaii, have proved that this need not be so; that, in fact, the land can be brought to greater fertility than it had before it was mined.

Through a careful program of revegetation, including the use of fertilizers, the scientists have been able to grow over 10 times as much grass as before on land from which bauxite had been strip-mined. From their researches, the State of Hawaii has drafted a strip-mining law which will allow development of the islands' mineral resources without ruining their precious resources of land.

Hawaii's bauxite deposits are not commercial now, because they are too low in grade and are far from processing plants. But they do represent a large potential resource for the United States, and the basis of a possible alumina industry in the future.

Deposits containing over 500-million tons of alumina extend over 330 sq miles of high-rainfall land on Kauai, Maui and Hawaii; occurring in surface formations, they range in depth from 10 to 30 ft. But average ore grade is only 20-40% Al_2O_3. Still, the deposits have been interesting enough that several aluminum mining companies have explored them.

Looking toward the future, the Hawaiian government foresaw the possibility of a bauxite mining industry; it also foresaw the possibility of damage to the land. Land, to Hawaiians, represents their most precious resource. Wanting above all to preserve it, but at the same time to encourage a mining industry if possible, the Legislature made a $50,000 grant to the Agricultural Experiment Station of the University of Hawaii to study the problem of reclamation of land after bauxite mining.

The site selected for the experiment was $5\frac{1}{2}$ acres, situated in the Wailua game refuge on Kauai. A bauxite mining company had designated the bauxite in the area as good commercial ore. The average composition was 0.7% silica, 40% alumina, and the balance chiefly iron oxide and water.

First, the surface foot of soil was removed and stockpiled. Then the ore was stripped off down to the subsoil, which consisted of weathered basalt boulders. The lower boundary of ore was determined by rapid tests for kaolin clay. Eighty-six thousand short tons of ore containing 35,000 short tons of alumina were removed, to an average depth of 11 feet. The exposed subsoil surface was then plowed and disked to give a friable seed bed. One-half of it was covered with topsoil, to its original depth of about a foot. The other half was left bare.

The ore was considered non-commercial where the silica content was higher than 6% and the alkali-soluble alumina fell below 30%. The cut-off point of the commercial ore was obvious even to the laymen by the appearance and frequency of certain types of weathered basalt boulders.

The tests, which lasted one year, showed that it was necessary to add fertilizer to get any crop yield at all. Nitrogen, phosphorus, potassium and magnesium were the essential ingredients of the fertilizers. Their cost came to $155 per acre on the land which had been re-covered with topsoil, and $245 on the directly-exposed subsoil.

But once the soil had been fertilized, it produced much more vigorously than the original land had done. Within 90 days after mining had finished, all areas were completely revegetated. Some took as little as 30 days. Much more grass grew from the fertilized soils than had grown before. The land originally had been poor grazing land, much like that of other bauxite areas; it would carry about one head of cattle per 10 acres, and produce from 10 to 30 lb of beef per acre per year. The most productive "new" land yielded enough grass to produce from 500 to 600 lb of

* Reprinted from Engineering and Mining Journal, August, 1960, by permission.

beef per acre-year. That's a whole one-third of a cow, in place of two or three fair-sized roasts.

The directly-exposed subsoil produced higher yields than did the removed-and-replaced topsoil. A great variety of plants could be grown in the mined-out-and-fertilized soils. The best was a grass-legume mixture; pineapples and sugar cane grew satisfactorily; so did sweet potatoes, guava, passion fruit and corn. Vigorously-growing eucalyptus trees achieved as much as a foot a month. The success of the re-vegetation allayed two fears of the Hawaiians: soil erosion and loss of watershed.

If the bauxite ores were to be up-graded by wet screening, the rejected fines would have a high content of kaolin minerals. On plots containing rejected fines from upgrading tests, sudan grass grew copiously. The layering in the fines produced by settling in ponds did not prevent plant roots from penetrating.

One year's study thus yielded valuable conclusions. Land denuded by bauxite stripping can be quickly brought back to life; it may in fact become much more valuable land than it was before mining. Hawaii is ready for a bauxite mining industry, knowing that it will not hurt the valuable land.

* * * * *

PORTLAND AREA GEOLOGY EXTENDED BY SURVEY REPORT

"Geology and ground-water resources of Clark County, Washington, with a description of a major alluvial aquifer along the Columbia River", by M. J. Mundorff, has been issued as an open-file report of limited distribution by the U. S. Geological Survey. The report, dated August, 1959, includes a discussion of the geology and ground-water resources of the area, well logs, and a geologic map. Geologic formations of the Portland area are shown to extend northward into Clark County, which is underlain by Eocene to Miocene volcanics and sediments of the Western Cascades, Piocene Troutdale and Boring formations, Pleistocene glacial deposits, and Recent alluvium. A copy of the open-file report is available for inspection at the department's office in Portland.

* * * * *

DEPARTMENT RECEIVES DRILLING RIG

The department was given a model drilling rig recently by Manning Barber of Portland. The model and base are about 48 inches tall. In the base beneath the rig, a cutaway diagram shows what geologic conditions might be encountered in drilling for gas and oil. The model rig, purchased a few years ago from the American Petroleum Institute by Mr. Barber for use in his business, will be on display at the department's office in Portland, and will be available for loan to school exhibits.

* * * * *

GROUND WATER FOUND IN FLORENCE DUNE SAND

The U. S. Geological Survey has just made available an open-file report entitled "Ground water in the dune-sand area near Florence, Oregon". The author is E. R. Hampton, geologist with the survey's ground water division in Portland. The open-file report may be consulted in Oregon at the survey's office at 1001 N. E. Lloyd Boulevard in Portland or at the office of the State Engineer, 251 Finance Building, in Salem.

* * * * *

CANADA LIKES GOLD AND GOLD MINING

Canada's attitude toward gold mining, as shown by the following news notes, contrasts sharply with the attitude toward mining of the United States government over the past 20 years. Although the news notes refer only to direct subsidy of gold mining, it might be added that Canada also grants even greater incentives to mining through a realistic tax schedule that recognizes costs of exploration and development and the need for early amortization.

"This office has received the annual reports of four Canadian gold mining companies which show the amount of money they received under the 'Emergency Gold Mining Assistance Act'.

	1959	1958
Lakeshore Mines, Ltd.	$ 394,400	$ 407,000
Wright-Hargreaves Mines, Ltd.	318,158	306,245
East Malartic Mines, Ltd.	251,238	386,189
Barnat Mines, Ltd.	343,087	429,601

"The amounts received from sales of bullion, with no credit for the bonus or subsidy, were:

	1959	1960
Lakeshore Mines, Ltd.	$2,232,978	$2,376,534
Wright-Hargreaves Mines, Ltd.	2,309,827	2,299,526
East Malartic Mines, Ltd.	3,711,452	3,660,275
Barnat Mines, Ltd.	1,275,578	1,459,230

"The amounts paid to the above four of Canada's many gold producers indicate that the Dominion feels that gold, and its continued production, is important and necessary to its economy." (Nevada Mining Association News Letter, August 15, 1960)

"The amount paid by the Dominion of Canada as a subsidy to gold producers, to preserve the gold mining industry and to increase the production of gold, totaled $131,063,000 up to March 31st of this year. 55% of the gold produced in Canada in 1959 came from mines eligible for assistance under the Gold Mining Act." (Nevada Mining Association News Letter, September 15, 1960.

"The gold mining industry in Canada has been receiving assistance from the federal government since 1948. We now have fifty lode gold mines, responsible for a pretty steady annual output of 4½ million ounces. Of these fifty mines, forty are eligible to receive assistance from the federal government, which pays out about $10 million a year to compensate them, in part, for the increased costs of operation. Without that assistance, at least half, if not two-thirds, of our gold mines would simply fold up and vanish. Even more serious perhaps, there would vanish with them large communities, some of them with twenty or twenty-five thousand people, entirely dependent on the continued operation of the gold mines." (Excerpt from statement by V. C. Wansbrough, Managing Director, Canadian Metal Mining Association, at Gold Session, AIME Northwest Metals and Minerals Conference, Portland, Oregon, April 29, 1960.)

* * * * *

BRISTOL NAMED CHAIRMAN

Governor Mark O. Hatfield named Fayette I. Bristol, Grants Pass, as chairman of the Governor's Mining Advisory Committee on September 28. The appointee, president of the Bristol Silica Company of Rogue River, has been a member of the committee and an active participant since 1955.

A meeting of the Western Governors Mining Advisory Council will be held in Las Vegas on Monday, October 10, at the time of the American Mining Congress mining show. New officers of the council will be elected and a review of past accomplishments and proposals for future action will be discussed.

* * * * *

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S. E. "H" Street
Grants Pass

* *

BORON IN ALVORD VALLEY, HARNEY COUNTY, OREGON

By
F. W. Libbey *

Introduction

The advent of the Space Age brought high-energy fuels into sharp focus. Boron compounds have offered promise as an important component of these fuels and have received much publicity in this connection. Thus attention has been directed to possible new sources of boron even though no shortage of domestic supplies can be foreseen at present.

Around the turn of the present century borax was harvested commercially from crusts formed on the surface of Alvord Valley, south of Alvord Lake, in southern Harney County, southeastern Oregon, just east of the famous Steens-Pueblo Mountains.

In 1957-58 a minor boom developed in applications for prospecting permits on federal land in the general vicinity of Alvord Lake basin. The present paper describes the conditions of boron occurrence in the basin and attempts to bring developments in the area up to date.

In July, 1947, the author was in the basin locality and sampled the water of Hot Lake at one outlet; the assay returned 80 p.p.m. of B_2O_3. During the last week of August and the first week of September, 1960, the area was revisited and thermal springs sampled as described in the following text.

Location

Alvord Valley is a generally flat surface, irregular in outline, about 70 miles long, and about 8 miles wide in the widest part near Alvord Lake (see accompanying map). On some maps the main valley is subdivided into three parts - Alvord Desert on the north, Wild Horse Valley in the central part, and Pueblo Valley on the south. The northern third of the valley is narrow, averaging about two miles in width. The remainder is a broad plain extending south into Nevada. The whole was once occupied by a large body of water, an arm of ancient Lake Lahontan, which covered much of southeastern Oregon and northern Nevada during Pleistocene time. The valley is fringed on the east by White Horse or Trout Creek mountains. The general area is included in Tps. 32 - 39 S., Rs. 33 - 36 E.W.M.

Access

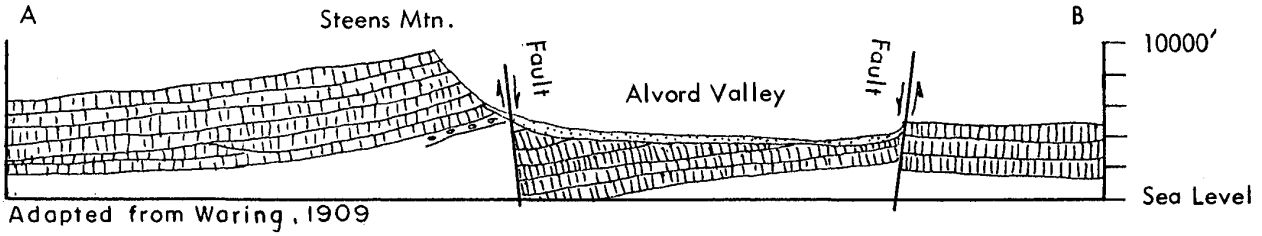
This part of the county has only a few inhabitants, who are engaged mainly in stock raising. A graveled road traverses the west side of the valley and connects three small settlements - Andrews, Fields, and Denio (the last on the Nevada line) - with Winnemucca, Nevada, on the south and Burns, by the way of Follyfarm, on the north. A road extends eastward by the way of White Horse ranch to U. S. 95, thence to McDermitt (on the Nevada border) and Winnemucca, Nevada. A road extends northwest from Fields through a pass in the Steens, thence north to French Glen and Burns. Distance from Fields to Burns by the way of French Glen is 107 miles; from Fields to Burns by the way of Follyfarm is about 130 miles; from Fields to Lakeview by the way of Denio and the partially built "Winnemucca to the Sea" highway is about 145 miles; from Fields to Winnemucca by the way of Denio is about 124 miles; from Fields to Winnemucca by the way of McDermitt is about 171 miles. Burns, on a branch of the Union Pacific Railroad, and Winnemucca, on the Western Pacific Railroad (as is Lakeview) are railroad shipping points.

---

*Formerly Director, State of Oregon Department of Geology and Mineral Industries.

Topography

Waring (1909) states that the Steens Mountains form the western compound limb of a great uplift or arch and that the western side of Alvord Valley borders an extensive fault zone, movement along which formed the large escarpment, giving such striking views from the east and from the air. The central part of the great arch sank to form the graben of Alvord Valley (see cross section). The eastern part of the valley



Adapted from Waring, 1909

CROSS SECTION SHOWING ALVORD VALLEY GRABEN

has lower escarpments and gentle dips to the east. The highest point of the Steens range is situated westerly from the Alvord ranch and has an altitude of 9670 feet. The highest point of the Pueblo range is Pueblo Mountain at 8725 feet southwest of Tum Tum Lake. The valley surface varies from about 4200 to about 4400 feet.

Climate

Alvord Valley has a semi-arid climate with rather wide extremes of temperature, which is common in the eastern Oregon basin regions. U. S. Weather Bureau records taken at Andrews show maximum temperature of about 106° F. and a minimum as low as minus 30° F. Annual precipitation has averaged about 7.75 inches with mean snowfall of about 20 inches.

Grazing is the most important industry. Some grain and hay as well as hardy fruits and vegetables are grown for local consumption and in a few favorable places restricted irrigation is practiced. Killing frosts are expected in spring and fall.

Drainage

As shown on map, the basin contains a few shallow lakes and playas, some streams which drain the adjacent mountains, and some flowing springs several of which are thermal. Drainage is all into the basin; there is no outlet. Alvord Lake is only a few feet deep and its areal extent varies with the season and rainfall. It averages about $3\frac{1}{2}$ miles long and 2 miles wide in its widest part. During periods of heavy precipitation it may overflow into the playa to the north called Alvord Desert. In summer the lake is usually shrunken and has alkali crusts on the surface. Mann, Juniper, and Tencent lakes, all small, are in the northern part of the valley. Tum Tum Lake, sometimes dry or nearly dry, is in the southern part toward Denio.

Trout Creek is the largest stream and flows into Alvord Lake from the southeast. Average discharge is approximately 15 c.f.s. measured at a point 5 miles east of Trout Creek ranch and 14 miles northeast of Denio (U. S. Geol. Survey 1957, p. 226). The next largest is Wildhorse Creek which drains into Alvord Lake from the north and for which no discharge records are available. Lesser creeks run into the valley from the Steens slopes as the result of precipitation and discharge of springs. The flow of most of these sinks into the alluvium of the western edge of the basin.

There are several springs on the eastern slopes of the Steens range as well as on the valley floor. Some of these are thermal and discharge water near the boiling point. Several flow through vents roughly in a line trending N. 20° W. from 2 to $2\frac{1}{2}$ miles south of Alvord Lake. The largest of these on the southern end of the line has formed a large pool named Hot Lake (some maps call it Borax Lake). It has a discharge at the margin of about 900 g.p.m. at a temperature of about 97° F. (Stearns 1937). The pool is about 275 yards in diameter (Waring 1909) and is adjacent to the site of the old Rose Valley borax works described later under History. Farther north on the western side of Alvord Desert, hot springs in a group discharge approximately 135 g.p.m. at a temperature of about 168° F. (Stearns 1937).

Still farther north and about 7 miles east of the north end of Alvord Desert, as shown on map, a group of springs (called Mickey Springs locally and Hickey Springs on a 1956 Bureau of Land Management map)

discharges water near the boiling point through several vents. There is no record of quantity of discharge.

Up the valley of Trout Creek a few small thermal springs, shown on map, are used for watering stock.

Several flowing wells have been sunk in the alluvial filling of the western side of Alvord Valley according to Waring (1909).

Geology

Russell (1884, 1903a, 1903b), Waring (1909), Fuller (1931), Ross (1942), and Williams and Compton (1953) have described the rocks and structures of the Steens-Pueblo mountains area. The most extensive study was made by Fuller, who first determined the sequence of the volcanic series as revealed in the magnificent Steens escarpment. A summary of the succession under three main headings of Pre-Tertiary, Tertiary, and Quaternary, for the most part according to Williams and Compton, is as follows:

Pre-Tertiary

In Oregon, pre-Tertiary rocks are exposed underlying Steens-Pueblo lavas as a broad core along the Pueblo range extending south from Horse Creek about 13 miles to the Nevada line. Prominent in the northern portion of this section are massive greenstones containing large feldspar crystals up to an inch in length. Along Arizona Creek the greenstones are associated with argillites, quartzites, and minor marble. Coarse-grained quartz diorite and monzonite are exposed on the South Fork of Willow Creek. Sericite phyllites and chlorite schists are prominent in the east face of Pueblo Mountain and farther south. It is the consensus of most geologists that the metamorphic rocks belong to the Paleozoic, while the plutonic rocks are of late Jurassic age.

Tertiary

Alvord Creek formation: As described by Williams and Compton (1953, p. 25), these beds include acid tuffs and tuffaceous sediments, clays, opaline cherts, and lenses of conglomerate. Thickness exposed in Alvord Creek Canyon is slightly more than 800 feet with the base concealed. The best exposures are at the bottom of the Steens scarp bordering Alvord and Pike creeks. Near the mouth of Pike Creek they include a rhyolite flow. Farther north the beds include andesite flows and a rhyolite laccolith. According to Baldwin (1959, p. 105), available evidence of the age of Alvord Creek beds is contradictory but appears to point to late Miocene.

Pike Creek volcanic series: As exposed along Pike Creek and in the canyons of Little Alvord, Toughey, and Indian creeks, the series overlies the Alvord Creek formation and includes rhyolite and dacite flows with tuff interbeds. Thickness exceeds 2500 feet. A flow of pinkish platy rhyolite, 250 feet thick on Pike Creek and twice as much on Toughey Creek, marks the supposed vent. Dark obsidian is in evidence near the top. Along Pike and Toughey creeks a lower platy rhyolite flow as much as 200 feet thick with high angle flow bands indicates proximity to a vent.

Four other places at the base of the Steens-Pueblo scarp have outcrops of siliceous extrusives similar to those described above and have been tentatively correlated with the Pike Creek series. These four are designated by Williams and Compton (1953, p. 25) as the Alvord Lake area, the Red Hill area, the Cottonwood Creek area, and Tum Tum point - the last projecting into the valley between Tum Tum Lake and Denio. No fossils have been found in these rocks and correlation has been indicated by stratigraphic and petrologic relationships.

A distinct unconformity is shown between the siliceous volcanic formations as described and the overlying andesitic and basaltic lavas of the Steens series.

Fifteen miles east of the last areas mentioned there is, in the general vicinity of Flagstaff Butte, a succession of tuffs and diatomite beds associated with rhyolite lavas and pyroclastics known as the Trout Creek formation. Fossil evidence places the age as late Miocene or Mascall (Baldwin 1959, p. 106) as has been indicated for both Alvord Creek and Pike Creek formations.

Steens-Pueblo series: This series is represented by massive exposures of andesite and basalt having an aggregate thickness of probably more than 2000 feet with considerable variation locally both in thickness and composition. According to Williams and Compton (1953, p. 24), interbeds of pyroclastics are relatively rare. Fuller (1931, p. 77-87) describes a massive flow of andesite in the Alvord Creek

locality and gives it the name of "The Great Flow". In the valley of Cottonwood Creek, it shows a thickness of 900 feet but thins to the north. The vent from which it was extruded is exposed on the northern side of Little Alvord Creek directly above the vent of the underlying rhyolite flow. Near the close of this period of eruption a flow of pale gray and purple dacite came from a vent under Alvord Peak. An outlier of this flow as much as 400 feet thick forms Sharps Peak. To the west of Alvord Peak there is a later flow of porphyritic rhyolite as much as 150 feet thick.

An unconformity separates the Steens-Pueblo lavas from the overlying Steens basalts.

Steens basalt. Imposing eruptions of lava which formed the High Steens are shown in Wild Horse canyon and form cliffs below Smith Flat. This lava is composed of light to dark gray, coarsely crystalline and porous olivine basalt showing large phenocrysts of labradorite which often have an open network ("diktytaxitic" of Fuller). Individual lava sheets vary from a foot to 70 feet in thickness. In the aggregate their maximum thickness exceeds 4000 feet in the High Steens. They probably extend south along the crest of Pueblo Mountains as well as over a large area elsewhere in south-central Oregon. Baldwin (1959, p.106-107) correlates the Steens basalt with the Owyhee basalt which would further extend the coverage over a large part of Malheur County.

Field work done by Johnson (1960) has shown that there is a welded tuff unit lying disconformably on the Steens basalt in the Catlow Valley area. This unit can be correlated with Beattys Butte, approximately 30 miles west of the Steens, from which upper Miocene fauna has been collected (Wallace 1946). The age of the Steens basalt is therefore probably no younger than upper Miocene.

On Horse Creek the Steens basalt is cut by two volcanic necks of dense rhyolite, each of the order of three-quarters of a mile in maximum dimension. Numerous basic dikes, in general roughly paralleling the big scarp, occur along the Steens front but are rare or lacking in the Pueblo Mountains.

Quaternary

Older alluvium. The easterly mountain spurs from an east-west line about 2 miles north of Fields to an area 2 miles southwest of Tum Tum Lake are made up of alluvial materials that have been compacted and faulted. They consist of sand, gravel, and boulders of volcanics (metamorphics in the southern part) apparently deposited under torrential conditions. Thickness varies from 200 feet in the northern part to 800 feet in Cottonwood Creek valley. The general dip is westerly and in places beds are inclined as much as 35 degrees. Ross (1942, p. 236) reports the discovery of two fragments of a silicified cameloid bone, a type which is reported to range in age through most of the later Tertiary. He suggests that the relation of the beds to other rocks indicates a possible Pliocene age. Williams and Compton (1953, p. 32) think it could be early Pleistocene.

Recent alluvium. The floor of Alvord Valley proper is made up of alluvial materials laid down in Pleistocene and later lakes.

Structure

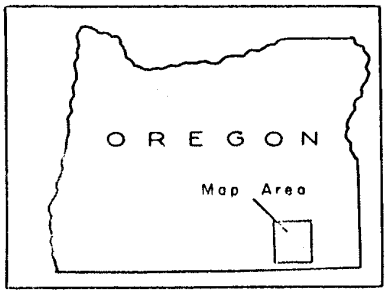
Russell (1884, p. 438-445) first suggested that the Steens-Pueblo range represents the western flank of an arch, the keystone of which dropped down to form the Alvord Valley graben. Subsequent investigators have been in general agreement. The maximum downthrow may have been as much as 10,000 feet. There is evidence of similar conditions on both sides of the valley, although on the east side the escarpments are on a much smaller scale.

Several fault systems are described by Williams and Compton (1953, p. 34) who trace major "boundary faults", together with subsidiary and transverse faults, all of which are related to the Steens-Pueblo block movements. A map of Baldwin (1959, p. 101) indicates some principal trends. Normal faulting appears to be the rule.

The hot springs, including Hot Lake, south of Alvord Lake, probably emerge on one of these faults or fault extensions. Williams and Compton (1953, p. 37) comment on recent earthquake activity in the region west of Alvord Lake, also on the evidence of faulting in the older alluvium. It is noted that some shocks were felt "about 25 years ago" and that at the same time unusual activity was observed in the hot spring at Hot Lake.

History

Harney County was originally included in Grant County and did not become a separate entity until



Index Map

		General Geologic Column of Area
QUATERNARY	Recent	Recent Alluvium -- Younger alluvial deposits filling the valley floor.
	Pleistocene	Older Alluvium (800' ±) -- Lenticular beds of sand, gravel and boulders, moderately indurated, deformed, and faulted.
TERTIARY	Middle or Upper Miocene	Steens Basalt (4500' ±) -- Light to dark gray, cliff-forming olivine basalt flows. Caps the high Steens Mountain. Equivalent lavas occur throughout southeast Oregon.
		Steens Mt. Volcanic Series (3000'±) -- Augite and olivine basalts, andesites; local areas of dacite and rhyolite cap the series. Pyroclastic interbeds rare or thin. Disconformable on underlying Pike Creek series.
		Pike Creek Series (2500' ±) -- Thick sequence of rhyolites, dacites, tuffs, tuffaceous sediments and volcanic agglomerates separated from Alvord Creek beds by angular unconformity.
		Alvord Creek beds (800' ±) -- Light-colored fine-grained tuffaceous sediments with minor opaline chert and conglomerate.
PRE-TERT.		Metasedimentary and metavolcanic rocks of probable Paleozoic age which have been intruded by monzonitic and dioritic plutons.

February 25, 1889, when the bill creating Harney County was signed by Governor Pennoyer.

In the early 1860's a number of expeditions of miners crossed south-eastern Oregon on their way to the gold discoveries at Auburn and Canyon City in Oregon, and at the Idaho camps. In addition, there were the western moving emigrants. To protect these travelers from the hostile Snake River Indians, military posts were established at various points along the routes. Among them was Camp Alvord, southwest of Alvord Lake named for Brigadier General Benjamin Alvord, paymaster of the Department of Oregon 1854-62 and in command of the Department of Oregon 1861-65. The Camp Alvord post was evacuated and moved to a new location called Camp C. F. Smith, on White Horse Creek in 1866 (McArthur 1952, p.12). The latter post was abandoned in 1869.

In the late 1860's and early 1870's cattlemen came into the country with stock and started ranches both in White Horse Valley and Harney Valley west of the Steens. After the Indian wars and abandonment of Fort Harney (established in 1867 as Camp Steele at the mouth of Rattlesnake Creek about 14 miles east of present-day Burns) many small ranch holdings were taken over by the large cattle owners. The largest of these was the Pacific Livestock Company which was a power in the political history of the Harney County area (Anon. 1902).

Settlers in Alvord Valley had observed a white saline crust formed by evaporation of waters flowing from hot springs south of Alvord Lake. They called the crusts "alkali" and paid little attention to them. It is related (Anon. 1902) that "a few years ago a borax expert discovered that the crusts contained borax." It is further stated that the "expert" interested capitalists who purchased the land in question for $7,000. In due time a plant was erected and production of borate began. Probably these events were a little before the turn of the century. In 1909 Waring (1909, p. 72) described the operation as follows:

"For the last nine or ten years borax has been shipped from the works near the hot springs south of Alvord Lake. Of the deposit here Joseph Struthers (1901, p. 870-871) says:

'The marsh deposits of sodium borate in Harney County, which extend over 10,000 acres south of Lake Alvord, have been operated during the last few years, and the refineries have produced a yearly output of approximately 400 short tons of refined borax, which is carried by mules to Winnemucca, on the Central Pacific Railway, whence it goes to Chicago, St. Louis, and occasionally to San Francisco. The Rose Valley Borax Company owns 2,000 acres of the richest portion of the deposit close to the lake. The ground is level and treeless and is incrusted with a layer of sodium borate several inches in thickness, which contains also sodium carbonate, sodium sulphate, sodium chloride, and other salts. During the summer the

loose surface deposit is shoveled into small heaps and is replaced by a second incrustation within a comparatively short time. As no mining is done in winter, sufficient material is collected in summer to furnish a supply to operate the refining works throughout the entire year. The crude mineral, containing from 5 to 20 percent of boric acid, is shoveled into tanks of boiling water, and chlorine or sulphuric acid is added to decompose the alkali salts, and thus free the boric acid. After twenty-four hours the clear supernatant liquor is drawn off into crystallizing tanks and cooled, yielding white pearly scales of high-grade boric acid, and a mother liquor, which is used repeatedly if it contains a sufficient quantity of sodium salts to warrant a separate treatment.'

"In the collection of the alkali crust, Chinamen have been employed chiefly. This crude deposit is first scraped into windrows with shovels and then loaded into wagons and hauled to the works. Sagebrush is used as fuel under the dissolving tanks. The refining plant consists of two of these tanks, of 6,000 and 8,000 gallons capacity respectively, and 24 crystalizing tanks, each of 1,200 gallons capacity. The crystallized product of borax is sacked and hauled to Winnemucca, Nevada, by 16-mule teams."

According to reports in "Mineral Resources of the United States", borax was not produced from the Harney County deposits in 1902 nor thereafter.

Ruins of the plant and sodhouse living quarters may still be seen on the west side of Hot Lake.

Recent Developments

Records of the U. S. Land Office in Portland, Oregon, show that on June 20, 1960, there were 45 apparently valid sodium prospecting permits* covering approximately 96,000 acres in Alvord basin, Harney County. In addition, applications had been made for four sodium permits (covering nearly 11,000 acres) and one potassium permit (covering 800 acres) in Lake County which adjoins Harney County on the west. The records indicate that 29 of the Harney County permits covering approximately 63,176 acres expire in late 1960.

In 1958 shallow drilling was reportedly done by Mojave Mining and Milling Company, Wickenburg, Arizona. Most of this prospecting was in secs. 11 and 14 with some in secs. 2, 12, and 13, all in T. 37 S., R. 33 E. It was reported that 32 holes were drilled from 2 to 22 feet deep. No information on sampling results has been made public.

In 1959 and 1960 some further development drilling reportedly was done by Boron, Inc. which employed Boyles Bros., Salt Lake City, to put down core drill holes east of Fields. The deepest hole was stated to be 600 feet where rock was encountered. No information on the alluvial material penetrated or the saline content is available.

Samples

Information on hot water samples collected in 1960 by the author is given below. Sample locations are shown on the map.

No. 1 -West side of Alvord Desert, 6 miles south of Alvord Ranch close to main road in sec. 33, T. 34 S., R. 34 E. Several vents. Sample taken at a main vent. Flow 135 g.p.m. Temperature 167° F. (Stearns 1937, p. 176-177). Flow goes to bath house. Total solids in solution, 0.298 percent. B_2O_3, 106 p.p.m.

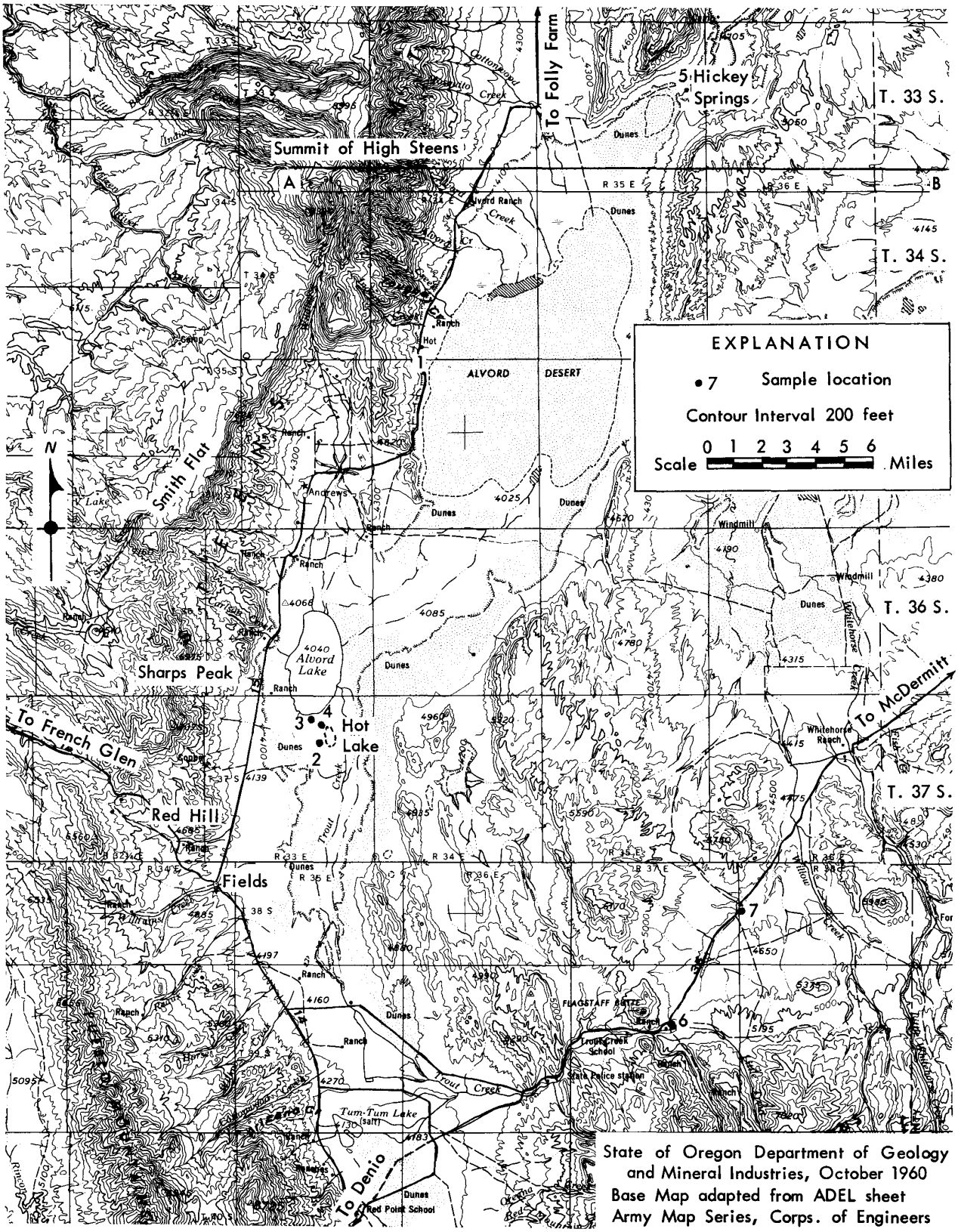
No. 2 -West outlet of Hot Lake in sec. 15, T. 37 S., R. 33 E., near ruins of old borax works. Temperature at western overflow outlet 82° F. several hundred feet distant from vents in bottom of lake. Temperature is reported as 97° F., with approximate discharge of 900 g.p.m. and diameter of lake about 275 yards (Stearns 1937, p. 176-177). (Hot Lake is 3.8 miles east of main road to Fields measured from a point 4 miles north of Fields where a desert road branches off.) Total solids in solution, 0.170 percent. B_2O_3, 61 p.p.m.

No. 3 -0.7 mile N. 20° W. of Hot Lake on fault line of vents. Sample from pool near north end of line. Temperature 122° F. (Vents from which nos. 3 and 4 were taken are mentioned by Waring [1909, p. 37].) Total solids in solution, 0.155 percent. B_2O_3, 31 p.p.m.

No. 4 - 0.1 mile south of No. 3 on same line of vents. Deep pool 3-4 feet in diameter. Sinter cone is arched. Temperature 198° F. Total solids in solution, 0.15 percent. B_2O_3, 56 p.p.m.

---

* A federal sodium prospecting permit may cover up to 2,560 acres or the equivalent of four sections of public land. It is normally granted for two years and, according to federal regulations, may be succeeded by a lease.



State of Oregon Department of Geology and Mineral Industries, October 1960
Base Map adapted from ADEL sheet Army Map Series, Corps. of Engineers

BORON DEPOSITS IN ALVORD VALLEY, HARNEY COUNTY, OREGON

No. 5 - Mickey Springs (Hickey Springs on Bureau of Land Management map) approximately 7 miles east of Follyfarm road, on south side of road which branches from Follyfarm road at right angle jog, 3½ miles north of Alvord Ranch. Springs include several vents, pools and sinter cones extending down hill toward flat of Alvord Desert extension. Sample taken from easterly of twin pools near bottom of first slope below upper pool. Some steam; pools about 8-10 feet in diameter. Water can be heard running underground. Temperature of sample 198° F., estimate of discharge uncertain, perhaps of order of 100 g.p.m. or more. Evidence is that activity was formerly greater. Total solids in solution, 0.168 percent. B_2O_3, 33 p.p.m.

No. 6 - At base of Flagstaff Butte on Trout Creek road in sec. 16, T. 39 S., R. 37 E., half a mile below mouth of Little Trout Creek. Vent on Deffenbaugh's ranch east of house and close to road. Discharge approximately 45 g.p.m. Temperature 136° F. Used for stock after flowing to pool. (No. 72 of Stearns, 1937, p. 177) Total solids in solution, 0.083 percent. B_2O_3, 4.4 p.p.m.

No. 7 - Near Trout Creek road on east side, few small springs, 5 miles northeast of Flagstaff Butte and 7.6 miles southwest of White Horse ranch. Temperature 95° F. Flow given by Stearns (1937, p. 177)(No. 71) as 30 g.p.m. Total solids in solution, .015 percent. B_2O_3, 1 p.p.m.

Spectographic analysis of the total solids obtained by evaporating Sample No. 1 gave elements in the following percentages:

(1) Concentrations more than 10%
Silicon, sodium
(2) Concentrations 10% - 1%
Potassium (high), boron (low), calcium
(3) Concentrations 1% - 0.1%
- - - - -
(4) Concentrations 0.1% - 0.01%
Lithium, iron, magnesium, vanadium
(5) Concentrations 0.01% - 0.001%
Molybdenum, barium
(6) Concentrations below 0.001%
Titanium, copper

The other samples gave similar results except that there was some variation in percentages of the same elements. Samples 1, 4, and 6 showed lithium. The others did not. All the samples showed calcium with the largest percentages indicated in Nos. 1, 4, and 6. Possibly this might have some future significance if it can be shown that boron may occur as calcium borate.

Summary

Possibilities of boron accumulation in commercial quantity in Alvord Valley are dependent upon factors such as:

(1) The valley is a large natural closed basin, in which all surface drainage is inward; there is no surface outflow. Extent and movement of subterranean drainage is unknown.

(2) Boron is a constituent of hot springs which drain into the basin and, in the past, borate has been produced commercially from saline crusts deposited in marshes south of Alvord Lake and adjacent to Hot Lake.

(3) In the aggregate, a large quantity of boron in dilute solution is discharged continuously from vents over the marshes surrounding the springs. Some of the solution forms crusts by evaporation and some percolates into the ground. If the two larger springs are considered as an example, those from which samples No. 1 and No. 2 were taken and whose quantity of discharge has been recorded - they represent a total discharge of approximately 1035 g.p.m. The No. 1 sample spring (135 g.p.m.) contains 106 p.p.m. B_2O_3 and No. 2 sample spring contains 61 p.p.m. B_2O_3. Thus in a year these two springs discharge a total of about 150 tons of B_2O_3, plus some lithia. The springs in the basin have been flowing for an unknown period of time and presumably have been fairly uniform in mineral content over their lives. What has happened to the minerals in the subsurface travels of the solutions is a moot question. Perhaps crystals have formed in a reservoir of brine as has happened in other similar basins. Only subsurface exploration can provide an answer. No attempt has been made to estimate the amount of saline crusts on the surface.

Acknowledgments

Hollis M. Dole, Director, and the members of the staff of the State Department of Geology and Mineral Industries gave generous assistance to the author in the preparation of this paper. Their cooperation in the field, laboratory, and office is greatly appreciated.

Bibliography

Anonymous, 1902. "An Illustrated History of Baker, Malheur, and Harney Counties": Western Historical Publishing Co. Multnomah Public Library, Portland, Oregon.

Baldwin, Ewart M., 1959. "Geology of Oregon": University of Oregon Co-op Book Store, Eugene, Oregon.

Fuller, R. E., 1931. "Geomorphology and volcanic sequence of Steens Mountain in southeastern Oregon": University of Washington Publications in Geology, vol. 3, no. 1.

Johnson, G. D., 1960. "Geology of the northwest quarter of Alvord Lake Three quadrangle, Oregon: Oregon State Coll. Master's Thesis.

McArthur, Lewis A., 1952. "Oregon Geographic Names": Binfords and Mort, Portland, Oregon, 3rd ed.

Ross, C. P., 1942. "Quicksilver deposits in the Steens and Pueblo Mountains, southern Oregon": U. S. Geol. Survey Bull. 931-J.

Russell, I. C., 1884. "A geological reconnaissance in southern Oregon": U. S. Geol. Survey 4th Ann. Rep., pp. 431-464.

_____, 1903a. "Preliminary report on artesian basins in southwestern Idaho and southeastern Oregon": U. S. Geol. Survey Water Supply Paper No. 78, pp. 16-23.

_____, 1903b. "Notes on the geology of southwestern Idaho and southeastern Oregon": U. S. Geol. Survey Bull. 217, pp. 14-33-64.

Stearns, N. D., Stearns, H. T., and Waring, G. A., 1937. "Thermal springs in the United States": U. S. Geol. Surv. Water Supply Paper 679-B.

Struthers, Joseph, 1902. "Borax: mineral resources of the United States for 1901": U. S. Geol. Surv.

U. S. Bureau of Land Management, 1956. "Basin Grazing District (District 2 - South Half) Area 1 - Oregon.

U. S. Geol. Survey, 1959. "Surface water supply of the United States, 1957, Part 10, The Great Basin": Water Supply Paper 1514.

Wallace, R. E., 1946. "A Miocene mammalian fauna from Beatty Buttes, Oregon": Carnegie Inst. Wash. Pub. 551, no. 6.

Waring, Gerald A., 1909. "Geology and water resources of the Harney Basin Region, Oregon": U. S. Geol. Surv. Water Supply Paper 231.

Wilkerson, W. L., 1958. "The geology of a portion of the southern Steens Mountains, Oregon": Univ. of Oregon Master's Thesis.

Williams, Howel, and Compton, R.R., 1953. "Quicksilver deposits of Steens Mountain and Pueblo Mountains, southeast Oregon": U. S. Geol. Surv. Bull. 995-B.

* * * * *

GSA TO SELL CHROMITE ORE

General Services Administration has announced plans for the disposal of approximately 89,750 long tons of domestic chromite ore and 151,000 lb of ferroalloys from the national stockpile.

In another move, GSA declared 169,000 lb of cobaltiferous materials in excess to defense needs and available for sale. Included in the excess inventory are partially processed ores, sludges, carbonates, metallics and oxides from which cobalt can be derived. (From E &MJ Metal and Mineral Markets, October 6, 1960.)

* * * * *

GOLD AND MONEY SESSION BOOKLET PUBLISHED

The 1960 Pacific Northwest Metals and Minerals Conference has just published Gold and Money Session, a 60-page booklet consisting of the papers and statements by the eight mining and monetary experts who participated in the day-long Gold and Money Session at the AIME 1960 Pacific Northwest Metals and Minerals Conference held in Portland April 28-30.

Permission for the conference to publish the booklet was granted by AIME. General Chairman for the conference was Hollis M. Dole, Director, State of Oregon Department of Geology and Mineral Industries, who announces that the booklet, Gold and Money Session, is being distributed by the department, 1069 State Office Building, in Portland. The price is $1.50, and checks should be made payable to: 1960 Pacific Northwest Metals and Minerals Conference.

Gold and Money Session, as outlined below, includes introductory notes, the three papers presented at the morning session, the luncheon address, and a full transcript of the statements, discussion, and summary by members of the afternoon panel.

"Foreword," by Evan Just, Head, Mineral Engineering Department, Stanford University, and Co-Chairman of Gold and Money Session.

"Notes for the Gold and Money Session," by Pierre R. Hines, Mining Engineer, Portland, Oregon, and Chairman of the Gold and Money Session. (A report written to serve as an introduction to the session. Originally published in the February 1960 Ore.-Bin.)

"Gold in the International Monetary System Today," by Miroslav A. Kriz, Associate Economist, First National City Bank of New York. (Paper presented at the morning session).

"The Problem of Gold Convertibility," by O. K. Burrell, Professor of Finance, University of Oregon. (Paper presented at the morning session).

"Review of Gold Production," by Donald H. McLaughlin, President, Homestake Mining Company. (Paper presented at the morning session).

"How to Obtain a Sound International Monetary System," by Philip Cortney, President, Coty, Inc. (Luncheon address).

Transcript of the afternoon panel discussion on gold and money - Evan Just as moderator.

a) Opening statement by V. C. Wansbrough, Managing Director, Canadian Metal Mining Association.

b) Opening statement by Oscar L. Altman, Advisor, Research and Statistics Department, International Monetary Fund.

c) Question and discussion period conducted by Evan Just, with Mr. Wansbrough, Dr. Altman, Dr. Kriz, and Dr. McLaughlin participating.

d) Summary of entire panel discussion by Oscar L. Altman.

* * * * *

NEW MINING ADVISORY COUNCIL OFFICERS

F. I. Bristol, Chairman of the Oregon delegation to the Western Governors Mining Advisory Council, reports that A. J. Teske, Secretary, Idaho Mining Association, was elected Chairman of the Western Governors Mining Advisory Council at the group's annual meeting October 10 at Las Vegas, Nevada. He succeeds Clark L. Wilson, Chairman, Emergency Lead-Zinc Committee, Washington, D.C. Russell W. Beamer, Executive Secretary, Wyoming Mining Association, was elected Vice Chairman, and Frank P. Knight, Director, Arizona Department of Natural Resources, was re-elected Secretary. After a report on the past year's activities of the Council, the meeting was adjourned subject to the call of the chairman.

* * * * *

RUSSIA GAINING IN MINERAL STRENGTH

Russia's stepped up trade in minerals is revealed in the U.S. Bureau of Mines new statistical report, "The Foreign Mineral Trade of the U.S.S.R. in 1959 - Mineral Trade Notes Supplement No. 60." The publication, announced in the Bureau's September 26 press release, may be obtained free of charge from the Bureau of Mines, Publications Distribution Section, 4800 Forbes Avenue, Pittsburgh 13, Pennsylvania.

Evidence of growing mineral strength, the Bureau states, is shown by the fact that Russia's mineral exports in 1959 gained 14 percent in value over 1958 and were twice the 1955 value. The Soviets cut down on shipment of zinc, tin, and aluminum to Free-World countries in 1959, while delivering substantially more of many bulk products, including solid and liquid fuels, iron ore, pig iron, rolled steel, manganese ore, chromite, asbestos, apatite concentrate, and potash salts.

Summaries of U.S.S.R. foreign mineral trade for the years 1956 and 1957, taken from earlier U.S. Bureau of Mines Mineral Trade Notes, appeared in the October 1958 and March 1959 issues of the Ore.-Bin.

* * * * *

UNPUBLISHED GEOLOGIC REPORTS ON INCREASE

The Department is rapidly building up a library of graduate student theses, Government open-file reports, and other unpublished data on Oregon geology not ordinarily available to the public. During the year 1960 the following such reports have been acquired, and anyone wishing to consult them is welcome to do so at the Department's Portland office, 1069 State Office Building.

Crowley, Karl C., 1960, Geology of the Seneca-Silvies area, Grant County, Oregon: Univ. of Oregon master's thesis, 44 p. illus., geol. map.

Dodds, R. Kenneth, 1960, Geology of the western half of the Svensen quadrangle, Oregon: Univ. of Oregon master's thesis (in preparation), 98 p., illus., geol. map.(Temporarily filed with Department while author is on foreign assignment.)

Hoover, Linn, 1959, Geology of the Anlauf and Drain quadrangles, Douglas and Lane counties, Oregon: U.S. Geol. Survey open-file report, 95 p., illus., geol. map.

Koch, John G., 1960, Geology of the Humbug Mountain area, southwest Oregon: Univ. of Wisconsin master's thesis, 49 p., illus., geol. map.

Maloney, Neil J., 1961, Geology of the eastern part of Beaty Butte four quadrangle, Oregon: Oreg. State Coll. master's thesis, 88 p., illus., geol. map.

Mundorff, M. J., 1959, Geology and ground-water resources of Clark County, Washington, with a description of a major alluvial aquifer along the Columbia River: U.S. Geol. Survey open-file report, 660 p., incl. illus., well records, geol. map.

Newcomb, R. C., 1960, Storage of ground water behind subsurface dams in the Columbia River basalt, Washington, Oregon, and Idaho: U.S. Geol. Survey open-file report, 31 p., illus., geol. maps.

Peck, Dallas L., 1960, Geologic reconnaissance of the Western Cascades in Oregon north of latitude 43 degrees: U.S. Geol. Survey open-file report, 232 p., illus., geol. map.

Smedes, Harry W., 1959, Geology of part of the northern Wallowa Mountains, Oregon: Univ. of Washington doctorate thesis, 217 p. plus 32 plates, geol. map.

Taylor, Edward M., 1960, Geology of the Clarno basin, Mitchell quadrangle, Oregon: Oregon State Coll. master's thesis, 173 p., illus., geol. map.

Vhay, J. S., 1960, A preliminary report on the copper-cobalt deposits of the Quartzburg district, Grant County, Oregon: U.S. Geol. Survey open-file report, 20 p., geol. and mine maps.

* * * * *

WHITE KING LEASED TO THORNBURG

The White King uranium group of claims has been leased to Vance Thornburg, of Grand Junction, Colo., it was announced by the partners who own the property. Owners are Mr. and Mrs. Don Tracy, John Roush, Wayland Roush, Walter Leehmann Sr. and Walter Leehmann Jr.

Thornburg does not plan any mining activity this fall, as the season is late, but plans to begin work next spring in producing ore at the mine. The White King has not produced since last fall and the Lakeview Mining Company's lease was dropped a few weeks ago.

Thornburg and his brother, the late Dr. Garth W. Thornburg, with their associates, Perry Bass, the Murchison interests and the late Sid Richardson, were the original lessors of the mining property which was mined from 1956 by the Lakeview Mining Company and produced ore for the company's reduction plant here. (From Lake County Examiner, October 20, 1960.)

* * * * *

OREGON BOARD MEMBERS NAMED

The following Oregon members were elected to the Board of Governors, Western Division, of the American Mining Congress at the annual business meeting in Las Vegas, Nevada, October 12:

Fayette I. Bristol, President, Bristol Silica Company, Rogue River, Oregon.
Earl S. Mollard, General Manager - Oregon, The Hanna Mining Company, Riddle, Oregon.
Hollis M. Dole, Director, State of Oregon Department of Geology and Mineral Industries, Portland, Oregon.

Messrs. Bristol and Mollard were re-elected, and Hollis M. Dole was newly elected, replacing S. H. Williston of the Cordero Mining Company.

In response to an invitation to hold the American Mining Congress meeting in Portland, the Board of Governors voiced strong hope that a September meeting in 1964 could be arranged. The 1961 meeting of the American Mining Congress was set for Seattle, and the next Mining Show for San Francisco in 1962.

* * * * *

ADDITIONAL OREGON PLACE NAMES

Ball Bay: bay about 2 square miles in size, indenting the western shore of Upper Klamath Lake about 8 miles west-southwest of the village of Modoc Point; Klamath County; secs. 28, 29, 30, 32, and 33, T. 36 S., R. 7 E., Willamette meridian; 42°24'30" N., 122°01'00" W. Not: Howard Bay. (q.v.)

Howard Bay: bay, about 3 miles long and 2.5 miles wide, indenting the western shore of Upper Klamath Lake about 6.8 miles northwest of Wocus; Klamath County; T. 37 S., R. 7 E. and T. 37 S., R. 8 E., Willamette meridian; 42°20'00" N., 121°55'00" W. Not: Wocus Bay (q.v.).

Wocus Bay: bay about 2 miles long and 0.4 mile wide forming the southeastern part of Klamath Marsh, about 43 miles north-northeast of the city of Klamath Falls; Klamath County; secs. 32 and 33, T. 31 S., R. 9 E., and sec. 4, T. 32 S., R. 9 E., Willamette meridian; 42° 50'00" N., 121°39'30" W.

* * * * *

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S. E. "H" Street
Grants Pass

* *

THE QUARTZ MOUNTAIN SILICA DEPOSIT, OREGON

By
Len Ramp*

A large deposit of fairly high-purity silica occurs on Quartz Mountain, about 35 air miles east of Roseburg, Douglas County, Oregon (see accompanying map). Quartz Mountain is a prominent craggy peak 5,530 feet in elevation, on the divide between Little River and South Umpqua River in sec. 2, T. 28 S., R. 1 E. It is reached by a forest access road connecting the South Umpqua River road and the Little River road. There is an abandoned Forest Service lookout station on top of the mountain.

The Quartz Mountain silica deposit is owned by Roy Rannells of Riddle, Oregon, and Gerald Rannells of Aurora, Oregon. About 30 claims were located in 1957 shortly after the Forest Service road into the area was completed. Development work at present consists of access roads, discovery cuts, and a pit in the talus on the northwest slope of the mountain where about 400 tons of silica have been taken out for smelter test at the Hanna Nickel Smelting Company at Riddle, Oregon.

Walter A. Foster, geologist for The Hanna Mining Company, has conducted a sampling and mapping program to determine the quality and quantity of the deposit.

GEOLOGY

Geologic Background:

The Quartz Mountain area lies in the belt of Western Cascades volcanic rocks composed of continental flows and pyroclastics which have been deformed and partially altered.

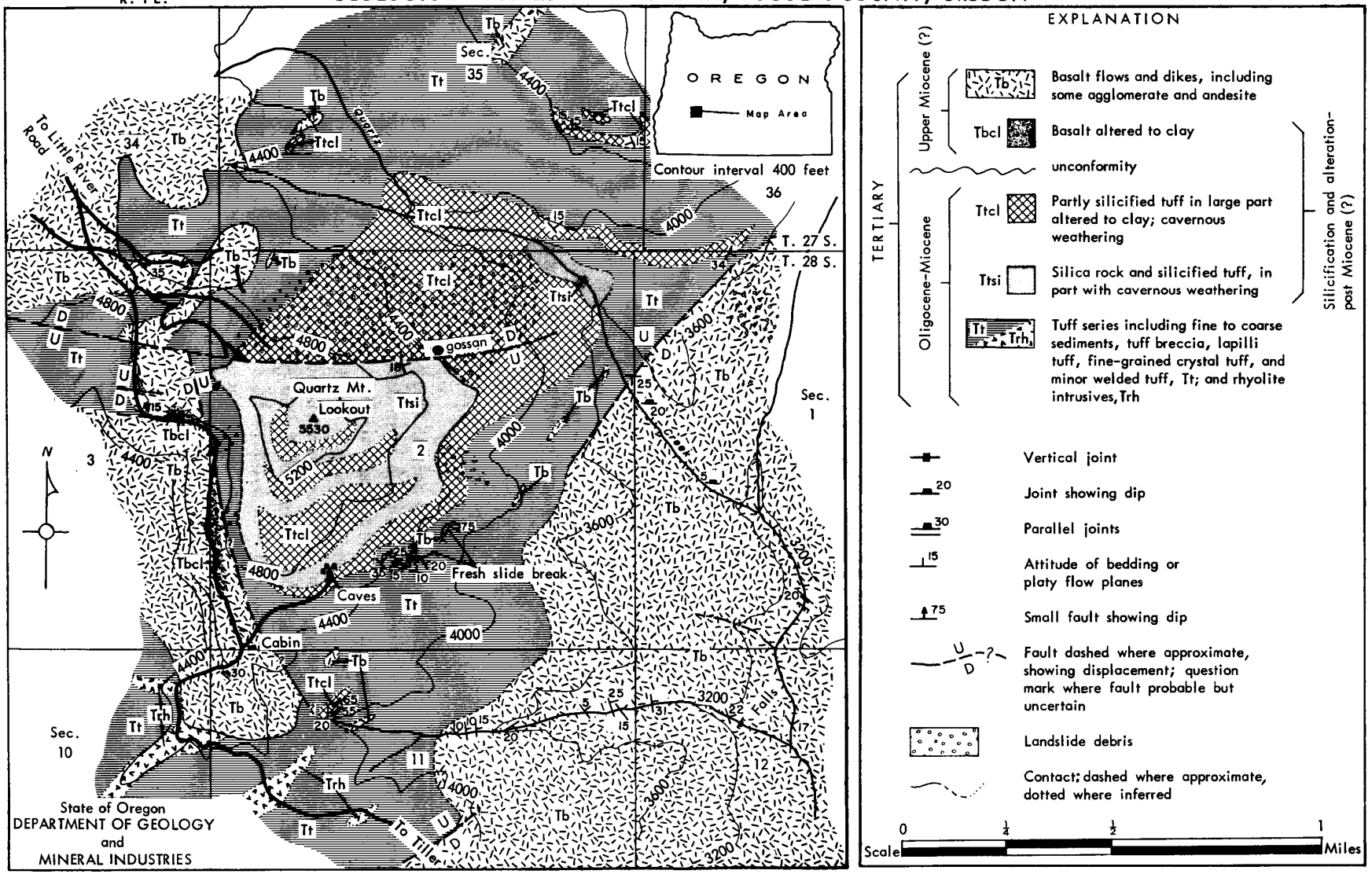
Most of the upper portion of Quartz Mountain is made up of a tough and massive grayish white cryptocrystalline silica rock which stands in bold relief. Vertical cliffs from 50 to more than 200 feet in height are prominent features on the north and east sides of the mountain. The main body of silica is about 3,000 feet long by 1,200 feet wide and crops out mainly between 4,800 feet and the top of the mountain at 5,530 feet. Silicified rock is also exposed at various places in Quartz Creek, a short distance to the northeast. The area between Quartz Creek and Quartz Mountain is covered by extensive slide debris, much of which is relatively pure silica rock.

Tuff Series:

The oldest formation is composed of a great thickness of pyroclastic rocks ranging from tuffaceous siltstones to agglomerates and including tuff breccias, lapilli tuffs, fine-grained crystal tuffs, and minor welded tuffs. Near Quartz Mountain the tuffs are mostly light colored and in large part altered to clay minerals and replaced in varying amounts by silica. The relict textures

* Field Geologist, State of Oregon Department of Geology and Mineral Industries.

GEOLOGIC MAP OF QUARTZ MOUNTAIN, DOUGLAS COUNTY, OREGON



State of Oregon
DEPARTMENT OF GEOLOGY
and
MINERAL INDUSTRIES

of the silica rock appear to be those of fine-grained crystal tuffs and lapilli tuffs.

Fossil leaves and wood fragments are found in some of the fine-grained tuffaceous lacustrine sediments in the tuff series. A collection of leaves was made from an outcrop of these sediments 4 miles south of the map area in the SW¼ sec. 26, T. 28 S., R. 1 E. This collection, which contains Engelhardtia (fruits), Platanus, and possibly Salix, Alnus, and Alangium, has been tentatively identified as an Oligocene-Miocene flora. Other Oligocene-Miocene floras in the Western Cascades include the Rujada flora from Layng Creek in T. 21 S., R. 1 E. (Lakhanpal, 1958) and the Scio flora and other fossil leaf collections from the Mehama volcanics in the Lebanon quadrangle (Allison and Felts, 1956). Various collections of Oligocene-Miocene plants, identified by R. E. Brown of the U. S. Geological Survey occur in similar tuffaceous rocks mapped as Little Butte volcanic series in the Medford quadrangle (Wells and others, 1956) and in the Western Cascades in general (Peck, 1960).

Rhyolite Intrusives:

Rhyolite and dacite porphyry dikes intruding the tuff series are fairly common in the area. A few fairly large siliceous intrusive bodies were observed during reconnaissance mapping along the South Umpqua River. Included in these are a dacite porphyry dike at Deer Lick Falls about five miles southeast of Quartz Mountain and banded rhyolite dikes exposed in the South Umpqua River at Camp Coffee Pot, sec. 17, T. 29 S., R. 1 E., and about 3/4 mile above the South Umpqua Falls. Several rhyolite dikes were observed along the Quartz Mountain road between the South Umpqua River and the map area. Clay alteration and pyrite impregnation in the tuff series appear to be closely related to the rhyolite intrusives.

Basalt Flows and Dikes:

Lavas of andesitic to basaltic composition overlie the tuffs unconformably and a few small dikes and sills of similar composition intrude the tuffs. These basic lavas are generally fresh and have textures varying from glassy to porphyritic, occasionally with feldspar phenocrysts so abundant as to appear coarse grained. In places, the lava is bleached and almost completely altered to clay. This is especially evident along the road west of Quartz Mountain. Peck (1960) maps the lavas as part of the Sardine formation of upper Miocene age.

Structure:

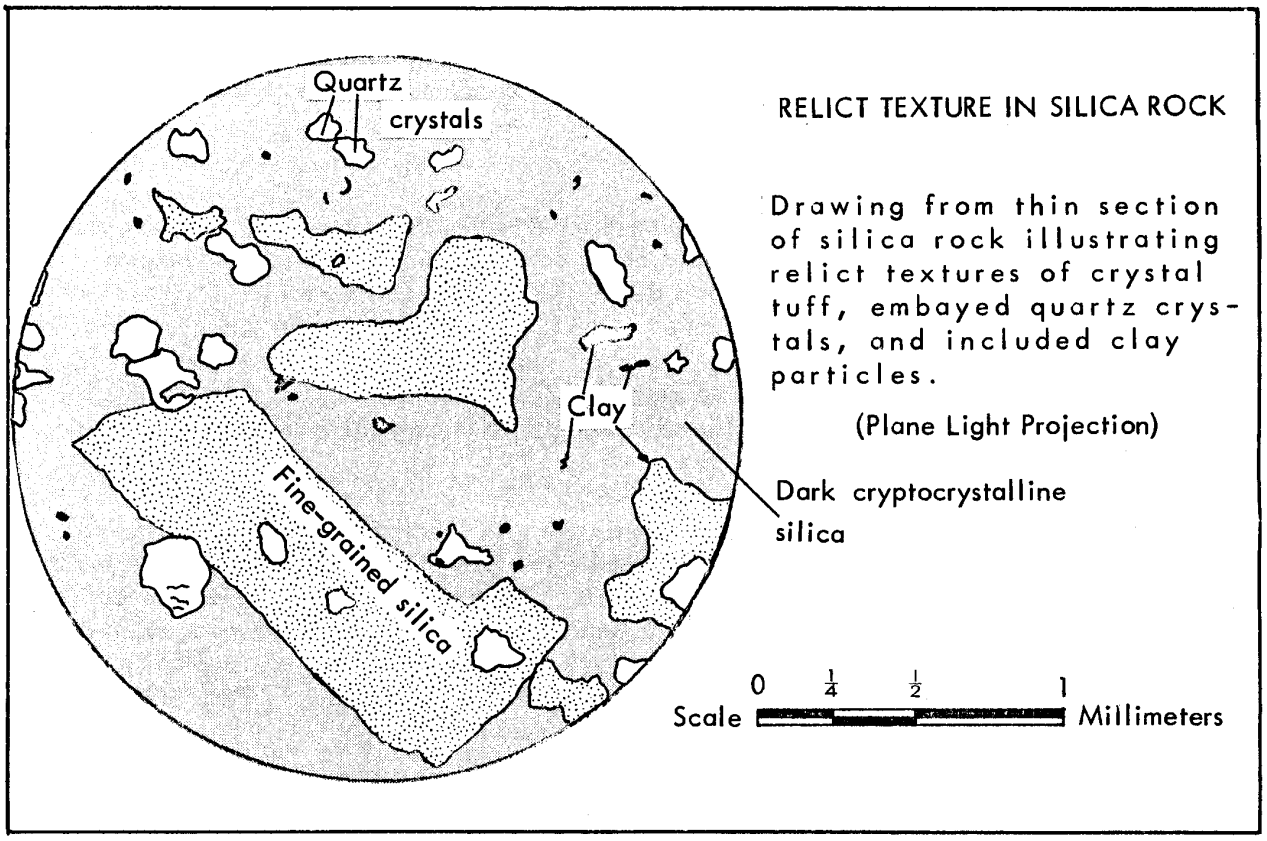
The tuffs and lavas generally strike in a northwesterly direction and dip gently northeast. Wherever attitudes can be seen in the deposit of silica rocks the northwest strike and low dip to the northeast is also apparent. Where the tuff series is better exposed outside the map area along the South Umpqua River, it has a similar strike and dip.

Faults are evident at various places and are probably more numerous than shown on the map. The west-trending fault mapped along the north edge of the main silica deposit is visible where it offsets a basalt flow exposed in the road on the northwest flank of Quartz Mountain. Along this same fault on the northeast flank there is an associated gossan indicating alteration and mineralization. Rocks north of this fault appear to have been downthrown. It is possible that another body of silica lies to the north under the slide debris.

Mineralization:

In addition to the widespread silicification, the tuffs and to a lesser extent the basic lavas, are in places completely altered to clay. Areas of intense rock alteration are impregnated throughout with small crystals of pyrite. Surface alteration of these clayey rocks containing abundant disseminated pyrite have in places produced typical gossans. Secondary iron-aluminum sulfate minerals have also formed in caverns and overhanging bluffs in the clayey pyrite-impregnated tuffs.

As shown on the map, the silcified tuffs are interbedded with less silicified layers of altered clayey tuffs. Some of the silicified horizons contain many caverns. Those at Caves Camp site are so large that they were used for living quarters by the mine owners during the exploration period. The cavernous weathering is the result of differential porosity of the silicified tuffs. Porous clayey areas, not completely replaced by silica, absorb water and are thus subjected to more rapid weathering and deterioration by frost action.



Origin of the Silica:

Relict textures of tuff in the silica rock are visible both megascopically and in thin section (see accompanying figure). It is apparent that the silica of Quartz Mountain is due to silicification (replacement of the tuffs by silica). The process by which this took place is not completely understood. One of the more feasible explanations is that the action of hot springs, with highly reactive siliceous thermal waters ascending through and migrating laterally in the more porous layers of tuff, caused wholesale replacement by silica. The possibility of the mountain having been a major vent or a concentration of hot springs emerging along faults or fractures may also be considered. It is also possible that the deposit was formerly opalite and that it later altered by diagenesis to chalcedony. Opalites are commonly formed by the action of thermal waters in areas of volcanic activity.

The presence of secondary iron-aluminum sulfate minerals formed by the leaching action of sulfate solutions (derived by alteration of pyrite) on the clays may explain the formation of the silica deposit. The fact that some of the zones of clay alteration containing disseminated pyrite are partly silicified would lend support to such a theory.

ECONOMICS

Analysis:

The average grade of the silica rocks has not been established for the overall deposit but the better grade contains from 96 to 99 percent silica. The principal impurities are iron, alumina, and titania. A typical analysis shows: 98 percent SiO_2, 1 percent Fe_2O_3, .2 percent Al_2O_3, .3 percent TiO_2, .05 percent CaO, .005 percent P_2O_5, and a small loss on ignition. The loss on ignition (water) appears to be directly proportional with the alumina content. This is reasonable in light of the small inclusions of clay (kaolinite) seen in thin sections of the silicified rock.

Uses of Silica:

High purity silica has been applied to many industries. Some of the more important uses are listed below:

Metallurgical
- Silicon metal, ferrosilicon, and other silicon alloys.
- Flux in smelting basic ores, foundry mold wash and foundry parting sand.

Abrasives
- Scouring and polishing powders and soaps.
- Sandpaper, whetstones, and sandblast.
- Production of silicon carbide (carborundum).
- Pebbles for ore-grinding mills.

Refractory
- Silica firebrick and other refractories.

Miscellaneous
- Road-surfacing aggregate.
- Chicken grit.

Chemical
- Lining for acid towers.
- Filtering medium.
- Catylitic agent in petroleum refining.
- Cement.
- Manufacture of sodium silicate (water-glass), silicones, and other chemicals.

Mineral Fillers
- Inert extender in paint, wood filler, fertilizer, insecticides, rubber, phonograph records, linoleum, etc.

Ceramics
- Pottery, glazes, and enamels.
- Manufacture of glass and fused quartz chemical apparatus.

Building
- Roofing granules.
- Rubble stone for exterior walls.
- Aggregate for stucco and plaster.

Most users of silica demand a uniform high-purity raw material containing 97 percent or more SiO_2. The production of high-purity silicon metal, such as that produced by the National Metallurgical plant in Springfield, Oregon, requires an ultra-pure variety of quartz, 99.7 plus percent SiO_2. Most of their quartz is obtained from the Crystal Peak deposit in California, a short distance west of Reno, Nevada.

Objectionable impurities in the production of ferrosilicon metal include calcium, arsenic, phosphorous, and refractory elements such as aluminum, titanium, and magnesium. Physical properties such as toughness and whiteness are also important in certain uses.

Silica Production in Oregon:

The only producer of high-purity silica in Oregon is the Bristol Silica Company. This

company has operated a quarry and plant near Rogue River, Oregon, since 1938. The Quartz Mountain property, although not in production at the present, represents a vast supply of relatively high-purity silica for use in the future.

BIBLIOGRAPHY

Allison, Ira S., and Felts, Wayne M., 1956, Geology of the Lebanon quadrangle, Oregon: Oregon Dept. Geology and Min. Ind. Map.

Ladoo, Raymond B., and Myers, W. M., 1951, Non-metallic minerals: McGraw-Hill Book Co., Inc., 2nd ed.

Lakhanpal, R. N., 1958, The Rujada flora of west central Oregon: Univ. of Calif. Pub. in Geol. Science, vol. 35, no. 1.

Palache, Charles, Berman, Harry, and Frondel, Clifford, 1951, Dana's system of mineralogy: John Wiley & Sons, Inc., vol. 2, p. 600-601, 7th ed.

Peck, Dallas L., 1960, Geologic reconnaissance of the Western Cascades in Oregon north of latitude 43°: U. S. Geological Survey Open File Report.

Wells, Francis G., and others, 1956, Geologic map of the Medford quadrangle, Oregon-California: U. S. Geological Survey, Map GQ 89.

* * * * *

AMERICAN MINING CONGRESS RESOLUTIONS

The following resolutions on gold, silver, and monetary policies were adopted at the meeting of the American Mining Congress at Las Vegas, Nevada, in October, 1960:

1. The restrictions on the purchase, ownership and sale of gold by United States citizens be abolished.
2. The Administration recognize the historical and traditional confidence in gold and silver as monetary metals throughout the world, and as part of its foreign policy aid other governments in restoring gold and silver coinage -- and currencies convertible into gold -- as a standard of value and as a circulating medium.
3. Congress fix the ratio at which the dollar and gold are to be made fully convertible and take all steps necessary to provide for the orderly restoration of the gold standard.
4. The Treasury, prior to restoration of full convertibility, cease sales of gold for industrial uses.
5. The Secretary of the Treasury, under the discretionary powers granted him by the Act of July 31, 1946, cease sales of silver at less than the monetary value and retain the Treasury's dwindling supply of free silver for future subsidiary coinage requirements.
6. The Congress act to prevent the wasteful reduction of our silver stocks by immediately monetizing the presently held free silver and declaring inviolate the present monetary stocks, as well as insuring the supply of silver to our country by amending the Act of July 31, 1946, to eliminate the 30 percent seigniorage charge.
7. The tax on silver transactions be repealed and the buying and selling of silver for future delivery be allowed.
8. The Government give immediate recognition to the increased costs of producing gold within the United States by means of an increase in the price paid to domestic producers for newly mined gold.

* * * * *

STATE OF THE MINING INDUSTRY - STRATEGIC METALS *

By
S. H. Williston**

The strategic metal industry in the United States has reached, or will reach in the next few months, the production levels of 1939. We are again the "have not" nation in strategic metals that we were before World War II.

At one time or another during the last 20 years we have produced up to 100 percent of our annual mercury requirements, up to 50 percent of our antimony requirements, roughly 15 percent of our chrome and manganese requirements, 200 percent of our tungsten requirements, and 50 percent of our cobalt requirements. It cannot be said, in the light of these facts, that we do not have the deposits to mine.

As it so happens, deposits of these strategic metals are relatively abundant in some of the lower labor cost countries in the world. Thus chrome, cobalt, antimony, beryl, columbium, manganese and tungsten come from countries such as Africa, Turkey, Brazil, Bolivia, Red China, and India, where the total wages per day are far less than the cost of the American miner per hour, and the types of deposits are such that the efficiency of labor in these countries is fully equal to the efficiency of the American miner. Thus, in the United States labor costs in strategics range from 500 percent to 5000 percent of foreign labor costs. Further, when, as, and if technical experts or American technical equipment are necessary our own government has been quite willing to assist the foreigner in acquiring that knowledge and machinery.

While many of the manufacturers of finished goods in the United States enjoy tariff rates ranging as high in some cases as 50 percent ad valorem, or even higher, tariffs on the strategic metals are either non-existent, as in the cases of chrome, cobalt and columbium, or extremely low (less than 10 percent) such as the case in respect to antimony, manganese and mercury. Of all of the strategics only tungsten has a tariff in excess of 10 percent, and it is interesting to note that only tungsten is showing a slightly improved production figure at the present time.

These two reasons clearly explain the almost complete elimination of the strategic mining industry. There is, however, a contributing cause which is most difficult to understand, and that is the apparent policy of our government in Washington to permit the complete elimination of this industry so long as the cold war continues. You may recall that at the end of World War II a strategic mineral policy was proposed that we leave our minerals in the ground and procure them from unfriendly foreign nations. That proposal was never officially adopted and the man who made it came to an ignominious and tragic end, yet, at the present time, that policy has been apparently firmly established as the underlying strategic mineral policy of the United States.

Where, except in the strategics, are metals repeatedly taken from the military stockpile without Congressional approval and without published Presidential permission?

Where, except in the strategics, do government agencies use barter for the procurement of their current requirements?

Where, except in strategics, are government agencies' requirements acquired 90 percent from abroad at prices no lower than domestic, and without giving domestic producers an opportunity to bid?

Where, except in the strategics, are government import figures falsified?

Where, except in the strategics, are barter contracts entered into after announcement that our stockpiles are full to overflowing?

---

* Presented at the 1960 Metal Mining and Industrial Minerals Convention and Exposition, American Mining Congress, Las Vegas, Nev., October 10-13, 1960.

**Executive Vice President, Cordero Mining Co., Palo Alto, Calif.

It might be wise for producers of other metals to examine the precedents set by government action in the strategics. They could prove disastrous to other industries beside our own.

The present situation as to the individual strategics is as follows:

Antimony:

Domestic production of antimony is limited to by-product metal from Idaho which accounts for about 5 percent of domestic antimony requirements. Antimony in the ore is worth about 13 cents a pound, as the metal, about 26 cents a pound, and the ad valorem tariff is less than 5 percent. Our present supply of antimony comes from Mexico, Red China, South Africa and Bolivia.

Cobalt:

The only primary cobalt producer in the United States has closed down. The refining equipment and mining plant machinery has been sold. World cobalt prices have declined materially and even the Canadian cobalt producers announced that they will be unable to continue operations. Although there is some by-product production in the United States, the principal source of cobalt for consumption in the United States is now the Congo and Castro's Cuba. Cobalt is on the free list.

Chromite:

Domestic production of chromite is limited to the Mouat Montana operations of American Chrome on a government contract which expires in 1961. Metallurgical investigations, looking toward the production of ferro-chrome, are reported as satisfactory, but the recent decline in imported chrome ore prices must make continued operation considerably less than certain.

Metallurgical grade chrome production on the West Coast and in Alaska ceased in 1958. These chrome mines are no longer on a stand-by basis but are closed and caved. Little of the reserves developed are now available.

Chrome in the ore is worth approximately 3 cents a pound, as ferro-chrome it is worth 30 cents a pound, and as electrolytic chrome metal a little over $1 a pound. United States' requirements of chrome come from Turkey and the East Coast of Africa. Chrome is on the free list.

Columbium:

The only producer of appreciable amounts of columbium, Porter Brothers in Idaho, discontinued mining operations in early 1960. Columbium in the ore is worth less than $2 a pound but, as the metal, is worth $50 a pound. United States' requirements of columbium come from Brazil and Africa. Columbium is on the free list.

Manganese:

Domestic production of manganese has declined drastically since the termination of the government purchase program. A small amount of battery manganese and special-purpose manganese is being produced in Montana. The Three Kids operation in Nevada is still operating but will not continue beyond the middle of next year. Current United States' requirements of manganese come from Brazil, India and Africa. Manganese in the ore is worth approximately 3 cents a pound and, as electrolytically reduced metal, slightly over 30 cents a pound. Tariff protection is considerably less than 10 percent.

Mercury:

As a result of lowered prices mercury production in the United States dropped 20 percent during 1959 and will probably decline another 20 percent in 1960. World-wide production has also declined materially in the last two years for the same reason. Domestic production is able to supply almost half of domestic commercial requirements, the balance coming from Mexico, Italy, and Spain. Tariff protection is less than 10 percent.

Tungsten:

Two primary producers of tungsten, as well as one by-product producer, are in operation, and two additional mines have announced reopening. Since the Bureau of Mines has discontinued production statistics on tungsten, and since the producing picture is subject to change without much notice, accurate estimates are difficult to make. It is, however, rather certain that United States production is in excess of one-fourth our consumption requirements but not as much as one-half our requirements. While the world price of tungsten has improved materially in the last year or so from its extreme low point, domestic costs have continued to rise so that present tungsten prices cannot bring forth much more tungsten production than that now in operation or considering operation. The balance of United States' tungsten requirements comes from Australia, Korea, Brazil, Red China, Bolivia and Africa. Tungsten is the only strategic metal which has an import duty in excess of 10 percent ad valorem.

* * * * *

MINING NEWS OF SOUTHWESTERN OREGON

Harry Commers of Grants Pass shipped two carloads of copper-bearing vein quartz from the Copper Eagle (Brass Ledge) mine in the Galice district, Josephine County, to the Tacoma Smelter. The shipments were made during October.

The War Eagle Quicksilver mine in Jackson County is being explored by Dave Chase of Medford, Oregon. He has moved his 10-ton Gould type rotary furnace from the Bonita mine to the War Eagle. The lower drift and shaft have been opened and the upper drift extended for about 60 feet to the east. Small amounts of ore are being mill tested.

* * * * *

SURVEY PUBLISHES RECENT TECHNICAL FINDINGS

A new type of publication has been issued by the U. S. Geological Survey as an experiment to meet public and professional demand for prompt release of important research results. This is Professional Paper 400, "Geological Survey Research 1960", issued in two separately bound chapters, 400-A and 400-B. Chapter 400-A, with 138 pages and four illustrations, presents a synopsis of a wide variety of geologic studies by the Survey's Geologic Division. Chapter 400-B, with 515 pages and 303 illustrations, consists of 232 individually authored papers averaging about 1,000 words in length. Some are scientific notes announcing new discoveries; others are summaries of more comprehensive investigations. Included in Chapter 400-B are the following reports on Oregon geology:

"Age and correlation of some unnamed volcanic rocks in south-central Oregon," by George W. Walker.

"Upper Triassic graywackes and associated rocks in the Aldrich Mountains, Oregon," by T. P. Thayer and C. E. Brown.

"The John Day formation in the Monument quadrangle, Oregon," by Richard V. Fisher and Ray E. Wilcox.

"Cenozoic volcanism in the Oregon Cascades," by Dallas L. Peck.

Copies of Professional Paper 400-A and 400-B are available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at $1.00 and $4.25 respectively.

* * * * *

OPTIMISM EXPRESSED FOR GOLD MINING

Las Vegas, Nev., October 13 -- "The outlook for the gold and silver mining industries is good," declared Dr. Elgin Groseclose, financial consultant and internationalist of Washington, D. C., speaking at the 1960 Mining Show of the American Mining Congress.

He based his optimism upon an acute and growing shortage of the precious metals and the necessity to stimulate higher production. "Paradoxically", he said, "although 60 percent of the total gold produced since the discovery of America is still in existence, and over 20 percent of the silver, the demand for both far exceeds the supply." He pointed out that while world industrial production is expanding at the rate of 5 percent a year, carrying with it a monetary expansion of 60 percent in the decade, the gold stock to support this money has increased only 14 percent. In the case of silver, he said, new industrial techniques are creating a voracious demand for the metal, and taking annually more than the world produces. Meantime, he added, demand for silver for coinage is also expanding. Dr. Groseclose emphasized: "In the U. S., some 40 million ounces of silver coins are required annually to meet the appetite of juke boxes, parking meters, laundromats, and other vending machines. Abroad, governments are rediscovering that cheap substitutes like copper, aluminum, and dirty paper do not serve the dignity of sovereignty and are turning again to silver for their small coinage."

The shortage of gold arises from the vast increase in money and claims on money, which only gold can ultimately settle, he declared. Citing International Monetary Fund figures, Dr. Groseclose pointed out that in the years 1950-1959, free world money supply increased by 60 percent, and in Continental Europe, where the claims on U. S. gold are the highest, the money supply doubled.

Dr. Groseclose predicted a further devaluation of the dollar unless steps are taken to curb the balance of payments deficit and the gold outflow, which has been going on now since 1949. The decade of the nineteen fifties is the first decade in American history to register a net decline in U. S. gold holdings. This decline, which has taken 20 percent of the gold stock, he stated, occurs at a time of extraordinary domestic expansion, itself requiring increased supplies of money.

The cause of the gold outflow is the adverse balance of payments, which began coincidental with the foreign aid program, Groseclose said. He pointed out "The cumulative adverse balance for the decade is around $18 billion. In addition to loss of $5 billion in gold, foreigners have added to their dollar holdings some $13 billion, which represents an added potential threat to the gold supply."

Dr. Groseclose urged, as to silver, a cessation of Treasury sales to industry, and the maintenance of substantial stocks of silver as a prime strategic reserve. As to gold, he pointed out that as the world monetary and credit structure depends upon a stable dollar, foreign expenditures of the government should be curtailed until the gold reserves of this country are replenished. He expressed the conviction that a stable dollar is more important to the world than foreign aid, and that a stable dollar can be maintained only through a hundred percent reserve. Meantime, as a measure of protection, he recommended suspension of international convertibility of the dollar and the establishment of a free gold market to determine the proper value at which the dollar should be exchanged. (From American Mining Congress Press Release, October 13, 1960).

* * * * *

EARLY CRETACEOUS AMMONITES DESCRIBED

The U. S. Geological Survey has just issued Professional Paper 334-F, "Ammonites of Early Cretaceous Age (Valanginian and Hauterivian) from the Pacific Coast States", by Ralph W. Imlay. The publication is for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The price is $1.25, paperbound. The report describes 26 genera and 65 species of ammonites from Washington, Oregon, and California, gives localities, and makes correlations. It supplements the earlier study by Imlay (Prof. Paper 314-G, 1959) on the pelecypod Buchia (formerly Aucella) in the interpretation of the Jurassic-Cretaceous boundary on the Pacific Coast.

* * * * *

STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 1069 State Office Bldg., Portland 1, Oregon
Telephone: CApitol 6-2161, Ext. 488

Field Offices

2033 First Street
Baker

239 S. E. "H" Street
Grants Pass

* *

HOW MULTIPLE IS THE MULTIPLE-USE PLAN?

After five years of Public Law 167 (the Multiple-Use Mining Law), the U. S. Bureau of Land Management reports it has examined 5 million acres on which was found 36,400 mining claims located prior to passage of the law. Verified statements asserting validity of the claims by the claim holders were filed on 2,500 claims. Of these, 2,000 claims have been examined by Bureau engineers. On 500 (or 25 percent) of the claims the claim holders were allowed the management of the surface and on 1,500 (75 percent) of the claims the Bureau took over surface management.

In this same period of time the U. S. Forest Service completed all required steps in proceedings under Public Law 167 on 24 million acres. There were an estimated 172,000 claims in the area of these examinations. Verified statements were submitted on 2,154 claims, of which the Forest Service stipulated that 294 (or 14 percent) were valid, but on 1,860 (86 percent) of the claims the surface management was taken over by the Government.

From the miner's viewpoint it would appear that the Forest Service was twice as tough in the examination of claims as the Bureau of Land Management. That this might be the case is reflected in a recent talk by a local U. S. forester before a civic organization in southwestern Oregon (as reported in the Grants Pass Courier, December 8, 1960). He stated that mining is permitted within the national forests but it does not fit into the multiple-use plan. "However," he added, "the mineral is there and wherever it is practical to do so, mining is permitted." The attitude of the Forest Service toward mining was also displayed in the latest session of Congress when the National Forest Multiple-Use law was being considered. This law gave official recognition that national forests should be administered for "outdoor recreation, range, timber, and wildlife and fish purposes". When the bill was under discussion in Congress, the miner's request that the language be clarified in order to protect the historic right of use of Forest Service land for mining and prospecting was met with surprising opposition. Further evidence of opposition to mining by the Forest Service is found in the recently developing trend to shy away from the long-time court established "prudent man" rule in the patenting of claims and to lean toward a rule requiring proof of profitable operation of the claim.

When Edward P. Cliff, Assistant Chief, U. S. Forest Service, spoke before the American Mining Congress on October 11, 1960, he concluded his remarks by stating: "The Forest Service believes in multiple use as a basic guiding principle. It has been time-tested since the creation of national forests. Mining has always been recognized as an important use of national forests. As population increases and more intensive use is made of all national resources, greater skill and more effort will be required to harmonize public use and the utilization of renewable resources with mining activities. We know the Mining Industry recognizes this and, as in the past, will sit down with us to resolve mutual problems. The effort will be rewarding because it will make possible the fullest practicable development of the national forests under a policy of wise use."

It is hoped that this fine policy statement by Mr. Cliff will permeate to all divisions and to all levels of the Forest Service, for the mining and oil industries must step up their exploration activities if they are to meet the dual challenge of increasing use of mineral materials and supplying an expanding population. It is axiomatic that the more land open to investigation, the more mineral products will be found.

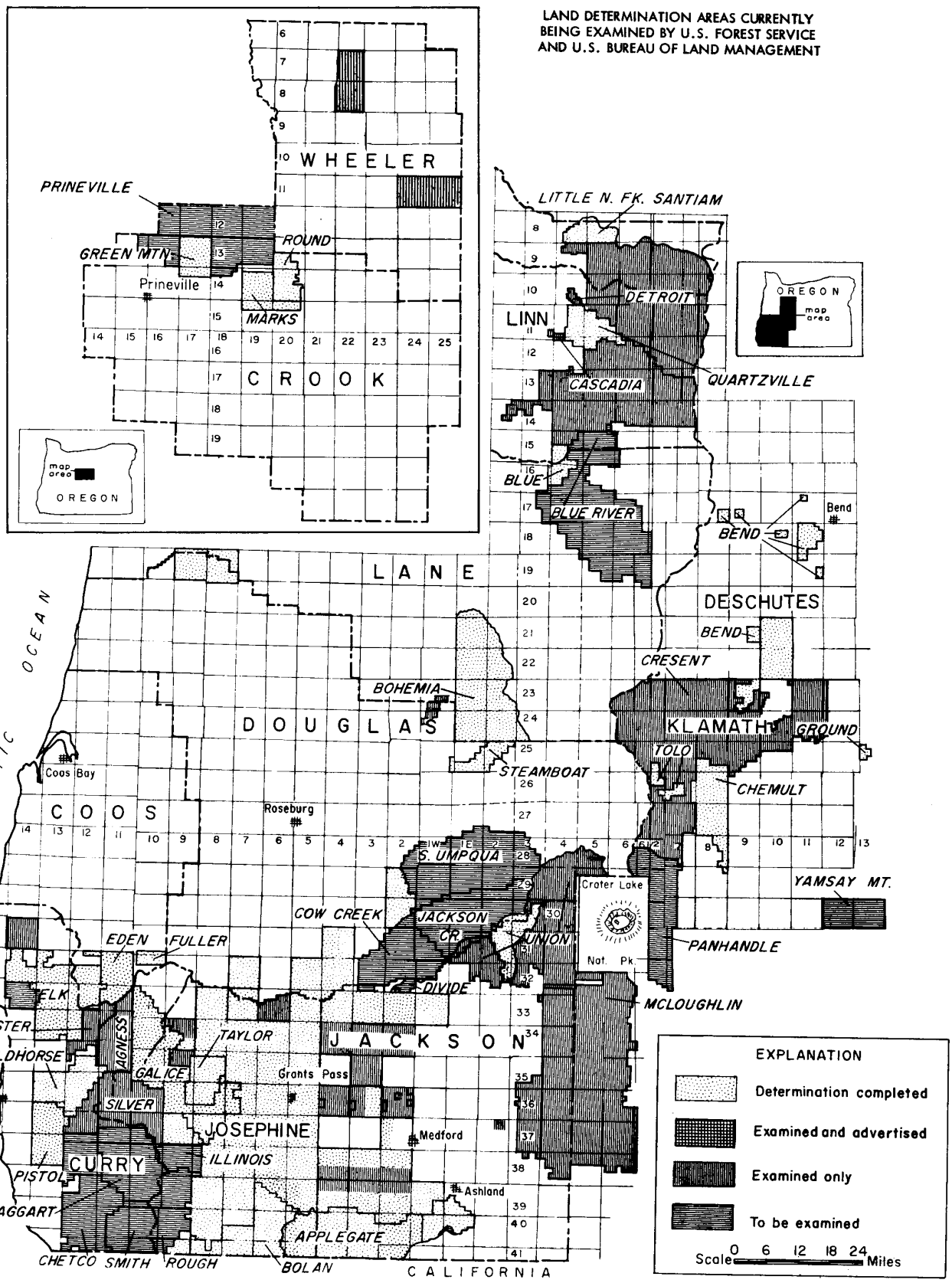
Hollis M. Dole, Director

PROGRESS REPORT OF AREAS IN U. S. NATIONAL FORESTS APPROVED FOR DETERMINATION OF SURFACE RIGHTS

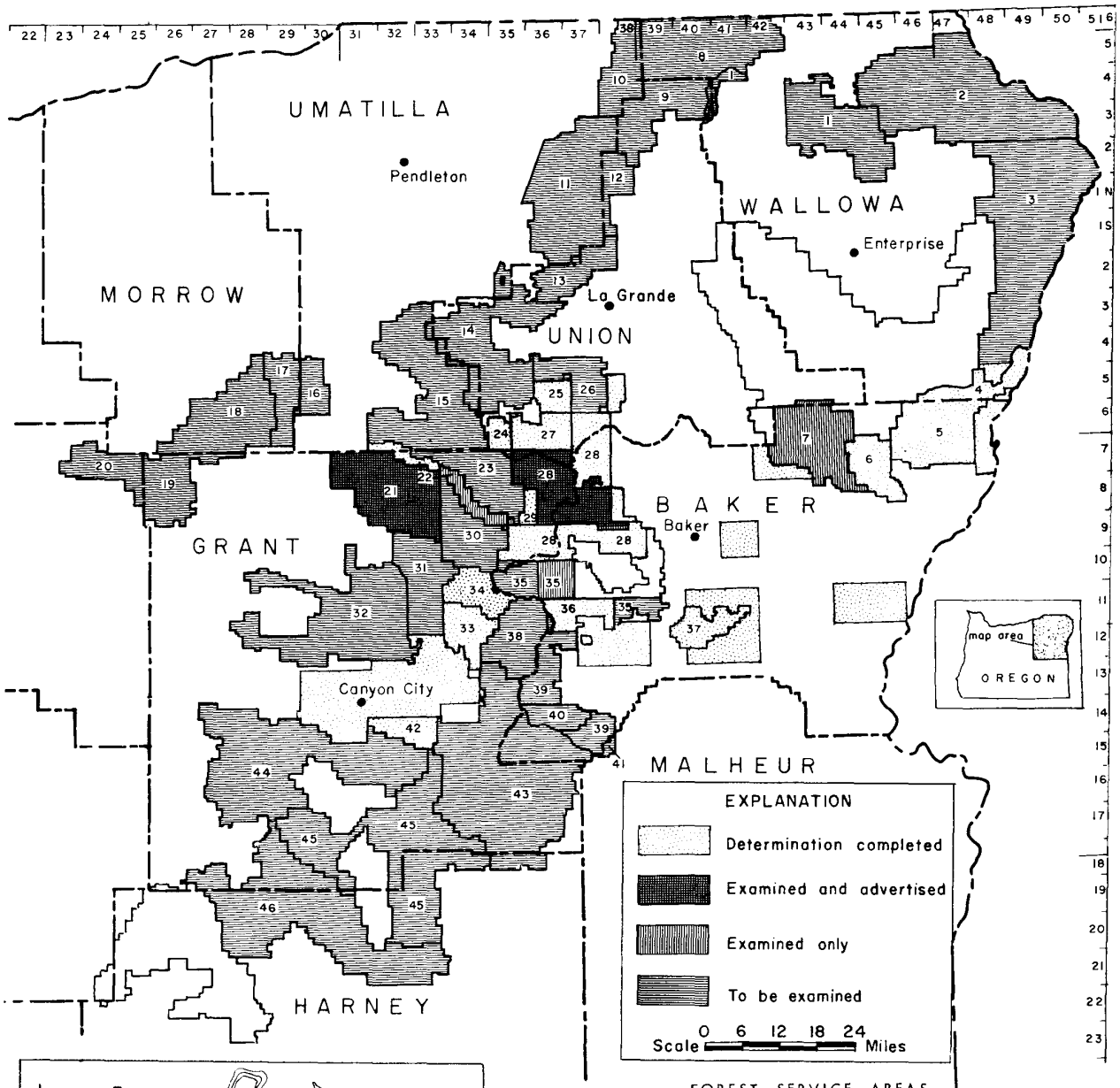
Forest	Name of Area	Acres Nat'l Forest Land	Acres Examined	Approved for Examination	Date of First Publication	End of 150-day Period*
Deschutes	Chemult	45,500	45,500	5- 4-56	2-27-57	7-29-57
	Bend	29,760	29,760	5- 1-57	12-24-59	5-23-60
	Tolo	9,750	9,750	5- 1-57	12-24-59	5-23-60
	Ground	1,120	1,120	5- 1-57	12-24-59	5-23-60
	Crescent	300,000	300,000	5-21-60		
Fremont	Chemult	8,500	8,500	5-17-56	2-27-57	7-29-57
	Fremont	31,200	31,200	3-25-59	12-24-59	5-23-60
	White King-Thomas Cr.	50,000		8-11-59		
	Mill Flat	29,000	29,000	7-28-60		
	Drews	114,924		4-20-60		
	Brattain Butte	44,541		4-20-60		
	Yamsey Mtn.	44,520		5- 3-60		
	North Warner	45,750		5- 3-60		
	Bly-Lake	70,000		5-25-60		
Malheur	Twin	39,600	39,600	7- 5-56		
	Dixie	36,070	36,070	7- 5-56	9-25-58	2-23-59
	Canyon	22,680	22,680	4-25-57	12-24-59	5-23-60
	Drewsey	247,366		4- 6-60		
	Clear Creek	60,160		4- 6-60		
	Long Creek	180,382		4- 6-60		
	Burns	257,340		4- 6-60		
	Prairie City	297,429		4-21-60		
	Bear Valley	246,000		4-21-60		
	River	75,360		4-21-60		
Ochoco	Round "A"	10,440	10,440	7- 5-56	11-20-57	4-21-58
	Round "B"	14,015	14,015	7- 5-56	9- 4-58	2-23-59
	Marks	21,900	21,900	7-31-57	12-24-59	5-23-60
	Green Mtn.	22,920	22,920	7-31-57	12-24-59	5-23-60
	Prineville	101,240		5- 3-60		
Rogue River	Applegate "A"	17,785	17,785	7- 5-56	9-24-58	2-23-59
	Applegate "B"	35,660	35,660	7- 5-56	12-23-59	5-23-60
	Applegate "C"	59,865	55,449	7- 5-56		
	Union "A"	39,295	39,295	4-25-57	9-17-58	2-16-59
	Union "B"	191,105	26,033	4-25-57		
	Ashland "A"	28,184	28,184	4-25-57	12-23-59	5-23-60
	Ashland "B"	946		4-25-57		
	McLoughlin	401,703	401,703	9-21-59		
	Panhandle	74,880		9-21-59		
Siskiyou	Wildhorse	53,000	53,000	2- 2-56	2-21-57	7-22-57
	Elk "A"	14,570	14,570	7-11-56	9-12-57	2- 9-58
	Elk "B"	110,706	110,706	7-11-56	9-11-58	2- 9-59
	Elk "C"	4,487	4,487	7-11-56	2-26-59	7-27-59
	Elk "D"	8,457		7-11-56		
	Fuller	8,800	8,800	7-11-56	2-21-57	7-22-57
	Taylor	34,230	34,230	7-11-56	9-11-57	2- 8-58
	Illinois "A"	26,880	26,880	7-11-56	3- 4-59	8-24-59
	Illinois "B"	18,470		7-11-56		
	Pistol	39,950	39,950	7-11-56	3- 5-59	8- 3-59
	Galice "A"	27,280	27,280	7-16-58	12-17-58	5-16-59
	Galice "B"	111,440	111,440	7-16-58	6-29-60	11-28-60
	Foster	23,220	23,220	9-11-58		
	Agness	45,007	45,007	3-25-59		

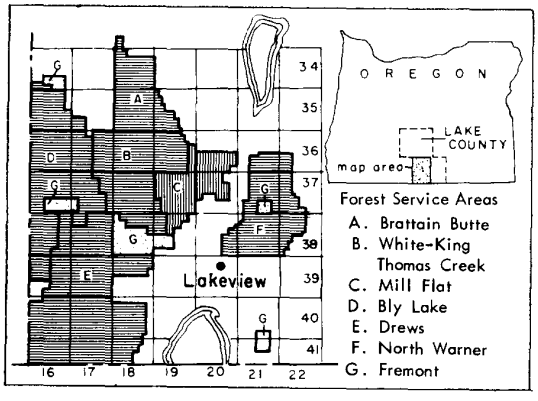
*Determination completed (time expired for submitting verified statement), except where noted by #.

Forest	Name of Area	Acres Nat'l Forest Land	Acres Examined	Approved for Examination	Date of First Publication	End of 150-day Period*
Siskiyou (cont.)	Taggart	90,202		4- 6-60		
	Smith	55,278		4- 6-60		
	Rough	58,718		4- 6-60		
	Chetco	133,321		3-25-59		
	Eden	32,618	32,618	3-25-59	6-29-60	11-28-60
	Bolan	76,793	76,793	3-25-59	6-29-60	11-28-60
	Silver	94,234	94,234	4- 6-60		
Umatilla	John Day "A"	8,942	8,942	7-11-56	9-25-57	2-23-58
	John Day "B"	20,223	20,223	7-11-56		
	Desolation	94,640	94,640	4-16-59	10-27-60	3-27-61#
	Olive Lake	61,400		5- 5-59		
	Silver Butte	62,960		5- 5-59		
	Wheeler	37,900		4-20-60		
	Umatilla	147,720		4-20-60		
	Phillip Creek	29,240		4-20-60		
	Ellis	35,320		4-20-60		
	West Ukiah	31,960		4-20-60		
	East Ukiah	135,160		4-20-60		
	Tollgate	48,620		4-20-60		
	Grant	64,320		4-20-60		
	Jarboe	71,720		4-20-60		
	Morrow	96,565		4-20-60		
	Wenaha	121,860		4-20-60		
Umpqua	Bohemia	157,000	157,000	7- 5-56	9-17-58	2-16-59
	Steamboat	24,000	24,000	7-31-57	12-24-59	5-23-60
	Cow Creek	67,000		4- 6-60		
	Jackson Creek	86,000		4- 6-60		
	Divide	9,400		4- 6-60		
	South Umpqua	161,616		12-13-60		
Wallowa-Whitman	Dooley Mtn-Buffalo	44,000	44,000	6- 1-56	2-21-57	7-29-57
	Pine	82,230	82,230	7- 5-56	2-21-57	7-29-57
	Woodley	35,250	35,250	7- 5-56	2-27-57	7-29-57
	Unity	37,500	37,500	7- 5-56	2-21-57	7-29-57
	Baker "A"	79,120	79,120	3-22-57	5-28-58	10-27-58
	Baker "B"	63,557	63,557	3-22-57	12-24-59	5-23-60
	Baker "C"	119,093	10,600	3-22-57	10-27-60	3-27-61#
	Bull Run	22,200	22,200	3-22-57		
	Whitney	55,270	17,570	3-22-57		
	Eagle	89,600	89,600	3-22-57		
	Limber Jim-Sheep Cr.	39,780	39,780	3-22-57	5-21-58	10-20-58
	Snake River	31,750	31,750	3-22-57	5-22-58	10-20-58
	Summit	35,720	35,720	3-22-57	12-24-59	5-23-60
	Sheephead Mtn.	3,200		5- 3-60		
	Imnaha	280,000		12-13-60		
	Chesnimnus	287,972		12-13-60		
	Sled Springs	106,200		12-13-60		
	Mt. Emily	49,280		12-13-60		
	Beaver	43,640		12-13-60		
	Burnt River	64,720		12-13-60		
Willamette	Little North Fork Santiam	22,600	22,600	2-21-56	2-27-57	7-29-57
	Quartzville	28,000	28,000	2- 2-56	11-1-56	4- 1-57
	Blue	17,600	17,600	7- 5-56	9-25-57	2-22-58
	Blue River	170,200		7- 8-57		
	Cascadia	162,000	162,000	7- 8-57		
	Detroit	281,950	224,000	7- 8-57		
	TOTAL	8,200,549	3,277,661			


LAND DETERMINATION AREAS CURRENTLY BEING EXAMINED BY U.S. FOREST SERVICE AND U.S. BUREAU OF LAND MANAGEMENT
WHEELER
PRINEVILLE
GREEN MTN.
ROUND
Prineville
MARKS
CROOK
map area
OREGON
LITTLE N. FK. SANTIAM
DETROIT
LINN
CASCADIA
QUARTZVILLE
BLUE
BLUE RIVER
BEND
Bend
DESCHUTES
CRESENT
LANE
BOHEMIA
DOUGLAS
KLAMATH
GROUND
TOLO
STEAMBOAT
CHEMULT
PACIFIC OCEAN
Coos Bay
COOS
Roseburg
S. UMPQUA
YAMSAY MT.
Crater Lake
Nat. Pk
COW CREEK
JACKSON CR.
UNION
PANHANDLE
EDEN
FULLER
ELK
DIVIDE
MCLOUGHLIN
FOSTER
WILDHORSE
AGNESS
TAYLOR
JACKSON
GALICE
Grants Pass
Gold Beach
SILVER
JOSEPHINE
Medford
CURRY
ILLINOIS
PISTOL
Ashland
TAGGART
APPLEGATE
CHETCO
SMITH
ROUGH
BOLAN
CALIFORNIA
EXPLANATION
Determination completed
Examined and advertised
Examined only
To be examined
Scale 0 6 12 18 24 Miles

LAND DETERMINATION AREAS CURRENTLY BEING EXAMINED BY
U.S. FOREST SERVICE AND U.S. BUREAU OF LAND MANAGEMENT





FOREST SERVICE AREAS

1. Sled Springs
2. Chesnimnus
3. Imnaha
4. Snake River
5. Pine
6. Summit
7. Eagle
8. Wenaha
9. Jarboe
10. Tollgate
11. Umatilla
12. Phillip Creek
13. Mt. Emily
14. Starkey
15. East Ukiah
16. West Ukiah
17. Ellis
18. Morrow
19. Grant
20. Wheeler
21. Desolation
22. John Day
23. Silver Butte
24. Sheep Creek
25. Limber Jim
26. Beaver
27. Woodley
28. Baker
29. Buffalo
30. Olive Lake
31. River
32. Long Creek
33. Dixie
34. Twin
35. Whitney
36. Unity
37. Dooley Mt.
38. Clear Creek
39. Burnt River
40. Bull Run
41. Sheephead Mt.
42. Canyon
43. Prairie City
44. Bear Valley
45. Drewsey
46. Burns

RESUMÉ OF U. S. BUREAU OF LAND MANAGEMENT PUBLIC LAW 167 WORK*

AREAS EXAMINED AND ADVERTISED

Deschutes County
May 25, 1960

T. 21 S., R. 10 E.
T. 22 S., R. 10 E.

Douglas County
October 28, 1959

T. 29 S., R. 2 W.
T. 31 S., R. 4 W.
T. 32 S., R. 4 W.
T. 32 S., R. 5 W.
T. 32 S., R. 7 W.
T. 33 S., R. 7 W.

Jackson County
December 10, 1958

T. 33 S., R. 2 W.
T. 37 S., R. 2 W.
T. 40 S., R. 2 W.
T. 33 S., R. 3 W.
T. 39 S., R. 3 W.
T. 33 S., R. 4 W.
T. 34 S., R. 4 W.
T. 38 S., R. 4 W.

Josephine County
June 11, 1958

T. 39 S., R. 7 W.

Klamath County
May 25, 1960

T. 23 S., R. 9 E.

Josephine County
April 1, 1959

T. 33 S., R. 5 W.
T. 35 S., R. 5 W.
T. 35 S., R. 6 W.
T. 38 S., R. 6 W.
T. 33 S., R. 7 W.
T. 35 S., R. 7 W.
T. 40 S., R. 7 W.
T. 33 S., R. 8 W.
T. 34 S., R. 8 W.
T. 35 S., R. 8 W.
T. 34 S., R. 9 W.

AREAS EXAMINED AND NOT ADVERTISED

Crook County

T. 17 S., R. 19 E.

Curry County

T. 31 S., R. 14 W.

Douglas County

T. 24 S., R. 1 W.

Jackson County

T. 34 S., R. 2 W.
T. 34 S., R. 3 W.
T. 35 S., R. 3 W.
T. 34 S., R. 4 W.
T. 36 S., R. 4 W.
T. 36 S., R. 2 W.
T. 38 S., R. 3 W.
T. 39 S., R. 3 W.
T. 38 S., R. 4 W.
T. 39 S., R. 4 W.
T. 37 S., R. 2 E.

Josephine County

T. 33 S., R. 6 W.
T. 34 S., R. 9 W.
T. 35 S., R. 9 W.

Lane County

T. 23 S., R. 1 W.

Wheeler County

T. 7 S., R. 22 E.
T. 8 S., R. 22 E.
T. 11 S., R. 24 E.
T. 11 S., R. 25 E.

*In most instances only part of township has been examined. Exact areas examined can be obtained from U. S. Bureau of Land Management.

* * * * *

NEW DRILLING PERMIT ISSUED

Humble Oil & Refining Co. was issued a new permit by the Department on December 9, 1960, for the drilling of "D. J. Leavitt No. 1". Humble moved the Sun Drilling Co. rig from the Thomas Creek site to the Leavitt property early this month. The new location is adjacent to Highway 395 about four miles south of Lakeview. Coordinates were given as 412 feet south and 991 feet west from the NE corner of Sec. 2, T. 40S., R. 20E., Lake County. Elevation of the ground is 4784 feet. This location is not contained in the Thomas Creek Federal Unit.

* * * * *

IRVING B. HAZELTINE

Irving B. Hazeltine, lifetime resident of Grant County, died in Canyon City November 10 at the age of 80 years. Son of one of the first Canyon City gold miners, Hazeltine also mined gold, and during World War I he produced and shipped large quantities of chrome ore. Mr. Hazeltine was active in many aspects of Oregon mining and was a member of several mining organizations.

* * * * *

SHELL OIL PROPOSES OREGON OFFSHORE LEASE

The Shell Oil Company awakened new interest in the search for oil in Oregon this month when it applied to the State Land Board for rights to lease the entire submerged coast land owned by the State. Terms in the proposal specified payment of 25 cents per acre annual rental plus 12½ percent royalty and a commitment to drill a 7,000-foot hole offshore within two years. The yearly rental would amount to $150,000. Besides this, Shell agrees to spend a minimum of $150,000 a year on geological exploration beginning with the third year and until termination of the ten-year lease.

The Shell proposal was considered at a meeting of the State Land Board in Salem November 3, 1960. It was decided at this meeting that no action could be taken on the lease until an opinion was obtained from the Attorney General's office. The subject was raised again at a meeting of the State Land Board on December 20, 1960, at which time Attorney General Robert Y. Thornton ruled that the Land Board did not have authority to lease the submerged lands of the State under existing statutes. Governor Mark O. Hatfield, during the discussion, asked that appropriate legislation be drafted for the next session of the Legislature, setting up conditions under which offshore lands could be leased.

A public meeting is to be held January 5, 1961, in the Attorney General's office in Salem at 2:00 p.m. Oregon State officials will discuss with representatives of the Western Oil and Gas Association and the California State Lands Division the problems encountered in California offshore leasing and drilling and the manner in which they were solved. This meeting is to provide background for preparation of legislation.

* * * * *

GOLD MINES FORM COUNCIL ON MONETARY EDUCATION

An informal organization of gold producers has been launched under the name of C.O.M.E. (Council on Monetary Education). Membership in the group is to be restricted to U.S. citizens and domestic corporations inasmuch as C.O.M.E. intends to work with U.S. senators and representatives, administration, and cabinet personnel, and participation at this level by foreign interests is not considered ethical. With the many new faces in Washington, in both legislative and administrative positions, a campaign of education must be pursued. Under consideration at present are the following objectives:

1. Allow American citizens to own and trade freely in gold.
2. Require the Treasury to hold monetary stocks of gold (and silver) exclusively for monetary purposes.
3. Require the Federal Reserve to increase the present 25 percent ratio, by stages, until all Federal notes and deposit liabilities are fully convertible. The gold for this purpose is to be purchased at such prices as a free gold market affords.
4. International convertibility of the U.S. dollar to cease when full convertibility is restored.
5. Help to be given other governments to restore gold (and silver) coinage as a standard value.
6. The government to give immediate recognition to the increased cost of production of gold (since the $35.00 price was established in 1934) by payment of a premium for newly mined domestic output.

The organization activities of C.O.M.E. are being directed by L.L. Huelsdonk of Best Mines Company, Inc., Downieville, California. Henry L. Day of Day Mines, Inc., Wallace, Idaho, serves as treasurer. Dr. Elgin Groseclose, financial analyst, Washington, D.C., has been retained as technical consultant.

An invitation is issued to all interested in the domestic production of gold and a sound monetary policy to "COME and join our organization."

* * * * *

KOCH AWARDED RESEARCH GRANT

George S. Koch, Jr., Assistant Professor of Geology at Oregon State College, has received a $23,000 grant from the National Science Foundation for a three-year study on distribution of ore in mine veins. Cooperating with him is Richard F. Link, Associate Professor of Statistics at OSC. They will do basic research into the zoning of ore at two large mines in Mexico where extensive ground is exposed to inspection and thousands of mine assays are available. High-speed data-processing machines will play an important part in the study. The findings will be valuable in predicting distribution of ore deposits. Koch and Link have been studying metal zoning in mines since 1958. They presented a joint paper entitled "IBM Processing of Mine Assay Data" at the 1960 Pacific Northwest Metals and Minerals Conference held in Portland last April.

* * * * *

WELL-RECORDS LIST PUBLISHED BY THE DEPARTMENT

"Well Records on File of Oil and Gas Exploration in Oregon," by V.C. Newton, Jr., was published by the Department this month as Miscellaneous Paper No. 8. Records of oil and gas drillings contained in the Departmental files are listed in the report along with mention of wells for which representative cutting and core samples may be seen. The price of this 9-page paper is 25 cents.

* * * * *

ORE AT PORT OF PORTLAND MOVING TO SMELTERS

Lead and zinc ores and concentrates from Peru, Bolivia, Australia, Honduras, and Guatemala, which have been stockpiled for more than seven months at Terminal 4, Port of Portland, because of the mine and smelter strike at Kellogg Idaho, are once again moving.

The 20,000 tons of stockpiled material, estimated to be in excess of $1.5 million in value by the Portland Commission of Public Docks which operates the ore-handling facilities, is being loaded into gondolas at a rate of 70 tons per hour. The Commission handled 116,056 tons of ore and concentrates in the first 11 months of this year as compared to 69,696 tons for last year. About May 1, 1961, a bulk unloader, capable of handling 900 tons of ore an hour, will be in operation. This equipment will give the Port the finest ore-moving facilities on the Pacific Coast.

* * * * *

JEROME APPOINTED TO NEVADA BUREAU OF MINES

Dr. Stanley E. Jerome has been appointed Associate Director of the Nevada State Bureau of Mines and the Nevada Mining Analytical Laboratory, public service agencies of the Mackay School of Mines of the University of Nevada.

He will direct research projects and supervise activities of the Bureau and laboratory in the field and on the campus. Prior to his appointment, Dr. Jerome was consulting geologist for Hunting Geophysical Services, Inc., Salt Lake City, Utah. Prior to this, he served as District Geologist of the Bear Creek Mining Company, a subsidiary of Kennecott Copper Corporation, and as Chief Geologist for Gulf Minerals Company. From 1937 to 1954, he was employed by New Jersey Zinc Company as Assistant to the Western General Manager of that Company. (Nevada Mining Association News Letter , December 15, 1960)

* * * * *