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STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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OREGON'S MINERAL INDUSTRY IN 1952

Metals

Gold, silver, copper, lead, and zinc

Gold production in Oregon probably reached an all time low in 1952. Final figures are not yet available but incomplete reports by the U.S. Bureau of Mines indicate a value for the year of about $188,000. This contrasts with $4,000,000 in 1940. High costs, fixed price of gold, and government gold regulations all serve to discourage gold mining. Placer mining has accounted for more than 90 percent of the production and nearly all of this came from the dredge of the Powder River Dredging Company, Sumpter Valley, Baker County. About 40 small hydraulic mines were active in Josephine, Jackson, Grant, and Baker counties when water was available. Gold lode mining is nearly nonexistent. A small amount of ore from the Buffalo mine in Grant County and the Champion mine in Lane County was shipped to the Tacoma Smelter.

Oregon's copper, lead, and zinc mines remain dormant because of high costs and repressive taxation which discourage venture capital. Some underground exploration work was done at the Silver Peak mine south of Riddle in Douglas County and at the Ruth mine of the Pacific Mining & Smelting Company on the Little North Santiam River in Marion County.

Chromite

Mining and shipping of chrome ore to the government purchasing depot at Grants Pass occupied the center of the stage in the State's mining activities. Producers got a late start because of snow in the mountains, but receipts of ore at the depot started to increase in May and reached a high point from July through October. Weather conditions forced some producers to close down in November.

Prospecting uncovered some new ore deposits, the extent of which may not be evaluated. Concentrating ore continued to be mined at the Sordy property in Josephine County and treated at two small mills. Two mills in the John Day area of Grant County milled ore from properties near John Day. Reportedly new ore, including some of shipping grade, was found. Operators in the John Day area work under a severe handicap because of distance from Grants Pass, and shippers of concentrates from John Day to Grants Pass have paid $20 a ton freight. If production from this section is to be encouraged the government should give attention to providing a freight differential or provide a plan for direct shipment of acceptable ore to a government stockpile.

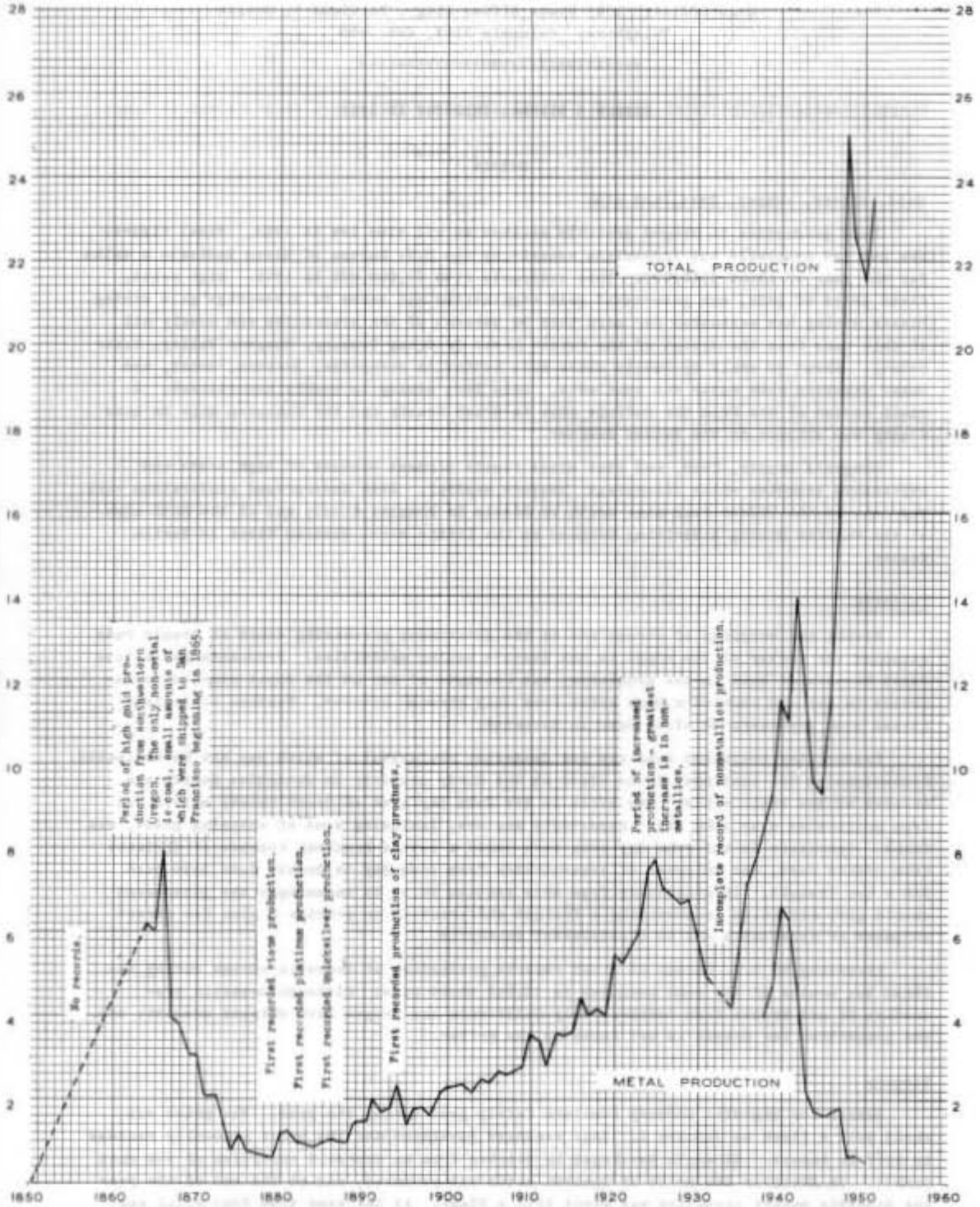
According to U.S. Bureau of Mines reports, production of domestic chrome during the first ten months of the year amounted to 13,652 short tons. Although domestic production is not broken down further, only California and Oregon have shipped domestic ore. The proportion for Oregon is not known by the writer.

Mercury

Demand for domestic mercury remained fairly good during the year. The price was about $212 a flask on January 1. Some weakness developed and the price gradually receded to $187 in August. Strength developed in October from an oversold condition of the spot market. In November the price of Spanish metal was advanced, and at the end of the year the domestic market quotation was about $218 a flask. At the same time E&MJ Metal and Mineral Markets reported that Spanish producers will not name an "official price" but will sell "at the market."

OREGON MINERAL PRODUCTION

(IN MILLIONS OF DOLLARS)



The Bonanza mine in Douglas County operated its furnace throughout the year and also developed some new ore. The Maury Mountain mine in Crook County started to mine ore and to retort some mercury late in the year. The Roba prospect on Murderers Creek in Grant County was active in prospecting early in the year and produced a few flasks of metal.

Government policies have encouraged foreign production at the expense of the domestic industry. Because of this factor, the unstable price situation, repressive taxes, and high operating costs there is no incentive to develop new mercury mines.

Nickel

The Hanna Development Company carried on extensive exploration work at Nickel Mountain near Riddle in Douglas County throughout the year. In addition a great deal of metallurgical testing work was done in continuing similar work of previous years. Contracts with the government were negotiated and certificates of necessity were granted under which rapid amortization of both a mining and a smelting plant was allowed. Total amount involved was announced as more than $28 million. On January 18, 1953, it was announced in the press that the Defense Materials Procurement Agency had entered into a contract with two subsidiaries of M. A. Hanna Company, Cleveland, Ohio, under which the government would purchase nickel ore at Nickel Mountain from the Ore and Coal Corporation for $6 a long ton for 1.5 percent ore, and resell to the Hanna Nickel Smelting Company at the same price for conversion into ferro nickel which will be purchased by the government. A minimum of 95 million pounds of nickel in ferro nickel will be purchased.

Bauxite

Alcoa Mining Company still maintains an office at Hillsboro, Oregon, but no field work was done during 1952 on the high-iron bauxite deposits owned by the company in Columbia and Washington counties.

Asbestos

Diamond drilling of a serpentine asbestos deposit in eastern Grant County was carried on during the summer and fall by the Johns Manville Company of Canada.

Tungsten

A small amount of scheelite was mined at the Mattern mine near Ashland and concentrated at the Van Curler Bros. mill. A new scheelite prospect was found about 1½ miles southwest of Ashland.

Antimony

Some prospecting for antimony was carried on in Jackson County.

Manganese

There was some activity in manganese prospecting in Baker County and a car of ore was shipped to the Ray-O-Vac Company in Salem. Also, deposits were prospected and ore mined at the Ranes property 4 miles from Whitney, Baker County.

Iron

The Orr Engineering and Chemical Company, Portland, Oregon, continued to treat limonite ore in a plant at Scappoose, Oregon. The limonite is mined from the Oregon Charcoal Iron Company deposit 2 miles northwest of Scappoose and is trucked to the plant where it is activated and sold to the Portland Gas & Coke Company for use in removing sulphur from manufactured gas. The Orr Company has also experimented with making paint pigment and in pelletizing the limonite for possible use as a raw material in iron making.

Nonmetallics

Limestone

Quarries of the Oregon Portland Cement Company at Lime, Baker County, and Dallas, Polk County, and the Pacific Portland Cement Company (control of which is now with the Ideal Portland Cement Company) at Marble Mountain, Josephine County, continued active throughout the year. Building construction slackened somewhat the first part of the year but increased near the end. Demand for cement was reported good, and local supplies were augmented by cement brought in from outside the State.

Limestone for calcium carbide was quarried at the Enterprise quarry in Wallowa County by the Pacific Carbide and Alloys Company. Fines in the operation of providing stone of proper size for carbide making are stockpiled for use as agricultural stone.

It has been estimated by the Production and Marketing Administration of the United States Department of Agriculture that Oregon farmers used the following amounts of limestone in 1952:

Estimated amount under the Agricultural Conservation Program	65,000 tons
Estimated amount outside of the Agricultural Conservation Program	5,000
Total	70,000 tons

Limestone supplied in 1952 came from both Oregon and Washington. Stone supplied under the program in 1951 amounted to 61,464 tons valued at $347,917. More than half of this stone came from Washington.

Concrete aggregate

Although demand for sand, gravel, and crushed rock for construction decreased during the first part of the year, it increased in the second part. Government dams required a large quantity as did construction of highways and logging roads. The dollar value has not yet been reported by the Bureau of Mines. Expanded shale used as lightweight concrete aggregate was made in two plants, one in Portland and one near Sunset Tunnel in Washington County. Demand for this material continues to increase.

Perlite

The perlite quarry and plant of Dant & Russell, Inc., Dantore Division, on the Deschutes River south of Maupin was bought by Kaiser Gypsum early in the year. Production of perlite plaster sand continued as before.

Pumice

Production of pumice aggregate used mainly in blocks and concrete pipe continued about as in 1951.

Diatomite

The Great Lakes Carbon Corporation operated the diatomite quarry and plant on the Deschutes River near Terrebonne continuously throughout the year.

Silica

Demand for crushed quartz and granite for poultry grit was good throughout the year. An increased demand for quartz developed because of the needs of the ferro silicon and silicon carbide industries. The only shipper was Bristol Silica Company, Rogue River.

F.W.L.

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NORTHWEST CHROMITES INVESTIGATED FOR REFRACTORY PROPERTIES

The U.S. Bureau of Mines has recently published Report of Investigations 4929 entitled "Refractory properties of Pacific Northwest chromites" in which the results of tests on ores from 7 localities are described.

Four Oregon chromite ores were investigated. These were Krome Corp. concentrates from beach sands in Coos County, Oregon Chrome ore from Josephine County, and Chambers and Iron King ores, both from Grant County. Test bricks made from these ores when compared to commercial refractories showed that, for refractory purposes, ore from the Oregon Chrome mine, Josephine County, was a satisfactory substitute for Rhodesian chrome, and ore from the Chambers and Iron King mines, Grant County, was equal to Cuban chrome. The Krome Corp. concentrate made from black sand in an ancient marine terrace, Coos County, was found usable with corrective additions of high-grade chrome ore.

The publication has 38 pages and includes analyses of the ores, tabulated results of tests, and many illustrations. It may be obtained free of charge from Publication Distribution Section, U.S. Bureau of Mines, 4800 Forbes Street, Pittsburgh 13, Pa.

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MAGNETITE IN MALHEUR COUNTY

The presence of magnetite deposits in an area extending approximately from Brogan to Ironside in northern Malheur County, Oregon, has been a source of interest to local prospectors for many years. Claims have been staked at different times and it is understood that a company of Ontario, Oregon, business men was once organized to develop the showings, but there is little evidence of development work. However, some bulldozing was done on one occurrence during the summer of 1952 by Harry Schaffer of Ontario. The ore consists of finely disseminated magnetite in siliceous rock matrix. Analysis of one grab sample shows 49.72 percent Fe and 27.94 percent SiO_2. Some one-inch octahedron crystals were seen. An examination will be made by the Department when the area is accessible this spring.

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JOSEPHINE COUNTY METALS BULLETIN

A second edition of the Josephine County volume of the Oregon Metal Mines Handbook has just been issued by the State Department of Geology and Mineral Industries. The Department's Metal Mines Handbook, published as Bulletin 14, is a continuing series of volumes, each of which is a catalog of the mines and mineral resources of a particular portion of the State. The Josephine County volume describes, in alphabetical order, all the known mining properties in each of the six mining areas of the county. As the first edition of this volume, published in 1942, has been exhausted and there has been an increased demand for it because of resumption of chromite mining in southwestern Oregon, it was decided to reissue the bulletin together with such up-to-date information as was available. The new edition contains 234 pages and several illustrations. An index map showing location of chromite deposits together with a list of these deposits is included. The volume is designated as 14-C, Volume II, Section 1, Josephine County. It may be purchased at the Portland office of the State Department of Geology and Mineral Industries in the State Office Building or at the field offices in Baker and Grants Pass. If desired, it will be sent postpaid upon receipt of $1.25.

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NEW PIPELINE

Petroleum Administration for Defense has allocated pipe for 103-mile line of Cal-Ore Pipe Line to cost $2,272,000 and run from Crescent City, California, to Medford, Oregon.

(From - Oregon Voter, December 27, 1952, p. 22.)

RADIOACTIVE MINERALS REPORT AVAILABLE

A new edition of a report entitled "Radioactive Minerals the Prospector Should Know" has just been issued by the State Department of Geology and Mineral Industries. The author is David J. White, Department geologist. The first edition, published in 1949, was recently exhausted because of the large demand. The new edition contains 14 pages including an index map, minerals list, and bibliography. There is a brief description of the geology of radioactive mineral deposits together with some suggestions on areas which might be favorable for prospecting. Some standard testing equipment is described. This report, G.M.I. Short Paper No. 18, may be obtained at the Department office in the State Office Building in Portland and in the field offices in Baker and Grants Pass. If desired, a copy will be sent postpaid. The price is 20 cents.

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PROBLEMS AND HOW TO SOLVE THEM
(Condensed from the Lion Oil Company magazine)

Ingenuity, "know-how," and luck recently solved a knotty problem for the giant gasoline plant on the Diamond M field in west Texas.

When the Diamond M gasoline plant's operation hit its stride about a year ago, some 100,000 gallons of butane and 140,000 gallons of propane were recovered daily. But butane and propane are seasonal products, which means that demand for them in fall and winter is very high, while in spring and summer the demand is low. The problem was: what to do with the combined 240,000 gallons of LPG (liquid petroleum gas) products flowing from the plant daily during the "off season." Since the cost of building steel storage tanks was prohibitive, the problem had to be solved in a different way, and it was done by a very ingenious method.

Underlying a great expanse of west Texas, including the Diamond M field, is a stratum of salt about 800 feet below the surface and around 400 feet thick. It was discovered that by dissolving the salt and removing it from its underground bed, a great cavern could be created and used for storage space. Thus the Lion Oil Company has been able to store 2½ million gallons of butane and propane.

The process for developing and utilizing the underground cavern is as follows: A well is drilled to the salt stratum where casing is set to the top of the salt section. Next the salt section is penetrated with the drill bit, after which tubing is set to the base of the salt section. Fresh water, pumped through the tubing, dissolves the salt and the resulting brine is forced out through the casing around the tubing. The brine is stored in huge earthen pits on top of the ground. When the LPG products are ready to be stored, they are pumped into the cavern through the casing of the well. Brine in the cavern, displaced by the LPG products, is forced out through the tubing and transferred to the brine storage pits. When it is time to bring the products out of storage, the brine in the earthen pits is pumped back into the cavern, through the tubing. LPG products, being lighter in weight than brine, are forced out through the casing. During the periods when the products are gone to market, operations are changed again; fresh water is pumped underground, more brine is formed and forced out -- and the result is more cavern.

Today, there are three wells on the Diamond M property -- all of them steadily at work at various times enlarging the underground storage vaults. Eventually, there will be enough underground storage beneath the Diamond M to accommodate 15 million gallons of LPG products.

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PHILIPPINE CHROME PRODUCTION

According to the Minerals News Service of the Philippines Bureau of Mines, from July 1, 1951, to June 30, 1952, the Republic of the Philippines produced chromite ores as follows:

Refractory	373,235 metric tons valued at ₱ 10,312,510	(₱ peso 49.92 cents U.S.)
Metallurgical	38,942 metric tons valued at ₱ 1,963,762	

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IRON

Many inquiries concerning location and characteristics of iron occurrences in the State have been received by the Department in recent months. Therefore the accompanying list was prepared to supply information on questions of this kind.

Editor

HELVETIA DEPOSIT — Washington County

Owner: Abe Zoller

Location: NW¼ sec. 2, T. 1 N., R. 2 W., about 1 mile northeast of Helvetia store, at end of road.

Description: Dense limonite outcrops on flank of low knob. Some ore occurs as float. Ore is apparently in horizontal bed, perhaps a foot thick. There are no known analyses, but specific gravity is determined by Rosenberg to be 3.76.

Informants: F. W. Libbey, verbal report, 1953
F. J. Rosenberg, verbal report, 1953

SCAPPOOSE DEPOSITS — Columbia County

Location: Numerous limonite deposits in area west of Scappoose.

Description: Several reports describe the properties. The following analysis is typical of much of the ore. Fe (dry) 49 to 58 percent, loss on ignition 14 percent, sulphur .025 percent, phosphorus .30 to .85 percent.

References: Williams, Ira A. and Parks, Henry M. - Limonite iron ores of Columbia County, Oregon: Oregon Bur. Mines Mineral Resources of Oregon, vol. 3, no. 3, May 1923.

Bell, L. Gordon - Preliminary report on laterite deposits and occurrences in the Portland region, Oregon: U.S. Geol. Survey Strategic Minerals Inv., July 1945.

Hotz, Preston E. - Iron ore deposit near Scappoose, Columbia County, Oregon: U.S. Geol. Survey Strategic Minerals Inv., unpub. ms., 1942.

Libbey, F. W., Lowry, Wallace D., and Mason, Ralph S. - Ferruginous bauxite deposits in northwestern Oregon: Oregon Dept. Geology and Min. Industries Bull. 29, 1945.

U.S. Bureau of Mines - Scappoose mine, Columbia County, Oregon: War Minerals Rept. 186, 1944.

Wilkinson, W. D., Lowry, W. D., and Baldwin, E. M. - Geologic Map of the St. Helens quadrangle, Oregon-Washington: Oregon Dept. Geology and Min. Industries Map, 1945.

Oregon Dept. Geology and Min. Industries - Oregon Metal Mines Handbook Bull. 14-D, Northwestern Oregon, p. 31-33, 1951.

Zapffe, Carl - Iron ores of the Pacific Northwest: Steel, vol. 114, Apr. 1944; Iron-bearing deposits in Washington, Oregon, and Idaho: Raw Materials Survey Resource Report No. 5, p. 55, 1949.

HUTCHISON FARM Washington County

Owner: Lawrence Hutchison ?

Location: SE¼ SW¼ sec. 1, T. 2 N., R. 3 W., just east of the Hutchison house and about 50 feet lower, on hillside.

Description: Fairly solid limonite outcrops on hillside, but areal extent is unknown. Length of exposure is about 40 feet. There are no analyses.

Reference: Libbey, F. W., Lowry, W. D., and Mason, R. S. - Ferruginous bauxite deposits in northwestern Oregon: Oregon Dept. Geology and Min. Industries Bull. 29, 1945. (Map of Hutchison-Nixon project in pocket.)

OSWEGO IRON MINE Clackamas County

Owner: Unknown

Location: On Iron Mountain south of Lake Oswego.

Description: Property has been idle for many years. It was formerly operated as an underground mine to supply iron ore to blast furnace at Oswego. Deposit depleted. Located on expensive residential property.

Reference: Williams, Ira A. and Parks, Henry M. - Limonite iron ores of Columbia County, Oregon: Oregon Bur. Mines Mineral Resources of Oregon, vol. 3, no. 3, May 1923.

TOLMAN IRON Gold Hill District Jackson County

Owner: C. A. C. Tolman, Gold Hill, Oregon

Location: SW¼ sec. 3, T. 36 S., R. 3 W., on ridge northwest of State Highway 234, and 2.1 miles north of the town of Gold Hill.

Description: Numerous cuts and an adit (now caved) expose nearly vertical zone in which magnetite and some hematite occur in a lime-igneous intrusive contact. Analysis (Hodge) gives: Fe 51.63 percent, phosphorus .060 percent. The ore occurs in discontinuous masses. Dip needle survey reported in second reference below.

References: Oregon Dept. of Geology and Min. Industries - Oregon Metal Mines Handbook, Bull. 14-C, vol. II, sec. 2, Jackson County, p. 113, 1943.

Hodge, Edwin T. - Available raw materials for a Pacific Coast iron industry, vol. 5, pt. 1, p. 58, U.S. Corps of Engineers, North Pacific Div., 1938.

EDWARDS RANCH Wheeler County

Owner: Fred W. Edwards, Fossil, Oregon

Location: S½ sec. 13?, T. 7 S., R. 21 E., approximately 2 miles south of Fossil, .85 mile of which is on the road to Antelope, and 1 mile to the west and south on the county road.

Description: Limonite float is scattered over one acre on west hillside, probably originating in bed several inches thick near the top of the slope. Areal extent has not been determined. Analysis gives: Fe 55.16 percent. Partially explored by bulldozer cut.

Reference: Oregon Dept. Geology and Min. Industries Mine Report File, Wheeler County.

FITZGERALD RANCH Wheeler County

Owner: Mark Fitzgerald, Mitchell, Oregon ?

Location: Sec. 9, T. 11 S., R. 20 E., on county road.

Description: Massive limonite is said to occur in two veins. Analysis gives: Fe 52.10 percent.

Reference: Oregon Dept. Geology and Min. Industries Mine Report File, Wheeler County.

TROUT CREEK LIMONITE Ashwood District Jefferson County

Owner: Unknown

Location: Sec. 28, T. 9 S., R. 16 E.

Description: Lavoy Swanson, Ashwood, submitted a sample of limonite for identification. It is said to occur as float over 80 acres. None was found in place. No analysis.

Reference: Letter in Oregon Dept. Geology and Min. Industries file from L. C. Swanson, May 24, 1952.

CURRY COUNTY DEPOSITS

Magnetite occurs in cemented black sand at Horse Sign Butte and in "boulder deposits" on Wake Up Riley Ridge and other localities. Black sand deposit contains about 0.5 percent vanadium (analysis by Department). Boulder deposits may contain copper minerals with small percentage of nickel and cobalt. No development of boulder deposits has been attempted because of probable limited individual extent.

References: Allen, J. E. and Lowry, W. D. - Horse Sign iron deposit: Oregon Dept. Geology and Min. Industries unpublished report, 1942.

Butler, G. M. and Mitchell, G. J. - Preliminary survey of the geology and mineral resources of Curry County, Oregon: Oregon Bur. Mines and Geology Mineral Resources of Oregon, vol. 2, no. 2, Oct. 1916.

HAMMOND BLACK SAND Clatsop County

Ownership: Clatsop County Bio-Products Laboratory, Point Adams Packing Company and others.

Location: South bank of Columbia near town of Hammond, approximately 10 miles west of Astoria in NW¼ sec. 9, T. 8 N., R. 10 W., and SW¼ sec. 5, T. 8 N., R. 10 W.

Description: Black sand containing as much as 40 percent magnetite occurs in a layer about 3 feet thick by 500 feet by 800 feet.

References: Kelly, J. V., Columbia River magnetite sands, Clatsop County, Oregon, and Pacific County, Washington, Hammond and McGowan deposits: U.S. Bur. Mines Rept. Inv. 4011, 1947.

Oregon Dept. Geology and Min. Industries - Oregon Metal Mines Handbook, Northwestern Oregon, Bull. 14-D, p. 25, 1952.

Zapffe, Carl - Iron bearing deposits in Oregon, Washington, and Idaho: Raw Materials Survey Resource Report no. 5, p. 44, 1949.

POWDER RIVER IRON Sparta District Baker County

Owner: Clyde Wilkins and others

Location: In the foothills bordering Powder River in Tps. 8 and 9 S., R. 44 E.

Description: Dark red to black, dense hematite occurs in a series of widely separated lenses or pods in schist and gabbro. Individual pod size varies from 3 to 5 feet in width, 30 to 70 feet in length. Typical analysis - 67.0 percent Fe, 1.0 percent TiO_2, 0.017 percent phosphorus, trace sulphur. Tonnage small.

References: Ross, C. P.- The geology of part of the Wallowa Mountains: Oregon Dept. Geology and Min. Industries Bull. 3, 1938.

Wagner, N. S. - Powder River Consolidated Mines Company : Oregon Dept. Geology and Min. Industries unpublished report, 1944.

SCHAFFER IRON Malheur County

Owner: Harry Schaffer, East Idaho Avenue, Ontario, Oregon

Location: Sec. 9, T. 16 S., R. 41 E., 12 miles from highway and railroad.

Description: Finely disseminated magnetite in siliceous rock matrix. Some pieces show copper staining. Grab sample assayed 49.72 percent Fe.

Reference: Wagner, Norman S. - Magnetite in Malheur County: Oregon Dept. Geology and Min. Industries unpublished report, January 1953.

EGGER MAGNETITE Greenback District Josephine County

Owner: O.& C. land

Location: Sec. 28, T. 33 S., R. 5 W., ½ mile from King Mountain road.

Description: Massive magnetite with some malachite along fractures. Analysis by Department gave Fe 50.11 percent, Cr_2O_3 0.9 percent, SiO_2 11.08 percent, Cu 1.20 percent.

Reference: Oregon Dept. Geology and Min. Industries SIR, Sherman Egger, Sept. 1951.

JOSEPHINE CREEK MAGNETITE Waldo District Josephine County

Owner: Unknown

Location: Josephine Creek

Description: Nodular magnetite found as result of placer operations.

Informants: Verbal reports from placer miners, etc.

MOSS MAGNETITE Illinois River District Josephine County

Owner: Ed Moss, c/o Don Barnes, 115 S.W. "H" Street, Grants Pass, Oregon.

Location: NW¼ sec. 3, T. 38 S., R. 9 W., ½ mile from Lower Illinois River road.

Description: Magnetite assaying Fe 66.12 percent, Ni 0.047 percent.

Reference: Oregon Dept. Geology and Min. Industries, SIR, Ed Moss, July 1951.

GILLIAM MAGNETITE Tiller-Drew District Douglas County

Owner: U.S. Forest Service

Location: Sec. 3, T. 31 S., R. 2 W., 1 mile from Tiller-Drew road.

Description: Massive black magnetite assaying 68.88 percent Fe.

Reference: Oregon Dept. Geology and Min. Industries, SIR, L. F. Gilliam, May 1951.

BULLIS HEMATITE Gold Beach District Curry County

Owner: Howard Bullis, Carpenterville, Oregon

Location: Sec. 33, T. 38 S., R. 14 W.

Description: Red hematite assaying 67.9 percent Fe_2O_3.

Reference: Oreg. Dept. Geology and Min. Industries, SIR, Howard Bullis, Sept. 1951.

AUMSVILLE LIMONITE Marion County

Owner: James E. Towle, Aumsville, Oregon

Location: Sec. 24, T. 8 S., R. 2 W., 1 mile north of Aumsville, Marion County.

Description: Limonite. Analysis shows Fe 51.32 percent, Al_2O_3 4.90 percent, SiO_2 3.44 percent, ignition loss 16.43 percent.

Reference: Libbey, F. W., Lowry, W. D., and Mason, R. S. - Ferruginous bauxite deposits in northwestern Oregon: Oregon Dept. Geology and Min. Industries Bull. 29, p. 81, 1945.

R.S.M.

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METAL PRICES

Metal prices for the week ending February 5 are given by E&MJ Metal and Mineral Markets as follows:

Copper, (domestic) 24½ cents per pound; (foreign) 34.792 cents. It is believed that the domestic price is certain to rise substantially higher between now and April 30, and most observers believe that the price could rise to 30 cents or more. Demand for copper continues active. Congress has approved suspension of the import duty on copper to June 30, 1954.

Lead, 13½ cents New York, and shows a downward revision of the domestic price, which was a reflection of an unsettled and lower London market.

Zinc, 11½ cents per pound East St. Louis. Demand for galvanizing grade has not met expectations and offerings of foreign metal have affected the market so that the price was lowered half a cent per pound on February 3. Price in London has also been weak and lower.

Quicksilver, $208-210, New York. Because of selling pressure, lower prices prevailed. Spot metal was obtainable at this price or $2 lower than in the preceding week. Nearby delivery metal is available at $205 and the market was weak.

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NEW ALUMINUM PLANTS FOR OREGON

An AP dispatch from Washington, D.C., under date of January 26, 1953, announced that Harvey Machine Company, Inc., of Torrance, California, announced plans to build a $20,000,000 rolling mill for the production of sheet, strip, and circular aluminum. The announcement said that the plant will be financed privately and will be erected at Torrance.

It has been announced also that the Defense Production Administration has granted a certificate of necessity to the Harvey Machine Company for the fast writeoff of the expense of building a new aluminum reduction plant at The Dalles, Oregon. The certificate involves $65,250,000 and permits Harvey to write off 85 percent of the cost of the new plant and facilities over a period of five years.

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OREGON NICKEL PROJECT

One of the most important events in Oregon mining history took place January 16 in Washington, D.C., when the Defense Materials Procurement Agency signed a contract with Hanna Coal and Ore Corporation and the Hanna Nickel Smelting Company, both subsidiaries of the M. A. Hanna Company, Cleveland, Ohio, for the production of nickel from Nickel Mountain near Riddle, Douglas County, southwestern Oregon. The contract calls for the production of from 95,000,000 to 124,000,000 pounds of nickel in ferronickel which will contain at least 25 percent nickel and not more than 75 percent iron. The Hanna Coal and Ore Corporation agrees to develop the mine on Nickel Mountain at its own expense to cost approximately $4,300,000. Ore from the deposit will be sold to the Government at $6 a ton. In turn, the Government will sell the ore to the Hanna Nickel Smelting Company at the same price and the smelting company will treat the ore in an electric furnace plant to produce the ferronickel. This plant will be located about 2 miles down the mountain from the mine and will consist reportedly of four primary furnaces, one refining furnace, and two auxiliary furnaces.

It was announced in the press on February 3 that according to H. L. Pierce, Vice President of Hanna Coal and Ore Corporation and of Hanna Nickel Smelting Company, a contract has been awarded to the Bechtel Corporation, San Francisco, to handle the design, engineering, and construction of the nickel smelting plant at Riddle.

The Hanna Smelting Company will use a patented process developed in France by the Societe D'Electro-Chimi, D'Electro Metallurgie et des Acieries Electrique D'Ugine. This process has been used in treating New Caledonia ores having characteristics similar to the nickel silicate ore on Nickel Mountain. The contract price is 79.39 cents per pound for the first 5,000,000 pounds of nickel produced in the ferroalloy and 60.5 cents per pound thereafter.

The Government agrees to advance $24,800,000 for construction of the smelter and related expenses. The contract includes rapid amortization of the facilities installed.

The importance of this development to Oregon cannot be overemphasized. Nickel is one of the most strategic of metals needed in national defense and Nickel Mountain contains by far the largest deposit of nickel ore known in the United States. Moreover, the economy of the State will be greatly benefited by this large production of new wealth.

F.W.L.

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NEW COMPANY TO BUILD METALLURGICAL PLANT IN OREGON

According to E&MJ Metal and Mineral Markets, the Apex Smelting Company of Chicago has announced the formation of National Metallurgical Corporation in which Apex and American Smelting and Refining Company each has a half interest. The National Metallurgical Corporation will construct and operate a pilot plant at Springfield, Oregon, for production of aluminum-silicon metal from clays. It is planned to have the plant in production by June 1 of this year. Officers are W. A. Singer, President; R. D. Taylor, Vice President; R. K. Beck, Vice President; L. Lippa, Secretary and Treasurer. Directors, including officers, are: Edgar L. Newhouse, Jr., Leo Halpern, James B. Wescott, Gordon W. Reed, Robert D. Bradford, and Oscar S. Straus.

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U.S. COURT OF CLAIMS - L-208 HEARINGS

Hearings started January 26 before Commissioner William E. Day of the U.S. Court of Claims, for the purpose of receiving evidence relating to the issuance of Order L-208 by the War Production Board, which summarily closed the nation's gold mines in October 1942.

The present action before the Court of Claims would have been limited to comparatively few mining companies, but under a bill sponsored by Senator Pat McCarran (Dem., Nev.) - Public Law 532, 82nd Congress, the Statute of Limitations was waived until July 14, 1953. All claims for damages, resulting from Order L-208, must be filed with the Court of Claims on or before that date.

Sixteen gold mining companies and individuals are joined in the present action. They are: Homestake Mining Company, South Dakota; Idaho-Maryland Mines Corporation, California; Central Eureka Mining Company, California; Alaska-Pacific Consolidated Mining Company, Alaska; Oro Fino Consolidated Mines, Inc., California; Bald Mountain Mining Company, Inc., South Dakota; Ace Dredging Company, California; Alabama-California Gold Mining Company, Inc., California; Ashland Mine, Inc., Nevada; Consolidated Chollar Gould and Savage Mining Company, Inc., Nevada; Edgecombe Exploration Company, Inc., Alaska; Ermont Mines, Inc., Montana; F. G. Gibson, California; Golden Eagle Mine, Nevada; Fred and Dora L. Lyman, Arizona; and Paul Nardin, Colorado.

The Homestake Mining Company is presenting the case for this group, but counsel for all other parties are present and will participate in the hearings at their discretion.

Shaw Livermore, an economist with WPB during World War II, was the first witness, testifying as to the materials control procedures and general policies of WPB, prior to the issuance of Order L-208.

Livermore's testimony, to parts of which strenuous objection was made by government counsel but overruled by Commissioner Day, clearly pointed up the fact that WPB was established and empowered solely to issue orders and administer controls directly affecting the manufacture and consumption of critical materials.

The next witness was Dr. Wilbur A. Nelson, who headed the WPB Mining Division at the time L-208 was issued, and administered the order for the Government. Nelson was on the stand for two days and presented testimony, again over strong objection from Government counsel, on the series of events leading up to and following the issuance of L-208. Many photostatic copies of WPB records were introduced in evidence, clearly corroborating Nelson's testimony to the effect that he did everything possible within his advisory position in WPB to prevent the issuance of the Gold Mine Closing Order.

Nelson further pointed out that, rather than a shortage in the supply of critical materials for defense, as stated in Order L-208, the true reason for the order was an erroneous belief by the Labor Division of WPB that over 10,000 gold miners would be released by the closing of the mines, and would gravitate to the copper mining industry. The testimony subsequently revealed that, as a manpower measure, the order was unenforceable and that no attempt was ever made to so enforce it, because no agency of the Government had the right or power to compel the transfer of labor from one industry to another; and it was further revealed by the Records Branch of WPB at a later date -- in pointing out specifically that L-208 was not achieving desirable results -- that not more than one hundred gold miners had gone into nonferrous mines and remained for more than a year.

Additional witnesses during the first week's hearings were Senator Francis Case (Rep., S.D.), former U.S. Senator Chan Gurney of South Dakota, and Guy N. Bjorge, Vice President of Homestake Mining Company.

Senators Case and Gurney were two of several members of Congress who had appeared before WPB in protest against L-208. They offered testimony to show that WPB had had sufficient reason to believe that L-208 could not relieve the manpower shortage in the copper mines, nor that it could appreciably affect the supply of critical materials for defense.

Bjorge testified as to the operation of the Homestake Mine prior to the closing order, and then pointed out that Homestake could have operated at a limited rate for the duration of the war, without experiencing such extensive damage, had their priority privileges simply been cancelled, in lieu of the outright closing order.

It is expected that the present hearings will be completed within two weeks. The evidence received by Commissioner Day will be presented to the Court of Claims later in the year, and the Court's ruling will determine the extent of government liability, if any, resulting from the issuance of L-208. If liability is found to exist, each claimant will then be required to establish the amount of damages.

(From: The American Mining Congress Bulletin Service, February 2, 1953.)

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NO SALE FOR OLD BONES

The market for fossil material, at least as far as most publicly supported museums are concerned, is practically nonexistent. The information comes from Dr. George Gaylord Simpson, Director of the Department of Geology and Paleontology of the American Museum of Natural History. Most museums, it seems, have limited funds for purchasing fossil material and many will not even accept fossils as a gift unless they are collected carefully and complete data are available concerning their occurrence and age.

Scientific-supply houses will buy fossils occasionally, but careful inquiry should be made before going to any great expense of collection. Dr. Simpson suggests that inexperienced collectors who find vertebrate fossils should get in touch with the nearest museum or paleontologist before attempting removal.

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"FREE" GOLD MARKETS

Pick's World Currency Report quoted on bar gold, free market, per fine ounce, as follows:

	Dec. 31	Jan. 31
New York, transit	$37.60	$37.85
Manila	37.80	41.10
Hong Kong	40.50	40.90
Bombay	43.00	47.35
Tangier	37.50	37.80
Beyrouth	37.55	37.90
Paris	39.30	38.95
Buenos Aires	39.75	40.50

(From: E&MJ Metal and Mineral Markets, February 5, 1953.)

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INDUSTRIAL MINERALS DIRECTORY PUBLISHED

A directory of Pacific Northwest industrial minerals producers has just been issued by the Raw Materials Survey, 701 Woodlark Building, Portland. Producers of thirty-three mineral commodities are listed in the Survey's Information Circular No. 8. Territory embraced in the canvass of producers includes British Columbia, Montana, Idaho, Washington, and Oregon. Twenty-one Oregon producers appear in the list which does not include producers of brick and sand and gravel.

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STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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LIST OF ACTIVE MINES IN OREGON
1953

Many requests are received annually for names of active Oregon mining properties. The list does not include brick and tile plants, sand and gravel quarries, or rock crushers.

Ed.

Building Stone

Northwest Granite Co. Haines, Oregon	Baker County Sec. 27 T. 7 S., R. 39 E.
Pacific Cut Stone Co. (Tuff) C/o Mutual Materials Seattle, Washington	Jefferson County Sec. 9 T. 9 S., R. 15 E.
Perma Building Stone Co. (Tuff) Bend, Oregon	Deschutes County Plant in Bend
Rainbow Rock Quarry (Tuff) D. A. Temple Brightwood, Oregon	Wasco County Sec. 11 T. 6 S., R. 11 E.
Rocky Butte Quarry (Basalt) Joe Marsden Portland, Oregon	Multnomah County Quarry at Rocky Butte
Tuff Stone Co. Frank Singletary Portland, Oregon	Marion County Sec. 29 T. 8 S., R. 1 E.

Chrome Concentrating Plants

Ashland Mining Co. Van Curler Bros. Ashland, Oregon	Jackson County Sec. 6 T. 39 S., R. 1 E.
Birdseye Creek Mill Roy A. Mills and W. H. Holloway Gold Hill, Oregon	Jackson County Sec. 27 T. 36 S., R. 4 W.
Bristol-Baker F. I. Bristol Grants Pass, Oregon	Curry County Sec. 36 T. 40 S., R. 11 W.
Bowers Mill Dana W. Bowers Medford, Oregon	Josephine County Sec. 3 T. 35 S., R. 8 W.
Chrome Milling Co. Rice Brothers Takilma, Oregon	Josephine County Sec. 23 T. 40 S., R. 8 W.
Foster Mill Ernest Foster Grants Pass, Oregon	Josephine County Sec. 28 T. 37 S., R. 9 W.
Freeman & Twombly Mill W. B. Freeman and L. Twombly Cave Junction, Oregon	Curry County Sec. 11 T. 38 S., R. 10 W.
Grants Pass Chrome Mill Mary Ellen Dieter Sunny Valley, Oregon	Josephine County NW "F" Street Grants Pass, Oregon

Chrome Concentrating Plants (cont.)

King Mill Franklin & Elmo King Grants Pass, Oregon	Josephine County Sec. 31 T. 37 S., R. 9 W.
Laughlin Engineering Co. Medford, Oregon	Jackson County 1½ miles W. of Eagle Point
McCaleb Mill R. E. McCaleb Selma, Oregon	Curry County Sec. 24 T. 38 S., R. 10 W.
Southwest Mines Inc. Dale H. Franklin Medford, Oregon	Josephine County Sec. 2 T. 37 S., R. 7 W.
Tri-County Milling & Concentrating Corp. E. R. Wells, et al John Day, Oregon	Grant County Sec. 26 T. 13 S., R. 31 E.

Chrome Mines

Ali Baba Chrome John Rodwick Grants Pass, Oregon	Josephine County Sec. 31 T. 40 S., R. 7 W.
Althouse Chrome Mine C. C. Beck Holland, Oregon	Josephine County Sec. 23 T. 40 S., R. 7 W.
Big Bear Fred Langley and Claude Dean Grants Pass, Oregon	Josephine County Sec. 35 T. 36 S., R. 8 W.
Black Diamond Mine Marlin Williams Grants Pass, Oregon	Josephine County Sec. 31 T. 40 S., R. 6 W.
Black King Mine Donald Foster Kerby, Oregon	Josephine County Sec. 24 T. 38 S., R. 9 W.
Black Nugget Chrome Gordon Leonard and D. D. Austin Bridgeview, Oregon	Josephine County Sec. 11 T. 41 S., R. 8 W.
Black Streak Chrome Murphy Young Kerby, Oregon	Josephine County Sec. 19 T. 39 S., R. 9 W.

Chrome Mines (cont.)

Chapman Peak Chrome Oregon Caves Lumber Co. Grants Pass, Oregon	Josephine County Sec. 14 T. 39 S., R. 8 W.
Chetco Mining Co. F. I. Bristol, et al Grants Pass, Oregon	Curry County Secs. 2, 3, 10 T. 39 S., R. 10 W.
Chollard Chrome Mine M. E. Hughes Murphy, Oregon	Josephine County Sec. 17 T. 40 S., R. 7 W.
Chrome King Paul Fattig Wonder, Oregon	Josephine County Sec. 32 T. 40 S., R. 9 W.
Chrome King Mine E. E. Thompson Glendale, California	Josephine County Sec. 36 T. 37 S., R. 10 W.
Deep Gorge Mine James N. & Max Grissom Selma, Oregon	Josephine County Sec. 32 T. 37 S., R. 9 W.
Dry Camp Mickey Elliott John Day, Oregon	Grant County Sec. 8 T. 14 S., R. 33 E.
Eight-Dollar Chrome Glen, Tom, Murphy Young Kerby, Oregon	Josephine County Sec. 20 T. 38 S., R. 8 W.
Esterly Mine R. F. Oliphant Cave Junction, Oregon	Josephine County Sec. 22 T. 40 S., R. 8 W.
Gardner Chrome Fred Gardner Harbor, Oregon	Curry County Sec. 10 T. 39 S., R. 11 W.
Glade Creek Chrome Wallace A. Budden Medford, Oregon	Jackson County Sec. 29 T. 39 S., R. 1 W.
God's Little Acre Edwin Cook and R. J. Nauve O'Brien, Oregon	Josephine County Sec. 32 T. 40 S., R. 9 W.
Inman & Leonard Chrome Jack Leonard and Joe Inman Grants Pass, Oregon	Josephine County Sec. 21 T. 37 S., R. 9 W.

Chrome Mines (cont.)

Jackson Chrome Roy Jackson Selma, Oregon	Curry County Sec. 11 T. 38 S., R. 10 W.
Last Drink Edwin N. Cook and R. J. Nauve O'Brien, Oregon	Josephine County Sec. 7 T. 41 S., R. 9 W.
Lucky Star E. K. McTimmonds Selma, Oregon	Josephine County Sec. 21 T. 37 S., R. 9 W.
Lucky Strike Chrome Glen Young Kerby, Oregon	Josephine County Sec. 18 T. 39 S., R. 8 W.
Mammoth Chrome O. L. Moore Wolf Creek, Oregon	Josephine County Sec. 28 T. 33 S., R. 5 W.
Mary Walker Claim Louis A. Robertson Galice, Oregon	Josephine County Sec. 22 T. 36 S., R. 9 W.
McCaleb Chromite R. E. McCaleb Selma, Oregon	Curry County Secs. 11, 12 T. 38 S., R. 10 W.
Mockingbird Chrome A. R. Strickland Grants Pass, Oregon	Josephine County Sec. 28 T. 37 S., R. 9 W.
Mohawk Chrome Mine Carl Stevens Selma, Oregon	Josephine County Sec. 29 T. 38 S., R. 9 W.
Molly No. 1 Claim Colin B. and Levi V. Campbell Grants Pass, Oregon	Josephine County Sec. 29 T. 40 S., R. 9 W.
Munger Creek Chromite W. C. Lind Grants Pass, Oregon	Josephine County Sec. 25 T. 38 S., R. 6 W.
Nigger Mine Louis A. Robertson Galice, Oregon	Josephine County Sec. 24 T. 36 S., R. 9 W.
Oregon Chrome Mine W. S. Robertson Grants Pass, Oregon	Josephine County Sec. 21 T. 37 S., R. 9 W.

Chrome Mines (cont.)

Onion Springs Mining Corp. H. H. Wilson Azalea, Oregon	Jackson County Sec. 17 T. 33 S., R. 4 W.
Pearsoll Mine Ernest Foster Grants Pass, Oregon	Curry County Sec. 2 T. 38 S., R. 10 W.
Potato Patch Mine E. R. Wells John Day, Oregon	Grant County Sec. 3 T. 14 S., R. 31 E.
Rainy Day Mine Glenn Shippen Canyonville, Oregon	Douglas County Sec. 15 T. 30 S., R. 4 W.
Rock Creek Chrome Claims Edwin Cook and R. J. Nauve O'Brien, Oregon	Josephine County Sec. 3 T. 41 S., R. 9 W.
Salt Rock Mine Pat Arnot Grants Pass, Oregon	Josephine County Sec. 6 T. 36 S., R. 7 W.
Shade Mine Roy Hills and Pieren Bros. Grants Pass, Oregon	Josephine County Sec. 21 T. 37 S., R. 9 W.
Shady Cove H. Z. Bielenberg Galice, Oregon	Josephine County Sec. 11 T. 36 S., R. 9 W.
Sordy Mine Dana W. Bowers Medford, Oregon	Josephine County Sec. 14 T. 36 S., R. 9 W.
Sourdough Mine Ben Baker, et al Grants Pass, Oregon	Curry County Sec. 36 T. 40 S., R. 11 W.
Sowell Chrome R. G. Sowell Cave Junction, Oregon	Josephine County Sec. 30 T. 40 S., R. 8 W.
Squaw Creek Chrome R. E. Williams and Brooks Bros. Takilma, Oregon	Josephine County Sec. 33 (?) T. 37 S., R. 8 W.
Tennessee Pass Chrome Murphy Young Kerby, Oregon	Josephine County Sec. 12 T. 39 S., R. 9 W.

Chrome Mines (cont.)

Twin Cedars R. E. McCaleb Selma, Oregon	Josephine County Sec. 6 T. 38 S., R. 9 W.
Wonder Mine W. B. Freeman and L. Twombly Cave Junction, Oregon	Curry County Secs. 11, 14 T. 38 S., R. 10 W.

Gold Lode Mines

Buffalo Mine J. P. Jackson, Jr. Granite, Oregon	Grant County Sec. 14 T. 8 S., R. 35½ E.
East Eagle Mine Rawleigh Chadwell Baker, Oregon	Baker County Secs. 17, 18 T. 6 S., R. 44 E.

Gold Placers
(Mostly seasonal operations)

Cal.-Ore. Placer Ed Carlson Galice, Oregon	Josephine County Secs. 2, 3 T. 35 S., R. 8 W.
Goff Mine C. C. Clark Leland, Oregon	Josephine County Sec. 5 T. 34 S., R. 6 W.
Golden Bar Placer R. L. Pancost Merlin, Oregon	Josephine County Sec. 2 T. 35 S., R. 8 W.
Leipold Placer H. Brunswick Pieren Bros. Galice, Oregon	Josephine County Sec. 3 T. 35 S., R. 8 W.
Lewis Placer Bud Lewis Galice, Oregon	Josephine County Sec. 36 T. 34 S., R. 8 W.
Pankey Placer Bert Pankey Merlin, Oregon	Josephine County Sec. 10 T. 35 S., R. 8 W.
Pedro Bros. Placer Huntington, Oregon	Baker County Lower Connor Creek

Gold Placers (cont.)

Powder River Dredging Co. Sumpter, Oregon	Baker County Upper Sumpter Valley
Spanish Gulch Placer Sydney Zintner Antone, Oregon	Wheeler County Near Antone
Tennessee Gulch Placer Ray Rife Glendale, Oregon	Douglas County Sec. 2 T. 33 S., R. 5 W.
United Mining & Metals Corp. Henry L. Bruneau Portland, Oregon	Baker County Secs. 10, 15, 21, 22 T. 12 S., R. 39 E.
Winterville Placer A. Brandenthaler Baker, Oregon	Baker County Sec. 16 T. 10 S., R. 35½ E.

Lightweight Aggregate Producers

Cascade Pumice Lloyd A. Williamson 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) Leroy E. Grote Redmond, 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. & Sec. 33 T. 14 S., R. 13 E.
Great Lakes Carbon Corp. (Diatomite) Dicalite Division Lower Bridge, Oregon	Deschutes County Sec. 16 T. 14 S., R. 12 E.

Lightweight Aggregate Producers (cont.)

Harney Concrete Tile Co. (Pumice) Don Robbins Burns, Oregon	Harney County Sec. 3 T. 24 S., R. 30 E.
Lady Frances Mine (Perlite) Kaiser Gypsum Div. Kaiser Industries Dant, Oregon	Wasco County Sec. 24 T. 6 S., R. 13 E.
Northwest Aggregates, Inc. (Expanded shale) Portland, Oregon	Washington County Sec. 24 T. 3 N., R. 5 W.
Red Rock Cinders (Cinders) Don E. Hurrle and M. E. Roberts Portland, Oregon	Deschutes County Sec. 29 T. 14 S., R. 13 E.
Smithwick Concrete Products Co. (Expanded shale) Otto C. Frei Portland, Oregon	Washington County T. 3 N., R. 4 W.
Western Pumice Sand Co. Thomas Philipsen Klamath Falls, Oregon	Klamath County Sec. 20 T. 36 S., R. 15 E.

Limestone

Burch Gravel Co. Route 1 Sheridan, Oregon	Polk County Secs. 19, 20, 29, 30 T. 6 S., R. 6 W.
Lime Products Co. T. T. Leonard Dallas, Oregon	Polk County Sec. 11 T. 8 S., R. 6 W.
Oregon Portland Cement Co. (Quarries at Lime and Dallas; plant at Oswego) Portland, Oregon	Baker & Polk counties Secs. 26,27,34,35 T. 13 S., R. 44 E. & Sec. 12 T. 8 S., R. 6 W.
Pacific Carbide & Alloys Co. (Quarry near Enterprise) Portland, Oregon	Wallowa County Sec. 19 T. 2 S., R. 44 E.

Limestone (cont.)

Pacific Portland Cement Co. (Quarry at Marble Mt.) Gold Hill, Oregon	Josephine County Sec. 30 T. 37 S., R. 6 W.
Polk County Lime Co. Dallas, Oregon	Polk County S.W. of Dallas
Roseburg Lime Products Co. Harry Brubaker Roseburg, Oregon	Douglas County Sec. 33 T. 27 S., R. 4 W.

Mineral Processing Plants

Electro Metallurgical Co. (Carbide) Div. Union Carbide Co. Portland, Oregon	Multnomah County Plant in St. Johns
Morris P. Kirk & Son (Antimony) 5909 N.W. 61st Portland, Oregon	Multnomah County Plant in Guilds Lake Dist.
National Metallurgical Corp. (Aluminum silicon) Springfield, Oregon	Lane County Plant under construction at Springfield
Oregon Steel Mills (Steel) 5200 N.W. Front Portland, Oregon	Multnomah County
Orr Eng. & Chemical Co. (Limonite) James M. Orr Scappoose, Oregon	Columbia County Plant in Scappoose
Pacific Carbide & Alloys Co. (Carbide) N. Columbia Blvd. & Hurst Portland, Oregon	Multnomah County Plant in North Portland
Reynolds Metals Co. (Aluminum) 935 N.W. 12th Portland, Oregon	Multnomah County Plant at Troutdale
Vermiculite - Northwest, Inc. (Vermiculite) 2303 N. Harding Portland, Oregon	Multnomah County

Miscellaneous Metals

Bonanza Mine (Mercury) Bonanza Mines Inc. Sutherlin, Oregon	Douglas County Sec. 16 T. 25 S., R. 4 W.
Coast Minerals Co. (Black sand) Geo. E. & Harry Murphy Portland, Oregon	Coos County Secs. 28, 33 T. 27 S., R. 14 W.
Hanna Development Co. (Nickel) Riddle, Oregon	Douglas County Nickel Mountain T. 30 S., R. 6 W.
Maury Mountain Mine (Mercury) F. D. & H. W. Eickemeyer Prineville, Oregon	Crook County Secs. 10, 15 T. 17 S., R. 19 E.
Platner Mine (Mercury) Laverne Taylor Portland, Oregon	Crook County Secs. 18, 19 T. 18 S., R. 17 E.
Roba Quicksilver (Mercury) Lawrence N. Roba Canyon City, Oregon	Grant County Mine on Murderer's Creek
Sheep Mountain Mine (Manganese) Paul Wise Boise, Idaho	Baker County Sec. 33 T. 11 S., R. 42 E.
Standard Mine (Copper, Cobalt) Ray Summers John Day, Oregon	Grant County Sec. 12 T. 12 S., R. 33 E.
Towner Quicksilver Mine (Mercury) Frank Towner Post, Oregon	Crook County Sec. 10 T. 17 S., R. 19 E.

Miscellaneous Nonmetals

Bristol Silica Co. (Crushed granite & quartz) F. I. Bristol Rogue River, Oregon	Jackson County Sec. 30 T. 36 S., R. 3 W.
Gibbs Coal Mine Leonard Gibbs Coquille, Oregon	Coos County Sec. 2 T. 27 S., R. 14 W.
Wilhoit Coal Mine T. G. Mandrones Portland, Oregon	Clackamas County Sec. 15 T. 6 S., R. 2 E.

R.S.M.

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YOUTHFUL OIL

It has previously been thought that oil is formed from the remains of small marine plants or animals by a chemical process requiring millions of years. Today that idea of very slow chemical change is being challenged by a young organic chemist, Dr. Paul V. Smith, of Jersey's research affiliate, Standard Oil Development Company. Dr. Smith has detected traces of oil in recently deposited ocean, river, and lake muds. In one case, oil was found in a mud sample taken from an artificial lake which was constructed only 100 years ago.

Just to be sure that the oil traces he finds do not come from some leaking boat motor or torpedoed tanker, Dr. Smith has, with the help of Columbia University's Lamont Geological Observatory, used the carbon 14 method to determine the ages of several oil samples. Radioactive carbon 14 is present in all living things but begins to disappear immediately after death and is gone after about 30,000 years, so that measurement of the remaining amount of carbon 14 makes possible an accurate calculation of the time which has passed since the plant or animal died. These radioactive measurements have, in every case, revealed measurable amounts of carbon 14 still remaining in the oils which Dr. Smith has extracted from recent mud deposits, showing these oils are not the result of contamination but formed in the recent deposits in which they are now found.

The amount of oil in recent sediments is far too small to give any promise of commercial production. But an increased knowledge of the origin of oil may indicate new places to look for commercial deposits.

(Excerpt from Briefs, published by Standard Oil Company of New Jersey, March 1953.)

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TUNGSTEN EXPLORATION

George, Ed, and Lewis Tulare are driving a crosscut from the end of the lower or "mill level" tunnel at the Sylvanite mine, 3 miles northeast of Gold Hill, Jackson County, in sec. 2, T. 36 S., R. 3 W. The crosscut will intersect the "Little Scheelite" and the "Big Scheelite" veins that are exposed in a crosscut trending N. 48° W. from the so-called "Half-Tunnel" which is about 470 feet northwest and approximately 75 feet higher in elevation than the lower tunnel. The "Big Scheelite" vein is intersected at 113 feet in the crosscut off the "Half-Tunnel" and is exposed along a 25-foot drift. It is 10 inches wide, striking N. 40° W. and dipping 70° N.E. Scheelite occurs irregularly and sparsely disseminated along this exposure and especially along a 2-inch band in the quartz vein. No scheelite was observed in the "Little Scheelite" vein in the upper workings, but a minor amount appears in this vein where exposed at the end of a 100-foot crosscut extending N. 27° E. from an incline raise at the end of the lower tunnel.

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STRATEGIC MATERIALS REPORT

The Defense Production Administration has issued a report which asserts that the United States must depend more and more on imports of strategic raw materials rather than stepped-up domestic production for its ever-growing raw materials needs.

The report lists these materials which must be imported, the percentage of which must be imported, and the current supply situation:

Antimony, 75 percent, ample; asbestos, 95 percent, very short; bauxite, 65 percent, adequate; beryl, 90 percent, tight; bismuth, 50-55 percent, adequate; chromite, 99 percent, short; cobalt, 90 percent, very short; columbium, 100 percent, short; copper, 35 percent, inadequate; fluorspar, 35 percent, adequate; ilmenite, 32 percent, sufficient; industrial diamonds, 100 percent, barely adequate; iron ore, 8 percent, ample; jewel bearings, 90 percent, adequate; lead, 45 percent, adequate; manganese, 90 percent, inadequate; mercury, 90 percent, adequate; mica, 95 percent, barely adequate; nickel, 99 percent, critical; platinum group, 90 percent,

adequate; quartz crystals, 100 percent, adequate; natural rubber, 100 percent, adequate; rutile, 31 percent, adequate; selenium (elemental), 34 percent, short; tin, 100 percent, short; tungsten, 52 percent, ample; zinc, 35 percent, ample.

(From The American Mining Congress Bulletin Service, February 16, 1953.)

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BILL TO EXTEND DOMESTIC MINERALS PROGRAM

H. R. 2823 - by Congressman Aspinall (Colo.). Referred to Committee on Interior and Insular Affairs. Would have Congress recognize that continued dependence on overseas sources for strategic or critical minerals and metals during periods of world political instability gravely endangers the economy and security of the United States. Would declare it the policy of Congress that Federal agencies concerned with discovery, development, production, and acquisition of strategic or critical minerals and metals undertake to decrease and eliminate, where possible, United States dependency on overseas sources.

Would extend at least two years the termination dates of all purchase programs designed to stimulate the domestic production of tungsten, manganese, chromite, mica, asbestos, beryl, and columbium-tantalum-bearing ores and concentrates. Would also empower regulatory agencies to extend termination dates beyond the two-year extension and increase the quantity of materials that may be bought under these programs.

(From The American Mining Congress Bulletin Service, February 17, 1953.)

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ATOMIC ENERGY COMMISSION MEN SURVEY OREGON

H. W. Norman and R. G. Pruett, geologists with the Atomic Energy Commission with mailing address at P.O. Box 1984, Butte, Montana, are investigating possible sources of radioactive minerals in Oregon. They visited Grants Pass during the week beginning March 20. After making inspections in southwestern Oregon, they returned north through eastern Oregon. They inspected records at the field offices of the Department as well as the head office in Portland. Any person who has a suspected source of radioactive minerals should correspond with, or better, send sample to Mr. Norman at the above address.

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TOWNER QUICKSILVER MINE PRODUCING

Frank Towner, Jr., is retorting ore being mined at the Towner quicksilver mine in the Maury Mountain district, Crook County, Oregon. Some underground development work is also being carried on.

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TAX WRITE-OFF FOR OREGON METALLURGICAL PLANT

National Production Authority has announced in the press that the National Metallurgical Corporation, Springfield, Oregon, has been granted tax amortization for 85 percent of the plant cost of $438,000. This corporation is a joint project of the Apex Smelting Company and the American Smelting and Refining Company. The plant, designed for pilot plant work, will produce an aluminum-silicon alloy from clay.

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STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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...in other words, "BUG MEN"[1]

By

W. F. Barbat[2]

The visitor to our Exploration Department was deeply interested, but some of the things he heard were hard to believe. He could appreciate, and could adjust himself to accept, a great number of applications of physics and chemistry to petroleum geology. Such things as detecting accumulations of oil, gas, and salt-water in the unseen formations of a drilling well by testing the drilling fluid with fluorescent light, a "hot wire," and a galvanometer, seemed reasonable when our Chief Geologist explained them.

Others, such as recording on a film the varying natural electrical properties of the formations penetrated in a well, and translating this record into a log of the types of rock and their fluid content, were amazing, but certainly in tune with this age of wonders.

He listened with fascination as the Chief explained how sound waves, echoing from layers of rock miles below the surface, were commonplace tools of modern "rock hounds," or geologists, and how delicate recordings of the slight variations of the earth's gravitational pull, which occur from place to place, lead to the discovery of oil.

Finally, as he was about to leave, he heard something that strained his credulity. The phone rang. The Chief talked briefly, then excused himself, saying, "Would you mind if I dictated a short wire?" A girl stepped in. "Send this wire to the Taft Bug Laboratory, please: Dixon Community Well No. 1 reports formation change at 3785 feet. Samples to 3710 feet sent by express today. Please wire results."

He turned to the visitor. "It's one of our important wildcat wells, and operations depend on what the bug men find."

"Bug men!" exclaimed the visitor. "Who - and what - are they?"

The Chief chuckled. "That's what we call our micropaleontologists. Our laboratory for the Northern Producing District is at Taft; our Southern District laboratory is in Los Angeles."

"Well, bug men is a lot easier to pronounce, anyway," said the visitor. "If I remember rightly, paleontologists are the fellows who dig up old bones and reconstruct dinosaurs and saber-tooth tigers. I suppose your micropaleontologists, or bug men, dig up old bugs and infest their asylums with them. You have given me a lot of interesting and extraordinary information about your profession, but please don't tell me that you consult bug experts before deciding what to do next in an important wildcat well."

"That's what we do," answered the Chief, "and they <u>are</u> experts. But I'll have to explain a bit. The 'bugs' our micropaleontologists work with are tiny, single-cell animals, mostly smaller than the head of a pin. They are related to amoeba, but differ in that they have shell-like hard parts which show remarkable diversification. These little organisms are called Foraminifera and are quite widespread in the oceans. You would have to look at some with a microscope to appreciate the intricate form and delicate ornamentation of these little animals."

"But what have they to do with oil wells?" the visitor interrupted.

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[1]Courtesy of <u>The Standard Oiler</u>, November 1946.

[2]When the article was written Mr. Barbat was in charge of the Standard Oil Company laboratory at Taft, California. He has since been made Chief Geologist of the company.

"Quite a lot. You see, their remains become a part of the sediment that accumulates on the sea bottom. After this material gets pressed into rock and folded into various types of geologic structures suitable for the entrapment of oil and gas, it becomes the job of the Petroleum Geologist to seek these structures and test them for possible production. The most reliable way of testing, as you can guess, is to drill into them with a prospect hole, and study the core-samples thus secured. The little fossils found in the samples tell us many things we need to know.

"The microfossils differ from area to area, and they differ with the temperature, salinity, and depth of the sea-water in which they formerly lived - just as the existing animals vary in our present seas. But more important to us, they differ with the passage of time. Successive layers of sedimentary rock tell a story of extinction of certain types of animals, of development and change of others. Migrations into and away from a given area of former sea-bottom, or any change in the animal population which may be caused by changing conditions within the sea, tend to cause the fossils in succeeding layers of sedimentary rock to be different from those preserved in preceding layers.

"Now about the examination in the Bug Laboratory: A formation sample sent to our micropaleontologists is broken down by mechanical and chemical means into something like the mud it once was. This is washed through fine-meshed screens, which pass the mud but catch the microfossils along with a lot of other objects about the same size - teeth or parts of bone of fish, sea-shell fragments, sand grains, or maybe some incompletely disintegrated rock.

"After drying, the catch is spread on a black dish, placed under a microscope, and the microfossils are picked out with the tip of a moistened brush. They are placed in covered slides for study and identification.

"From knowledge and experience, the bug men decide what changes in the fossil content of each sample are caused by the passage of time. They have learned to recognize certain varieties as characteristic of certain rock layers; these they call 'markers.' Markers are like the numbers on a calendar - they give us reference points to measure the passage of geologic time.

"This applies to the samples I sent that wire about," continued the Chief. "The report we get should give the geologic age of the new formation the drill has entered."

"But why should you be concerned with how old it is?" demanded the visitor.

"Oh, we're not interested in the age as such, certainly not measured in years or millions of years as the case may be. But determining the age of this formation tells us in effect every other place that it has been encountered. It tells us where this rock-layer crops out on the surface, and at what depth it occurs in all the other wells that have penetrated it. From this knowledge we can map the formation and show its surface and underground convolutions."

"I see what you mean," agreed the visitor. "It locates the geologic structure and shows where it is folded up and where folded down - and you say the structure controls the accumulation of oil. However, I don't understand why you need a report from your bug men to determine the course of action in this well."

"If this new formation the drill has entered is close to the oil-sand we are looking for," the Chief explained, "we will reduce the diameter of the drill hole and keep a close watch for showings of oil or gas. This will put us in a position to make an economical test of the sand if the showings warrant. If the formation is not close, the age reported will probably give us a fairly accurate estimate of the additional feet we must drill to reach our objective.

"Then too, if by some odd chance the formation proves to be older than the sand we hope to get oil production from, there is no need to drill deeper. Some sort of geologic

complexity not previously known will be indicated, because the sand which should be there is missing, and we will abandon this well without delay and perhaps try another location. If a detailed study of the core-samples from this well, combined with geologic data from other sources, discloses the reason for the missing sand, it may point to a location where we can drill with more assurance."

The visitor asked, a little banteringly, "Do your bug men, then, give you all the right answers and take all the guesswork out of oil prospecting?"

The Chief shook his head. "It would be easy for me to say yes, but unfortunately that is not always true. They do a remarkably good job of interpreting the life histories of organisms that lived aeons ago, but the complexities involved sometimes lead to incorrect conclusions. But even the mechanical tools geologists use do that too. However, experience has shown that we can rely a great deal on what the micropaleontologists tell us. We are fortunate indeed that these specialists have developed their skill to such a high level. We still have to 'ask the drill' in prospecting for oil in an unproved area, but the findings of the bug men remove some of the gamble."

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CHROMITE NEWS ITEMS

Paul H. Floyd, Jean W. Pressler, and Roy S. Jackson have bought the Hayes mill that was located at the McCaleb ranch and are building a mill at the mouth of Sixmile Creek on the Illinois River road 8.7 miles west of Selma, Josephine County. The name of the organization is the Sixmile Chromite Company. Floyd and Pressler were formerly employed by the Metallurgical Division of the Northwest Electro-development Laboratory of the U.S. Bureau of Mines, Albany, Oregon.

The mill when completed will have 2 jigs, 4 tables, and other equipment. It is estimated that its capacity will be approximately 70 tons a day. The company has leased several chromite claims and will negotiate to custom mill ore from other properties.

* * * * *

Fred Langley and Claude Dean, Grants Pass, Oregon, have been operating the Big Bear property since June 1952. It is in sec. 35, T. 36 S., R. 8 W., about 6 miles up Slate Creek from the Redwoods Highway.

A crosscut, 75 feet lower in elevation than the original workings at the Big Bear mine, has been driven about 200 feet. More than 200 tons of chromite have been mined from the original adit and stope, and a chromite lens with a maximum width of about 7 feet is exposed in the floor of these workings. The owners hope to intersect this lens at 270-285 feet in this new crosscut.

* * * * *

Doyle Compton and James Gallaher of Grants Pass are hand sorting chromite from the old dumps of the Oregon Chrome mine on the Illinois River 16 miles west of Selma, Josephine County. This work was begun in late March. Six tons of chromite was shipped after 10 days work.

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ALASKA CHROME

The Defense Materials Procurement Agency has announced that the government has contracted to buy 13,000 long tons of chromite from the Red Mountain deposit on the Kenai Peninsula of Alaska from the Kenai Chrome Company. The government has agreed to advance $110,000 for exploration and equipment, including a loading dock, and up to $200,000 for working capital. Advances are to be repaid with interest. The standard of payment will be $97 per ton f.o.b. port of entry in the State of Washington, for ore containing 48 percent Cr_2O_3 and 3 to 1 chrome-iron ratio. Both penalties for lower grade and premiums for better grade are provided for.

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REVISIONS IN CHROME BUYING PROGRAM

According to the Grants Pass Courier of April 14, 1953, O. C. Bradeen, Regional Director, General Services Administration, Seattle, announced two changes in the government's program for buying chromite at Grants Pass, Oregon. Formerly a shipper was limited to deliveries of 5000 tons in one year. Hereafter there will be no restrictions on the tonnage that can be delivered in one year. The second change has to do with termination of the program, and it appears that buying of ore by the government will be in effect until the close of business June 30, 1955, or until 200,000 tons of ore or concentrates have been received. Formerly there was a provision that the government could terminate the program by giving one year's notice.

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CHROMITE STATISTICS

Chromite Report No. 35, by the U.S. Bureau of Mines, states that domestic production in 1951 amounted to 7,056 tons. Domestic production for 1952 totaled 21,216 short tons. All 1952 domestic shipments with the exception of one California producer, were received at the government's purchase depot at Grants Pass.

Total domestic consumption of chromite in 1952 amounted to 1,185,460 short tons of which 676,624 was metallurgical grade and 387,085 refractory grade. Industrial stocks at the end of 1952 amounted to 364,013 tons metallurgical grade, 269,933 refractory grade, and 120,353 chemical grade, making a total of 754,299 tons.

Imports in 1952 amounted to 1,700,209 short tons, of which 54 percent was metallurgical grade, 35 percent refractory grade, and 11 percent chemical grade. Turkey supplied 49 percent of the metallurgical grade and Southern Rhodesia 19 percent. The balance came from Union of South Africa, 10 percent; New Caledonia, 6 percent; the Philippines, 4 percent; and Cuba, 4 percent. The remaining 8 percent was distributed among small shippers from several countries.

Chromite Report No. 36, covering January 1953 only, states that a total of 815 short tons of chromite was received at the Grants Pass depot during the month.

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INCREASED GOLD PRICE REQUESTED

The Eastern Oregon Mining and Mineral Association, B. F. Kulis, president, and Orville Fleetwood, secretary, petitioned the Oregon legislature requesting that the legislature memorialize the President and Congress to raise the domestic price of gold from $35 to $75 per ounce. The resolutions of the Association were sent to Representative Robert Steward and Senator Rex Ellis for introduction. The resolutions were sent also to United States Senator Cordon and United States Representative Sam Coon.

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STRONTIUM DEPOSIT PRODUCING

A deposit of combined celestite and strontianite on Fidalgo Island in Puget Sound has been put into production by the owners, Dr. William E. Caldwell of Oregon State College and George Waterman of the Manufacturers Mineral Company, Seattle. One hundred tons of the ground ore will first be sold to Hooker Electrochemical Company, Tacoma, Washington, where it will be used to remove a small amount of iron in the process of making caustic soda. The ore is ground to about 250 mesh by the Manufacturers Mineral Company

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SPECIAL BULLETIN FOR SALE

A few copies of Department Bulletin 41, "Ground-Water Studies in Umatilla and Morrow Counties," 1946, by Norman S. Wagner, are still available from the Department at a price of $1.25 each. Included are logs of 209 water wells in the two counties.

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BAKER CITY COINS

In examining a catalog advertising an auction by a coin dealer in New York, the writer was interested to see a picture of gold coins made in Baker, Oregon, in 1907. Inquiry among coin dealers and collectors both in Portland and Baker failed to get any definite information about these coins. A letter to the coin dealer in New York resulted in a reference to an article in the Numismatist of April 1933, which gave a brief history of the coins. The article is reproduced below. Incidentally the coins were valued at $3000 each and realized $900 each at the auction. It is certain that the Baker City individualism has not changed and would crop out in any similar situation today.

Gold Coins of Home Manufacture Circulate in Baker City

Baker City, in eastern Oregon, is nothing if not original. When currency became somewhat scarce in other parts of the country, the whole thing was treated as a huge joke by the business men of that part of the State. The banks went right along paying out "real money" to their depositors as if a scarcity of circulating medium was the least of their troubles, and looking over the gold-bearing hills of the surrounding landscape, ejaculated, "Ah, ha," if not, "Oh, ho." At least that is the way the average Bakerite puts the case, now that the rest of the State has caught its breath and things financial are again normal.

A week or two after the "squeeze" was in full blast two or three Baker City citizens conceived the idea of issuing "gold Currency" on their own hook, and evolved a plan of manufacturing 2-ounce slugs, or buttons, of native gold, which, of course, could not bear the stamp of the Government, but could be worth their weight just the same. Fred Mellis, a mine owner, and James Howard, ex-president of the bank of Sumpter, are said to be responsible for a design used on these slugs, a number of which were hammered out of pure gold and which weighed somewhere near two ounces. The effect of having these slugs passed around Baker City had a good effect on the people, for the natural inference was produced that as long as the mines of eastern Oregon could produce the precious metal in $20 chunks there was no need of getting alarmed over a scarcity of circulating medium.

W. G. Ayer, the "sheep king" of Baker County, who is a visitor in Portland, has one of these buttons, which he bought at its weighing-in value and a trifle over, desiring to hold it as a souvenir commemorative of the faith the people of his section of the State entertain of their ability to meet emergencies.

The obverse has the words stamped into it with a stencil die, "Baker City, Or., 2 Ounces," and the reverse the words, "In Gold We Trust." A picture of this unique "coin" is presented herewith of actual size.

From the Numismatist.

From the coin catalog.

Supplementary information on the Baker coins received and reproduced below does not check in some details with the article in the Numismatist, but it does mention the two types of slugs as represented by the pictures. One type appeared in the Numismatist article; the other was illustrated in the coin catalog.

> "In this year there was a terrific depression in the U.S. and this Baker Bank had a few hundred ounces of gold dust which the bank president proposed to coin into money for circulation in Baker City. So he ordered a jeweler to make some sample coins, and two varieties were made. These two are distinctively very different. They were made to the weight of $40.00 each, BUT with NO denomination on them, ONLY the weight, 2 oz., as the banker probably thought if there is a dollar denomination on them, they might NOT be permitted to pass by the government. But the federal authorities nipped the scheme in the bud and ordered the banker under serious threat and coercion of imprisonment to abstain from his idea."

F.W.L.

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BINGHAM REAPPOINTED TO STATE BOARD

Governor Paul L. Patterson announced on March 20, 1953, that his reappointment of Mason L. Bingham as a member of the Governing Board of the Department of Geology and Mineral Industries was confirmed by the State Senate on that date. Mr. Bingham's 4-year term began March 21, 1953, and ends March 16, 1957.

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METALS FROM OIL WELLS

According to the American Geological Institute News Letter of April 1953, certain types of crude oils found in California contain appreciable amounts of nickel and vanadium, and it may be that mining of metals from oil wells may some day be economically feasible. The Atomic Energy Commission has suggested to some oil companies and geophysical contractors that they combine exploration for oil with seeking evidence of uranium and thorium. Such a combination in prospecting would require little extra effort by the drillers.

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HAVE WE LEARNED THESE LESSONS?

Lessons of a Decade was the attractive title of a paper read at the Annual Meeting of the Pacific Coast Section of the American Association of Petroleum Geologists, in Los Angeles, California, October 31, 1952, by Ira H. Cram, Continental Oil Company, Houston, Texas. Among danger spots to our future, Mr. Cram said, in part:

> ". . .I cannot refrain from . . . dwelling upon geologic prejudice which manifests itself mainly in being too sure where deposits of hydrocarbons can't exist. The geologist ridden with such prejudice develops too few ideas regarding the location of the next oil or gas fields and geologic ideas are the backbone of discovery which in turn is the backbone of the petroleum industry. The geologic idea is the 'gleam in the father's eye' which precedes interesting consequences and productive results. The future requires superlative geological, geophysical, and managerial talent -- the most skillful, the most daring, the most ingenious, the most imaginative. We geologists must battle the insidious forces of prejudice to the end that more and more intelligent ideas are born and sold to management resulting in the drilling of more and more wildcat wells. Such a drilling campaign is almost as necessary as death is inevitable. I do not question that the outcome will be favorable.

(From American Geological Institute News Letter, March 1953.)

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SALEM ALUMINA-FROM-CLAY PLANT SOLD TO HARVEY

Early in the World War II period, many bauxite boats transporting ore from Surinam to the United States were sunk by German submarines. Great concern was felt at that time over the adequacy of domestic supplies of bauxite to keep our defense plants operating, since in peacetime we had depended upon Surinam for a large proportion of our bauxite ore. It was decided in government circles that experiments should be started immediately to develop a process for recovering alumina from so-called high-alumina clays or other high-alumina silicates. The Defense Plant Corporation decided to try out three different processes. The first was a lime-sintering process in South Carolina. The principal raw materials were high-alumina clay and limestone and the sintered product was leached with sodium-carbonate solution to obtain aluminum hydroxide. The second process, started at Laramie, Wyoming, involved sintering anorthosite, a calcium-sodium-aluminum silicate, to produce sodium aluminate which could be leached and the leach solution treated to precipitate aluminum hydroxide. It was said that the sintered rock residue could be used in making portland cement. The third process using an acid ammonium-sulphate leaching solution was planned for development at the plant at Salem, Oregon. The Chemical Construction Company, New York, a subsidiary of the American Cyanamid Corporation, developed the process in their laboratories and built and started up the Salem plant with government funds to try out the process on Northwest clays.

The Salem plant hardly had a chance to work the "bugs" out of the equipment when the government decided to close down the experiments. The plants in North Carolina and Wyoming were also closed down. The submarine menace had been overcome and it was felt that the need for obtaining alumina from clays had abated. After the war ended, the Salem plant was leased to Columbia Metals Corporation for the production of ammonium-sulphate fertilizer, mainly for shipment to Japan under government contract. Later the Continental Chemical Company leased the plant from the government for making ammonium-sulphate fertilizer and also for experimenting with the production of battery-grade manganese oxide. The Continental Chemical Company was sold to Ray-O-Vac Company for the production of manganese oxide and this latter company operated the plant for several months before bids were asked by General Services Administration which had taken the plant over as surplus government property.

A new chapter in the varied history of the Salem plant was begun March 25, 1953, when it was announced that Harvey Machine Company of Torrance, California, was the successful bidder. The sale price was $325,000. Original government investment was in excess of $4,000,000 but depreciation, obsolescence, and cannibalizing of equipment reduced the value of the plant substantially. It was announced on April 11 that the United States Department of Justice had given its approval to the sale, and transfer only awaited release by the General Services Administration Seattle office. Harvey Machine Company stated that experiments begun at the plant during World War II on methods for production of alumina, aluminum oxide, from high-alumina clay would be continued.

Why is it desirable to develop a commercial process for production of aluminum oxide from clay? To explore this question, let us consider briefly the method of producing aluminum from its ores.

In the production of metallic aluminum, two steps are required. First, bauxite, at present the only commercial aluminum ore, is treated by a chemical process known as the Bayer process to obtain a pure aluminum oxide, or alumina as it is called. Theoretically

bauxite contains only alumina and water. In nature, however, the bauxite contains impurities, mainly silica, iron oxide, and titania, and these must be eliminated before the pure Al_2O_3 may be used in an electric furnace to produce metallic aluminum. Although this electrolysis is expensive because of the cost of electric power, it is a standard procedure now and presents no technical difficulties. In the second step, the pure aluminum oxide obtained through the Bayer process is electrolized in cells called pots to obtain metallic aluminum. In the Northwest we have plants for producing only the metal. The plants for the first step - that is, making alumina - are all in the Midwest and South, and a large part of the bauxite used to produce the alumina is still brought in across the Caribbean.

Aluminum metal is the third most abundant element in the earth's crust, making up about 8 percent. The other two more abundant elements are oxygen (46.5 percent) and silicon (27.6 percent), which for convenience are considered to be combined as SiO_2, silica. The great mass of the earth's crust is aluminum silicate - that is, the combination of the three elements aluminum, silicon, and oxygen. If we consider aluminum silicate as a reserve from which we could obtain the metal aluminum, the supply would be inexhaustible even on the superficial thin skin of the earth.

Clays are essentially aluminum silicates which have resulted from weathering of the rock aluminum silicates. Some of these clays have weathered under conditions which have concentrated the alumina. These are called high-alumina clays. In Oregon, high-alumina clay localities are known and have been explored at Hobart Butte south of Cottage Grove and at Molalla south of Oregon City. In addition, many other deposits are known but have not been explored.

The critical characteristic of aluminum silicates, including clays, as far as treatment to obtain alumina is concerned, is the inherent quality of alumina in its persistent affinity for silica. Because of this strong attraction, it is difficult to separate alumina from silica and this presents the big problem in treatment of clays. Chemical processes to accomplish the separation are well known and have been carried out on a laboratory scale in many places. Germany produced alumina from clays commercially during World War II because of lack of bauxite. The whole question is a matter of competitive costs of producing alumina from aluminum silicates and from bauxite.

The Salem alumina-from-clay plant is favorably situated to carry on pilot plant work in the production of alumina from clays. East of Salem over a wide area extending to and beyond Mehama are several known and probably large but unexplored deposits of high-alumina clays. Both south of Salem in the Salem Hills and north in the Eola Hills there are lateritic clays which contain high alumina, high iron, and relatively lower silica than other high-alumina clays. The lateritic deposits have the added advantage of containing a certain small percentage of gibbsite cobbles. These cobbles consist of high-grade bauxite and contain usually less than 5 percent silica. Because of the availability of these lateritic clays and because of their low silica-to-alumina ratio, it would appear that they could be an important raw material if an economic process could be developed. Their high iron content would preclude their use in an acid process such as that originally planned for the plant by the Chemical Construction Company.

Typical analyses of Department samples from the lateritic clay in the Salem Hills show the following range:

	Percent
Alumina	35 - 42
Iron	13 - 23
Silica	13 - 20

At one bulldozer cut on the Veall place south of Salem, two channel samples covering 9 feet of depth below 3 feet of soil averaged 40.6 percent Al_2O_3, 17.6 percent Fe, and

18.6 percent SiO_2. From another cut on the same property a channel sample representing a section 9 feet thick below $2\frac{1}{2}$ feet of soil averaged 35.5 percent Al_2O_3, 21.3 percent Fe, and 15.4 percent SiO_2. An undetermined thickness of the clay lies below the cuts.

Some progress is being made in direct reduction of an aluminum-silicon alloy from clay, and it has been announced that a pilot plant for testing work on production of this alloy will be built this year at Springfield, Oregon. An electric furnace process developed by the Bureau of Mines laboratory at Albany, Oregon, will be tried out. The fact that two companies experienced in metallurgical work, the Apex Smelting Company and the American Smelting & Refining Company, have combined to carry on the research is evidence of the apparent feasibility of the process and also that a good job of testing will be done.

It should be pointed out that production of an aluminum-silicon alloy directly from clay is considerably different from production of the same alloy synthetically from pure materials, as is the present practice. In direct reduction from clay, control of the composition of the alloy must in large part be in selecting as pure a clay as can be obtained because some of the impurities in the clay are reduced along with the aluminum and silicon. Where the alloy is made by combining pure aluminum and pure silicon there are no impurities in the alloy and complete control of its composition may be had. Of course for some applications, aluminum-silicon castings with some impurities may be acceptable, but in castings used in equipment that may be subject to critical strain it seems likely that nothing will replace the synthetic alloy.

Experiments which may lead to the production of aluminum oxide or alloys from high-alumina clays should be made in peacetime, not under the pressure of wartime necessity. If pilot plant experiments can be made by private industry rather than by the government, so much the better. There is no doubt that production of alumina from bauxite is cheaper than from clays under normal conditions and using known processes. However, American metallurgists and chemical engineers are especially resourceful and, given the chance, they may come up with a workable process which in time could be competitive with alumina produced from bauxite. Aluminum companies are using lower and lower grade bauxite in the modified Bayer process and a step to utilize clays instead of low-grade bauxite would not be too much to expect.

Certainly a shortage of domestic bauxite may be expected in a war emergency and it would be farsighted to be prepared with a workable process for treatment of clays when the need arises.

F.W.L.

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NEW OIL AND GAS CONSERVATION LAW

Senate Bill No. 433, a new oil and gas conservation law, was passed by the Forty-seventh Legislature and signed by the governor April 16, 1953. The new law repeals Chapter 365, Oregon Laws 1949, and becomes operative July 21, 1953.

Senate Bill No. 433 sets up machinery under the administration of the State Department of Geology and Mineral Industries to prevent waste in the drilling of oil tests and in production of petroleum when and if it is discovered. The Governing Board of the Department is given the authority to require that anyone proposing to drill a well for oil and gas must notify the director of the Department upon a form prescribed by the director and pay a fee of $25 for each such well.

The new law requires drilling, casing, and plugging of wells to be done in such a manner as to prevent the escape of oil or gas from one stratum to another and to prevent the intrusion of water into oil or gas strata. Casing must be set so as to prevent the pollution of fresh water supplies by oil, gas, or salt water, and all wells are to be plugged and marked in accordance with specifications established by the Board. A reasonable bond will be required to insure good practice in casing each well and plugging each dry or abandoned well. Records of each well, including all logs, drill cuttings, or cores, if cores are taken, must

be filed in the office of the director of the Department within 20 days from the date of completion or abandonment of any well and shall be maintained free from public inspection by the Department for a period of two years from the date of filing. Various other requirements are specified in case petroleum is discovered.

As soon as practicable a bulletin covering all requirements set up in Senate Bill No. 433 will be issued by the Department.

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MORE ABOUT BAKER CITY COINS

The April Ore.-Bin had an article on the 2-ounce gold coins or slugs issued in Baker City, Oregon, during the depression of 1907. John Arthur, well-known mining man and old-time resident of Baker, comments on the incident in a letter as follows:

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"I noted in The Ore.-Bin, vol. 15, no. 4, of April 1953, page 27, an article 'Baker City Coins,' made in Baker in 1907---It seems strange that no one knew who made them, as scores of people here knew who made the coins, or slugs. Of course, many have passed away and others have forgotten which would be natural after gold was outlawed in this United States.

"The only party who ever made these gold coins in Baker was John Arthur who made quite a number of them. This was during the depression when Hetty Greene, the richest woman in the United States as well as others, could only get a few hundred dollars a week to live on from the banks. We were trying to relieve Hetty's and other's money troubles, as only gold could do. The coins or round discs weighed two ounces, and actually had $40.00 worth of gold in each coin.

"As we took the Mellis 40-ton car of specimens to the San Francisco fair about that time for exhibit, we took quite a number of these Baker coins which were eagerly grabbed up. Thomas Edison, the electrical wizard, was much interested and secured one or two.

"John Arthur was a partner in the Oregon-Idaho Investment Company at Baker, who for twenty years operated a sampling works having a capacity of 75 tons per day; also an assay office. Ores were sampled and purchased for the Tacoma and Salt Lake smelters. As there were many placers and quartz mines operating we bought gold in quite large quantities; also sampled 90% of the chrome shipped out of Baker and Grant counties during World War I.

"The fine gold collection now in the Baker First National Bank was in our office for twenty years, and Fred Mellis purchased what interest the other partners had. Some of that gold was got later by the bank. . . ."

/s/ John Arthur

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FERRONICKEL TESTS

The U.S. Bureau of Mines reports that "use" tests of ferronickel have been made by the Electric Steel Foundry, Portland, Oregon, in 45 heats in electric arc and induction furnaces for the production of heat and corrosion resisting steels. The company reports that these tests show that ferronickel can be used readily in production of these steels, and that they are of normal quality as judged by chemical analysis and strength tests. The report also states that use of ferronickel involved no changes in the foundry's normal steel-making practices. Ferronickel is the product that will be produced by the Hanna Company from Nickel Mountain ore at a plant to be erected near Riddle, Douglas County, Oregon.

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NEW DEPARTMENT PUBLICATIONS

Two new bulletins, "Geology of the Albany Quadrangle, Oregon," and "Bibliography of the Geology and Mineral Resources of Oregon," have just been published by the Department.

"Geology of the Albany Quadrangle, Oregon," designated as Bulletin 37, is by Dr. Ira S. Allison, Chairman of the Department of Geology at Oregon State College. The Albany 15-minute quadrangle is in the center of the Willamette Valley and occupies the northwest corner of Linn County and the northeast corner of Benton County. The Willamette River meanders through the quadrangle and the geological features along it are typical of the Willamette Valley. The 18-page bulletin describes the historical, structural, and economic geology of the area and includes a bibliography and a geologic map. Bulletin 37 is priced at 75 cents.

"Bibliography of the Geology and Mineral Resources of Oregon," designated as Bulletin 44, is by Margaret Steere, librarian and geologist with the Department. Bulletin 44 is the second supplement of the original bibliography issued by the State Planning Board in 1936. The first supplement, covering the succeeding 9 years through the year 1945, was issued by the Department in 1946. Bulletin 44 covers the five-year period from January 1, 1946, through December 31, 1950. It consists of 61 pages and is made up of both an author and subject index. Included in the source material are unpublished theses and governmental reports available for public inspection. The Bibliography is priced at $1.00.

Both bulletins may be obtained postpaid at the prices indicated from the Department's Portland office in the State Office Building, or at the field offices in Baker and Grants Pass.

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CHROMITE IN FEBRUARY 1953

The U.S. Bureau of Mines reported in No. 37 Chromite Report that shipments of domestic chromite to the government purchase depot at Grants Pass in February totaled 1,232 short tons compared to 815 short tons in January. The report also states that according to the Bureau of Census imports of metallurgical grade chromite during February increased 55 percent compared to January and were the highest for any month for at least 5 years. Refractory imports dropped 12 percent and chemical grade imports increased 17 percent. During February total imports of all grades amounted to 204,202 short tons of which metallurgical grade comprised 110,448 long tons, refractory 61,341 long tons, and chemical grade 10,413 long tons, making a total of 182,202 long tons which is equivalent to the previous figure of 204,202 short tons. (Short tons of 2,000 pounds are used in one part and long tons of 2,240 pounds are used in another part of the report.)

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OFFICIALS NAMED FOR NICKEL PLANT

According to the Grants Pass Courier, April 27, 1953, the general manager of the Riddle, Oregon, nickel operation for the M. A. Hanna Mining and Smelting Company will be Earl S. Mollard, who has been in charge of the Hanna Company operations in Minnesota since 1948. Plant manager will be E. Emmons Coleman. Mr. Coleman previously was general manager of Bradley Mining Company's furnace plant at Stibnite, Idaho.

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GYPSUM ACTIVITY

It was reported that the Northwest Gypsum Company, which has been developing a gypsum deposit on the bank of the Snake River in Washington County, Idaho, has completed installation of a cable tramway across the river to loading bunkers situated on the Oregon side. The company's main office is 201 Main Street, Colfax, Washington. There are plans for a field office at Weiser, Idaho. Gypsum will be produced for the agricultural market.

THE STOCK PILE IN NEW DRESS

Vol. 1, no. 6 of The Stock Pile, the periodical published by the Chrome Committee of the Oregon Mining Association, has been issued in a new attractive form and contains numerous photographs of chrome mines and mountain scenery where chrome mining is carried on. These photographs illustrate graphically some of the natural difficulties which the chrome miner has to overcome, particularly in building access roads. Some are aerial photographs and show that much of the high country in northern California and southwestern Oregon still has a heavy snow pack. The editor of The Stock Pile is Fay Bristol, Box 505, Rogue River, Oregon. The Publishing Committee of the Oregon Mining Association is composed of Walt Freeman, William S. Robertson, and Dewey Van Curler. Subscription rate is $3.00 yearly.

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NEWS FROM THE STOCK PILE

Elmo and Franklin King and Roy Hanson, partners in Chrome King mines No. 1 and No. 2, are building a new road off the McCaleb road which crosses the Illinois River near the mouth of Rancherie Creek. Their low-water bridge near the mouth of Dailey Creek was washed out.

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Ernest Foster's mill, located near milepost 13 on the Illinois River road, Josephine County, is now ready to operate. Ore from the Pearsell mine, about 8 miles distant, has been stockpiled at the mill. The mill has one and one-half tons per hour capacity with nearly 10 tons per hour crushing capacity.

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Rice Brothers mill near Takilma in Josephine County has recently been sold to Eggers and Tyeer.

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Word has been received from Senator Guy Cordon that access road money to improve the Illinois River road, the Wimer road, and the Youngs Valley road has been approved and will soon be available to the Forest Service so that work can be started.

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NEW CHROME AT BIG BEAR MINE

As reported in the April Ore.-Bin, Fred Langley and Claude Dean, Grants Pass, Oregon, are running a crosscut at the Big Bear mine on Slate Creek, Josephine County, designed to intersect downward extension of a chromite pod found in an adit 75 feet higher in elevation than the present workings. In the lower crosscut small pods of chromite have been encountered about 300 feet from the portal and 6 tons of shipping ore have been taken out. Raising will be done on this ore toward the old adit.

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NEW RIVER BASIN COMMISSION

The Upper Columbia River Basin Commission was established by the 1951 Legislature according to Chapter 522, Oregon Laws 1951. Senate Bill 136 of the 1953 Legislature, authored by Senators Rex Ellis, Hounsell, Smith, and Steen, and Representatives Goad, Steiwer, and Tom, creates new provisions and amends the original law. A bill (Senate Bill 139), by Senator Ellis and Representative Goad, provides an appropriation of $40,000 for the expenses of the Commission. Both bills were passed by the Legislature. This Commission will promote studies of development of the Upper Columbia River basin system and will assist any interstate agency established for such development. The Commission has the power to hold hearings and to recommend projects which have promise of promoting the best interests of the Upper Columbia River Basin area. The State Engineer is named Engineer for the Commission, and the Director of the State Department of Geology and Mineral Industries is Geologist.

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STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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ASSESSMENT WORK

The assessment year ends at noon, July 1, 1953. Holders of unpatented mining claims should have $100 worth of work or improvements done on each claim prior to that time. However, if the work has not been completed July 1, it should at least have been started and then it must be prosecuted "with reasonable diligence" until completed.

Within 30 days after the performance of labor or making of improvements to comply with the law, an affidavit setting forth the following facts must be recorded in the mine records of the county in which the mining claim is situated:

1. The name of the claim or claims, if grouped, and the book and page of the record where the location notice of said claim or claims is recorded.

2. The number of days work done and the character and value of the improvements placed thereon, together with the location of such work and improvements.

3. The date or dates of performing said labor and making said improvements.

4. At whose instance or request said work was done or improvements made.

5. The actual amount paid for said labor and improvements and by whom paid if the same was not done by the owner or owners of said claim.

If a mining claim is on O&C lands, the owner, within 60 days after the expiration of any annual assessment year, must file for record a statement under oath as to the assessment work done or improvements made during the previous assessment year at the office of the Bureau of Land Management, Swan Island, Portland, Oregon.

A bill (HR 5704) has been introduced in Congress by Representative Pfost of Idaho to extend the time to complete assessment work in the United States and Alaska for three months to October 1. The bill has been referred to the Interior and Insular Affairs Committee, but because of the lateness of time it seems unlikely that this bill will be acted upon before the end of the assessment year.

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H.R. 4983

IN THE HOUSE OF REPRESENTATIVES

May 4, 1953

Mr. D'Ewart introduced the following bill; which was referred to the Committee on Interior and Insular Affairs

A BILL

To define the surface rights vested in the locator of a mining claim hereafter made under the mining laws of the United States, prior to issuance of patent therefor, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That mining claims hereafter located on lands belonging to the United States under the mining laws of the United States shall not, prior to issuance of patent therefor, be used for any pruposes other than prospecting, mining, or processing operations and uses reasonably incident thereto.

Sec. 2. (a) Any mining claim hereafter located, prior to the issuance of patent therefor, shall be subject to the right of the United States, its permittees and licensees for surface uses only, under the limitations of subsection (c) hereof, to use so much of the surface thereof as may be necessary or appropriate for forage control or usage, or reforestation, fire prevention, or other forest protection, upon such claim of for access to adjacent land for said purposes or to cut and remove timber on the adjacent land, and to the right of the United States, its permittees and licensees, under the limitations of subsection (c) hereof, to cut and remove dead, down, diseased, insect-infested, or over-mature timber.

(b) Except to the extent required to provide timber for the mining claimant's prospecting, mining, or processing operations and uses reasonably incident thereto, or to provide clearance for such operations or uses, or for buildings or structures in connection therewith, no claimant of an unpatented mining claim hereafter located shall cut and remove any timber growing thereon without authorization from the United States. Any cutting and removal of timber for such prospecting, mining, or processing operations and uses reasonably incident thereto (but not cutting required to provide clearance as aforesaid) shall be conducted in accordance with sound principles of forest management.

(c) Any use of the surface of an unpatented mining claim authorized to be made under this section 2 by the United States, or its permittees or licensees, shall be such as to not interfere materially with the prospecting, mining, or processing operations or reasonably incidental uses of the mining claimant.

Sec. 3. Nothing in this Act shall be construed in any manner to limit or restrict or to authorize the limitation or restriction of any existing rights of any claimant under any valid mining claim heretofore located or to authorize inclusion in any patent hereafter issued under the mining laws of the United States for any mining claim heretofore or hereafter located, of any limitation or restriction not otherwise authorized by law.

This bill received the endorsement of the Department of the Interior and was approved unanimously by the Subcommittee of the Interior and Insular Affairs Committee. The companion measure in the Senate is S. 1830.

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EXPLORATION WORK AT THE BONANZA QUICKSILVER MINE

New exploration work is now underway at the Bonanza quicksilver mine near Sutherlin, Douglas County, Oregon. The 830 drift from the No. 19 winze is being extended southerly to get under the south ore body which was mined above on the 630 south drift. In the near future additional exploration work will be done through drifts on the 1050 level extending both north and south on the north ore body. A DMEA exploration loan of $50,056 has been granted, of which $37,542 is the Government's share. Burt Avery is superintendent, and about 15 men are employed. Production is from a Gould rotary kiln.

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MONTANA CHROME

The News Letter of the Mining Association of Montana, of which Mr. Carl Trauerman has long been the efficient secretary, states that the American Chrome Company in a few months expects to start full-scale operations at its Mouat chrome mine near Nye, Stillwater County, Montana, according to Estey A. Julian, San Francisco, president of the company, who visited the property in the middle of May. Production would be 1,000 tons of ore per day, to be concentrated and delivered to the United States Government on a contract providing for 900,000 tons of chrome concentrates over an 8-year period. The mine has been re-equipped and housing provided for 350 workers. The mill also will be re-equipped. The property last was operated by the U.S. Government during World War II. The U.S. Government and American Chrome Company are financing present building and equipment program. Mr. Julian estimates that the company will spend in the community, when the property is in full operation, about $300,000 per month.

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CESSATION OF THE KAISER PERLITE OPERATION

It is reported that the Kaiser Gypsum Division of Kaiser Industries has abandoned the perlite operation at Dant on the Deschutes River about 14 miles south of Maupin. Dant & Russell, Inc., Dantore Division, installed a mill, expansion plant, and an acoustical-tile plant and then gave an option to the Kaiser Gypsum people in May 1952.

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NEW DIATOMITE PROJECT

According to the Oregonian, a group representing Portland interests has been incorporated to develop and produce diatomite at the extensive deposits in the Harper-Westfall district of northern Malheur County. It is reported that about 2700 acres of diatomite have been leased and claims covering more than 1200 acres have been filed upon. New uses for diatomite are continually being found and an expansion of the industry in Oregon is logical because of the extensive deposits in central and eastern parts of the State. For many years the only consistent operation has been near Terrebonne on the Deschutes River now owned and operated by Great Lakes Carbon Corporation.

Diatomite deposits in Oregon were formed in fresh water as distinguished from those in California which were formed in a marine environment. Diatoms are the minute siliceous skeletons of single-celled plants. They accumulate by the billions on the bottom of fresh and salt water lakes and inlets, and when covered up and consolidated form porous white deposits of opaline silica, called diatomite or diatomaceous earth.

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NEW ALUMINUM PLANT AT THE DALLES

According to the Oregon Statesman, the General Services Administration announced that the first firm to sign an agreement under the present aluminum expansion program is the Harvey Machine Company, Torrance, California. It was announced that Harvey would build an aluminum reduction plant at The Dalles, Oregon, having a capacity of 54,000 tons of primary aluminum annually. The Harvey concern had previously announced that a 500-acre plant site had been purchased. Previously the Harvey Company had purchased the Salem alumina-from-clay plant at Salem, Oregon, and plans are being made for research work on high aluminous materials at the Salem plant.

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DEPARTMENTAL NOTES

Hollis Dole, geologist with the Department, who has been on leave engaged in graduate work at the University of Utah for the past two years, has returned to the Department and is now stationed at the Portland office. He will devote a considerable part of his time to State geologic map work.

Len Ramp, Department geologist, has resumed work on his chromite study project begun last year. As chromite areas become accessible they will be visited and mapped by Mr. Ramp. His headquarters are at present in Grants Pass.

Norman Wagner, Department geologist stationed at Baker, is on annual leave during June visiting his father in Pennsylvania. In his absence, R. E. Corcoran and Ralph S. Mason of the Portland office successively substituted in the Baker office. In July Wagner will resume mapping in Umatilla County on a project started in 1951.

Thomas Matthews, Department spectroscopist, is chairman of the Oregon Section of the American Institute of Mining and Metallurgical Engineers for 1953.

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TUNGSTEN PURCHASE PROGRAM

According to the Bulletin Service of the American Mining Congress, H.R. 2824 by Representative Aspinall of Colorado was passed by the House on June 15. The measure provides for a two-year extension of the government purchase program for domestically mined tungsten. As amended by the House Interior and Insular Affairs Committee, the bill provides for publication by the government of the amounts of ores purchased during each quarter and total amounts purchased under the program. It is reported that an attempt will be made in the Senate to amend the bill to include other strategic metals including chrome.

Fay Bristol, State Senator Gene Brown, and Joe Holman, members of a chrome committee of the Oregon Mining Association, have just returned from Washington, D.C., where they worked on securing an extension of the government chrome purchase program. They report that government officials and legislators were receptive to their arguments that the chrome purchase program should be extended.

Senator Cordon has stated that he is giving a great deal of attention to the inclusion of chrome in the bill which extends the government tungsten purchase program.

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NEW FOSSIL PUBLICATION

"Facts About Fossils" is the title of Miscellaneous Paper No. 3 just issued by the State Department of Geology and Mineral Industries. This paper is a collection of eight articles on fossils previously published by the Department, chiefly in its monthly publication, The Ore.-Bin. Authors of these reprinted articles are: Dr. John E. Allen,

Dr. E. L. Packard, Mr. R. E. Stewart, Dr. Ralph W. Macey, and Mr. W. F. Barbat. The paper was issued to supply the demand which has built up among geology students and fossil collectors in Oregon.

Miscellaneous Paper No. 3 may be obtained at the Portland office of the State Department of Geology and Mineral Industries in the State Office Building, or at Department field offices in Grants Pass and Baker. The price is 35 cents.

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METAL MARKETS

The E&MJ Metal and Mineral Markets, New York, issue of June 18, 1953, quoted the following prices of metals:

Copper - domestic, average refinery price, 29.68¢ per pound. Deliveries in May totaled 146,815 tons. Chilean copper has remained at 35½¢ per pound, f.o.b. port of shipment.

Lead - 13½¢ per pound, New York. Demand is reported excellent with a possible oversold condition in London.

Zinc - 11¢ per pound, East St. Louis.

Tin - 92¢ per pound, New York. It is reported that the Bolivian government has reached an agreement with the nationalized Patino Tin Mine Corporation to compensate the company's stockholders, including American investors.

Tungsten ore - Foreign ore is quoted at $42-$43 per short ton unit for WO_3, c.i.f. United States ports. The floor price on domestic tungsten is $63, f.o.b. mine.

Quicksilver - Business was reported slow and limited largely to small lots. The price was quoted as $191-$193 per flask, down $2 from the preceding week.

Aluminum - 20½¢ per pound in ingots, 99 percent plus; 19½¢ in pigs.

Antimony - Domestic boxed, New York, 37.97¢ per pound; bulk 34.5¢ per pound.

Bismuth - $2.25 per pound in ton lots.

Cadmium - $2 per pound commercial sticks, $2.15 per pound in special shapes for platers.

Chromium - 97 percent grade, $1.23 per pound, spot (usually sold as chrome metal).

Cobalt - in 500 to 600 pound containers, $2.40 per pound, New York or Niagara Falls.

Germanium - $340 per pound.

Indium - 99.9 percent pure, $2.25 per ounce troy.

Iridium - $172-$175 per ounce troy.

Lithium - $11-$14 per pound, 98 percent.

Magnesium - 99.8 percent, 27¢ per pound in carload lots, 29¢ per pound in less than carload lots.

Manganese - 96 percent, carloads, bulk, 36.2¢ to 37.45¢ per pound; electrolytic, 99.98 percent Mn, 30¢ per pound in carload lots, 32¢ in ton lots.

Molybdenum - 99 percent, $3.00 per pound.

Nickel - Electrolytic cathodes, f.o.b. Port Colborne, Ontario, contract price, 60¢ per pound; U.S. import duty included.

Osmium - $200 per ounce troy.

Palladium - $22-$24 per ounce troy.

Platinum - $93-$95 per ounce troy.

Rhodium - $125 per ounce troy.

Ruthenium - $90 to $93 per ounce troy.

Selenium - $4.25-$4.75 per pound, 99.5 percent pure.

Silicon - Minimum, 97 percent Si, maximum, 1 percent Fe, 18½¢ per pound.

Tantalum - Base price per kilo, $160.60 for rod; $143 for sheet

Tellurium - $1.75 per pound.

Thallium - $12.50 per pound.

Titanium - 99.3 percent plus, $5 per pound.

Tungsten - 98.8 percent minimum, $5.35 per pound in 1000 pound lots.

Zirconium - $7 per pound, powder.

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M.I.T. GEOLOGY DEPARTMENT RENAMED

"The M.I.T. Department of Geology was recently renamed the Department of Geology and Geophysics to recognize increased emphasis on instruction and research in Geophysics. Two separate courses, each with its own curriculum, were started in September.

"Course XIIA, Geology, leads to the Bachelor of Science degree in Geology; Course XIIB, Geophysics, leads to the Bachelor of Science degree in Geophysics. The two courses of study are essentially similar for the first two years, including a required Summer Field Camp in Nova Scotia at the end of the second year. They differ greatly in the third and fourth years, for the Course XIIB students take additional work in Mathematics, Physics, and Electrical Engineering, while the Course XIIA students take advanced work in Geology. Summer field work at the end of the third year is strongly advised, but not required.

"Either course satisfies requirements for admission to the M.I.T. Graduate School for work on the masterate or doctorate degree in Geology, Geochemistry, or Geophysics."

(From News Letter of the American Geological Institute, November 1952.)

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NEW OREGON EXPLORATION PROJECT

Exploration work is underway at the Almeda mine on the Rogue River just north of Galice, Josephine County, Oregon. Work is being done by the Alaska Copper Corporation, of which C. F. Herbert, Seattle, is president. The Alaska Copper Corporation is controlled jointly by Yukon Placer Mining Company and Transcontinental Resources, Ltd., of Toronto, Ontario, and British Columbia. Examination work began last April. Equipment was installed and diamond drilling started early in May 1953. Drilling was started underground on the river level. Roy Hillis, Galice, is owner of the Almeda, one of the old Oregon gold and copper mines.

The principal period of activity at the Almeda was between 1908 and 1916 during which time more than $100,000 was produced. In 1908 a 100-ton matting furnace was erected at the mine and was in operation from 1911 to 1916.

Ore bodies occur in a wide zone of intense silicification called the Big Yank Lode that follows the contact between porphyritic dacite and argillite (Galice slate). Two types of ore have been described: siliceous gold-silver ore and copper ore in barite gangue.

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GOLD PRODUCTION IN WESTERN STATES

According to an estimate just released by the U.S. Bureau of Mines, Albany, Oregon, gold production in Oregon during 1952 totalled 5,509 fine ounces valued at $192,815. This is considerably less than any annual production ever before reported excepting the two years 1943 and 1944 when gold mining was stopped by the destructive War Production Board Order L-208. If the buying power of the gold is taken into consideration, the value of Oregon production for 1952 is especially insignificant compared to the buying power of the gold produced in other low-production years such as from 1874 to 1888, 1908 to 1912, and 1921 to 1933. At all other times, annual production has been well over a million dollars and in 1940 production was valued at almost $4,000,000.

Most of Oregon's gold production in recent years has come from placer mining, especially dredging. In 1952, 83 percent of value of production came from the operation of Powder River Dredging Company in Sumpter Valley, Baker County. This is the only gold-dredging operation left in the State. Two lode mines, the Buffalo mine near Granite in Grant County and the Champion mine operated by Harold E. L. Barton, lessee, in the Bohemia District, Lane County, produced a small amount of gold from ore shipped to smelters. Gold produced from the small lode mining operations amounted to 9 percent of the total. A very small proportion of the gold produced from placer mines came from hydraulic operations which worked during periods of high water and when placering was not prohibited by orders of the Rogue River Coordination Board.

Oregon, because of its lack of base metal mines which would produce by-product gold, is the most glaring example of the depressed state of gold mining in the United States. California, which produced 1,455,671 ounces in 1940 and 253,553 ounces in 1952, also shows a large decline. Alaska produced 755,970 ounces in 1940 and 289,272 ounces in 1950, the latest year for which production figures are available. South Dakota is in a class by itself among gold-producing states because of the great Homestake mine. South Dakota produced 586,662 ounces in 1940 and 567,996 ounces in 1950. The other gold-producing states rely on by-product gold from base metal mines to maintain gold production. Even so, Colorado's gold production declined from 367,336 ounces in 1940 to 116,503 ounces in 1951, while production of base metal ores was constantly increasing. In 1951 approximately 50 percent of the gold production in Colorado came from base metal ores. In Arizona gold production in 1940 was 294,807 ounces, in 1950 it was 118,313 ounces. Practically all of the gold comes from base metal ores, mainly copper (in 1950 67 percent of the gold came from copper ores and 20 percent from zinc-lead ores) and the decline in gold production came despite greatly increased copper production. In 1940 Arizona produced 281,169 tons of copper, in 1950 403,301 tons. There was a 60 percent decrease in the quantity of gold and a 43 percent increase in the quantity of copper produced. This difference is, of course, due to the declining average gold value of the base metal ores.

Other western states show a similar decline in value of gold production and an increase in base metal production from which the gold is largely derived. Utah and Washington are exceptions. Both show an increase in gold production for the 1940-1950 decade. The increase in Utah is due to greater copper production at the Utah Copper mine. In Washington a new gold mine, the Gold King at Wenatchee, accounted for the increase, although the Holden copper-zinc mine remained the largest Washington gold producer in 1950.

All gold-producing nations of the world except the United States (excluding the Soviet Union whose policy is unknown) have thought it wise to encourage gold mining in their respective countries either by some type of subsidy as in Canada or by allowing their

nationals to sell gold in the free market. In addition, these countries have increased the value of their gold by devaluing their currencies. Only the United States has seen fit to restrict gold production because of the government fixed price of $35.00 an ounce in the face of greatly increased operating costs. Outside of South Dakota, gold mining in this country which is not tied in with production of other metals is rapidly becoming a thing of the past.

F.W.L.

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MINING LAW REVISION

As reported in the American Mining Congress Bulletin Service, the Hope Bill (H.R. 5358) sponsored by the U.S. Forest Service, which would give to the Forest Service complete control of the surface of mining claims in National Forests, is being considered by the Agricultural Committee even though the Interior and Insular Affairs Committee is usually supposed to have jurisdiction over public-land law matters.

The Hope Bill contains all the specifications for control of mining claims which have been promoted in the past by the U.S. Forest Service and Bureau of Land Management. The Forest Service has alleged that such control is necessary in the interests of better administration of timber cutting programs as well as recreational and grazing programs, and it appears that finding and developing new ore deposits are of little significance compared to these other National Forest features. Some day lack of developed mineral deposits may lose us a war and minerals do not grow on trees.

The writer believes that public opinion to promote the Forest Service views has been wrongly influenced by the series of articles which have appeared over the past few years in periodicals and newspapers. The authors used "facts" supplied by the Forest Service. Clearly they showed little or no knowledge of mining or the great need for this country to develop ore deposits. These articles have a germ of truth but are highly exaggerated, inflamatory in character, and contain some statements of very doubtful accuracy. They obviously were planned and timed to promote changes in the mining laws along the lines of the Hope Bill, with only lip service to the development of mineral resources.

F.W.L.

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PETROLEUM REPORT

The Independent Petroleum Association of America has just published a comprehensive report by the Western Hemisphere Oil Study Committee of the Association entitled "Petroleum in the Western Hemisphere." A large number of people connected with the oil industry made up the Oil Study Committee. The contents include reports on statistics, government policies and laws, conclusions and recommendations as well as statements on productive capacity and reserves, supply and demand, and a summary of production and reserves in producing and non-producing countries.

Some very interesting comparative statistics concerned with production and reserves are tabulated. The figures are somewhat startling to anyone who has had little or no direct connection with production of petroleum. For example, in 1900 production of crude oil in the western hemisphere amounted to 178,000 barrels. In 1950 this production had increased to 7,425,000 barrels. As is generally known, by far the largest production in the western hemisphere is in the United States where in 1951 the total production amounted to 6,149,000 barrels or 72.5 percent of the total of the western hemisphere. The growth in production of crude oil in Canada has been tremendous but the large increase has occurred only in the past 25 years and largely in the past 5 or 6 years. Twenty-five years ago Canadian production was only 1,000 barrels daily and production remained less than 10,000 barrels through 1937. In 1946 production was 21,000 barrels. In 1951 production was 129,000 barrels. Production is mainly from the two provinces of Alberta and Saskatchewan, with Alberta furnishing about 95 percent of the total.

Reserve estimates provide interesting statistics also. Oil reserves in the United States have greatly increased over the past years despite the large increase in annual production and consumption. It was estimated on January 1, 1952, that the United States reserves amounted to 32.2 billion barrels. (In the 1920's it was estimated that oil reserves in the United States amounted to about 20 billion barrels.) In Venezuela reserves are estimated at 10 billion barrels and the Middle East 51.8 billion barrels. All other areas, including Russia, are estimated at 12.4 billion barrels. Broken down into hemispheres, known reserves are: western hemisphere, 46.2 billion barrels, and eastern hemisphere, 60.2 billion barrels, with a total of 106.4 billion barrels.

Natural gas reserves in the United States have also increased substantially. For example, at the end of 1945 estimated proved reserves amounted to 147.8 trillion cubic feet. In 1951 the proved reserves were estimated at 193.8 trillion cubic feet.

A pertinent quotation from a report by the American Association of Petroleum Geologists is included. This is from the A.A.P.G. February 1951 bulletin which presented a symposium on the "Possible Future Petroleum Provinces of North America" as follows:

> "Nine years have passed since the 1941 symposium. In those nine years our outlook has grown both geographically and geologically. The 1941 volume, for example, contained no mention of the Continental Shelf and no suggestion of the importance of reefs; it gave little consideration to possibilities in deeper strata in geologic basins already productive in upper beds; and it considered no possibilities deeper than 15,000 feet.
>
> "These limitations were due to no lack of mental reach; they reflected the 1941 state of knowledge and of physical techniques. To cite a single example, the deepest well theretofore drilled had stopped at 15,004 feet, and no well had produced oil or gas from below 14,000 feet. Since that time several wells have been drilled below 15,000 feet, one to 20,520 feet; two wells are producing from depths below 15,000 feet; the Continental Shelf is producing oil off California, Texas, and Louisiana; reefs have become prolific producers; and important production has been developed in deeper beds in basins that formerly produced mainly from shallower formations. Our concept of where to find oil and gas has both widened and deepened."

The Oil Study Committee's report is especially valuable because it supplies up-to-date authoritative information to people who may not be directly connected with the oil industry.

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NEW BAUXITE OCCURRENCE

Ferruginous bauxite has been found in a dragline trench in the Clackamas River about a hundred yards from its junction with the Willamette and half a mile north of Oregon City. The dragline is operated by the Oregon City Sand and Gravel Company. The occurrence is under water at present and below the gravel of the river bed. When the bucket of the dragline reaches a certain depth in the trench, it brings out pieces of the bauxite. Under present stream conditions, the trench is continually being refilled with gravel.

Some pieces of the bauxite show the typical red oölitic texture. Other pieces are oölitic but are gray in color resembling some of the material found at Estacada, Clackamas County. The oölites are all strongly magnetic. Other pieces which come up with the oölitic material consist of massive tan and buff-colored clay. It appears unlikely that the bauxite could have traveled 20 to 25 miles down the river from Estacada without being crushed into bits. When the time of low water comes, the Department will investigate the occurrence further.

Analyses of specimen samples were as follows:

	Al_2O_3	Fe_2O_3	SiO_2
Gray oölitic	36.88%	31.30%	13.96%
Red oölitic	34.68	29.40	12.14
Massive buff clay	32.84	21.49	32.88

The occurrence was called to the Department's attention by Mr. Murray R. Miller, Oregon City.

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PROSPECTING COURSE OFFERED

The School of Mineral Engineering, University of Washington, will again offer the short course for prospectors commencing in the fall quarter. This course is available to all persons past high school age who may be interested in mining, and it does not require admission to the University.

The course offers instruction in mineral identification, prospecting methods, mining law, elementary geology, and related subjects of importance to prospectors.

Registration fee for the course is $10, and instruction commences October 1. Applicants should register at the University during the preceding week. Further information may be obtained from the Director of the School of Mineral Engineering, University of Washington, Seattle 5, Washington.

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STUDENT FIELD WORK

The Field Geology class of Oregon State College, under Dr. W. D. Wilkinson, is now mapping in the Mitchell quadrangle. Dr. Wilkinson has directed a class of geology students in the John Day and Mitchell areas each summer since World War II.

Geological field work by students under Dr. Bressler of the University of Oregon has been done in the vicinity of the Cornucopia gold mine, Baker County, during the past two or three weeks.

It is reported that a party of geology students from the University of Washington, under Dr. George E. Goodspeed, will also work this summer in the vicinity of the Cornucopia mine.

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TELEGRAM FROM SENATOR CORDON RECEIVED JULY 24, 1953

SENATE JUST APPROVED HR 2824 EXTENDING MINERALS PROGRAMS INCLUDING CHROME IN FORM IT WAS REPORTED BY SENATE INTERIOR AND INSULAR AFFAIRS COMMITTEE.

DREDGE DISMANTLED

Porter and Company's electric bucketline dredge which operated in the Granite area of Grant County, Oregon, for many years and finally on Crane Creek is being dismantled. It probably will be moved to Idaho.

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HAMLIN COPPER PROSPECT ROAD

Wesley and Russell Hassett, Box 38, Murphy Stage Road, Grants Pass, Oregon, and J. E. Hamlin, Route 3, Box 388, also Grants Pass, are building a road to the Hamlin prospect on Taylor Creek, Onion Mountain, western Josephine County. A tunnel to crosscut ore exposed in a shallow cut has been started. In 1949 Hamlin and Baker built a 1000-foot tramway from the mine up a steep slope to a truck road. The road being built to the mine will eliminate the need for the tramway. The Strategic Minerals Corp., Ltd., of Medford leased the mine in April 1951 and shipped two carloads of ore to the Tacoma Smelter.

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HIGH WATER BRIDGE ON ILLINOIS RIVER, JOSEPHINE COUNTY, OREGON

The Bureau of Public Roads is building for the Forest Service a reinforced concrete bridge across the Illinois River near the mouth of Josephine Creek. The location is the same as the old high water bridge which was washed out several years ago. Four of the old bridge piers have been raised 12 feet and are being used in the new structure. The new bridge will be 40 feet above low water and will be 62 feet longer than the old structure. It is 16 feet in width and will have a steel center span. Hamilton & Thoms are the contractors. The bridge will be valuable to provide access to a large area south of the Illinois River and to the upper Chetco River.

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EGGERS AND TYCER CHROMITE MILL

The chromite mill at French Flat near Takilma, formerly owned and operated by Rice Brothers, has been purchased by Eggers and Tycer, O'Brien. A jaw crusher has been installed. The chrome ore being milled is hauled from the old Chollard mine. Eggers and Tycer have enlarged the Chollard glory hole and have repaired and extended the haulage tunnel. Considerable milling ore, including some highgrade, is exposed both in the glory hole and the tunnel.

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ORE BUYER WILL VISIT GRANTS PASS

Mr. Dave Somerville, ore buyer for the Tacoma Smelter, will be in Grants Pass on August 3 and 4, 1953. Appointments to see Mr. Somerville may be made with Dave White, in charge of the office of the Department at 239 S.E. "H" Street, Grants Pass.

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GRANTS PASS PURCHASING DEPOT PROGRESS

With the advent of good weather, shipments of chrome to the Grants Pass purchasing depot have steadily increased. It is said that receipts so far this year are nearly 2½ times the amount received over a comparable period in 1952.

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FERROCHROME PLANT FOR SPOKANE

According to the U.S. Bureau of Mines, Pacific Northwest Alloys, Inc., has leased part of the government-owned Mead magnesium plant at Spokane to produce ferrochrome. The company will spend nearly 1½ million dollars in additions and alterations to adapt the plant to treat low-grade chrome ore.

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ACCELEROGRAPH INSTALLED IN STATE OFFICE BUILDING

An accelerograph, or strong-motion seismograph, has been installed in the basement of the State Office Building in Portland by the Seismological Field Survey of the U.S. Coast and Geodetic Survey. The instrument was developed by the U.S. Coast and Geodetic Survey with the assistance of Dr. Frank Wenner of the Bureau of Standards and consists of three instruments which respond directly to earthquake motion (accelerometers) a starting device, a camera recorder, a time-marking clock, a lamp and optical system, various relays and electrical circuits, and a light-tight covering case. It is powered by storage batteries to guard against interruption of the record due to local power failure during a large earthquake. A signal box which will indicate when the instrument has operated and count the number of operations is installed in an adjacent office. Recording is made on photographic paper.

Normally the instrument will remain inactive until disturbed by an earthquake of about intensity IV on the Modified Mercalli Scale. Should such a disturbance occur, the starting device simultaneously starts the motor-driven camera recorder, the time-marking clock, and turns on the lamp. The instrument will operate for about 70 seconds and, if the disturbance has ceased, will stop. Should the disturbance continue for longer than 70 seconds, the instrument will automatically re-cycle and continue to record without interruption for another 70 seconds. The camera is loaded with enough photographic paper for about seven of these operations.

The accelerometers, which are set at right angles to each other to record both components of horizontal motion and the vertical component, also, are a form of torsion pendulum. Each pendulum carries a small mirror which reflects the image of the filament of the lamp back to the paper in the recorder camera through an optical system to give a trace of any motion of the pendulum.

The starting device is a pendulum which carries a platinum cone separated from a platinum ring by an air gap. Small motions, such as caused by traffic or other artificial vibrations, will cause no contact between the cone and ring but when the motion is sufficient, as in an earthquake, a contact will be made and the electrical circuits will start the cycle described earlier.

This instrument is the only one of its kind in the State. There are similar installations at Tacoma, Olympia, and Seattle in Washington. The Tacoma and Seattle accelerographs were put in service just prior to the disastrous April 13, 1949, earthquake in the Puget Sound area. Installation of the accelerograph in the State Office Building is the result of joint cooperative efforts by the U.S. Coast and Geodetic Seismological Survey, the Secretary of State, the Structural Engineers Association of Oregon, Pacific Telephone & Telegraph Company, and the State Department of Geology. The Department has agreed to service the installation periodically.

Accelerographs should not be confused with seismographs which operate continuously and record minute earth tremors often transmitted many thousands of miles from their source.

R.S.M.

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A RECORD FOR DOUGLAS COUNTY

According to the Grants Pass Courier, on June 25 a mortgage for $24,800,000 was recorded by the Federal government in the Douglas County Court House, Roseburg, Oregon. This mortgage covers a loan to the Hanna Nickel Smelting Company and has to do with a contract by the company to supply the government with ferronickel obtained by treatment of the Nickel Mountain nickel ores. Terms call for the liquidation of the loan by June 30, 1962.

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LIMESTONE PROJECT

The Morrison-Knudsen Company has moved in equipment west of Durkee, Baker County, Oregon, and is preparing to quarry limestone at a large deposit. Large-scale testing work will be done to determine suitability of the stone for sugar mills in southeastern Oregon and southwestern Idaho.

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STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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CANADA'S BOOMING MINING INDUSTRY

The Annual Report for 1950 of the Mines Branch (the latest published records available) of the Canadian Department of Mines and Technical Surveys has just been received by the Department. Total value of production has exceeded the one billion dollar mark for the first time in history and marks the sixth consecutive increase in annual production. Principal gains were in crude petroleum, asbestos, gold, zinc, copper, and nickel. Also in 1950 a record in physical volume was achieved as the index was 147.6 compared with 133.6 in 1941, the previous peak. Total value of mineral production was $1,045,450,000. The value of metallics amounted to $617,238,000. This latter figure was a 14.5 percent increase over 1949.

In the metallics field, great significance for future production may be attached to construction of the railroad from the Port of Seven Islands on the Gulf of St. Lawrence to the Quebec-Labrador iron ore deposits believed to contain high-grade reserves among the largest in the world. Also in 1950 shipments of titanium ore were begun from the very large Allard Lake deposits in eastern Quebec owned by Kennecott and New Jersey Zinc companies. Both iron and titanium dioxide were produced. During the year great interest developed in the Beaver Lodge area north of Lake Athabaska in Saskatchewan where a major source of supply of uranium ore was indicated. During the year the Aluminum Company of Canada announced plans for construction of a new aluminum reduction plant at Tweedsmuir Park in northern British Columbia. The first stage of this project is the building of a hydroelectric plant with a capacity of 500,000 h.p. (Construction of this plant is proceeding according to schedule in 1953 - Ed.)

As a contrast to conditions in the United States, the Canadian gold industry shows an increase in production of 318,000 ounces compared to 1949. Canada, again in contrast to the United States, gives special encouragement to gold mining.

It is interesting to compare value of production of metals in Canada and in the United States on a per capita basis. In 1950, according to Minerals Yearbook, production of metals in the United States amounted to about $1,351,000,000 or $8.67 per capita (total United States population in 1950 approximated 154,000,000). Using the value of Canadian metallics production of $617,238,000 as given above and the population of 14,000,000, as reported in the Canadian census of 1951, the per capita production was $44.09 or five times that of the United States. The disparity is considerably greater if comparison is applied to gold only. Value of United States gold production in 1950 was approximately $83,789,000 or $0.54 per capita. Canadian production was valued at $168,988,687 or $12.07 per capita, or more than 22 times that of the United States.

Canada's mineral wealth, especially in metallic minerals, is developing by leaps and bounds. Hardly a year goes by that we do not hear of some major discovery of metallic minerals in Canada. This, of course, is partly due to the wonderful mineral potentialities in the great Canadian shield which covers so much of northern Canada. However, if there were no profit incentive, prospecting and discovery would cease. In large part credit for the healthy state of Canada's mining industry is the government's recognition of the importance of the industry to the country and appreciation of the hazard to capital represented by the search for and the development of mineral deposits. This recognition has resulted in a favorable tax climate created by the Canadian government - a climate not now enjoyed by the United States mining industry.

F.W.L.

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STATE OF OREGON
STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

In the matter of adoption of rules and regulations for the conservation of crude oil and natural gas to be adopted pursuant to Chapter 667, Oregon Laws, 1953, by the Board of the State Department of Geology and Mineral Industries.

PROCEEDING NO. 1

NOTICE OF HEARING

Hearing will be held in Room 36, State Office Building, Portland, Oregon, on September 15, 1953, beginning at 10:00 a.m. Copies of proposed rules and regulations may be secured from the Department at a cost of 7 cents each to cover cost of mailing.

/S/ Mason L. Bingham
Chairman

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AUSTIN DUNN NEW MEMBER OF DEPARTMENT'S GOVERNING BOARD

Mr. Austin Dunn's appointment by Governor Patterson as a member of the Governing Board of the State Department of Geology and Mineral Industries has been confirmed by the interim committee on executive appointments to the Department. Mr. Dunn's term began August 1, 1953. He replaced Mr. H. E. Hendryx, long connected with mining activities of eastern Oregon, who resigned because of ill health. Mr. Dunn is an attorney of Baker and a former State Senator.

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ASBESTOS COMPANY TO ENCOURAGE PROSPECTING

The Canadian Johns Manville Company is seeking information on sources of potentially commercial deposits of serpentine asbestos in Oregon. Prospectors who have such a deposit or who know of one are requested to send samples to Mr. John Gill, geologist, Canadian Johns Manville Company, Bates, Oregon. If samples are encouraging, the company will make an examination and will pay for an option if the field conditions warrant exploration.

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AN OREGON EXPLORATION LOAN

Among 46 new mineral exploration contracts announced by the Defense Minerals Exploration Administration on July 22, 1953, is approval of one to Morris L. and Charles J. Page, Crook County, Oregon. The contract is for a total of $5,600, of which the Government's share is $4,200. The exploration project is for mercury.

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ZIRCONIUM AND HAFNIUM PRODUCTION

The U. S. Bureau of Mines reports in its July Commodity Report that zirconium production for July amounted to 23,037 pounds of sponge; also that hafnium production during the month was 667 pounds of cleaned metal sponge. Entire output of both metals goes to the Atomic Energy Commission.

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BAUXITE ON CLACKAMAS RIVER AT GLADSTONE

In the July issue of the Ore.-Bin it was reported that pieces of oölitic and pisolitic ferruginous bauxite were being brought up from a gravel trench in the Clackamas River by the dragline of the Oregon City Sand and Gravel Company at Gladstone near Oregon City. Water in the river has been falling since the first report and Mr. Murray Miller, who first recognized the pieces, has been able to inspect the shore north of the trench. Directly below the garage of the Oregon City Sand and Gravel Company, on the north side of the river, a nearly vertical bank a few feet above river level contains an outcrop of oölitic bauxite about 4½ feet thick which lies on and grades into massive brown clay. The exposure is about 65 feet long. Both ends are masked by debris and brush. There is an apparent gentle dip to the south and toward the dragline trench. However, the pieces brought up out of the trench may be float from the exposure on the bank.

Three vertical channel samples were taken by the Department and gave returns as follows:

		Width	Al_2O_3	Fe_2O_3	SiO_2
1.	Top Section	22 inches	41.13%	20.51%	10.06%
2.	Middle Section	30 "	40.01	18.11	16.12
3.	Bottom Section	36 "	29.60	17.96	31.04

(Full section not exposed.)

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CHROME NEWS

New chrome producer

Bob Radcliffe and Al Lea are working their claim, the Lucky L & R, which they discovered last November. It is on the west side of the northern extension of Chrome Ridge in sec. 35, T. 35 S., R. 9 W., Josephine County. They put in about half a mile of road and began mining on their claim this spring. They hauled out their first load of high-grade chromite early in July. To date they have shipped nearly 50 tons of ore, none of which assayed less than 52 percent Cr_2O_3. They are also mining some low-grade ore which they are stockpiling at Radcliffe's mill at his gold mine, the Black Bear, in sec. 26, T. 34 S., R. 8 W., about 3 miles northwest of Galice. At the L & R claim open cuts have exposed disseminated and some high-grade chrome in discontinuous narrow stringers over a distance of about 120 feet.

Ashland Mining Company leases Chrome Ridge claims

The Ashland Mining Company, operated by Fred and Dewey Van Curler, has a leasing agreement with Dana Bowers to work any of the old Sordy claims not being worked by Bowers and sons. The Van Curler brothers are also leasing the Catty Buck claim from Lou Robertson. It is in sec. 22, T. 36 S., R. 9 W., in Josephine County at the head of Red Dog Creek.

Robertsons lease chrome properties

Lou and Bill Robertson have leased the Sad Sack, formerly known as the Black Prince, from C. O. Russell and C. O. Anderson. It is in the northeast corner of sec. 23, T. 36 S., R. 9 W., Josephine County. They have recently driven nearly 300 feet of tunnel about 60 feet below the open pit work done last summer and are starting to mine a stringer of high-grade ore, which is apparently an extension at depth of a pod mined near the surface. The Jim Bus mine, owned by Jim Gallaher and C. O. Russell, on the southwest side of the Illinois River in sec. 21, T. 37 S., R. 9 W., has been leased by Bill Robertson and

associates. A low-water bridge has been built across the river and an inclined shaft is being sunk alongside a prominent diorite dike where a fairly large pod of high-grade chromite occurs. The Jim Bus is about ¼ mile south of the Oregon Chrome mine near the Illinois River west of Selma, Josephine County.

High-grade chrome shipped from Gardner mine

Fred Gardner, Harbor, Oregon, is shipping from his property discovered in July 1952 near Vulcan Peak, Curry County, Oregon (Ore.-Bin, September 1952). A total of 75 tons of high-grade ore has been shipped to the purchasing depot at Grants Pass. One shipment averaged 51.38 percent Cr_2O_3; another, 50.75 percent Cr_2O_3.

Six Mile Creek mill shipping

The chromite concentrating mill built this spring at the mouth of Six Mile Creek on the Illinois River road about 8 miles west of Selma in Josephine County is now milling ore. The mill is known as the Six Mile Creek mill and is owned and operated by Messrs. Floyd, Pressler, and Jackson. Ore from the Jackson Creek mine is being milled.

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CHROME PURCHASE PROGRAM EXTENSION BECOMES LAW

On August 7, 1953, the President signed HR 2824, the "Domestic Minerals Program Extension Act of 1953," thus extending the Government's chrome buying program an additional two years until June 30, 1957. Besides chromite the Act includes tungsten, manganese, mica, asbestos, beryl, and columbium-tantalum-bearing ores and concentrates. It is specified that the Act "Shall not be construed to limit or restrict the regulatory agencies from extending the termination dates of these programs beyond the two-year extension periods provided by this section or from increasing the quantity of materials that may be delivered and accepted under these programs as permitted by existing statutory authority"; also ". . .the responsible agencies controlling such purchase programs are directed to publish at the end of each calendar quarter the amounts of each of the ores and concentrates referred to in Section 3 purchased in that quarter and the total amounts of each which have been purchased under the program."

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THE REVOLUTION IN METALS*

Developments of a tremendous order are taking place in metallurgy as a result of the demand by research men and engineers in the new sciences such as electronics, aerodynamics, and nuclear physics, for materials with highly specialized and unique properties.

Metals unheard of a few years ago, except as numbers on the table of chemical elements or available only in test-tube quantities, are coming into commercial scale production. One of the newcomers is titanium, which has been found to have the best combination of high strength, light weight, and corrosion resistance of any known metal. Less than 5 years ago, titanium output was measured in tens of pounds; production this year may reach 2500 tons. High unit cost is the obstacle in the way of large scale use and this cost will be lowered as research on production methods is prosecuted. Likewise, zirconium, beryllium, lithium, and a number of other "uncommon" metals with unusual properties, are now being produced on an industrial scale.

Some of the new metals and some of the companies which are currently processing them are listed as follows:

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*Abstract of Weekly Staff Letter of David L. Babson and Company, Inc., Boston, Massachusetts.

Titanium	National Lead; DuPont; Crane
Magnesium	Dow Chemical
Zirconium	Foote Mineral; Carborundum
Lithium	Lithium Corporation; Foote Mineral
Germanium	Eagle-Picher
Columbium	Fansteel Metallurgical
Beryllium	Beryllium Corporation
Hafnium	Foote Mineral; Carborundum
Tantalum	Fansteel Metallurgical; Metal Hydrides
Thorium	Lindsay Chemical
Cerium	Lindsay Chemical; Molybdenum Corporation
Rare Earths	Molybdenum Corporation; National Lead; Lindsay Chemical
Uranium	Climax Molybdenum; Vanadium Corporation; Union Carbide

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SECONDARY RECOVERY*

Modern Producing Practices Aid Conservation of Oil

As America becomes increasingly dependent upon petroleum as an energy source, and consumption of oil products rises year after year, it becomes clearly evident that we should give serious regard to our reserves of this great natural resource. Nature put only so much crude oil in the ground, and with each passing year the chances of finding new reserves diminish in some degree.

The growing dependence upon petroleum has led oil companies in the United States to intensify their search for new oil pools in recent years, as our country came to use more oil than it could produce. It has also directed their thinking in another direction - the recovery of greater amounts of oil from fields which are already producing or even from fields which have been virtually abandoned. One effort which the oil industry is making in this direction is termed secondary recovery.

The very nature of crude oil itself, and of the underground formations in which it has collected, make modern secondary recovery projects possible. Crude oil is generally endowed with qualities which cause it to resist movement from the underground beds in which it has accumulated, unless there is a force of energy present to drive it out. In an oil field the energy which drives a flow of oil into the wells is usually water or gas which has been confined with the oil under pressure. As this energy decreases, oil production diminishes, until it is no longer economic to produce the well. As the percentage of oil becomes less and less, it moves with even greater difficulty due to surface tension effects.

Because this is the nature of crude oil, as much as three-fourths of the oil in many fields has never been brought to the surface. It lies locked in the underground strata where it has collected, and most of it will stay there forever. But success is being attained in increasing the percentage of oil which can be taken from our underground reserves.

Tests made in some of our older fields show that as little as 15 percent of the original oil was ever recovered. Because of more intelligent producing methods, we can now expect to double ultimate recovery from oil fields discovered in recent years. There is more oil known to exist underground in our oil fields than has ever been produced from them, and it is these reservoirs which are the target of modern oil men.

Standard Oil Company of California, along with other American oil companies, is acutely conscious of the need for greater recovery of this valuable natural resource. Its end effect

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*From Standard Oil Company of California's Bulletin, July 1953.

is the same as a new discovery. Being aware of the need to extend our oil supplies, Standard has made secondary recovery an important part of its oil field research activities, investigating the possibilities of improving present methods, and experimenting with new methods.

The Company also has a number of secondary recovery projects under way, both in California and in other Western producing areas, which are giving new life to older fields.

The success of such projects, incidentally, depends to some extent upon agreement among the various operators in these fields upon a unitization plan. Briefly, this means that they must agree to allow the field to be operated by one company, for the benefit of all the owners, so that control is exercised over energy input, and the flow of oil from the wells can be regulated to ensure greatest ultimate recovery.

The magnitude and general importance of work such as this is indicated in a compilation recently published by the Interstate Oil Compact Commission. It revealed that through secondary recovery efforts nine fields in Pennsylvania had increased their yield by some 230,000,000 barrels. Four fields in New York showed increased recovery of crude oil totaling more than 100,000,000 barrels, from pools once considered to be almost depleted.

At the present time two principal means are being employed to increase the production of such older fields as these. Both involve replacement of necessary energy which has dimished over years of production. One method centers around the use of water flooding to flush out what was once considered unrecoverable oil. The other utilizes natural gas, pumped into the oil-bearing formations under pressure to push or carry the oil to producing wells.

Everyone is familiar with agricultural achievements in putting worn-out and eroded farmlands back into production. The reworking of our older and poorly operated oil pools is a conservation step in the same direction. The original energy which brought oil booming to the surface is long since gone. But we have found that a substitute energy can do a very creditable job.

It is likely that in the future, as more research and experimental work is done, we can expect even more favorable results than those achieved so far. Oil men are learning more every day about the behavior of underground oil pools, and their response to new energy sources. And some day they may count it as a normal practice to extract more than half of the oil from any reservoir.

These things are a long way, in both time and practice, from the methods and philosophies in vogue when the petroleum industry began to grow. And they are indicative of the sound thinking of the oil men of today, who consider seriously their trusteeship of a great natural resource.

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GOVERNMENT MINERAL EXPLORATION PROGRAM REVISED

Previously 37 minerals were eligible for government assistance under the Defense Minerals Exploration Administration. According to an amendment to the DMEA Order 1, 19 of these minerals have been eliminated from the list. Government assistance is now available for the following metals and minerals:

Group A, for which the Government will contribute 50 percent of the approved project costs: Chromium, copper, molybdenum, bauxite (refractory grade only);

Group B, for which the Government will contribute 75 percent of the approved project costs: Manganese, tungsten;

Group C, for which the Government will contribute 90 percent of the approved project costs: Asbestos (amosite, chrysotile, and crocidolite), beryl, cobalt, columbium, tantalum, industrial diamonds (bort), mica (muscovite block and film), nickel, platinum, thorium, and uranium.

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OREGON MINERAL PRODUCTION IN 1951*

Oregon's 1951 mineral production as just reported by the U.S. Bureau of Mines totals nearly $28½ millions, and is the largest in dollar value ever attained despite low returns in value of metallic minerals. By far the greatest returns are in construction materials such as sand, gravel, stone, and cement. The breakdown of production of the different materials is as follows:

Mineral	Quantity	Value
Antimony ore and concentrate - short tons, gross weight	-	-
Carbon dioxide, natural (estimated) - thousand cubic feet	1/	1/
Chromite - short tons, gross weight	754	$ 63,000
Clays (except for cement) - thousand short tons	95	105,000
Coal - thousand short tons	-	-
Copper (recoverable content of ores, etc.) - short tons	11	5,000
Gold (recoverable content of ores, etc.) - troy ounces	7,927	277,000
Lead (recoverable content of ores, etc.) - short tons	2	1,000
Mercury - 76-pound flasks	1,177	247,000
Perlite (crude) - short tons	1/	1/
Pumice and pumicite - short tons	47,026	137,000
Sand and gravel - thousand short tons	10,504	9,117,000
Silver (recoverable content of ores, etc.) - thousand troy ounces	6	6,000
Stone (except limestone for cement and lime) - thousand short tons	8,722	10,831,000
Tungsten concentrate - short tons, 60-percent WO_3 basis	1	3,000
Zinc (recoverable content of ores, etc.) - short tons	3	1,000
Undistributed: Asbestos (1949-1951), cement, diatomite, gem stones, lime (1950-1951), quartz, stone (dimension granite, 1949; dimension and crushed granite, 1950), and minerals whose value must be concealed for particular years (indicated in appropriate column by footnote reference 1/)	-	7,608,000
Total Oregon	-	$28,401,000
Clays sold or used for cement - thousand short tons	57	$ 57,000

1/ Value included with "Undistributed."

*Graph showing Oregon Mineral Production 1850-1951 on following page.

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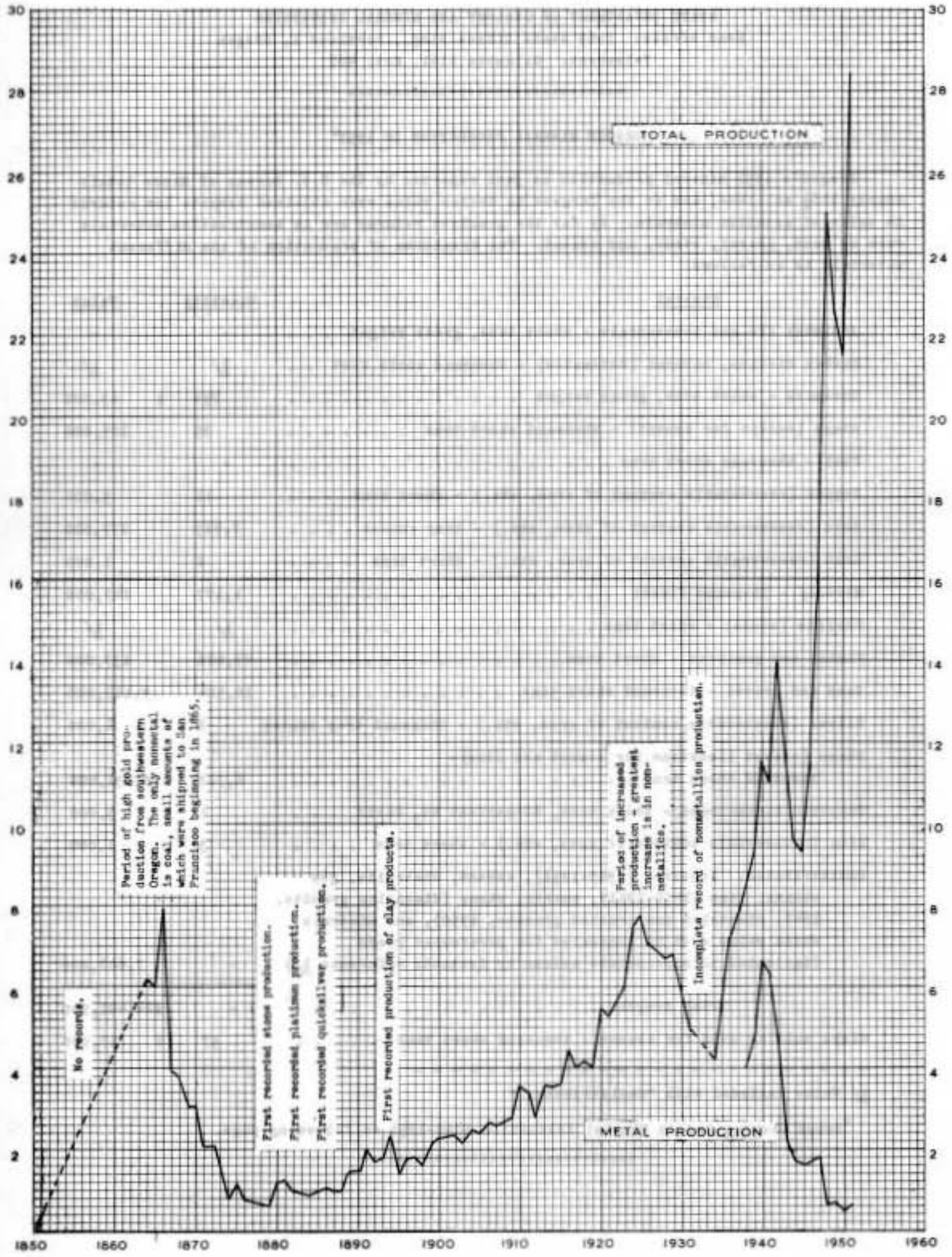
OREGON MINERAL PRODUCTION

(IN MILLIONS OF DOLLARS)



EASTERN OREGON MINING NEWS

Mr. Anthony Brandenthaler, Baker, Oregon, has announced the start of construction of a lime burning plant in Baker. The first kiln of a contemplated battery of three is now being prepared for shipment to Baker from California. Road building to the quarry site on Marble Creek about 8 miles west of Baker will begin about October 1. The limestone deposit on Marble Creek was diamond drilled several years ago and results showed exceptionally pure stone. It is planned to convert wood waste from sawmill operations into gas for burning limestone.

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The Morrison-Knudsen Company, Boise, Idaho, is carrying on exploration work on a deposit of limestone west of Durkee, Baker County, Oregon. Bulldozing and road building has been under way for the past two months and now diamond drilling will be done.

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William Wendt, Baker, Oregon, is installing a 5-ton mill to test a free milling ore showing at the Sanger mine east of Baker in Baker County. The Sanger is one of the famous early-day gold producers of eastern Oregon. The vein which will be tested was discovered several years ago and has been under development for the past two summers. A length in excess of 300 feet along the vein has been indicated.

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Burt Hayes, who shipped the first chrome concentrates from the John Day area to the Grants Pass purchasing depot in 1952, is building a small concentrating mill on Dog Creek about 7 miles southeast of John Day, Grant County, Oregon. Hayes has leased the property from Ray Summers, John Day.

* * * * *

The United Mining and Metals Corporation, Cottage Grove, Oregon, is installing a new pipeline on the High Bar Placer above Pine Creek in Baker County. Water will be pumped to a reservoir from Burnt River and thence pumped to giants at the pit. Operations are in charge of Mr. H. L. Bruneau.

* * * * *

According to The Stockpile, the Buffalo mine in eastern Grant County, Oregon, is active and is being operated by Jim Jackson and Bill Coxe who have leased the property from the Boaz Mining Company, Seattle. The Buffalo has a long record of production of both high-grade shipping ore and milling ore. Concentrates are shipped to the Tacoma Smelter.

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ZIRCONIUM AND HAFNIUM

The U.S. Bureau of Mines has announced that production of zirconium at the Northwest Electrodevelopment Laboratory, Albany, Oregon, is currently maintained at an average rate of about 22,000 pounds per month. The entire output is consigned to the Atomic Energy Commission. July production of hafnium amounted to 896 pounds, also sent to the Atomic Energy Commission.

Zirconium and hafnium are associated in the mineral zircon, zirconium silicate.

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CHROMITE IN JUNE 1953

Domestic chromite production in June 1953 amounted to 2,825 short tons, an increase of 73 percent compared to production in May, according to the U.S. Bureau of Mines Chromite Report No. 41. All of the production originated in California and Oregon and was received at the Grants Pass ore purchasing depot at Grants Pass, Oregon. Shipments for the first six months of 1953 amounted to 9,780 short tons. This amount was 120 percent greater than shipments during the first six months of 1952.

Total consumption of all grades of chromite in the United States during the first half of 1953 was 17 percent greater than the previous half year high which was attained in the second half of 1951.

Consumption of chromite for chemical purposes during June was less than 1 percent below the monthly average during the peak year of 1951, increasing 9 percent over May 1953. Refractory use gained 5 percent during June 1953 but metallurgical use dropped 9 percent, reversing the recent upward trend in total consumption of all grades of chromite with the total falling 3 percent below the May record high. Imports during June 1953 totalled 189,132 short tons. For the first six months of 1953 imports amounted to 1,071,128 short tons of which metallurgical grade totalled 562,068 long tons, refractory grade 307,065 long tons, and chemical grade 87,231 long tons. This compares with total imports of 1,700,209 for the whole of 1952. Imports are reported in long tons; other statistics in short tons.

Countries from which metallurgical grade chromite was imported during the first six months of 1953 in order of importance were: Turkey (208,786 tons), Southern Rhodesia (133,247 tons), Union of South Africa (94,357 tons), New Caledonia (36,815 tons), Philippines (34,659 tons), Yugoslavia (22,455 tons), Cuba (16,300 tons), India (6,056 tons), Sierra Leone (6,000 tons), Pakistan (3,060 tons), Greece (335 tons), Afghanistan (42 tons).

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MOUAT CHROME MINE GOES INTO PRODUCTION

According to the August Commodity Report of the U.S. Bureau of Mines, the American Chrome Company which has reactivated the Mouat chromite project in Stillwater County, Montana, has gone into production at a current rate of about 500 tons of ore daily. Plans are to double this output. The American Chrome Company has a contract to supply the government with 900,000 tons of chromite concentrates over a period of 8 years. The property was developed and a concentrating mill erected at the mine in World War II under the management of Anaconda Copper Mining Company. After the war the property remained inactive until taken over by the American Chrome Company.

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QUEEN OF BRONZE, JAPAN MAKE COPPER AGREEMENT

As reported by Mining World, August 1953, the Queen of Bronze Mining and Smelting Company of Grants Pass, Oregon, has agreed to export between 19,000 and 28,000 tons (copper content) of copper concentrate over a year's time to the Tokyo Boeki Shokai, a Japanese trading company, for use in Japanese smelters.

The initial shipment, which is expected to reach Japan by September, will be about 1,000 tons. The Queen of Bronze mine in Josephine County, Oregon, is said to have a stock of about 4,000 tons of copper concentrate. The mine had been closed since the end of World War II.

The copper will be divided among six leading Japanese copper smelters and will be used to reduce smelting costs and also to meet the shortage of scrap copper.

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DMEA ACTIVITIES IN OREGON
(July 15 to August 15, 1953)

The status and location of Defense Minerals Exploration Administration contracts approved and accepted to date in Oregon is indicated in the tabulation below.

Operator	Location (County)	Commodity	Amount	Status
Paul W. Wise	Malheur	Mercury	$34,727	Terminated
Waite Minerals	Josephine	Copper	30,000	Terminated
Owen Pigmon	Crook	Mercury	20,460	Terminated
Bonanza Oil and Mine Corporation	Douglas	Mercury	50,056	Active
Roba and Westfall	Grant	Mercury	20,140	Active
Strickland Butte Mines (Page and Page)	Crook	Mercury	5,600	Active

Summary of Active Projects

Bonanza Oil and Mine Corporation

Drifting is in progress on the 830 level and the 1050 level of the Bonanza mine.

Strickland Butte Mines

Bulldozer trenching at the Strickland Butte prospect was completed during the first part of August.

Roba and Westfall

Preparatory work is in progress. It is anticipated that shaft sinking will be commenced in the near future.

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CEMENT COMPANY EXPANDS ACTIVITIES

According to Commerce, published by the Portland Chamber of Commerce, the Oregon Portland Cement Company, Frank E. McCaslin, President, has announced a $1,000,000 expansion program at the plant of the Oregon Portland Cement Company at Lime, Baker County, Oregon. The project now in progress will increase conveying and crushing capacity and will modernize the kiln firing system in order to boost production. The announcement states that capacity of the plant will be increased sufficiently to provide cement needed for Snake River dam construction. It is expected that the expansion initially planned will be completed by the end of 1953. The O.P.C. quarry is near the present plant site and in addition the company has large deposits of limestone on Fox Creek in Baker County on the Snake River side of the divide a few miles from the Lime plant.

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MINERAL PRODUCTION IN CONTINENTAL UNITED STATES

According to the U.S. Bureau of Mines, value of mineral production in continental United States in 1951 was $13,524,000,000 compared to $11,855,000,000 in 1950. Texas led all the states in 1951 with production valued at $3,268,555,000 (because of the huge production of oil and gas). Pennsylvania was second with $1,289,226,000 (principally because of the large coal production). California was third with a production of $1,208,920,000 (mainly because of large oil and gas production).

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QUICKSILVER

E&MJ Metal and Mineral Markets, issue of September 10, reports that the market for quicksilver was inactive and prices unsettled. Market quotations for the metal ranged from $186 to $189 per flask which showed a drop of about $2 per flask under the level of the previous week. The United States Government is apparently not in the market, and under this condition lower quotations may be expected. Reportedly high market price stimulated Mexican production. The chlorine program which required large supplies of mercury for mercury cells seems to be coming to an end.

The U.S. Bureau of Mines reports that the mercury industry in the second quarter of 1953 was featured by a decline in receipts of the metal from abroad. Imports in the second quarter amounted to 6,431 flasks. This compares with 24,265 flasks for the first quarter of 1953 and 68,686 flasks for the full 1952 period. Domestic production for the first six months of 1953 amounted to 7,320 flasks. Total 1952 production amounted to 12,547 flasks. This domestic output showed a continued upward trend but was small compared to the long-time history of domestic mercury mining. The eight leading domestic producers which accounted for 93 percent of the total production were Abbott (Lake County), New Idria, including San Carlos (San Bernite County), Culver-Baer, Cloverdale, and Mt. Jackson, including Great Eastern (Sonoma County), California; Hermes (Valley County), Idaho; Cordero (Humboldt County) Nevada; and Bonanza (Douglas County) Oregon. In addition twenty-one other properties were productive during the second quarter of 1953. Imports in order of importance during the first quarter of 1953 came from: Spain (12,417 flasks), Italy (7,264 flasks), Mexico (2,854 flasks), Yugoslavia (1,652 flasks), Miscellaneous (78 flasks). Imports during the second quarter in order of importance were: Mexico (3,469 flasks), Italy (1,179 flasks), Yugoslavia (1,131 flasks), Spain (624 flasks), miscellaneous (28 flasks).

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ATKINSON DREDGE LEASE IS TAKEN BY VERNER ALLEN

Dredging lease in Hells Canyon area of Snake River which forms the Idaho-Oregon boundary line, has been taken over from S. K. Atkinson of Boise by Verner Allen of San Francisco. Transfer of the lease was approved by both the Idaho and Oregon land boards.

The Atkinson lease was approved more than a year ago after a public hearing at which Mr. Atkinson estimated that a dredging operation in Hells Canyon gorge could recover about $171,000,000 worth of gold, monazite, and other metals.

(From Mining and Industrial News, p. 14, August 1953.)

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STAINLESS STEEL OUTPUT IS RISING AT 16 PERCENT YEARLY RATE

The production of stainless steel ingots increased an average of 16 percent a year from 1940 to 1951, according to statistics by American Iron and Steel Institute. At the same time the total physical output of the country increased an average of 5 percent a year, according to the Department of Commerce. Stainless ingots are converted by the steel industry to nearly all the forms in which other steel is sold, such as bars, sheets, pipe, etc.

Since 1935, when the official statistics on stainless steel were first compiled, the ingot output of this metal has increased more than 12 times to a total of approximately 930,000 net tons in 1952, compared with the record high of nearly 934,000 tons in 1951. The combined output of two light metals, including primary and secondary or reclaimed metal, set a record in 1952 of over 1.3 million tons, nearly 12 times the 1935 production.

(From Steel Facts, June 1953.)

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THE NICKEL MOUNTAIN PROJECT*

Introduction

A very important event in Oregon mining history occurred on January 16, 1953, in Washington, D.C., when the Defense Materials Procurement Agency signed contracts with the Hanna Coal and Ore Corporation and the Hanna Smelting Company, both subsidiaries of the M. A. Hanna Company, Cleveland, Ohio, for the production of nickel from the Nickel Mountain deposit near the town of Riddle, Douglas County, Oregon. In addition, signing of the contracts marked the opening of an important chapter in the domestic mining industry since no nickel has ever been produced in this country on a commercial scale from ore mined in continental United States (a total of a few hundred tons is recorded as a by-product in smelting copper ores). We have always depended on Canada for our nickel. Start of nickel production at Riddle will make the United States partly independent of outside sources of this very strategic metal.

Because of the importance of the Nickel Mountain project, it seems desirable to assemble background descriptive material as a record.

Geography

Nickel Mountain is about 5 miles northwest of Riddle, an incorporated town in Douglas County, as shown on the accompanying index map. Elevation of the summit of the mountain is 3533 feet. The nickel deposit, occupying much of the upper part of the mountain, may best be reached from the Hanna plant site which is about 3½ miles west of Riddle. The Hanna Company has constructed a new road more than 2 miles long extending from the plant to the deposit at the summit. Because of the hazard of meeting heavy trucks on this road, permission to drive over it must be obtained at the Hanna Company office, at present in Riddle. A gatekeeper is stationed at the entrance to the new road and a pass is required to enter.

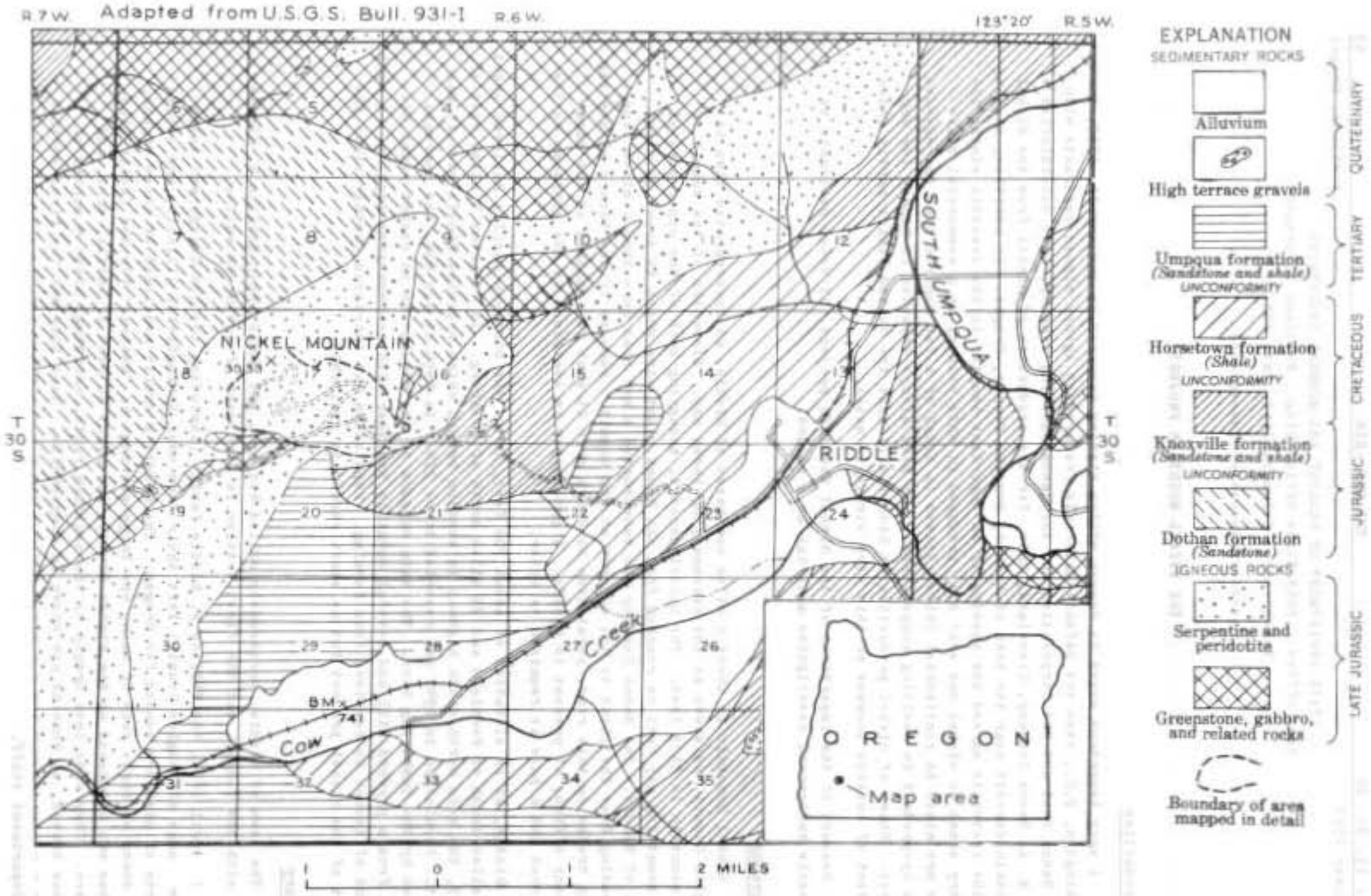
Riddle, at an elevation of about 700 feet, is on the Southern Pacific Railroad about 220 miles south of Portland and 25 miles south of Roseburg. It is about 4 miles west of US 99, the main north-south highway in western Oregon which bypassed Riddle when it was built. Population in 1940 was reported to be 214. In 1950 it was 634, the increase caused by the lumbering boom. The main support of the population in recent years has been from a plywood mill and several sawmills together with accompanying logging. A small amount of income is received from farming. Population has increased further since the start of the nickel project but no exact record is available.

History

The town of Riddle, erroneously called Riddles, was named after William H. Riddle who, with his family, was the first settler in that part of Cow Creek valley.

In April 1851, the William H. Riddle family (including the son George who later became Judge of Douglas County) left their farm near Springfield, Illinois, and joined a party of pioneers headed for Oregon. The Riddle's outfit consisted of three wagons, each drawn by three yoke of oxen, one large carriage or "omnibus" for the family (the omnibus was abandoned at the Platte River), and about 40 head of cattle, cows, and heifers. They came into Oregon by the southern route, arriving, after 5 months of arduous travel, at what is now known as Canyonville. Here they met the first settler

*By Department staff.



GEOLOGIC MAP OF THE VICINITY OF NICKEL MOUNTAIN, DOUGLAS COUNTY, OREGON

they had seen in Oregon, namely Joseph Knott, who had located the first donation land claim in the Cow Creek valley. Joseph Knott showed Riddle the Cow Creek valley, and Riddle, impressed by the beauty of the valley and the splendid range for cattle, selected a site near what is now the town of Riddle. Here he immediately cut and laid the first four logs of his cabin, this being sufficient in those days to hold a land claim.

Early in the spring of 1852, other settlers began to arrive in Cow Creek valley. One of these was John Smith, from South Bend, Indiana, who located a donation land claim embracing the present site of the town of Riddle. After establishing the claim, Smith returned to his home in Indiana, but sent his daughter and son-in-law, J.Q.C. Vandenbosch, out to take over the claim. The Vandenbosch family thereby were the first owners of the townsite of Riddle, and their name appears on all abstracts of title to Riddle town property. In 1866, Vandenbosch sold his claim to Abner and J. B. Riddle.

In 1882, the Oregon and California railroad (later the Southern Pacific railroad) began extending its line south from Roseburg and soon reached Cow Creek. Abner and J. B. Riddle donated land for a town site, and a depot was located on it. The little town which sprang up was named Riddle, sometimes called Riddleburg, and for 8 months it was the southern operating terminus of the railroad. Stages left from this point for Redding, California. A. G. Walling, in his "History of Southern Oregon," published in 1884, reports that during the time that Riddle was the railroad terminus, "the place was 'lively' in the broadest significance of the term, and its like the peaceful citizens of Cow Creek valley hope never to witness again." With the extension of the railroad, and the departure of "the horde which infested the terminus," Riddle became a subdued but thriving village and shipping point for a small but prosperous community. There were two hotels, a store, a warehouse, a saw mill, and a school house. Placer mines were being extensively worked and "a nickel mine was being worked with good results on a neighboring mountain called 'Old Piney.'"

The deposit of nickel was first discovered by sheepherders in 1865 and was thought to be tin. In the excavations the prospectors found green ore which they supposed was copper. Samples of the rock were sent to Mr. William Q. Brown, a mining expert, who was then mining on Althouse Creek in Josephine County. An analysis showed the ore to be not copper or tin, but nickel, and the sample contained 6 percent nickel.

According to a newspaper clipping dated January 17, 1908, Mr. Brown and associates purchased the property in 1882 and ran open cuts, tunnels, and shafts. More than 3,000 tons of the ore was piled on the dumps, showing an average of 5 percent nickel, the value of which at that time was about $150,000 (the price of nickel varied from 40 to 60 cents per pound). The mine was then placed on the market for sale at prices ranging from $400,000 to $1,000,000 but no purchasers were secured. In 1891, Mr. Brown and J. B. Riddle sold 200 acres of the property to the International Nickel Mining Company, of Chicago. The Company expended over $100,000 in surface improvements, including a hotel, houses for workmen, a large Corliss engine and boilers, and a saw mill. A complete smelting plant of 150 tons capacity was purchased but was never erected. The newspaper stated that the stockholders got into litigation, and the machinery for the smelting plant was still stored on the railroad at Riddle. Mr. Winslow of Chicago had become owner, and Mr. W. Q. Brown still held some of the original property. Both properties were idle in 1908, and the International Nickel Company had 60 acres in prunes, then a thriving industry in the Cow Creek valley.

Sometime during the latter part of the last century the Adams family of Oakland, California, acquired ownership in the nickel area, and early in the present century Edson F. Adams emerged as the owner of the land containing the deposit.

In the late 1930's and early 1940's at least two important groups examined the deposit. A few churn drill holes were put down, mainly on the lower deposit. It seems likely that some metallurgical testing work was done on the nickel ore at this time but the investigations were conducted quietly and no publicity was given to the field work or results obtained.

In 1941 Freeport Sulphur Company negotiated a lease with Mr. Adams and in 1942 carried on extensive exploration work. Besides geological studies, some 50-odd diamond drill holes were put down with the principal attention given to the upper deposit, which contains much the greater amount of nickel. Metallurgical testing work was done along with the drilling.

In 1943 Freeport relinquished the lease, mainly because of the seeming difficulties of economic treatment of the ore. (The market price of nickel was then 35 cents per pound.) Moreover the company had acquired the Nicaro nickel property in Cuba and put it in production under a government contract so that interest in the Oregon deposit waned. The area containing the deposit, as well as some adjoining land which had been acquired by Freeport, was turned back to Mr. Adams.

After World War II, the M. A. Hanna Company of Cleveland, Ohio, became interested in the Nickel Mountain property. Negotiations were carried on, first with Mr. Adams and then, after his death in 1947, with his estate and a deal was finally transacted. Geological work and extensive metallurgical testing were begun. This was supplemented by churn drilling, shaft sinking for testing purposes, and bulldozing deep trenches during the succeeding three years. The culmination of all the exploratory work was the signing of the government contract early in 1953.

Geology

1. General geology and geologic setting

Nickel Mountain is in the northwest part of the Siskiyou Mountains a few miles east of their juncture with the Tertiary rocks of the Coast Range. Approximately 30 miles to the northeast the Tertiary volcanics of the Cascade Range overlap the continuation of the rocks that are found in the vicinity of the nickel deposit at Nickel Mountain.

The summit of Nickel Mountain and the host rock of the nickel deposit is peridotite, an ultrabasic rock consisting chiefly of olivine and enstatite. All the peridotite is serpentinized to some extent - fresh specimens being rare. A band of serpentine several hundred feet wide divides the peridotite into two parts. Serpentine is an altered ultrabasic rock and in this area it may mark a zone of intense shearing and considerable movement within the main peridotite body. Feldspathic and quartzose dikes of small areal extent occur in the serpentine and metavolcanic rocks. The ultrabasic rocks are probably late Jurassic or early Cretaceous in age and are intrusive into metavolcanic and metasedimentary rocks of late Jurassic age. The metavolcanic rocks are greenish colored and were originally lavas or pyroclastic igneous rocks. They have undergone varying degrees of change and some may even be classified as schists or phyllites. The metasedimentary rocks are graywackes and shales with minor chert and conglomerate and belong to the Jurassic Dothan formation.

Sedimentary rocks belonging to the late Jurassic Knoxville formation, early Cretaceous formations, and the mid-Eocene Umpqua formation occupy a minor structural basin developed in the old terrain of the Klamath Mountains after the mountain-making period which followed or accompanied the intrusion of the ultrabasic rocks. The Knoxville and early Cretaceous formations are well indurated grayish-colored rocks. Graywacke type sandstones predominate in both but conglomerates composed almost entirely of chert pebbles from $\frac{1}{2}$ inch to 2 inches in diameter mark the Knoxville formation while shales are characteristic of the early Cretaceous formations. The jointing in the Knoxville formation is more pronounced than in the early Cretaceous rocks. It is most noticeable in the chert conglomerates where the fracture planes through the pebbles form smooth surfaces. The Umpqua sediments are lighter in color than the Mesozoic sediments. A yellowish sandstone is the most common material of this formation but a pebble to boulder conglomerate is found near the base and dark-colored, thin-bedded shales are found in the valley floor. The conglomerate is composed largely of pebbles derived from the metavolcanics and metasediments of the ancient Klamath Mountains. Chert pebbles are not as prominent as in the Knoxville conglomerate and the jointing is so poorly developed that the rock generally breaks around the pebbles rather than through them as in the Knoxville conglomerate. Fossils, the basis on which the age of these formations has been determined, are fairly common in the Umpqua and early Cretaceous formations, less common in the Knoxville formation and very rare in the Dothan formation.

The Dothan and metavolcanic formations generally have high dips to the southeast with a strike to the northeast. The peridotite and serpentine form a discontinuous band which can be traced for nearly 35 miles from Cow Creek near the mouth of Salt Creek northeastward to Little River near Peel. The Knoxville and younger formations have attitudes which suggest a basin in the Riddle area. All contacts of the serpentine and peridotite with the other rocks are faults, consequently when the younger formations are found lying next to the ultrabasics the otherwise low attitudes found near the middle of the basin are distorted and frequently quite steep. The contact between the Dothan formation and the volcanics appears to be gradational although in many places serpentine occurs between the two, indicating a fault. Differences in attitudes between the Knoxville, early Cretaceous, and Umpqua formations mark unconformities. The unconformity between the Knoxville and early Cretaceous formations is more pronounced than the one between the Cretaceous and the Eocene formations, while the unconformity between the Knoxville and older formations indicates that the most severe orogenic disturbances took place at that time.

2. Geology of the deposit

The nickel mineralization is confined to the area of the peridotite. The serpentine band separating the peridotite is barren.

The ore mineral is a nickel-bearing hydrosilicate. The name garnierite is generally applied to this light to dark green mineraloid but as pointed out by Pecora (Pecora, Hobbs, and Murata, 1949)* garnierite is not a single mineral but a mixture of at least two and possibly three hydrosilicates.

The source of the nickel was the olivine and enstatite, the main minerals of peridotite. Both olivine and enstatite are compatible to having nickel concealed in their structures. An analysis of olivine from Nickel Mountain showed 0.26 percent NiO while an analysis of bronzite (the alteration mineral of enstatite) showed 0.05 percent NiO (Pecora and Hobbs, 1942). According to Rankama and Sahama (1949), during weathering ultrabasic rocks are converted into magnesite by the carbon dioxide-bearing weathering solutions; the magnesite goes into solution as magnesium bicarbonate in the uppermost weathering zone, and only silica, hydrosilicates of nickel and magnesium, and iron oxide remain as a residue. Also, according to Rankama and Sahama, "Contrary to Fe^{2+} and Mn^{2+}, Ni^{2+} is very stable in aqueous solutions and is accordingly able to migrate for considerable distances under proper circumstances."

The deposit can be divided into three zones that conform well with this data. The upper zone is a brick-red soil layer from 0 to 10 feet thick that was formed under lateritic conditions. In this zone silica nodules are common but the boxwork structure of the underlying zone is lacking. Small round pellets of red iron oxide and the brick-red soil are characteristic. The green nickel-bearing silicate is not found and the mineral which contains the nickel is not known. Pecora and Hobbs (1942) give a nickel content for this zone from 0.61 percent to 1.10 percent on four composite samples. The second or medial zone is characterized by a preponderance of silica in the form of a limonite-stained boxwork. Garnierite also stains the boxwork, imparting to it a pleasing mint-green color. Boulders of peridotite which contain garnierite veinlets are common in this zone. The lower zone is referred to as the root zone by Pecora and Hobbs. Here garnierite veinlets are found filling fractures within the peridotite. The limonite-stained silica boxwork is missing, indicating that the waters depositing the nickel were relatively lower in silica and iron than those which formed the medial or boxwork zone. Undoubtedly the garnierite of this lowest zone is confined to the more permeable shear zones within the peridotite. Shearing has fractured the peridotite and localized the nickel-bearing solutions to definite zones to impart a rootlike shape. The depth to which this zone extends is not known but distances of over a hundred feet may exist. All three zones will grade into one another and the depth to which economic mineralization will extend will also probably be gradational as well as variable.

The age of the mineralization is directly related to the period of laterization. It is thought that this is Tertiary, probably early Tertiary, but until the topographic development

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*Bibliography at end of this report.

of southwestern Oregon has been more accurately dated a more precise dating is not readily assignable. Probably the mineralization of the medial and lowest zones owes a great deal of its enrichment to leaching of the lateritic horizon. This suggests that mineralization in these zones has been continuous since laterization and may possibly extend to the present.

Government-Hanna contract

According to the contract between the Defense Minerals Procurement Agency and the Hanna Nickel Smelting Company and Hanna Coal and Ore Corporation, the Hanna Nickel Smelting Company will produce from 95 million to 125 million pounds of nickel in ferronickel to contain at least 25 percent nickel and not more than 75 percent iron. The government will pay not more than 79.39 cents a pound for the first 5 million pounds and 60.5 cents a pound thereafter. DMPA agrees to advance 24.8 million dollars for construction of smelting facilities and all but 2.4 million dollars will be spent on construction of the smelter. The loan will be written off under a mortgage for 24.8 million dollars recorded in Douglas County on June 25, 1953. The mortgage calls for liquidation by June 30, 1962.

The Hanna Coal and Ore Corporation contracts to develop the mine on Nickel Mountain at its own expense to cost approximately 4.3 million dollars. It is provided that ore from the deposit will be sold to the government at $6 a ton. In turn the government will sell the ore to the Hanna Nickel Smelting Company at the same price.

Plans have been made for transportation of the ore from the mine down the mountain to the smelting plant, a distance of about 1½ miles, by means of an aerial wire rope tramway. It is reported that the smelter will have four primary furnaces, one refining furnace, and two auxiliary furnaces. The company has obtained the rights to use the process of Societe D'Electro-Chimi, D'Electro Metallurgie et des Acieries Electrique D'Ungine. This process has been used successfully in treating New Caledonia ores having characteristics similar to the nickel silicate ore on Nickel Mountain.

At the time the DMPA announced the contract between the government and the company, it was stated that the ore to be treated would have an average grade of 1.5 percent nickel and that the ore would be mined by surface methods, put through a primary crusher and then conveyed to the smelter. A contract for construction of facilities was let to the Bechtel Corporation and construction has been underway since early in the spring. At the plant site furnace construction is well underway as well as numerous buildings. A railroad spur has been run from the Southern Pacific main line to the plant site, a distance of about 2½ miles. A pipe line and other water supply facilities have been installed. Sources of water will be Cow Creek and Rail Creek. Foundations for the tramway have been poured and the new first-class road from the plant to the mine has been completed. Timber is being logged off the ore body, some stripping has been done, and an office building erected at the mine. It is reported in the Mining World that production of ferronickel from one furnace will be started before September 30 of next year and that the remaining three furnaces will be installed by the end of 1954. The General Manager at Riddle is Earl S. Mollard and E. Emmons Coleman is Plant Manager. Mr. D. N. Vedensky, metallurgist, is Director of Hanna's Research and Development department.

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RIDDLE NICKEL WILL HAVE LONG LIFE

Under a Roseburg October 18 dateline the Oregon Journal published facts about the Hanna nickel project quoting Mr. Earl S. Mollard, General Manager of the project. Mr. Mollard stated that about 400 employees would be needed when the plant gets into production in the summer of 1954. It is expected that nearly all employees will be hired in the State. There will be five electric furnaces, four for the production of ferronickel and one for ferro-silicon. About 65,000 kilowatts of power will be required. The ore from the open pit mine will probably yield about 25 pounds of nickel to the ton of ore. The plan is to mine about 1800 tons of ore per day. The plant is expected to run three shifts a day for seven days a week, and ore reserves are sufficient for 30 to 40 years of operation at the capacity now planned, assuming that the operation is economic after the government contract is completed.

Mr. Mollard stated that the furnaces would not be able to refine anything but nickel. Some other elements in the ore would go to the slag pile and tests are being made to determine uses for the slag.

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PHIL BROGAN NOW ASSOCIATE EDITOR

Phil Brogan, who has been on the Bend Bulletin staff for 30 years since graduating from the University of Oregon, has been named associate editor of the Bulletin, by Robert W. Chandler, the new owner. Brogan has been the geologists' spokesman in Oregon for many years, and a great many people look forward to his weekly article on Oregon geology in the Oregonian. He is chairman of the Oregon Geographic Board, member of the Legislative Interim Committee on Historical Institutions, member of the Geological Society of the Oregon Country and the Bend Geological Society.

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MINING CLAIMS ABANDONED

The Bureau of Land Management, under William C. Guernsey, Regional Administrator, is trying cooperation with mining claimants in a new approach to administering the mining laws. The BLM sent letters to about 400 persons holding 890 mining claims on O & C land. These letters reminded the claimants that they had not filed the required notice that assessment work on the mining claims had been performed during the 1952-1953 assessment year. Replies have been received by BLM that 126 mining claims have been abandoned. Mr. Guernsey stated that he felt encouraged by the cooperation of mining claimants, and he urged those who have received a letter concerning lack of assessment work and have not replied to do so at once so that the status of the claim may be cleared.

Holders of mining claims on O & C lands must file an affidavit of proof of labor showing that annual assessment work has been done. This proof must be filed in the United States land office as well as the office of the county recorder of the county in which the claim is located.

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OIL AND GAS CONSERVATION LAW HEARING HELD

On September 15, 1953, the Governing Board of the State Department of Geology and Mineral Industries, which administers the new oil and gas conservation law (Chapter 667, Oregon Laws 1953), held a public hearing in the auditorium of the State Office Building in Portland. The Board had previously compiled rules and regulations as required by the law and presented these rules for approval at the hearing. Minor changes were suggested by representatives of the industry and these have been taken under consideration by the Board. The final draft of rules and regulations is now being prepared.

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NEW CHROME CONCENTRATOR

The Thompson Milling and Manufacturing Company owned by L. H. Thompson and Lawrence Wilson of Ashland, Oregon, has constructed a concentrating mill on the south bank of Bear Creek near the end of Oak Street in Ashland for the purpose of concentrating chromite ore. It was put into operation October 6, 1953. The mill, powered by Buda Diesel engine, includes a 12-inch jaw crusher, a 32 x 48 Denver ball mill, and a Deister table. The owners plan to enlarge the mill by addition of another ball mill and two tables. Most of the ore is from deposits on the Klamath River in California under lease to Thompson and Wilson. Ore is also being shipped from three properties near Red Mountain which is nearly 30 miles southwest of Ashland on the Mt. Ashland road. One deposit on patented ground in sec. 32, T. 40 S., R. 1 W., has been leased from Larry Basey. Another in sec. 3, T. 41 S., R. 1 W., near Red Mountain Creek has been leased, and the third property is a claim adjacent to Basey's claim located by L. H. Thompson.

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STRATEGIC MINING INDUSTRY THREATENED

An important and perhaps disquieting development is taking shape in the domestic mining industry. As the difficulties connected with mining nonferrous metals increase, experienced mining companies are giving more attention to opportunities in the non-metallics field.

Lead and zinc mines are shutting down all over the West and even in the Tri-State field only the very low-cost operations can continue at a profit under present conditions. Operating costs have continually increased since the end of World War II whereas the market price for lead and zinc has weakened to a point that makes mining unprofitable for all except low-cost mines. Foreign mines can produce more cheaply than our own because of lower labor costs, higher grade ore, currency depreciation, and financial assistance by our own government under the Marshall and Point Four programs. Because of these conditions foreign lead-zinc mines are able to operate profitably at a price that makes our mines submarginal. In addition these foreign mines can supply our peacetime needs if not a pound of either metal is produced in the United States.

Copper appears to be in a more favorable position marketwise than lead and zinc. However some experts believe that the price is likely to decline in the not very distant future. The government has contracts with several copper companies to take their production at plus 30 cents a pound. This factor will serve to influence the domestic market price now and during the life of the contracts. All of the major copper companies have low-cost domestic operations but with any substantial decline in the market price any higher cost mines of these companies would be curtailed or shut down. Several of the large copper companies have low-cost foreign operations which could continue to produce to capacity if the world price declines.

Domestic aluminum production has been in an exceptionally favorable position ever since the process for reducing aluminum oxide to metal was invented in this country. The industry has grown tremendously in the last twenty years and more than tripled in the 1940-1950 decade. There has been little competition in world markets because of the favorable competetive position of the domestic industry. Only during the last two or three years has there been any foreign competition for the American industry. Recently Great Britain has bought cheap aluminum from Canada and has been able to compete in fabricated and semi-fabricated materials in this country.

Quicksilver mining in this country is only a small remnant of what it was in World War II. The world quicksilver market is closely controlled by Spanish and Italian producers. Overnight they can reduce the price to a figure that would make all domestic operations unprofitable. This condition places quicksilver mining in the United States on a hand-to-mouth basis with domestic operators unable to plan ahead. Thus the quicksilver mining industry is in an unhealthy, even precarious, position. No forward planning for exploration can be done with assurance without government backing.

As for gold, the plight of the domestic miner is well known. He gets nothing but sympathy from our government and is evidently considered to be expendable. It is devoutly to be hoped that from the standpoint of the general welfare and not merely from that of the gold miner's, the Treasury doesn't take seriously gratuitous advice given by a prominent radio commentator recently to the effect that the Secretary should buy and store uranium as the standard of our money rather than gold. The commentator didn't state how it should be stored - whether as ore, metal, isotopes, or bombs - or indeed how international settlements could be made with it.

Let us turn to nonmetallics and view the characteristics that make them attractive to the frustrated metal miner. Speaking generally, these minerals are low-priced materials and their production is similar to a manufacturing operation. Transportation is a critical factor of cost and they are, with some exceptions, consumed within a rather localized market area. There is little competition from imports or worry over tariffs. To a great extent the deposits may be developed on or near the surface in large deposits so that they are not subject to the vicissitudes and uncertainties of underground metal mining operations. The primary problem usually is one of merchandising and the principal operating requirements are business ability and experience. Price fluctuations are not likely to be violent or abrupt and the producer is much closer to his consuming customer than is the metal miner who is usually dependent on a smelter for his market.

The following statistics show the increase in value of nonmetallics produced in the United States during the decade 1940-1950 and point to the growing interest of large mining companies in the nonmetals group.

Value of Domestic Mineral Production in Millions of Dollars
(U.S. Bureau of Mines Minerals Yearbook)

	Total	Metals	Nonmetals (excl. fuels)	Nonmetals (incl. fuels)	Fuels
1940 . .	5,582.5	1,677.7	824.6	3,904.8	3,080.2
1950 . .	11,855.0	1,351.0	1,823.0	10,504.0	8,681.0

There is danger to national security in the picture as presented. Metals are the backbone of national defense. Some nonmetals such as mica and quartz crystal (strategic quartz crystal is a monopoly of the Brazilian Government) enter directly into national defense needs, but on the whole nonmetals are only indirectly connected to those needs. Excepting aluminum, nonferrous metals production has been on the decline in the past few years and if the trend continues our national defense will be jeopardized. If in the future the increase in production of nonmetals is obtained at the expense of metals production, the condition will be serious even though the figures for total value of mineral production may show a steady increase. We can't fight an all-out war successfully with nonmetals or with metals that must be imported.

F.W.L.

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BABYFOOT CHROME MINE

Exploration at the Babyfoot chromite mine in NW¼ sec. 30, T. 38 S., R. 9 W., Curry County, Oregon, was renewed this summer. Two bodies of chromite, 16 inches and two feet wide respectively, separated by 16 inches of serpentine were exposed in a bulldozer cut. In 1951 and 1952 some exploration was done at this property and some chromite was produced. The chromite stringers occur at the base of a small serpentinized ultrabasic sill and lie parallel to a footwall of argillite and metavolcanic rock striking N. 15° W. and dipping 68° E. They are separated by 16 inches of serpentine. Samples obtained by a Department geologist gave returns as follows:

16-inch body, Cr_2O_3, 45.90% Fe, 10.89%
24-inch body, Cr_2O_3, 52.30 Fe, 10.44

The Babyfoot mine is on the north side of Babyfoot Creek at an approximate elevation of 3600 feet. It is 0.8 mile west of Onion Camp, which is 41 miles southwest of Grants Pass via the Redwood Highway and Josephine Creek road to Days Gulch road over Fiddler Mountain. Ray Wilder, Art Wheeler, Jack Wheeler, and Doug Little of Selma, Oregon, are leasing the property from the Chetco Mining Company.

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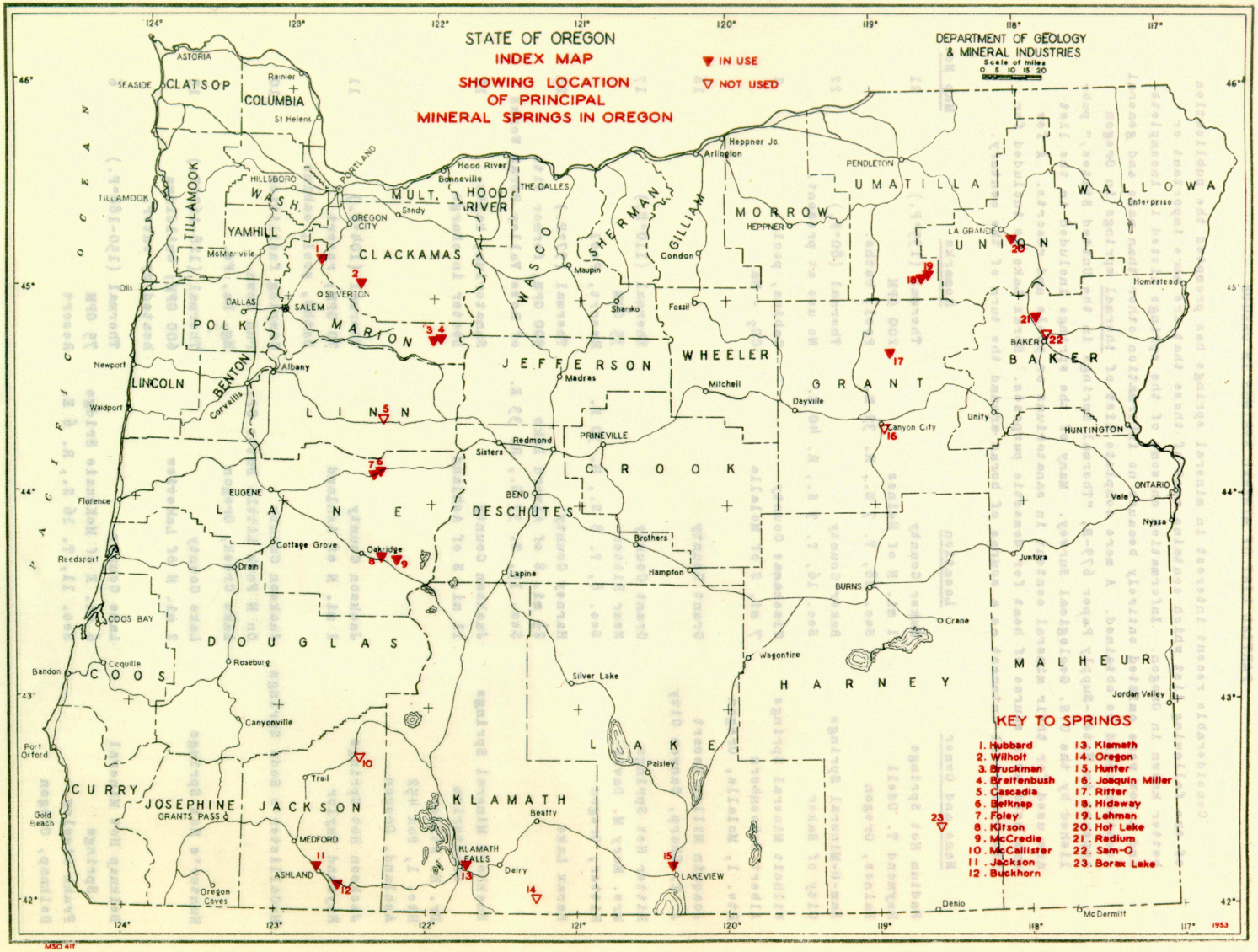
PARTIAL LIST OF MINERAL SPRINGS IN OREGON

Considerable recent interest in mineral springs has prompted the publication of the following list which contains most of those that are more important or better known in Oregon. Information on some of the springs listed is incomplete and a few were omitted entirely because no information other than name and general location could be obtained. A more complete list of thermal springs in Oregon appears in Water-Supply Paper 679-B, "Thermal Springs in the United States," published by the U.S. Geological Survey. Many of the springs included in the list are used for their mineral content in sanatoriums or pools and resorts. A few are used as a source of heat for domestic purposes. Borax Lake is included for its historical interest as a source of borax around the turn of the century.

Name and Owner	Location	Remarks	Map No.
Radium Hot Springs Raymond T. Odell Haines, Oregon	Baker County 1 mi. N of Haines Sec. 28, T. 7 S., R. 39 E.	Thermal (135°F.) 200 GPM Pool, baths.	21
Sam-O-Mineral Springs City of Baker	Baker County Sec. 16, T. 9 S., R. 40 E.	Thermal (80°F.) No use at present.	22
Wilhoit Mineral Springs Albert Schoenborn Rte. 1, Molalla, Oregon	Clackamas County 7 mi. S of Molalla	Cabins, pool CO_2 - Na	2
Joaquin Miller Resort J. E. Sharp, Canyon City	Grant County		16
Ritter Hot Springs Mrs. Mary M. Davis Ritter, Oregon	Grant County Near Ritter Sec. 8, T. 8 S., R. 30 E.	Thermal (110°F.) 35 GPM Resort, Pool	17
Borax Lake	Harney County 2½ mi. S of Alvord Lake Sec. 15, T. 37 S., R. 33 E.	Thermal (97°F.) 900 GPM; former site of Rose Valley Borax Works	23
Buckhorn Mineral Springs Sanatorium Dr. H. Wexler Rte. 1, Box 452 Ashland, Oregon	Jackson County 11 mi. S of Ashland	Sanatorium, baths Doctor in charge	12
Jackson Hot Springs Raymond Taylor	Jackson County 1 mi. N of Ashland	Thermal (104°F.) 70 GPM; resort Baths, pool, cabins	11
McCallister's Soda Springs	Jackson County On N Fork Little Butte Cr. Lake Creek, Oregon	Camping facilities run down. Mg, Na, Fe.	10
Hunter's Hot Springs	Lake County 2 mi. N of Lakeview	Thermal (128-162°F.) 600 GPM; buildings heated by water.	15
Belknap Hot Mineral Springs Frank Bigelow Belknap, Oregon	Lane County 6 mi. E of McKenzie Bridge Sec. 11, T. 16 S., R. 6 E.	Thermal (150-188°F.) 75 GPM Resort	6


STATE OF OREGON
INDEX MAP
SHOWING LOCATION
OF PRINCIPAL
MINERAL SPRINGS IN OREGON
▼ IN USE
▽ NOT USED
DEPARTMENT OF GEOLOGY
& MINERAL INDUSTRIES
Scale of miles
0 5 10 15 20
KEY TO SPRINGS
1. Hubbard
2. Wilhoit
3. Bruckman
4. Breitenbush
5. Cascadia
6. Belknap
7. Foley
8. Kitson
9. McCredie
10. McCallister
11. Jackson
12. Buckhorn
13. Klamath
14. Oregon
15. Hunter
16. Joaquin Miller
17. Ritter
18. Hidaway
19. Lehman
20. Hot Lake
21. Radium
22. Sam-O
23. Borax Lake
PACIFIC OCEAN
CLATSOP
COLUMBIA
TILLAMOOK
WASH.
MULT.
HOOD RIVER
WASCO
SHERMAN
GILLIAM
MORROW
UMATILLA
WALLOWA
UNION
BAKER
CLACKAMAS
YAMHILL
POLK
MARION
JEFFERSON
WHEELER
GRANT
LINCOLN
BENTON
LINN
CROOK
LANE
DESCHUTES
DOUGLAS
COOS
CURRY
JOSEPHINE
JACKSON
KLAMATH
LAKE
HARNEY
MALHEUR
ASTORIA
SEASIDE
Rainier
St Helens
PORTLAND
Hood River
Bonneville
THE DALLES
Heppner Jc.
Arlington
PENDLETON
HILLSBORO
TILLAMOOK
OREGON CITY
Sandy
McMinnville
Maupin
Condon
HEPPNER
LA GRANDE
Enterprise
Homestead
Otis
DALLAS
SALEM
SILVERTON
Shaniko
Fossil
BAKER
Newport
Albany
Madras
Mitchell
Dayville
Waldport
Corvallis
Canyon City
Unity
HUNTINGTON
Redmond
PRINEVILLE
Sisters
EUGENE
Florence
BEND
ONTARIO
Vale
Nyssa
Cottage Grove
Oakridge
Brothers
Juntura
Reedsport
Drain
Lapine
Hampton
BURNS
COOS BAY
Crane
Roseburg
Wagontire
Bandon
Coquille
Silver Lake
Jordan Valley
Canyonville
Port Orford
Trail
Paisley
Gold Beach
GRANTS PASS
Beatty
MEDFORD
KLAMATH FALLS
Dairy
ASHLAND
LAKEVIEW
Oregon Caves
Denio
McDermitt
124°
123°
122°
121°
120°
119°
118°
117°
46°
45°
44°
43°
42°
1953
MSO 4if

Name and Owner	Location	Remarks	Map No.
Foley's Hot Springs	Lane County 4½ mi. SE of Mckenzie Bridge Sec. 28, T. 16 S., R. 6 E. McKenzie Bridge, Oregon	Thermal (162-174°F.) 25 GPM Resort	7
Kitson Hot Springs Wm. H. Cash Oakridge, Oregon	Lane County 7 mi. SE of Oakridge Sec. 6, T. 22 S., R. 4 E.	Thermal (112°F.) 35 GPM Resort, baths Attendant	8
McCredie Hot Mineral Springs James T. Lackey McCredie Springs	Lane County 11 mi. E of Oakridge Sec. 36, T. 21 S., R. 4 E.	Thermal (hot) 20 GPM Resort	9
Cascadia Mineral Springs Administered by State Highway Dept.	Linn County At Cascadia	Former resort Picnic facilities only	5
Breitenbush Hot Springs E. C. Kennedy Detroit, Oregon	Marion County 12 mi. NE of Detroit Sec. 20, T. 9 E., R. 7 E.	Thermal (140-198°F.) 900 GPM Resort	4
Bruckman's Breitenbush Springs M. D. Bruckman Breitenbush, Oregon	Marion County	Thermal (124-194°F.) Hotel, baths, attendant Pool	3
Hubbard Mineral Springs (Sunrise Mineral Springs Sanatorium) A. C. McCoy, Box 242 Hubbard, Oregon	Marion County	Resort, baths Attendant	1
Klamath Hot Springs Mrs. Blanch Petroff 350½ Martin Street Klamath Falls, Oregon	Klamath County	Thermal (185°F.) 150 GPM Pool, baths Masseurs	13
Oregon Hot Springs Walter Smith Rte. 1, Box 90 Bonanza, Oregon	Klamath County 10 mi. SE of Bonanza Sec. 10, T. 40 S., R. 13 E.	Thermal (148°F.) 35 GPM Sanatorium (not in operation - 1953)	14
Hidaway Springs	Umatilla County 7 mi. SW of Lehman Hot Spring Sec. 16, T. 5 S., R. 33 E.	Thermal (hot) Private	18
Lehman Hot Springs Resort J. Vandelaar Ukiah, Oregon	Umatilla County 50 Mi. S. of Pendleton Sec. 1, T. 5 S., R. 33 E.	Thermal (scalding) 75 GPM Resort, pool	19
Hot Lake Sanatorium and Resort Dr. A. J. Roth LaGrande, Oregon	Union County 10 mi. SE of LaGrande T. 4 S., R. 39 E.	Thermal (180°F.) Bathing	20

R.S.M.

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WAR EAGLE QUICKSILVER MINE

James H. Holtzclaw, Jesse A. Holtzclaw, and S. A. Edwards are cleaning out the lower tunnel on the War Eagle Claim and plan to do further exploration as mining equipment is obtained. A small retort consisting of three 1-foot by 8-foot tubes and smaller condenser pipes has been built and a small amount of mercury has been produced.

The War Eagle claim is located in the NE¼ sec. 17, T. 34 S., R. 2 W., Jackson County, on the south side of Mill Hollow approximately 1 mile west of Evans Creek road. This mine was first discovered in 1916 and quicksilver has been produced at various times since. The ore in the workings occurs in a fault zone that cuts through the Applegate (May Creek) schists with a strike of N. 70° W. and dips 75° NE to vertical. The fault zone contains brecciated chalcedony and schist fragments cemented by marcasite. Cinnabar occurs in the matrix of the breccia and in the clay gouge.

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CANADIAN JOHNS-MANVILLE COMPANY

The Canadian Johns-Manville Company has optioned some claims on Josephine Creek between Days Gulch and Fiddler Gulch in sec. 36, T. 38 S., R. 9 W., Josephine County, and began exploration in September of a chrysotile asbestos occurrence. These claims are owned by George C. Foster, Box 152, Kerby, Oregon. Several diamond-drill test holes are planned. The Medford Drilling Company, owned by Ray Hageman, Medford, is drilling the test holes; John Gill is the geologist supervising the exploration.

The claims containing asbestos were originally part of the old Bear or Dixie placer mine. Foster discovered asbestos on one claim in a tunnel dug along the contact of moderately indurated Quaternary gravels with the underlying serpentine. The purpose of the tunnel was to mine gold which is usually concentrated at the base of the gravels. Chrysotile veins were first observed 70 feet from the portal. A zone approximately 6 feet wide containing asbestos veins with various attitudes is exposed in the face of the 147-foot tunnel.

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NOONDAY (THOMPSON) MINE

Earle N. Young, 514 N.W. 2nd Street, Grants Pass, Oregon, has shipped some copper concentrates to the American Smelting and Refining Company smelter at Tacoma, Washington. Approximately 23 tons of ore from the Noonday (Thompson) mine produced 6350 pounds of concentrates. The ore was concentrated in the mill at the Homa mine two miles southeast of Rogue River and was bagged and shipped by auto freight to Tacoma. The Noonday mine is located in sec. 10, T. 32 S., R. 10 W., Coos County, Oregon, on the west fork of Cow Creek. Young and two partners of Garibaldi, Oregon, are the owners. Young plans to do more work at the mine in the Spring of 1954.

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EASTERN OREGON MINING NEWS

Crushing facilities of the Harney Concrete and Tile Company of Burns are being moved from the company's pumice pits to a new location on a rail siding in Burns to facilitate aggregate shipments. Some improvements are being built into the plant as a result of the move. Mr. Robbins, the owner, reports that production from the company's pits included a large yardage of pit run material during the past season. This special pit run production was made for the Hines Lumber Company and was used as ballast on their railroad bed. Some was also spread in test strips on the logging company's trucking roads.

The Harney Concrete and Tile Company originally produced a block aggregate for use in its own block plant in Burns but has since expanded to make aggregate shipments to other block manufacturers in Eastern Oregon and Idaho.

* * * * *

Burt Hayes is milling his fifth and final shipment of chrome ore for the current season in his new mill on Dog Creek, near John Day, Grant County. This mill, the construction of which is still unfinished, was rushed into shape during the summer to handle newly developed ore from the old Haggard and New mine. Concentration ratio is approximately 2 to 1 to give a concentrate carrying around 47 percent Cr_2O_3 with a 2.8 to 1 chrome-iron ratio. Nearly 200 tons will have been milled when the current stockpile is depleted. Enough ore is reportedly in sight in the mine to operate the mill throughout most of the 1954 season.

* * * * *

Thirty tons of John Day chrome ore - 15 tons from the Chambers mine and 15 from the Iron King - are to be used in a test run of ferro chrome in the U.S. Bureau of Mines laboratory, Albany, Oregon. The ore was donated by Mr. Clint Haight, Jr., owner of the properties, and was trucked to a temporary storage place in Canyon City by John Day Chamber of Commerce. Mr. Hundhausen of the Bureau of Mines supervised the sampling and loading of the ore which will be shipped from Canyon City to Albany.

Arrangements for this test were first made at a meeting sponsored by the John Day Chamber of Commerce last July and attended by representatives of the U.S. Bureau of Mines, the U.S. Geological Survey, and the Oregon Department of Geology and Mineral Industries.

* * * * *

Incorporation has recently been completed for the John Day Mining Company organized by Mr. F. A. Neuman and Associates of John Day. Mr. Neuman holds a lease on the Dry Camp chromite property and is mining from the upper pit. Arrangements have been made to process the ore in the mill owned by the Tri-County Mining Company. Ore from the lower pit on the Dry Camp property was mined on a sub-lease basis by the Zanetti Brothers of Wallace, Idaho, during the past summer. This ore was milled in the Tri-County mill under an operating agreement with that company. The John Day Mining Company is planning to operate throughout the winter if possible.

* * * * *

Discovery of a new vein was recently made on the hill directly above the old Standard workings on Dixie Creek, Grant County, Oregon. Values are in copper and gold. A 17-ton test shipment to the Tacoma smelter was made on the strength of initial assays and an access road is being rushed to completion in order that development can be carried on throughout the winter. The work is being done by Ray Summers of Canyon City, Oregon. Plans are to continue exploration by drifting.

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ORE.-BIN PRICE ADVANCED

Beginning January 1, 1954, subscription to the Ore.-Bin will be raised from 40 cents to 50 cents a year because of increased costs. Only one-year subscriptions will be accepted.

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ATTORNEY GENERAL RULES THAT STATE MUST RESERVE MINERALS

Mineral rights to federal lands ceded to the State of Arizona by a Congressional Act of 1925 must be reserved to the state upon sale to private ownership. So ruled Ross F. Jones, attorney general, in an opinion given W. W. Lane, state land commissioner.

The act of 1925 granted federal land to the state for the purpose of supporting common and public schools. Failure to provide reservation of the minerals, said the opinion, could result in forfeiture of the lands to the federal government.

However, the attorney general said, a different situation exists with regard to lands granted the state under the enabling act. Mineral rights in such lands pass with the land to the buyer and may not be reserved. (From Pay Dirt, Phoenix, Arizona, November 20, 1953.)

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GOLD PRODUCTION

The U.S. Bureau of Mines and American Bureau of Metal Statistics report total world gold production in 1952 as 34,200,000 fine ounces. Included in the total were the following most important producers (with production in fine ounces): the United States including Alaska, 1,927,000; Canada, 4,419,570; Mexico, 459,370; USSR (estimate), 9,500,000; Philippines, 469,408; Union of South Africa, 11,818,681; Gold Coast, 715,036; Belgian Congo, 368,769; Southern Rhodesia, 496,731; and Commonwealth of Australia, 980,435.

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CHROMITE

According to the U.S. Bureau of Mines, consumption of chromite in August 1953 reached a record high. The consumption was 130,520 short tons which, for metallurgical grade, represented a 15-percent gain compared to July and was 3 percent above the former record set in May 1953. Refractory and chemical grades climbed 19 percent and 4 percent respectively.

During August, Montana entered the production picture. California, Montana, and Oregon shipped 5,066 short tons as compared with 3,771 short tons in July. Domestic shipments for 1951, 1952, and 1953 to August 1 were 7,056; 21,304; and 18,617 short tons respectively.

Imports of chromite during august totaled 207,471 short tons. Metallurgical grade comprised 63 percent of this total and came from Turkey (42 percent), Southern Rhodesia (17 percent), Union of South Africa (16 percent), Philippines (9 percent), Yugoslavia (4 percent), Pakistan (4 percent), Cuba (3 percent), Sierra Leone (3 percent), New Caledonia and Iran, the remaining 2 percent. Refractory chromite was shipped by the Philippines (86 percent), Cuba (6 percent), India (4 percent), Union of South Africa and Southern Rhodesia, the remaining 4 percent. All chemical grade chromite was shipped by the Union of South Africa.

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U.S. DEPLETES MINERAL RESOURCES SAYS WORMSER

Felix Wormser, Assistant Secretary of the Interior for Mineral Resources, outlined for the Conference of Chemical Economics the important relationship of the mineral and chemical industries.

Mr. Wormser told the conference, held at the Shoreham Hotel in Washington, D.C., that "we have been using up our great store of mineral wealth much faster than any other world power" and that there has been a ". . .shift in the position of the U.S. from self-sufficiency to substantial dependence on imports."

Mr. Wormser said that "the mineral industries supply essential raw materials (and many materials of construction) for the chemical industries. At the same time chemistry is vital in the conversion of mineral raw materials into useful products and chemical engineering is becoming increasingly important in mineral production. Thus we have a mutual interest that makes meetings of this kind worthwhile and I am especially pleased to have this opportunity to discuss our field of work with you.

"Sometimes we are apt to take mineral supply for granted and to assume that because mineral raw materials have been available abundantly in the past, especially in times of peace, we need not be concerned about the future. As a consequence, we have allowed matters to drift and now find ourselves facing an uncertain future in world affairs with many serious problems related to mineral supply still unsolved.

* * * * * * *

"Time does not permit an exhaustive analysis of the reasons for the shift in the position of the U.S. from self-sufficiency to substantial dependence on imports in some commodities, but I believe it is fair to say that one of the principal causes is that the national policies over the past 20 years have created a discouraging outlook for the profitable investment of capital in the exploration and development of mineral resources. As a consequence, these essential preliminary steps in maintaining a healthy domestic mineral economy have not been taken, and our ability to expand output has been affected adversely. . ." (E&MJ Metal and Mineral Markets,11/19/53)

STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
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Telephone: Columbia 2161, Ext. 488

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THE TITANIUM STORY

Introduction

News stories about titanium, naming it the "wonder metal," the "miracle metal," the "Cinderella metal," etc., have appeared frequently of late. The theme of these stories is that the metal has amazing characteristics of corrosion resistance and strength at high temperatures highly desirable in jet plane construction, that we have been backward in making the metal available to plane manufacturers, that it is necessary to step up production if we are to have a superior air force; and the impression has been also given that the lack of our supplies of metal is due in part to a shortage of the domestic titanium mineral supply. The statements about the superior characteristics of the metal are true and those concerning the need for increased production of the metal are true, but the reports that there is a shortage of domestic titanium minerals are inaccurate unless the shortage is confined to rutile. The shortage of titanium metal is the result of metallurgical obstacles, not scarcity of titanium minerals.

The list of companies owning titanium ore reserves, producing titanium slag or oxide or metal, and carrying on research to produce the metal more cheaply contains many prominent names in American industry as: E.I. du Pont de Nemours, Inc., National Lead Company, Allegheny Ludlum Steel Corporation, Crucible Steel Company, Kennecott Copper Corporation, New Jersey Zinc Company, American Cyanamid Company, Glidden Paint Company, Bohn Aluminum and Brass Corporation, Crane Company, Foote Mineral Company, and Republic Steel Corporation. In addition, there are several smaller companies in the pigment business and a few are mining ore.

Titanium minerals

Titanium ranks as the ninth most plentiful element in the earth's crust. Among structural metals titanium ranks fourth in nature and is exceeded only by magnesium, aluminum, and iron. It may be said that, like the other structural metals mentioned, titanium is all-pervasive in the rocks of the earth's crust. Like aluminum and iron, almost all rocks contain titanium but also, like aluminum, the occurrences of rocks containing economic amounts of titanium are restricted. Contrasted with aluminum, whose silicates are much more abundant than oxides, titanium oxide is more widespread than titanium silicate.

The most important titanium minerals are ilmenite, titanium-iron oxide ($FeO \cdot TiO_2$), and rutile, titanium dioxide (TiO_2). Domestic ilmenite deposits are much more important commercially than rutile deposits.

In places ilmenite occurs in large masses as ilmenite-magnetite or titaniferous magnetite or as ilmenite-hematite. Outstanding examples of these are in the Adirondacks of New York and Allard Lake deposits of Quebec. According to some authorities, some of the so-called ilmenite in sands may be arizonite, which is $Fe_2O_3 \cdot TiO_2$ but this is of academic rather than economic interest. Leucoxene is an altered titanium mineral and may be present in the ilmenite of commerce. Ilmenite occurs in the sands of the Oregon coast and in many Oregon rocks.

Rutile is widespread in occurrence, usually in sparsely disseminated grains so that the deposits have no economic value. However important concentrations of rutile (or anatase or brookite which are different crystal forms of titanium dioxide) occur in Florida, Arkansas, and Virginia, but Florida appears to have had the only commercial production of rutile in 1952. Rutile usually contains some iron as an impurity.

Other titanium minerals in this country of possible future economic importance are titanite, calcium titanium silicate, and perovskite, calcium titanate. A large body of perovskite is known in Colorado.

Large titanium mineral deposits occur in many foreign lands. Travancore, India, has the greatest beach sand concentrations. Australia, from which most United States imports of rutile have come, has very extensive beaches containing ilmenite, rutile, and zircon. Brazil likewise has large beach sand deposits. Norway reportedly has substantial ilmenite masses, and Russia is reported to have large deposits also.

Uses of titanium

By far the largest use for titanium is as the oxide in pigment. Its whiteness, spreading quality, chemical stability, and cheapness make it the most popular white pigment. Titanium, mainly from rutile, is used in welding rod coatings. It is also used in alloys and as carbide and a minor amount in ceramics. Artificial titanium dioxide gems came on the market in 1950. They have exceptional brilliance but have about seven-tenths the hardness of the diamond. Titanium metal is of first importance as a structural material and its application is restricted only by its supply and cost.

Production statistics

The U.S. Bureau of Mines reports the following titanium statistics for 1952:

Production and Shipments of Ilmenite

Production (short tons)	Shipments		
	Gross weight (short tons)	TiO_2 content (short tons)	Value
(1) 528,588	(1) 522,515	(1) 265,596	$8,022,752

(1) Contains altered ilmenite, leucoxene, and rutile.

Consumption

Ilmenite		Rutile	
Gross Weight (short tons)	Est. TiO_2 content (short tons)	Gross Weight (short tons)	Est. TiO_2 content (short tons)
682,850	351,553	18,317	17,353

Pigments consumed 670,829 short tons of ilmenite.

Welding rod coatings consumed 11,418 short tons of rutile.

Imports of titanium concentrates in 1952 were 184,013 short tons classed as ilmenite and 19,394 short tons of rutile. Of the ilmenite concentrates 145,562 short tons came from India and 38,451 short tons from Canada. Ninety-nine percent of the Canadian imports were titanium slag, a product obtained by smelting ilmenite ore from the huge deposit at Allard Lake, Quebec. Electric smelting results in a high-titanium slag and a low-carbon iron. All of the rutile came from Australia. Because of its simple composition, rutile is preferred for producing titanium metal.

Titanium metal production in the form of sponge amounted to 1,075 short tons in 1952 according to the U.S. Bureau of Mines. This was double the amount produced in 1951.

E&MJ Metal and Mineral Markets reports that facilities under construction for making the metal plus those now in operation can produce 20 tons a day. It is also reported that the Crane Company will go into production in 1955 at a rate of about 6000 tons a year. Defense Minerals Production Administration has a goal of 25,000 tons a year for 1956.

Metallurgy

Titanium is reduced to metal with great difficulty because of its tenacity to hold to and combine with oxygen. Thus it is necessary to reduce in a vacuum or in the atmosphere of an inert gas.

Two processes have been used to make titanium metal, the Van Arkel-De Boer iodide decomposition method, and the Kroll process. Other processes and modifications of the processes mentioned are constantly being investigated in the search for a lower cost of production.

The iodide process produces a purer metal but is more expensive. It employs a reaction of iodine with impure titanium in an evacuated vessel. Volatile iodides are formed and are decomposed on a white hot titanium wire to form pure crystalline titanium, releasing the iodine which again acts to carry atoms from the impure metal to form the pure metal on the wire.

In the Kroll process, which is most widely used, chlorine is passed through a mixture of titanium oxide and carbon, forming titanium tetrachloride. This chloride is dripped through helium gas onto molten magnesium, forming titanium sponge and magnesium chloride which is distilled to get rid of and collect the magnesium. The sponge is removed, cleaned, melted in an induction or arc furnace, alloyed, forged, and rolled.

Dr. W. J. Kroll, a consulting metallurgist and a resident of Corvallis, Oregon, introduced his process primarily for the production of zirconium (the twin of titanium) at the U.S. Bureau of Mines Northwest Electrodevelopment Laboratory, Albany, Oregon, following the end of World War II, to supply the Atomic Energy Commission with metallic zirconium. Dr. Kroll has recently been awarded the James Douglas Gold Medal for 1954 by the American Institute of Mining and Metallurgical Engineers "for outstanding contributions to nonferrous metallurgy, particularly in the art of lead refining and the production of metallic titanium." One wonders why zirconium is not mentioned in the citation.

Titanium has a density of 4.5 compared to 2.7 for hard-drawn aluminum and 7.8 for low-carbon steel. Pure titanium metal, like other pure structural metals, has no notable structural strength. However, small quantities of other elements even the small amounts of impurities in commercially pure metal change the picture. Titanium base alloys now available have outstanding strength and ductility characteristics if measured by their densities - that is, there are titanium base alloys which are as strong as structural alloy steels but which weigh considerably less, giving a strength-to-weight ratio far better than other structural metals. In addition, titanium base alloys hold their strength at elevated temperatures such as in the range of 300° to 750° F. where other structural metals lose strength rapidly. It is reported also that titanium alloys have superior fatigue properties and excellent noncorrosive characteristics especially its immunity to attack by salt water. Reportedly a 40-percent weight saving can be obtained in a gage-for-gage replacement of stainless steel by titanium in aircraft. Hence the concern expressed publicly a short time ago by the Secretary of the Air Force over our small titanium production and the need for greater effort to speed up production both for military aircraft and for industry.

Costs

Because titanium is necessarily made in relatively small quantities and because of the nature of the reduction technique, unit cost of the metal is high. According to

E&MJ Metal and Mineral Markets, the price for titanium sponge is about $5 a pound and $6 to $7 a pound for ingot. Mill products may cost from $15 to $30 a pound.

Many researchers are working on the problem of reducing the cost of production. Perhaps the history of titanium will parallel that of aluminum. In the early days of aluminum, production costs were high in dollars per pound, but as the demand for the metal increased, production techniques were gradually improved so that costs were reduced and at present the unit cost is 21½ cents a pound. As costs were reduced, the market expanded to proportions which would have seemed fantastic fifty years ago. Titanium may take a similar course.

F.W.L.

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GALICE QUADRANGLE GEOLOGIC MAP PUBLISHED

Publication of a geologic map of the Galice quadrangle in Josephine County of southwestern Oregon has just been announced by the State Department of Geology and Mineral Industries. The U.S. Geological Survey, which cooperated with the Geology Department, printed the map in five colors on a sheet measuring 50 by 30 inches. The map has a scale of one inch to the mile and is the first Oregon quadrangle to be printed in the recently adopted format. Authors are F. G. Wells and G. W. Walker, geologists with the Federal Survey.

The map embraces a gold mining area, and the locations of 95 gold lode and placer mines are shown. The oldest rocks of the area are of Jurassic age and are estimated to be at least 150 million years old. A brief description of the geologic formations and mineral resources appears on the sheet together with cross sections detailing the structure.

Copies of the geologic map of the Galice quadrangle may be obtained from the office of the Department of Geology and Mineral Industries in the State Office Building, Portland, or from the field offices in Baker and Grants Pass. Price is $1.00 postpaid.

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SOUTHERN OREGON MINING NEWS

M. J. and Phil McShane, Grants Pass, Oregon, have discontinued work at the Midnight claim (chromite) located at the water level of the Illinois River in sec. 21, T. 37 S., R. 9 W., and have moved to higher ground for the winter. They are now working the nearby Black Beauty claim. An incline is being sunk to intersect the lowest of two caved tunnels that were dug in the past by Pete Neubert. This new incline has intersected and by-passed the face of the upper tunnel. A narrow stringer of high-grade chromite is reported to have been exposed in the old tunnels. This stringer may be an extension of the chromite layer being mined by Everett McTimmonds on the Lucky Star claim adjoining the Black Beauty on the west. The ore and serpentine are badly crushed due to landsliding.

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The U.S. Bureau of Mines began a diamond drilling program in December 1953 at the Queen of Bronze Copper mine 1½ miles east of Takilma, Oregon. Richard N. Appling is supervising the drilling. The exploration program was planned as a result of soil sampling and other work done on this property a few years ago by R. H. Hundhausen and associates of the Bureau. Several drill holes are planned, but the exact number will depend on results of the drilling as it progresses.

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BULLETIN 16

Many inquiries have been received by the Department regarding when the revised (fifth) edition of Bulletin 16, "Field Identification of Minerals," will be available. There have been unavoidable delays caused mainly by the increased amount of material in the book. Probably it cannot be ready before early in April. Price will be $1.00.

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