STATE OF OREGON
DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

PORTLAND, OREGON

THE ORE.-BIN

VOL. 3 NO. 12 PORTLAND, OREGON December 1941

LET'S STICK TO FACTS

The California Mining Journal, J. P. Hall, publisher, has made several statements in the December issue which are not in line with the facts, and we wish herewith to refute them so that the record will remain straight.

The statements refer mainly to the Oregon Department's connection with the Burns Tin situation. The California Mining Journal and its editor have gone off the "deep end", misquoted us-- deliberately or otherwise-- and have accepted and published statements as news without, apparently, checking the origin or veracity of the statements; and in addition have maligned the U. S. Geological Survey, the U. S. Bureau of Mines, and other Federal agencies as well as the Oregon Department of Geology and Mineral Industries, accusing these groups of conniving with foreign tin monopolies in an effort to suppress development of domestic tin deposits. This latter accusation presumably makes interesting reading for prospectors, miners, and uninformed laymen, but in our opinion it is unsound and untrue -- one hundred percent misinformation.

On page 1 of the December issue of the California Mining Journal in the editorial column appears the statement, "It's true the Oregon counties are getting very little help from the State Department. . . ." This is the first statement that is contrary to fact. In the second paragraph appears the statement, "despite the fact that its (Oregon Department of Geology and Mineral Industries) mining department definitely found one to five percent tin in the Burns ore. . . ." This is the second statement which is absolutely false. On page 3 in bold-face type at the bottom of the first column is a quotation from our letter dated January 14, 1941, which is the Journal's "evidence" that this Department got one to five percent tin from the ore. It will be perfectly obvious, merely from the quotation, that this Department did <u>not</u> get one to five percent tin. These results were obtained in one of the independent commercial laboratories, a number of which have been working on the tin problem. In the 4th paragraph of Mr. Hall's tirade on page 1 he infers that the Government and State mining agencies "are committed to and held down by those same Washington policies". This is perfectly silly and so far as this Department at least is concerned is absolutely untrue. On page 3, at the bottom of the first paragraph, is a quotation from our letter of January 14th to Mr. Hall written at his request for information and written by us <u>in confidence</u>, the letter being marked "confidential", inasmuch as we felt that the best interests of all would not be served by publicizing anything on the tin matter until many more facts were at hand. According to our code, publication of this letter is an infraction of ethics. Following the above quotation, Hall states, "The Oregon state officials will back up and take program from those who want us to preserve democracy with British tin . . . ." This accusation, based on a wild-eyed assumption, is absolutely untrue. The policies of this Department are formulated by its Governing Board and Director, and we do not "take program" from any pressure group, foreign interests, or other agencies. We follow policies designed to encourage sound mining and mineral development in Oregon and nobody can buy or swap for our opinions.

The Journal's last paragraph, in the second column of page 3, referring to Dr. Harrison, is a deliberate misinterpretation of the contents of Mr. Burch's letter, which incidentally was in no sense a criticism of Dr. Harrison, but rather an indication that there is some interfering condition in the Burns rock that affects some standard analytical techniques.

At the top of the third column, page 3 of the Journal, we find the statement, ". . . . Government mining authorities, both State and Federal, found plenty of tin in the ore. . ." -- referring to the Burns deposits. This is untrue to the best of our knowledge, at least as regards published statements of results obtained by the U. S. Geological Survey, U. S. Bureau of Mines, and our Department.

We do not accuse the Editor of the California Mining Journal of dishonesty; we do accuse him of inexcusable carelessness in not checking the sources of his information; also of printing information that may make interesting reading to someone, without regard to whether or not the effect will be favorable to sound mining in general; and we accuse him further of drawing inferences and publishing them as conclusions that are not substantiated by the facts.

Mr. Hall appears to take the attitude that if it makes good reading, it is worth printing. This attitude could result in a great disservice to the mining industry.

Earl K. Nixon, Director.

*****

WELL - WHAT ARE WE GOING TO DO ABOUT IT?

We're in a war! A real, sea-going, man-sized, knock-hell-out-of-'em-kind of a contest in which men and machines and fuel for the machines and ammunition and BRAINS will win. That's all it takes. The planning, strategy, timing, co-ordination, and direction of effort all come out of the 'brains' part of the recipe. The effort - the main, driving, smashing force delivered by the machines of war, comes mainly from gasoline and diesel oil and from high explosives. These latter three are earthy, inert substances or entities- as are the machines of war, until 'brains' produce them and give them the spark and direction they need.

Our man-power can be inventoried easily; the machines, facilities of war, and the ammunition can be produced in relatively few months by putting man-power to work with materials already at hand. Some of those raw materials, we find, are <u>not</u> at hand in sufficient quantities to last many months. There is a weak link. On this weakness special emphasis must be placed.

All the smelters, all the machine shops, all the factories, all the skilled workmen, and all the money in the land, - can't turn out a fighting plane or a battleship unless all of the various essential raw materials are on hand to start with. True, we are taking nitrogen out of the air and making ammunition out of it; we are taking iodine and bromine and even magnesium out of sea water, - but nobody has ever taken quicksilver or chromite, or manganese or tungsten or antimony out of air or sea water. They have to be first found and then dug out of the earth. And you can't turn on a flow of chromite, manganese, etc...as you turn on water from a spigot.

Let us all - and the Congress - remember that we can order planes, tanks and boats 'till Hell won't have it, - and we can raise taxes to pay for them, - but they can't be produced without raw materials. We must supply those raw materials. That's our job - and THAT'S WHAT WE ARE DOING ABOUT IT.

*****

FORTY YEARS OF GEOLOGIC MAPPING IN OREGON

The story of the earliest years of geologic mapping in Oregon is, with one notable exception, the story of the work of Joseph Silas Diller, indefatigable pioneer field geologist of the United States Geologic Survey. Working as he did in areas which even today are relatively inaccessible, and covering hundreds of square miles of the most rugged part of the State on foot and on horseback; the amount and high quality of his work is constantly a wonder to geologists who have later followed in his tracks.

His Roseburg quadrangle, the first standard scale (two miles to the inch) geologic map to be made in Oregon, was published in 1898. It was followed in quick succession by the Coos Bay (1901), Crater Lake (1902), and Port Orford (1903) maps, altogether comprising an area of over 3000 square miles, in which geologic features were mapped in such detail that only minor readjustments have been made by later workers.

At the same time that Diller was working in the southwest, Waldemar Lindgren, also a member of the United States Geologic Survey, was compiling his classic volume "The Gold Belt of the Blue Mountains of Oregon" (1902), which has continued to be, to the present day, the "bible" of the miner in the northeastern part of the State. The reconnaissance geologic map covering over 4000 square miles accompanying the study of the mines and minerals of the region outlined the major divisions of the area and has served as a general guide to prospectors for nearly half a century.

Publications were few between 1903 and 1914, although Waring covered large areas (over 15,000 square miles) of the southeastern desert for the Water Supply division of the Survey, the reports and maps being published in 1908 and 1909.

In 1914 the newly instituted Oregon Bureau of Mines and Geology published maps of central Oregon and of the Baker area in northeastern Oregon, followed in 1916 by a reconnaissance of 1600 sq. miles of Curry County.

Between 1916 and 1932 published geologic maps were relatively few. Diller's last map in Oregon, the Riddle quadrangle, was published in 1924, and a few Water Supply Papers in which small areas were mapped came out between 1928 and 1932. Hodge's reconnaissance of nearly 8000 square miles in north central Oregon, published in 1932, was the only noteworthy contribution of that period.

A renewal of work by the Federal survey was ushered in during 1933 by the publication of a series of surveys of small areas in various mining districts in the State. Further studies followed in 1934.

Gilluly's study of the Baker quadrangle published by the U. S. Geological Survey in 1937 was the first complete and detailed survey to be made since the folios of Diller, and to that year, perhaps, may be referred as the date when geologic mapping in Oregon came of age. In July of the same year the State Department of Geology and Mineral Industries was established, and since that time over 12,000 square miles in Oregon has been mapped in detail. A reconnaissance map of an additional 12,000 miles of the Cascade range was published in 1938 by Callaghan for the United States Geological Survey.

The total area of the State is 96,981 square miles (of which water covers about 631 miles). About 40% of this area (38,634 sq. mi.) has been mapped by reconnaissance methods and about 15% (14,804 sq. mi.) has been mapped on a

large scale (2 miles to the inch or better). Of this nearly 15,000 square miles, the State Department of Geology and Mineral Industries, has mapped 52 percent, or a total of 7784 square miles, in less than five years. Besides the geologists of this Department, there are now actively mapping in the field,during field seasons, men from the Federal surveys, from the State College, and also men from several universities outside the State. It is probable that there will be at least twenty five geologists engaged in field work in Oregon during the summer of 1942. Most of these will represent State and federal agencies and institutions of higher learning.

*****

NEWS NOTES

The Southwestern Oregon Minerals Association has been organized with membership composed of miners and others interested in the development of the mineral industry in Coos and Curry Counties. The officers are as follows:

R. J. Hillstrom, President, Marshfield.
Harry Emmons, Vice President, Gold Beach.
Harry Shulz, Secretary, North Bend.
John Fosnacht, Treasurer, Bandon.
Arthur Jones, Director, Myrtle Point.
Gilbert E. Gable, Director, Port Orford.
Collier Buffington, Director, Gold Beach.

The purposes of the organization are to develop the mineral industry in order to supplement and replace revenues derived from timber; to cooperate with miners and prospectors in opening and exploring mineral deposits; to work for new roads into mineral areas; and to secure metallurgical reduction plants. In connection with this last objective, the association feels that the excellent port facilities at Marshfield justify a reduction plant which would treat both local and foreign ores.

The association is actively sponsoring a plan known as the Deemy Plan backed by the Marshfield Chamber of Commerce. In outline under this plan, a County Officer is designated to assemble mineral information submitted by prospectors. At frequent intervals, a geologist or engineer from the State Department would confer with the County Officer designated, make inspections of the properties, and advise with property owners concerning proper methods of procedure.

In order to make the plan operative, the association met with the Coos County Court, Judge Ervin L. Peterson presiding, on November 26. Besides officers of the association, those present included Mr. Baker, Secretary, and Mr. Coe, Chairman of the Minerals Committee of the Marshfield Chamber of Commerce, R. C. Treasher and F. W. Libbey of the State Department of Geology and Mineral Industries. After discussion of the matter, Charles Forrester, County Assessor, volunteered to act as the County Officer designated in the plan.

***

Austin McAdams and John Winters are mining manganese ore on the McAdams ranch close to the Coos-Curry County line, east of Langlois. Two carloads of manganese ore were shipped from Coquille during the fall of 1941. At present, weather conditions have interferred with trucking the ore. Development, mining

and stockpiling are continuing. Manganese ore was shipped from this property during the first World War.

***

Washington Brick and Lime Co., which is producing high-grade limestone for manufacture of burned lime from quarry and kiln near Provolt in Josephine County, has opened a new quarry on an apparently new lens 100 feet higher in elevation than the old quarry. Wolf Bauer is in charge. This property was formerly operated by the Oregon Lime Products Co.

***

The Murphy-Murray bucket-line dredge, formerly on both Ditch Creek and Foot's Creek in Jackson County, has been dismantled and moved to Eastern Oregon.

The Hayfork Exploration Company's dragline dredge has been moved back on Forest Creek north of Ruch. During the summer months, this company worked on the Applegate River because of insufficient water in Forest Creek. Charles Stearns is in charge.

The Southern Oregon Mining Company's dragline dredge on Forest Creek at Ruch has resumed work after being shut down during the summer months because of water shortage. J. D. Bowdish is Superintendent.

The B-H dragline dredge on the Left Fork of Forest Creek has moved upstream to the Black property where work will be continued during the winter and spring.

Charles Stearns and others have put in a dragline dredge on the Applegate River upstream from Applegate post office, on what is known as the Kubli ranch. Mr. Stearns is in charge of both this and the Forest Creek operation.

******

DOMESTIC QUICKSILVER STATISTICS FOR OCTOBER

According to the monthly mercury report of the United States Bureau of Mines, released December 6, 1941, domestic consumption of quicksilver reached a new monthly high of 4,800 flasks. The previous record of 4,700 flasks was made in February of this year. The large October requirements were caused mainly by munitions purchases. Domestic production of quicksilver during October was 4,000 flasks, a decrease of 200 flasks compared to September production. It will be seen that there was, therefore, a considerable spread between domestic production and consumption for October.

Information on imports of quicksilver in October are not as yet available, but it is reported that receipts from foreign countries gained in October. Imports for consumption during September amounted to 275 flasks. Statistics on exports in October are not available; in September, 143 flasks were exported. Stocks in consumers' and dealers' hands at the end of October amounted to 12,800 flasks as against 12,100 flasks at the end of September. Producers' stocks are reported as 546 flasks at the end of October, compared to 616 flasks at the end of September.

Companies that accounted for 98% of Oregon's total production in 1940 reported a 7% reduction below the monthly average for 1940, but the October total was 16% above that in September. California's production in October was 11% less than in September, but was 38% higher than the average monthly rate for 1940. Nevada's production increased in October and was a small amount above the 1940 monthly production rate in 1940. Production in Texas increased in October, while that in Arkansas and Arizona decreased.

*****

MONAZITE

Monazite, formerly a "has been" among minerals, has become increasingly important in the last ten years. With the coming of the electric light and tungsten filaments, monazite, used for the most part in incandescent gas mantles, was nearly forgotten. Since 1932, production and consumption have increased owing to the increased use of pyrophoric alloys, of ceria and other rare earths in glass, of cerium compounds in specialized carbon light cores, and (relatively new) of cerium acetate as a water- and mildew-proofing compound.

Monazite is an interesting mineral. It is stated to be an anhydrous phosphate of the rare cerium metals, essentially $(Ce,La,Nd,Pr)PO_4$, but nearly all specimens contain thoria and silica. Thoria, formerly desired for incandescent gas mantles, is present in amounts up to 18 percent, probably in solid solution as a silicate. Ceria constitutes from 25 to 35 percent of the mineral, and the phosphate radicle from 25 to 30 percent. The mineral is honey-yellow to reddish to brown in color, resinous in appearance and subtransparent. It has a hardness of 5 to 5.5 (harder than a knife but softer than quartz) and specific gravity of 5 (about the same as pyrite and magnetite). It is difficultly soluble in hydrochloric acid.

Monazite occurs as tiny flattened or elongated, occasionally prismatic, crystals in gneisses which have been soaked in pegmatitic solutions, as large crystals in pegmatites (largest known crystal reached a weight of 30 pounds) and in granites and the associated aplites. No primary deposit rich enough to exploit has been found. Monazite is very resistant to weathering, and as its occurrence is much the same as zircon, ilmenite, magnetite, and garnet, it is frequently found with these minerals in some "black sands". Monazite has been found in the sands of Oregon coast region, but as far as is now known, the quantity of monazite available is small. Possible operations for the recovery of other minerals in the beach sands may however yield monazite as a valuable by-product.

Monazite has thus far been mined successfully in North America in the Piedmont region of the Carolinas, at Centerville, Idaho, and in Florida. No production figures have been published since 1925 although the Florida beach sands at Jacksonville Beach were again mined for monazite in 1940. Monazite has also been found in Colorado associated with gold placer deposits south of Denver.

The State of Travancore, British India, is the dominant producer of monazite owing to the high-grade beach deposits which contain 50 percent monazite and yield, after concentration, a product containing 95 percent monazite. Brazil, for a long time the only producing area, Ceylon, New South Wales and the Netherlands East Indies have produced monazite from sands worked principally for rutile, ilmenite and zircon.

Prospecting for Monazite

Prospecting for monazite is similar to a search for gold. Monazite, because of its high specific gravity, is easily concentrated with the heavier sands and can be easily detected by its peculiar luster and color. Monazite possesses radioactive properties strong enough to affect a photographic plate and to be measured in the electroscope. The rare earths in monazite can be easily detected by the use of a spectroscope, a pocket or hand spectroscope being sufficient (U.S. Bureau of Mines Tech. Paper 110).

Concentration

Commercial deposits of monazite usually contain ilmenite, rutile, magnetite, zircon, garnet and occasionally gold and a trace of platinum. Treatment consists in rough concentration to reject the lighter sands, followed by careful separation of the heavier sands by gravity concentration, or electrostatic or electromagnetic methods. Gold, zircon and rutile can be separated from the tailing by shaking tables.

Extraction of the Rare Earth Metals

A number of processes, many of them secret, for the extraction of the rare earth metals have been adopted. Before the last war one of the commoner methods widely used for the separation of thorium from the monazite is as follows: The monazite concentrate is heated in a cast-iron pan with two times its weight of concentrated sulphuric acid until the monazite is thoroughly decomposed, giving a white mass of insoluble sulphates. The mixture is run into cold water in a lead-lined vat and stirred until the sulphates have dissolved and the insoluble residue of quartz and feldspars has settled. The solution with the rare earths and the phosphates is then decanted. The free acid is partially neutralized and the thorium phosphate is precipitated because of its low solubility. The thorium phosphate is filtered, dissolved and the fractional precipitation is repeated to purify the product. (Liddell, "Handbook of Non-Ferrous Metallurgy", vol. 2, 1926).

Cerium, the metal now most desired in monazite, is obtained by the electrolysis of the fused salts from the residue of the thorium precipitation. The initial separation involves the addition of sodium acid sulphate to throw down a double sulphate of the cerium group metals and sodium.

Mesothorium, a disintegration product of thorium, is extracted from monazite by the addition of a small quantity of barium sulphate to the monazite sand during its treatment with sulphuric acid, whereby the mesothorium is separated with the insoluble material left after the treatment of the product with water.

Prices

Quotation from Engineering and Mining Journal Metal and Mineral Markets.

Prices of monazite are based on the thoria content, in spite of the fact that the thoria is now a by-product of the process of extraction of ceria.

Price per ton of monazite, 8% thoria $60.

The lowest price at which the Carolina deposits can be worked has been estimated at 15¢ per pound. Other deposits in the country cannot be worked at this price unless ilmenite, magnetite, rutile, zircon or gold are present in sufficient quantities to carry part of the mining cost.

Production

In 1938 world production was about 6,000 tons. Domestic imports for that year amounted to 456 tons valued at $18,210. In 1939 domestic imports were 1,560 tons valued at $52,016.

Buyers of Monazite
(from U.S. Bureau of Mines)

Blackwell's Metallurgical Works, Ltd., Speke Road Works, Garston, Liverpool, England.
Foote Mineral Co., Inc., 1610 Sumner St., Philadelphia, Penn.
Henry A. Golwynne, Golwynne Magnesite and Magnesia Corp., 1532 Chrysler Bldg. New York City.
Harrison Mfg. Co., Rahway, New Jersey.
Harshaw Chemical Co., 1933 E. 97th St., Cleveland, Ohio.
Industrial Minerals Corp. of America, 220 Delaware Ave., Buffalo, New York.
Lindsay Light Co., 161 East Grand Avenue, Chicago, Illinois.
Maywood Chemical Co., Maywood, New Jersey.
A. D. Mackay, 198 Broadway, New York City.
Varlacoid Chemical Co., 116 Broad St., New York City.
Welsbach Co., Gloucester City, New Jersey.

Uses of Monazite

The mineral monazite is used only as a source of the rare earth elements, particularly cerium, thorium, lanthanum, neodymium, praseodymium. In the past, thorium was the principal metal desired and obtained, but because of technical advances the demand for thorium decreased while the demand for cerium increased, until now the thorium produced from monazite considerably exceeds the demand.

1. Pure cerium oxide, called "opaline" is used for the production of gray nickel or cobalt ground enamels for sheet metals. It is characterized by a remarkable opacity and is unaffected by furnace atmospheres.

2. Optical glass, containing cerium, praseodymium and neodymium, possess indices of refraction midway between flint glass and diamond, combining low dispersion and a high index of refraction. They are used in camera lenses with a greater light-gathering power and a better correction for chromatic aberration.

3. Alloys of cerium and iron are used in military signaling, as an illuminant in photography and for the ignition of explosives.

4. Alloys of cerium and magnesium are used as flashlight powders.

5. Cerium alloyed with iron, acts as a reducing agent and when alloyed with cast iron it opposes graphitization.

6. Cerium is used in small amounts from time to time in cerium glass, in tanning, in dyeing, and as catalysts.

7. Ceric oxide is one of the best opacifiers known for enamels, yet is seldom used even in Europe.

8. Cerium acetate is used as a mold preventive for cloth and as a water proofing agent.

9. Cerium is used to a small extent in flaming arc lamps. Cerium fluoride and oxide is used in searchlight cores, motion picture and therapy lamp carbons.

10. After the removal of thorium from the monazite, the residue of cerium, didymium and lanthanum is reduced as an alloy of iron and used as a spark producer in lighters for cigarettes and carbide lamps. (didymium is a mixture of neodymium and praseodymium)

11. The reduced alloy of the residual rare earth metals, known as "misch metal" has been used in a small way in steel making and in cast iron.

12. Thorium is used as a nitrate in incandescent mantles for gas, gasoline and kerosene lamps. Some mantles are used in heat and light therapy.

13. Thorium is used in the elsbach gas mantle.

14. Thorium is used to eliminate brittleness in ductile filaments. It is added in about 1% to tungsten filaments. It is used for filaments in the 3 electrode vacuum tubes.

15. Thorium is used in neon sign electrodes (U.S. Patent 2,136,918, November 15, 1938).

16. Thorium is used in high quality refractories.

17. Thorium is used as a catalyst in the Fischer-Tropsch benzine synthesis.

18. Mesothorium, a disintegration product of thorium is a substitute for radium both in luminous paint and in therapeutic work.

19. Lanthanum has been considered for loading silk and rayon.

20. Neodymium is a physical decolorizer for glass.

21. Didymium (neodymium and praseodymium) colors glass a neutral gray color.

*****

CLEARING HOUSE

50-CH

A copper property in the Little North Santiam District, Oregon, is for sale or lease. Underground development work amounts to 1200 - 1400 feet. Two good-sized ore shoots have been opened up. The ore is 6 inches to 5 feet wide and runs 3 to 4% copper, a few ounces of silver, and a little gold. The property has a 30-ton mill. Owner is Fred W. Andrews and address may be secured from the State Department's Portland office, 702 Woodlark Bldg.

***

51-CH

Dr. A. J. Walcott, 4029 N. E. Seventy-ninth Ave., Portland, Oregon has established a school with courses of instruction in gems and crystals. In addition Dr. Walcott is open for engagement as an expert gem consultant. His service in the Field Museum of Natural History in Chicago as well as private research fully qualifies him to undertake consulting work in the field of gems and crystallography.

***

52-CH

W. M. Briner, Coquille, Oregon desires to sell or lease mineral and timber property in Pistol River, in sec. 10, 11, and 22, T. 38 S., R. 14 W., in Curry County. Mineral property as explored by 3 opencuts is stated to contain large tonnage of material containing 61% hematite and assaying $18.90 per ton in gold together with 11% to 27% manganese. Owner states that property contains 8 million feet of merchantable timber. Purchase price, $50,000.

***

53-CH

Anyone desiring to sell antimony ore should communicate with Mr. H. J. Bishop, care of the Harshaw Chemical Co., 631 South Inglewood, Redondo Road, El Secundo, California. The company will quote prices delivered at railhead in Oregon.

***

54-CH

Mr. R. Reierson, 1952 Market Street Drive, Portland, Oregon, wishes to sell a lode property containing mainly copper values, but also carrying gold and silver. Location is in the Mount St. Helens district. There are five groups of claims with 1,080 acres patented. Substantial tonnage is claimed to be blocked out by several thousand feet of development work. It is necessary to construct four miles of road.

***

55-CH

Mr. W. L. Brennan, 1528½ North Hudson, Hollywood, California, desires to sell a slightly used Sullivan Diamond Core Drill, equipped to drill 500 feet. The owner states that the price asked is less than ½ of the cost price.

******

The ORE.-BIN
State of Oregon
DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES
702 Woodlark Bldg., Portland 5, Oregon
POSTMASTER: Return Postage Guaranteed