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

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OREGON'S OPALITE MINING DISTRICT ACTIVE AGAIN

By
Howard C. Brooks*

Introduction

The Bretz mine in the Opalite mining district of southern Malheur County, Oregon, is again producing a substantial amount of quicksilver after lying idle for more than ten years. Ore is being mined from a newly developed open pit located 200 feet northwest of earlier workings and is being treated in a flotation plant and furnace which were placed in operation in late 1956 by the Arentz-Comstock Mining Venture of Salt Lake City, Utah. In the years 1931 to 1944 the property was operated by the Bradley Mining Company during which time it produced 10,309 flasks of quicksilver to become one of Oregon's major producers of this strategic metal.

The Opalite mining district includes two other deposits having considerable past production as well as several unproved prospects. In Oregon, the Opalite deposit 7 miles west of the Bretz mine was a major quicksilver producer before closing in 1944. In Nevada, the Cordero mine, about 10 miles southeast of the Bretz mine, has been active since 1940 and is presently one of the nation's leading quicksilver mines.

Location

The Opalite mining district is located a few miles west of McDermitt in southern Malheur County, Oregon, and northern Humboldt County, Nevada (see index map). McDermitt, on the Oregon-Nevada state boundry is 74 miles north of Winnemucca, Nevada, which is the nearest railhead. The quicksilver deposits occur near the margins of the broad grabenlike valley of McDermitt Creek, which flows eastward and drains the area. This creek, with some of its larger tributaries, is the only permanent stream in the semi-arid district. Elevations range from 4,400 feet on the valley floor to more than 7,500 feet in the higher reaches of the White Horse Mountains to the north.

Geology

The geology of the area has been described by Schuette (1938) and by Yates (1942). Portions of the geologic data contained in the following summary and all of the quoted material were taken from the Yates report.

The rocks of the Opalite district consist of more than 3000 feet of nearly flat-lying Miocene lavas overlain by upper Miocene tuffaceous lake beds. These lake beds which in places are more than 200 feet thick contain the Bretz and Opalite ore bodies. Quaternary alluvium is locally present. Intrusive rocks appear to be scarce but southwest beyond the district, lavas rest on an eroded surface of a granitic complex.

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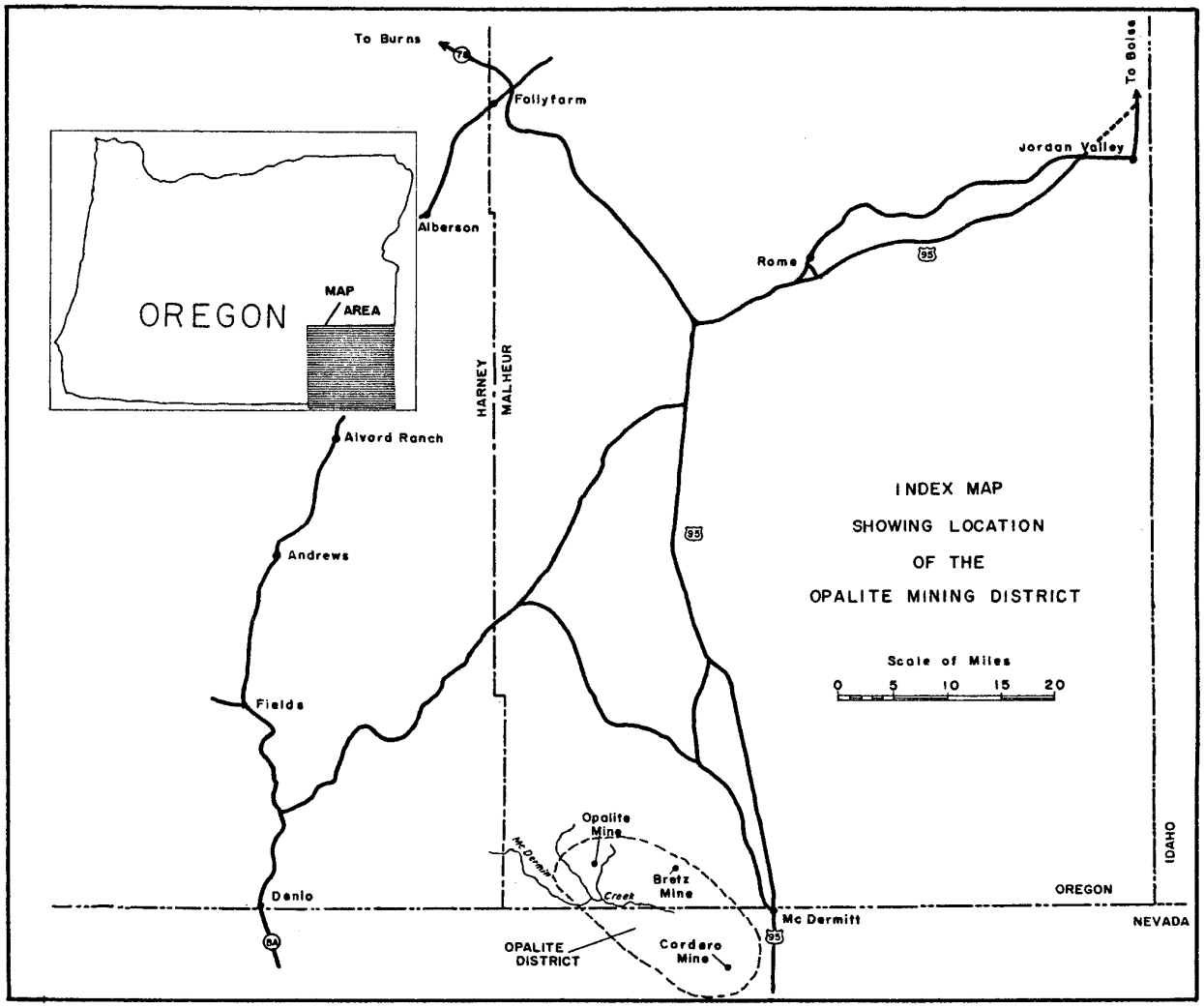
* Field Geologist, State of Oregon Department of Geology and Mineral Industries.

The lavas range from basalt to rhyolite. The siliceous lavas locally associated with tuffs range from obsidian to porphyritic rhyolite, and in general exhibit well-developed flow banding. The darker basaltic and andesitic lavas are characterized by vesicularity, columnar structures, flow brecciation, and porphyritic texture. Individual lava flows are from a few feet to more than 100 feet thick and are horizontal or nearly so, except locally where they have been tilted by faulting. The lake beds consist mainly of well-bedded tuffs, shales (including clayey, carbonaceous, tuffaceous, and diatomaceous varieties), and sandstone, but include small lenses of conglomerate. The constituent fragments are dominantly of volcanic origin. Age of the lake beds is based on fossil plants and fresh-water gastropods. The Quaternary rocks include two ages of deposits -- an older precanyon alluvium composed of angular rock fragments capping eroded surfaces of the lake beds in interstream areas and a younger alluvium occurring as valley fill and slope wash within the present stream valleys.



The Miocene rocks are cut by steep normal faults which probably developed during the Pliocene. "The throw on any single break cannot be measured, but the aggregate displacement, which accounts directly for much of the relief in the area, was more than 2,000 feet. The McDermitt Creek Basin is a result of such distributed faulting and all the quicksilver deposits of the district are related to faults within or along the borders of this grabenlike area." Minor

faulting related to the larger faults occurs in all the mineralized areas. Locally the soft lake beds are inclined as a result of drag along faults and possibly such drag structures were in part responsible for the concentration of the cinnabar.

"Mineralization probably began during or shortly after the Pliocene faulting." Some of these faults acted as channelways for rising hydrothermal solutions and in places the adjacent tuffs and lake beds were silicified into lenticular masses called "opalite." * The silicification was accompanied by kaolinization, but while both the lavas and lake beds were silicified, only the lake beds were kaolinized.

"All the ore deposits are either in or in contact with silicified rocks, and it is believed that the quicksilver was deposited at a late stage of the hydrothermal activity that produced the silicification." The northern limit of the Bretz ore bodies is an east-trending fault along which (mainly on its north side) occur local masses of silicified rock. This fault, adjacent to which the lake beds show steep drag folds, was probably the channelway for the solutions which formed the ore bodies to the south and that silicified the rocks to the north. "Quicksilver solutions presumably came up the same channelways that the silicifying solutions followed but were diverted into unsilicified rocks as they approached the surface."

While the Opalite ore body occurs in a mass of chalcedony some 1,200 feet long, 800 feet wide, and more than 100 feet in maximum thickness in which the cinnabar is finely divided and is generally intimately mixed with the silica, the Bretz ore occurs mainly in unsilicified shale and sandstone. Crystalline cinnabar fills open spaces in the shales and is deposited between grains in the coarser, more porous sandstone.

History and development

Cinnabar was discovered in the vicinity of the Bretz mine by William S. Bretz in 1917. For many years assessment work was confined largely to exploration of low-grade "opalite" outcrops revealing little ore, though some mercury may have been recovered with a small retort operated by Bretz and his brother.

Bretz continued to prospect the surrounding country and in 1924, with a partner named Murphy, discovered the Opalite ore body. The Opalite property was sold to the Mercury Mining Syndicate organized in April 1925 by F. W. Bradley. Construction of a rotary furnace 4 feet in diameter and 70 feet long was completed late in 1926. The furnace would handle from 80 to 100 tons per day of the hard "opalite" ore and was then the largest furnace of its type.

The Opalite deposit was developed by the "glory hole" method. Tunnels were driven beneath the ore body some 80 feet below the outcrops and raises were driven through to the surface. Ore from the surface open pit and from various sublevels was drawn down through the raises to the 80-foot level and hauled to the furnace stockpile.

Operations at the Opalite mine were discontinuous. Severe winters caused the mine and plant to be shut down for as much as three months, and in December 1938 the furnace buildings burned and the plant was closed until early 1940. Between 1927 and 1944 the Opalite mine produced 12,333 flasks from ore averaging approximately 6 pounds of mercury per ton. Production since 1944 has been confined to clean-up operations by lessees and amounts to about 25 flasks. The Bradley Mining Company, which succeeded the Mercury Mining Syndicate in about 1931, continues to hold the property.

In 1931, Bretz discovered high-grade ore in the soft lake beds near his original location. This property, now known as the Bretz mine, was leased to the Bradley Mining Company and was worked in conjunction with the Opalite mine. The ore was mined from open pits with a 3/8-yard shovel and trucked 11 miles to the Opalite furnace. Between 1931 and 1936, 7,751 flasks of mercury were recovered from 33,058 tons of ore. In 1936, reserves minable under existing conditions were exhausted and the property reverted to Bretz on expiration of the Bradley lease.

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* A rock consisting of a mixture of chalcedony, quartz, and opal.

The sharply rising price of quicksilver immediately prior to World War II stimulated search for new ore and in 1940 a discovery was made some 2,000 feet northwest of the 1931-1936 workings. Production from 1940 through 1942 from the new ore body amounted to 2,531 flasks. Little more was produced before final abandonment by the Bradley Mining Company in 1944. This was the last major work at the Bretz mine until 1954 when the preliminary developments leading to the present operation began. Total production for the two early periods of the mine's activity amounted to 10,309 flasks from ore averaging 18.8 pounds of quicksilver per ton.

During World War II, quicksilver prices rose to unprecedented heights and, in meeting the wartime demands of this country and allied nations, developed reserves of domestic producers were rapidly depleted. Materials and labor to develop reserves were scarce and production costs rose. As a result, some mines closed early in the war. Some of these such as the Bretz, could probably have produced much longer at a decelerated rate combined with an adequate development program if a realistic national mineral policy had been established by the government near the end or immediately following the war. Instead, as a thank you for the tremendous efforts of domestic producers, the United States Government in 1944 began purchasing large stocks of quicksilver from abroad. This metal was probably sold at prices well below production costs in order to obtain United States dollar credit. This, of course, caused immediate oversupply and brought about the destruction of the domestic industry. United States production of quicksilver, which reached an all-time peak of 51,929 flasks in 1943, dropped to 37,688 flasks in 1944, to 30,763 in 1945, and by 1950 production had decreased to 4,535 flasks, the lowest point in at least 100 years.

Recent developments at the Bretz mine

Encouraged by rising quicksilver prices and the government stockpiling program initiated in 1954, John Ruiz, a rancher from McDermitt, relocated several of the old Bretz claims and attempted to interest capital in additional exploration. In October, 1954, Ruiz leased the property to the U.S. Mercury Corporation of New York. Jay A. Carpenter, Reno, Nevada, former Director of the Nevada Bureau of Mines, acted as intermediary and manager of initial development. In April 1955, drilling of the property began and application was made for a Defense Minerals Exploration Administration loan. In July 1955, a contract for 4,000 feet of drilling was granted to the Shawano Development Corporation which had, in May 1955, absorbed the U.S. Mercury Corporation. Several new claims were located by Shawano surrounding those held by Ruiz and drilling continued under the direction of J. P. Hart through the latter part of 1955.

The exploratory drilling of the ore body was done with a truck-mounted rotary drill using a $4\frac{1}{2}$-inch roller-type bit. The cuttings were blown from the hole by air and from each 5 feet of hole the cuttings were rolled and sampled. The grade of each sample was determined approximately by panning, and samples estimated ro run more than 3 pounds of quicksilver per ton were assayed. Most of the holes were drilled to a depth of about 60 feet. The deepest was 105 feet.

New ore was discovered about 200 feet northwest of the 1940-1944 Bradley pit. According to John Ruiz, two substantial ore bodies were found -- one about 97 by 280 feet and the other about 14 by 345 feet. The ore averages 25 feet in thickness and is covered by 30 to 50 feet of overburden.

Under the terms of an operating agreement drawn up during 1956, Samuel S. Arentz, mining engineer of Salt Lake City, Utah, agreed to construct a treatment plant and to equip and operate the mine for half-interest in the property. Arentz, retaining the right of management, obtained a portion of the necessary capital for the venture through an agreement with the Comstock Uranium and Oil Company, also of Salt Lake City. This operating combine is known as the Arentz-Comstock Mining Venture.

When the operation began, it was reported that developed reserves were sufficient to maintain production of 150 dry tons per 24 hours through 1957 from ore averaging 8 to 10 pounds of quicksilver per ton. During this past summer, nearly 7,000 feet of exploratory drilling was done toward the development of future reserves. Some additional ore has been found but much more drilling must be done to determine its extent. Several new claims, located about midway between the Bretz and Opalite deposits, remain to be explored when time permits.

Mining and milling at the Bretz mine

Stripping of the ore to develop an open-pit mine was started at the Bretz mine in April 1956, and construction of the flotation plant was begun on August 1 after laboratory metallurgical test results had been checked in a pilot-plant operation conducted by the U.S. Bureau of Mines at Albany, Oregon. The original metallurgical test work leading to the design of the present plant was done by Mr. Keith Kunze (Kunze, 1957), general superintendent for Getchell Mine, Inc., at Golconda, Nevada. The plant was completed in December 1956 and by the end of the year was operating at its rated capacity.

During the process of stripping the ore body in the fall of 1956, approximately 25,000 tons of rock averaging between 3 and 4 pounds of quicksilver per ton was segregated and stockpiled for winter operation. Actual mining of the ore was begun in May 1957 by Wells Cargo, a Nevada trucking firm which has a contract for the mining and hauling of the ore. Mining operations ceased September 1, 1957, and are to be resumed next spring. During the 5-month period, more than 25,000 tons of ore were stockpiled to supply the mill operation during the coming winter months.

Because the ore is erratic, sample holes are drilled on 10-foot centers, and the ore is selectively mined. The ore is very soft and little blasting is required; in general, only alternate sample holes are shot to loosen the ground. Benches are carried approximately 22 feet high, and ore is loaded into dump trucks with a 1 3/4-yard shovel and trucked about a quarter of a mile to the mill stockpile in front of the crushing plant.

From the mill stockpile the ore is fed by scraper through an 8-inch bar grizzly where the small amount of oversize, mainly boulders of "opalite," is removed. From the grizzly the ore crosses a 1-inch vibrating screen. The oversize from the screen, about 25 percent of the feed, is fed to a 10- by 20-inch jaw crusher, then the fines and the crushed product are carried up an incline belt to a 100-ton circular ore bin. From the bin the ore is ground to 90-percent minus 48 mesh in a 5- by 5-foot ball mill in closed circuit with a double-rake classifier. The classifier overflow is fed to a conditioning tank and from there to a 6-cell flotation machine. The flotation concentrates, which contain 50 to 60 percent mercury (dry weight), are pumped to a thickener and then to a 4-foot American-type leaf filter. The resulting filter cake contains about 30 percent water.

From the filter the concentrates are screw-fed to a 6-hearth 54-inch Herreshoff furnace. The furnace, being of larger capacity (about 10 tons per day) than is required for roasting the 1 to 2 dry tons of concentrates, is not operated continuously. The furnace was installed in the latter part of May to replace two 20-inch by 10-foot D-retorts previously used. Good metallurgical results were obtained with the retorts but their capacity was inadequate.

Water for the mill operation is pumped at the rate of 275 gallons per minute from a 600-foot well located near the new site, and power is derived from diesel generators. Approximately 12 men are employed in the operation of the mill. Roy E. Hickman, who had charge of the mill construction, is superintendent and Paul E. Sorenson is chief engineer. A geologic study of the deposit was recently made for the company by S. Alderman of Salt Lake City.

The concentration of cinnabar by flotation before roasting is a process not widely used, although it has long been known that cinnabar when liberated sufficiently from its gangue is easily floated. Grinding the ore to a fineness sufficient to liberate the cinnabar for concentration

is expensive and often economically impossible. Further difficulties arise because of the tendency of cinnabar to slime, and the roasting of the finely ground cinnabar concentrates is often troublesome. Generally the most economical method of treating mercury ores is to crush and roast them directly. However, since the Bretz ore contains 20 to 25 percent water, its treatment by direct roasting is much more expensive than comparable treatment of dry ore. Schuette (1938, p. 167) gives a good example of this in comparing the relative costs incurred by the Bradley Mining Company during the operation of the furnace at the Opalite mine in which ores from both the Opalite and Bretz mines were alternately treated. The capacity of the furnace which was designed to handle 80 to 100 tons per day of the hard dry Opalite ore was reduced by about one-half in treating Bretz ore, and fuel consumption rose from 6 gallons to 13 gallons per ton of ore treated. Fortunately the Bretz ore was of much higher grade.

Due to the difficulty in the direct roasting of the ore the present process was developed which the management reports is more successful economically. The ore is soft and the cinnabar is easily liberated as is attested by the fact that 150 tons of ore per day are ground to adequate fineness in a 5 x 5 ball mill. Recovery is high; less than half a pound of mercury per ton of ore milled is lost in the entire process.

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GEOLOGIC MAPS OF BEND QUADRANGLE AND CENTRAL HIGH CASCADES PUBLISHED

"A geologic map of the Bend quadrangle, Oregon, and a reconnaissance geologic map of the central portion of the High Cascade Mountains," has just been published by the State of Oregon Department of Geology and Mineral Industries in cooperation with the U.S. Geological Survey.

The publication comprises two maps and their descriptive texts printed on one large sheet which folds to a convenient 7- by 11-inch size. The various geologic formations and rock units are indicated by color and pattern. The map of the Bend quadrangle has a scale of 1 inch to 2 miles and shows in detail the geology and topography of the area surrounding Bend and Redmond. The larger reconnaissance map has a scale of 1 inch to 4 miles and shows in a generalized way the geology of the central part of the High Cascades extending from Mount Jefferson to Crater Lake and including the Bend and Newberry quadrangles on the plateau to the east.

Descriptive texts accompanying the maps are written in a nontechnical style, their purpose being to make the geology understandable to the many interested persons who visit or live in this scenic region and wish to interpret what they see.

Author is Howel Williams, Department of Geologic Sciences, University of California. Dr. Williams is an authority on volcanology and long familiar with this region of lava flows, volcanic peaks, and cinder cones. The geologic history, as he shows, is chiefly a complex series of volcanic eruptions of various types, ranging in age from Eocene to Recent, some occurring within the last 1,000 years.

The publication may be obtained from the Department's offices in Portland, Grants Pass, and Baker. Price is $1.00.

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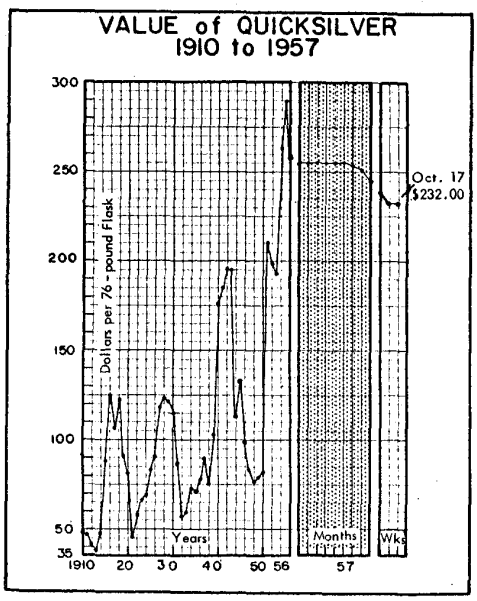
QUICKSILVER PRICE BREAKS



The uneasy price condition which has characterized quicksilver since the middle of the year finally broke early this month. On September 1 the price was $253 a flask (76 pounds). On the first of October the price was $241; on October 17 it was $232. How far the price will drop before leveling off depends on the price it takes to drive the domestic mines out of business. When the last major domestic mine has shut down, the price again will rise. At least that has been the pattern over the past 50 years (see graph) and there is no reason to expect a change.

Reason for the price drop is not hard to deduce. The Government has announced* ". . . sufficient capacity either is planned or now exists to meet presently known mobilization requirements." This can be interpreted to mean that the strategic stockpile for quicksilver has been completed and the substantial requirements of the undisclosed agency for its undisclosed use have been met. Further, the Korean crisis, which prompted the present price rise, has relaxed. This means that the foreign metal which filled the stockpile and supplied the unknown agency for its secret use will seek the markets now being filled by domestic producers. In addition to a lessening of Government purchases, the price drop can also be attributed to the fact that domestic mines have finally reached a position where they are important producers. Historically when this occurs the foreign producers "pull the rug." The most domestic producers can look forward to is the "floor plan." This is a guarantee by the Government to purchase quicksilver at a price of $225 a flask. This program ends upon purchase of 30,000 flasks or at the end of 1958, whichever occurs first.

From the national viewpoint it would seem to be good insurance if a nucleus of this very important strategic mining industry would be maintained. Experience over the past fifty years has proved that foreign imports cannot be depended on, and as it takes several years to bring a domestic property into production, an interim exists when quicksilver is not produced. Also, periodic mining destroys ore reserves as only the high-grade and easily accessible ore is extracted. Being placed at the mercy of a foreign controlled market just doesn't make good sense. If a domestic mining industry were allowed to become established, it would give the nation a dependable quicksilver supply and increase the ore reserves through continuing exploration and planned extraction.

The drop in the quicksilver market is of concern to the State of Oregon. Within the past year two new mines have come into production, and several properties, both new and old, are under exploration. In the second quarter of 1957, Oregon accounted for 13 percent of the nation's production. Four of the nation's 15 principal mines were located in Oregon. Loss of these mines will cut into the State's economy at a time when effort is being directed by many people and agencies toward broadening the State's economic base.

At the next session of Congress the domestic mining industry will fight for its existence. The industry will not ask for all of the nation's mineral business. It will try to get enough, from 10 to 50 percent, to stay alive. How this can logically be refused in light of past experience concerning national defense is difficult to see, but it appears from all present indications that this help will be refused. Quicksilver is just one of many strategic minerals that have been and are being turned over to foreign labor to be produced for us.

H.M.D.

*From U. S. Bureau of Mines Mineral Industry Surveys Mercury Report No. 123, prepared August 23, 1957

LIME PLANT DEDICATED

The Chemical Lime Company's burned lime plant at Wingville siding, Baker County, was formally dedicated on the evening of October 3, 1957, with Governor Holmes lighting the burner on one of the plant's two rotary kilns. Approximately 3,000 persons attended the ceremony and accompanying barbeque.

Construction of this plant was begun in the fall of 1956. When full production is attained, the plant will turn out a yearly total of 72,000 tons of calcined product. This will be marketed in the form of quicklime and hydrated to various industrial consumers - notably carbide manufacturers, steel mills, and paper plants.

Daily requirement of raw limestone needed for the kiln feed will be 400 tons. This will originate from the company's quarry at the head of Marble Creek, where reserves are present in sufficient quantity to insure several decades of sustained production.

Owners of the operation are Messrs. Anthony Brandenthaler and Thomas Dant. Mr. Robert Vervaeke is manager. An article by Mr. Vervaeke discussing all phases of this important new operation will appear in the Ore.-Bin in the near future.

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GOVERNOR APPOINTS NEW BOARD MEMBER

A Baker woman, whose training and experience includes many years of mine development and geological survey work, was named Wednesday by Governor Holmes to the governing board of the State Department of Geology and Mineral Industries. The new board member is Miss Nadie Strayer, twice president of the Eastern Oregon Mining and Mineral Association and now its secretary. She will fill the vacancy left by the resignation of Clint Haight, Jr., also of Baker, who was recently appointed as Baker County representative to the special legislative session. She is the first woman to serve on the board.

Miss Strayer, for many years chief clerk of the senate committee on mining, helped draft the bill setting up the State Department of Geology and Mineral Industries. A graduate of the University of Oregon where she majored in mathematics, engineering, and geology, Miss Strayer was research assistant to the late Dr. Warren D. Smith on a project involving appraisal of mineral lands of southwestern Oregon. This project included writing a documented history of mining in the area from 1855 and was based on studies of records and reports on mines of Coos, Curry, Josephine, Jackson, Lane, and Douglas counties.

Active for 20 years in exploration, development, and mining in eastern Oregon, Miss Strayer developed manganese properties near Pleasant Valley, and tungsten operations in the Chicken Creek tungsten group. She is presently directing exploration work on large copper holdings and has interests in gold, copper, and silver properties of the area.

Miss Strayer's term on the three-member board will expire March 16, 1959. Other members are Mason L. Bingham of Portland, and Lester Child of Grants Pass.

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NEW STONE QUARRY

Mr. Melvin W. Parker of Grants Pass has started a quarrying operation on a deposit of bedded, fine-grained, grayish-green sandstone (flagstone) located 5 miles southwest of Riddle on Cow Creek in Douglas County. The deposit is being leased from the owner, Darrel Carter, Riddle. The stone splits along parallel bedding planes into large slabs from 2 to 10 inches in thickness. Overburden was stripped in early September. Parker reports shipment of 35 tons and an additional 50 tons quarried. A large hydraulic clipping machine is planned for use in cutting the stone to standard widths.

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RUSSIAN CHROME REACHES UNITED STATES MARKETS

Chrome ores continue to be in a most uncertain state. Heavier shipments of Russian chrome ores are due to enter the United States via Canada. The total appears to be enough to definitely affect the market situation in the United States. The Russian ore in most cases runs about 49 percent Cr_2O_3; some of it is as low as 48 percent and some as high as 51 percent. The ratio in some cases is 3 to 1, but often 2.9 or even 2.8. Generally it is classifiable as hard lumpy, though often it contains 25 percent fines - it has been known to contain one third fines.

Many factors indicate the chrome ore market is weak and some suggest that a sizeable drop in prices would bring in consumers. They describe the consumer situation as comfortable. Others believe some large suppliers have sold out for much of 1958 and therefore are asking high prices. There is some feeling ore they sold went to equipment suppliers and will reappear on the market. Doubtless a good amount of the Turkish high grade ore has been sold ahead but there seems little agreement about its being resold. But importers continue to get many offers and some offers come from supplying firms with which they have done business for years. If the lira is devalued, the chrome ore market may be affected.

(From E&MJ Metal and Mineral Markets, October 3, 1957.)

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DIATOMITE EXPLORED IN LAKE COUNTY

The first diatomite mining operations in Northern Lake County got under way in mid-October when Babler Brothers Construction Company of Redmond began stripping overburden to obtain diatomite for testing by Great Lakes Carbon Company. The stripping will soon be completed, according to Bud Pollock of the construction firm, and will require the removal of 30,000 cubic yards. Two Euclid 20-yard scrapers and a D-8 Caterpillar are being used. Hauling to the company's processing plant at Lower Bridge, near Terrebonne, Deschutes County, should get under way October 21 or 22, Pollock said. They will haul on a 24-hour basis using a Hough loader and four truck and trailer outfits. Diatomite is used for filtering and if this test area yields the quality expected a larger area will be mined. Work is taking place on the Richard Schaub place 10 miles southeast of Fort Rock.

(From Lake County Examiner, October 17, 1957.)

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EASTERN OREGON MINING NEWS

Mr. Frank Mayo, Sumpter, Oregon, is setting up a washing plant on a section of unworked placer ground on Cracker Creek, about three miles south of Bourne, Baker County. The plant will consist of a skid-mounted washer of about 75-yards-per-hour capacity. Mr. Mayo plans to work a dry pit, level the coarse tailings, and spread the sands on top. The operation, which will begin production early next year, will employ three men. It is estimated that the available ground, owned by Ed Leeck, Baker, will support a full season's operation.

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Messrs. Wayne Waggoner, Weiser, Idaho, and Gordon West and Jack Milne, Portland, have leased the Paramount quicksilver property, near Greenhorn, Grant County. Attempts are being made to re-open some of the workings for sampling purposes this fall but the area is already under snow and most of the work will necessarily have to be deferred until next season. The property, owned by Mr. Helmer, Greenhorn, was last operated in 1941.

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ASSISTANT SECRETARY FOR MINERALS NAMED

Royce A. Hardy, Jr., of Henderson, Nevada, has been named Assistant Secretary of the Interior for Mineral Resources, to replace Felix Wormser who resigned from this position June 15.

Hardy has been general manager of Manganese Inc., Henderson, Nevada, since February 1956. Prior to that he was general superintendent of the Getchell Mine in Humboldt County, Nevada, for ten years. Born in Reno, May 20, 1921, he received a bachelor of science degree in mining from the University of Nevada in 1947. He also attended the University of Arizona and Stanford University. He served with the United States Army from 1943 to 1946, with more than seven months in the Asiatic-Pacific Theater. Prior to his military service, he was employed for several months by the U.S. Bureau of Mines.

As Assistant Secretary for Mineral Resources, Hardy will supervise the programs of the Bureau of Mines, the U.S.Geological Survey, Office of Oil and Gas, the Defense Minerals Exploration Administration, the Office of Minerals Mobilization, and the Division of Geography. (From The American Mining Congress Bulletin Service, October 7, 1957.)

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LAKE COUNTY U-ORE SHIPMENT MADE

Three carloads of uranium ore from the Lucky Lass mine were shipped by the Lakeview Mining Company on Tuesday, October 15, it was announced by James Poulos, company manager. The ore went to Vitro Chemical Company at Salt Lake City, Utah, for processing. Poulos said ore has been stockpiled at Lakeview for a larger shipment which will be made later.

(From the Lake County Examiner, October 17, 1957.)

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WHAT CARS ARE MADE OF

A weight breakdown of the 1957 Plymouth Belvedere 4-door sedan shows a total of 167½ pounds of nonferrous metals contained in the over-all weight of 3,569.4 pounds. The figures below should closely approximate the other two low-priced cars, and could be projected for total United States production, if carbon steel were adjusted for the heavier weights of cars in the other price classes. The breakdown includes automatic transmission and power steering, but not ignition components, wiper motors, fuel, oil or coolant, items delivered in finished form by outside suppliers.

Metals in pounds:	
Aluminum	77.8
Copper	45.3
Lead	28.5
Zinc	15.9
Plain carbon steel	2274.1
Plain cast iron	370.5
Alloy cast iron	195.2
Alloy steel	159.0
Malleable cast iron	71.3
Others:	
Rubber	177.7
Glass	95.4
Pads, cloth	33.7
Misc.	25.0

(From E&MJ Metal and Mineral Markets, October 3, 1957.)

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