ORE.-BIN

Vol. 1, 1939

This is the first issue (vol. 1, no. 1, January 1939) of THE ORE.-BIN. It will be released the early part of each month, and takes the place of the PRESS BULLETIN which has been released by this Department in the past.

The State Department of Geology and Mineral Industries will use THE ORE.-BIN to advise the public of the work of the Department, and of new and interesting developments in mining, metallurgy, and geology. This policy is similar to that employed with the PRESS BULLETIN.

Newspapers are encouraged to use any of the material contained in THE ORE.-BIN. It is designed primarily for such use. A credit-line of acknowledgement is requested.

Your comments and criticisms will be appreciated. It is our desire to make THE ORE. BIN an effective medium for "telling the world" about Oregon, its mineral resources and mining possibilities.

Earl K. Nixon,
Director.

OREGON MINERAL PRODUCTION

The State Department of Geology and Mineral Industries, Earl K. Nixon, director, has completed a statistical survey of Oregon non-metallic mineral production for the year 1937; and the following table shows the value of the different materials produced. The value of the non-metallic production is added to the value of the metallic production, as reported by the U. S. Bureau of Mines Mineral Yearbook, in order to get the total 1937 production. This total represents a 6.7 percent increase over the 1936 production.

An estimate of the 1938 production is also given, and this latter total is a 16.7 percent increase over the 1937 production.

OREGON MINERAL PRODUCTION FOR 1937.

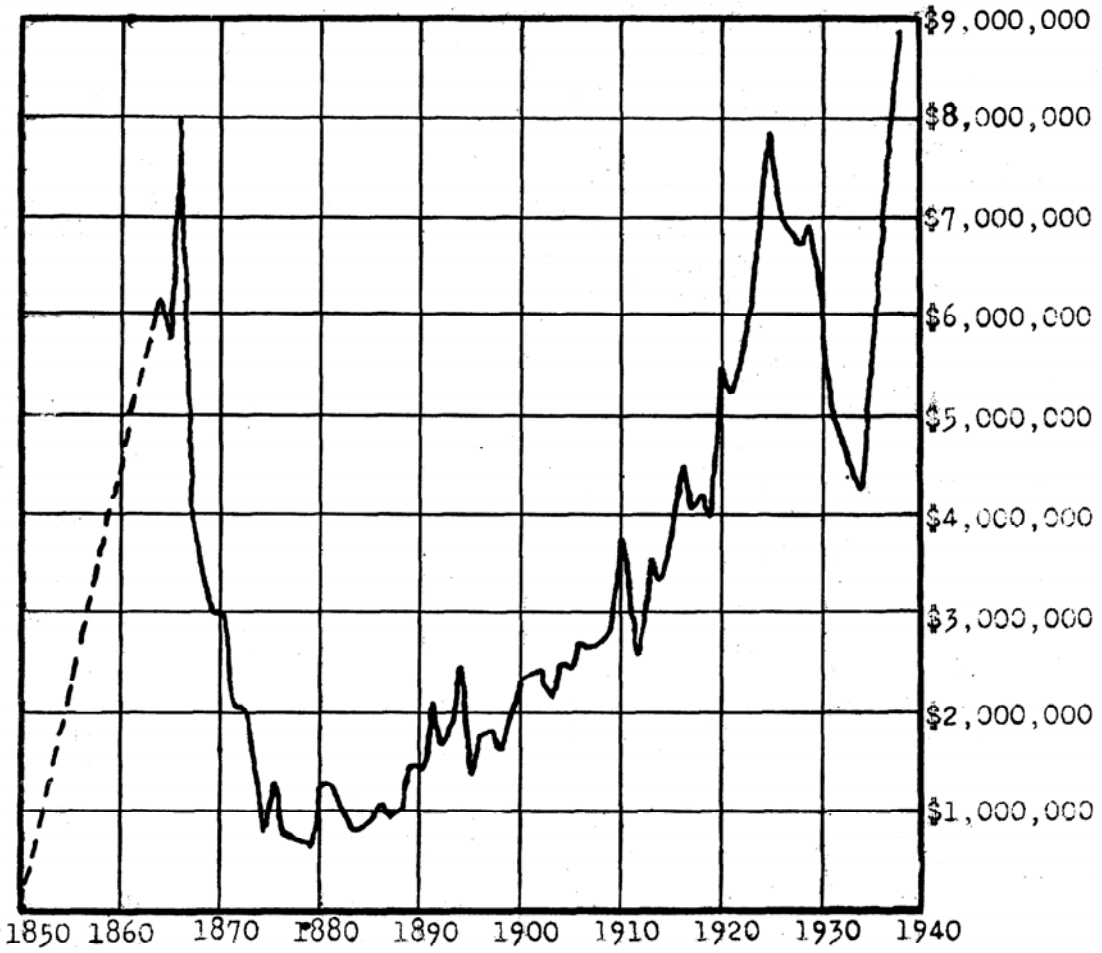
Sand, gravel and crushed rock	$3,715,069.	
Dimensional stone	36,279.	
Limestone for various uses (except cement)	58,577.	
Coal	34,156.	
	$3,844,081.	
Miscellaneous (inc. cement, clay products, abrasives, mineral water)	1,390,695.	
	$5,234,776.	
Metals	2,392,133.	(from Minerals Yearbook)
TOTAL	$7,626,909.	

ESTIMATE OF OREGON MINERAL PRODUCTION FOR 1938.

Gold	$2,900,000.
Silver	82,000.
Quicksilver	400,000.
Platinum	3,000.
Copper) Lead) Zinc)	15,000.
	$3,400,000.
Non-metals	5,500,000.
TOTAL	$8,900,000.

The accompanying graphs show the yearly recorded production of mineral products in the state since 1850. The records of production in the early years of the state's mining history are far from complete, as it was not until 1866 that a Government agency undertook the task of obtaining mine production statistics in the western states. For example, estimates of Oregon's gold production in 1866 varied all the way from two million dollars to twenty million dollars.

VALUE OF OREGON MINERAL PRODUCTION TO AND INCLUDING 1938



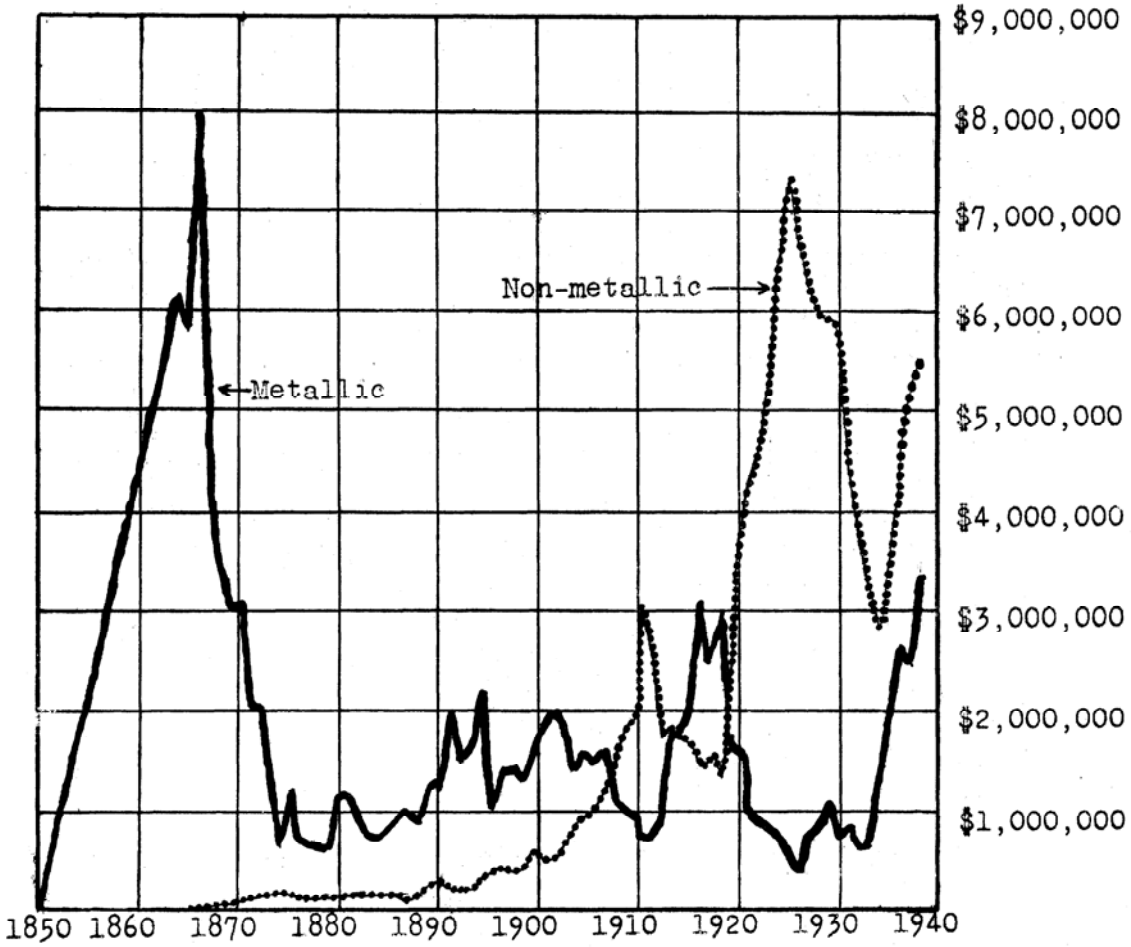
Total value of Production of Metals	$132,000,000
Total value of Production of Non-Metals	118,000,000
Total of all Oregon Mineral Products	$250,000,000

The peak of production at 1865-1866 was due to the high output of gold from hydraulic mining in Southwestern Oregon.

The peak around 1925 was due mainly to increased output of non-metallics.

Since 1933 the increase is due equally to non-metallic and to quicksilver and gold productions, - the latter being encouraged by a higher price for the metal.

VALUE OF OREGON METALLIC AND NON-METALLIC MINERAL PRODUCTION
to and including 1938.



The value of metallic production is estimated at $2,392,133 for 1937; $3,400,000 for 1938.

Value of the non-metallic production is estimated at $5,234,776 for 1937; $5,500,000 for 1938.

The percentage of increase for all mineral production in Oregon from 1937 to 1938 is 16 2/3%.

No complete record of Oregon's iron ore production, which began in 1867 and continued until near the end of the century, is available.

Concerning non-metallics, a material amount was produced chiefly in clay products for several years before any production records were kept.

It is worthy of note that the production curve shows rather a sharp rise beginning in 1934, indicating that by 1940 the total production will exceed the ten million dollar mark. This is in line with the Department's calculations based on its understanding of mining conditions.

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FISSURE ERUPTIONS NEAR BEND

The area south and southeast of Bend, Oregon, covered by the Newberry Crater topographic quadrangle, has had a geologic history and produced features that rival the famous Idaho "Craters of the Moon". Erupting volcanoes spewed forth lava flows so fresh that it is difficult to believe it happened hundreds of years ago instead of yesterday. These flows engulfed whole forests and the resultant lava tree casts and molds are worth going miles to see.

Nichols and Stearns* recently reported on a fissure 20 miles long, that extends from a point north of Lava Butte in a southeast direction to Devil's Horn, four miles south of East Lake. Four distinct lava flows issued from this fracture and ran into dense forests. Part of this area has been set aside by the U. S. Forest Service as the Lava Cast Forest, and thus preserved for future generations. Many of the trees were engulfed while standing, and one may see the cast or mold of the lower portion of the tree trunk as a hollow cylinder surrounded by a broken mass of rough lava. Other trees were knocked down and rafted so close together that the molds remind one of a log jam in a river.

Newberry Craters were reported by Howell Williams** a short time ago. The ancient mountain rivaled Mt. Mazama, the former Crater Lake mountain, in size and like it, disappeared by having its top engulfed by the hot, molten lava of the crater. Today, the crater is five miles in diameter, and is featured by beautiful Paulina and East Lakes. The surface elevation of the latter is 40 feet higher than that of Paulina Lake and there is no surface connection between the two.

Here may be found natural attractions, within an easy day's drive of any part of Oregon, that rival the greatly advertised Parks of the West. Our Oregon is truly a wonderful State in which to live.

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* Nichols, Richard L., and Stearns, Charles E., "Fissure Eruptions Near Bend, Oregon": Geol. Soc. Am., Bull. no. 49, no. 12, pt. 2, p. 1894, Dec. 1938.

**Williams, Howell, "Newberry Volcano of Central Oregon": Geol. Soc. of Am., Bull., vol. 46, pp. 253-304, February 1935.

ROCKS THAT FLOAT

A NEW METALLURGICAL PROCESS

The expression, "-- a country where the rocks float and the logs sink", is often used to describe a region that contains pumice. Pumice will float if placed on water, while some kinds of logs sink. Pumice is a rock, and, if it had had cooled under different conditions, might have become granite. It is so filled with air pockets that it is actually lighter in weight than an equivalent volume of water; therefore this rock floats.

If a steel ball-bearing is placed in a liquid, will it sink or float? That depends upon the liquid. If the liquid is water, the ball-bearing will sink; if mercury, the ball-bearing will float.

For example, a cubic foot of ice weighs 56.16 pounds or 0.9 as much as a cubic foot of water, which weighs $62\frac{1}{2}$ pounds. Therefore, the ice will float in water, with 0.9 submerged and 0.1 above water. Ice will remain stationary wherever placed in the water.

As the ice weighs 0.9 as much as an equal volume of water, it is said to have a specific gravity of 0.9 because pure water is taken as a standard with a specific gravity of 1.0. Quartz weighs 2.65 times as much as an equal volume of water so it has a specific gravity of 2.65. Iron has a specific gravity of 7.5, the same as lead ore (galena); mercury has a specific gravity of 13.6, all referred to water as a standard. However, it will be noticed that iron is lighter than mercury and will therefore float on mercury.

This phenomenon is the basis for one of the oldest methods of separating minerals. Suppose that we have a lead ore in a gangue (waste rock) of quartz. The lead ore weighs 7.5 times as much as an equal volume of water, and the quartz weighs 2.65 times as much as an equal volume of water. If this crushed ore were dumped into a liquid that weighed three times as much as an equal volume of water, the lead ore would sink and the quartz would float. The gangue could then be drawn from the surface of the liquid, and the separation of ore from gangue would be accomplished.

It would seem, therefore, that mineral separation could be accomplished with ease by merely obtaining liquid that is lighter than one constituent of a crushed rock, and heavier than another portion. Early experimenters with this method ran into so many difficulties that commercial applications were abandoned. Recently, the idea of "Sink-and-Float" has received new impetus as a result of studies by the du Pont chemical laboratories. The difficulties have been surmounted and the process has proved its worth by actual use under commercial conditions. "Sink-and-Float" has, of course, been used for many years for strictly test purposes on coal.

Sink-and-Float
A New Metallurgical Process

E. I. du Pont de Nemours & Company, of Wilmington, Delaware, announce the perfection of their SINK-AND-FLOAT process for separation and beneficiation of

minerals and coal. A copy of the report has been received from F. M. MEigs of the Minerals Separation Division of the du Pont Company. The report contains an account of the first successful installation of a plant of this kind for the treatment of anthracite coal on a commercial basis.

The Director of the Oregon Department of Geology and Mineral Industries is particularly interested in this new development because in 1932 he worked on a coal research problem in the anthracite field. He was associated with R. S. Walker, Charles Lotz and Ed Worthington, who at the same time were trying to devise a method of applying "sink and float" to the commercial treatment of anthracite coal.

These same technicians worked in collaboration with the Delaware Chemical Engineering Company (laboratories of Francis and Alfred I. du Pont) and built the first commercial sink-and-float plant. The plant was mechanically sound and made a premium quality product, but was discontinued because there were excessive losses of the "heavy liquid", and the escaping vapors were hazardous to workmen.

The du Pont technicians continued the experiments and made discoveries that overcame the former difficulties. The present plant treats 100 tons of anthracite coal per hour and is about the size of an eight-room house. It does the work of an anthracite breaker 25 times larger than the "sink and float" plant.

Fundamentally, the process is quite simple. Coarsely crushed coal is fed onto a "table" where it is washed with water and an active agent, then drained, and dumped into a tank containing heavy, "parting liquid", covered by a layer of water. The coal floats on top of the heavy "parting liquid" (at the bottom of the water layer) and the bone, slate, and rock sink to the bottom of the tank. Each product - coal and waste - is removed by conveyors and washed to recover the valuable "parting liquid". The coal is now ready for shipment and the waste goes to the dump.

It is obvious that the heavy "parting liquid" must be immiscible (won't mix) with water, or it could not be recovered from the washing process. A vapor seal is maintained at all points to prevent the escape of vapors from the "parting liquid", as these vapors are poisonous.

Metallurgical Possibilities of the Process

The liquids used by the Du Pont technicians are halogenated hydrocarbons - tetrabromethane, pentachlorethane, and trichlorethylene. The specific gravity of these ranges from 1.4 to 2.9. Common minerals such as asbestos, gypsum, quartz, feldspar, calcite, mica, etc., have specific gravities less than 3, and therefore will float on certain of these heavy liquids. The heavier minerals, such as native metals, metallic sulfides, and most metallic oxides, have specific gravities greater than 3 and therefore will sink. It would seem then, that here is a panacea for minerals separation problems, but this is not the case.

As a matter of fact there are certain limitations to the process. It is applicable to coal and to some other minerals which can be freed from their undesirable constituents by crushing. So far, it appears that finely divided material cannot be treated successfully with the "sink and float" process because there

are excessive losses of the "parting liquid". The material should be sized to plus 8-mesh Tyler standard screen scale, or plus one-quarter inch mesh.

One possible application of the "Sink-or-Float" process is in the treatment of coarser sizes of metallic ores. The primary crushed ore (plus one-quarter inch mesh) would be treated to eliminate gangue, in order to save the amount of feed to be finely ground for flotation. Another application might be in replacing the picking belt in certain operations. Careful experimental work will be necessary before any successful application to particular ores can be made.

The specific gravity of the parting liquid remains constant during the operation, and it is possible to make very sharp separation. It is said that quartz (specific gravity 2.65) can be separated successfully from calcite (specific gravity 2.71) by this "Sink-and-Float" process. What may be done eventually with this newly perfected process, is an interesting speculation.

Three cost estimates are given in the du Pont report:

Concentration of manganese ore (pyrolusite) - 300 tons per 24 hours - feed minus 1", plus 1/8 inch, estimated cost, $1.05 per ton of concentrate when working 300 days per year.

Concentration of silver-bearing lead ore - quartz gangue - 2,500 tons per 24 hours - 90 percent recovery of lead with 8:1 concentration ratio. Cost estimate, 30¢ per ton of mill feed when operating 300 days per year.

Concentration of iron ore- siliceous gangue - 14,100 tons mill feed per 24 hours - sink and float production per 24 hours, 6,000 tons - ground to minus 3/4 inch, plus 3/16 inch mesh. Estimate cost, 24.2¢ per ton of feed when working 300 days per year.

The above costs include power, water, steam, all labor, supervision, maintainance, reagents, incidentals, and plant depreciation at 10 percent per year.

TO ALL EXCHANGE LIBRARIANS:

This Department receives occasional letters from exchange libraries advising of non-receipt of our publications. We use every precaution to make certain that these bulletins leave this office properly addressed and we keep a record of all bulletins mailed out. An occasional bulletin, of course, may be lost in the mail and not received by the librarian of some exchange library, and, we find, some are actually received, misplaced, and later found after we have asked that a search be made.

In the future, issues of the "Ore.-Bin" will contain notices of the release of our bulletins. In case you do not receive your copy of the bulletin within a few days after the stated date of mailing, please advise us at once or the Department will feel it no longer needs to take the responsibility for miscarried or mislaid bulletins.

OREGON SILICA DEPOSIT BEING OPENED

MAY BE BASIS OF NEW INDUSTRY

A silica deposit having, according to preliminary estimates, a tonnage of something like ten or fifteen million tons, is being opened up and developed by the Bristol Silica Company about two miles from Gold Hill, Oregon. The deposit is quartz and is stated to have a thickness of 150-175 feet and a length of many hundreds of feet. A composite sample of this, taken from the surface of this deposit by a well-known engineer who reported on the deposit, was furnished the Department. The result shows the material to contain 98.7% SiO_2, with the impurities being very low.

At the present time Mr. Fayette Bristol, proprietor of the property, is manufacturing chicken grit of superior quality and is also shipping ground silica to some of the smelter people. So far as we know, there is in Oregon no other producer of insoluble poultry grit and it is our opinion that this is indeed a very high grade product.

The Department is particularly interested in this deposit of silica for the reason that the State has no known deposits of glass sands. The reason for this is plain, namely, because much of the State is covered by basic igneous rocks which do not produce this type of sand. The only difficulty with the Bristol deposit is that, being quartz, it is more difficult and costly to grind than is ordinary glass sand. In addition to furnishing a possible source for metallurgical silica, which the Department believes will be in demand for Bonneville industries, there is the added bare possibility that the material might furnish the basis for a glass brick industry. It is realized that in this connection the fuel situation is critical. However, with the presence of partially developed coal deposits in Oregon and the possibility that some method of using the electric furnace for glass manufacturing may be developed, there seems to be a very reasonable chance that this deposit may have interesting possibilities as an Oregon mineral resource within the next few years.

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STUDY OF SALT DEPOSITS

The State Department of Geology and Mineral Industries proposes to carry out an economic study of the possibilities of utilizing the salt deposits in the Lake and Harney county areas, in connection with a chemical industry or by-product plant near Bonneville. The principal products which would be produced by such a plant are chlorine, sodium silicate, and sodium sulphate, and certain others of lesser importance. For this study, the Department has asked in its budget for an additional sum of $1,000 to employ an outside metallurgical engineer for a period of two months. Field work would be carried out by the Department and laboratory work would be done in part with the facilities of the Department and in cooperation with the Department of Chemistry under Dr. George W. Gleeson of Oregon State College. The college has been interested in these deposits for some time, and the Department is pleased to receive the benefit of the excellent personnel and facilities which the College offers.

At the present time, considerable chlorine used in the Portland and lower Columbia area is obtained from salt manufactured from sea-water near San Francisco and shipped to a reduction plant near Seattle, and the chlorine itself shipped again to Portland. If the sewage disposal plant proposed for the city of Portland should be of the type requiring substantial amounts of chlorine, this would furnish a substantial outlet for chlorine which might be produced at the Bonneville chemical plant from salt deposits existing in this state. The study proposed by the Department includes the problem of transportation, cost of manufacture, and the market situation of all of the various by-products.

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MINING ASSISTS LUMBERING

OREGON QUICKSILVER MAY BE USED AS FUNGICIDE.

The mining industry, through its production of quicksilver, or mercury, is assisting the lumber industry to produce bright air-dried lumber. Lumber which a few months after cutting becomes sap-stained or which develops the well-known "blue stain", is difficult to sell. This stain, it has been determined recently, is caused by a fungus growth that flourishes on the sap fluid. In recent years the Graselli Chemicals Department of E. I. du Pont de Nemours & Company has developed a fungicide which in its new form is called "lignasan". This contains ethyl mercury phosphate, which has a toxic effect on the sap fungi. It is expected that enlarged use of this quicksilver bearing compound in the lumber industry to combat the fungus, may be helpful in increasing the demand for quicksilver in this state.

Lignasan is dissolved in water in the ratio on one pound to 50 gallons of water for small lumber, and $\frac{1}{4}$ to $1\frac{1}{2}$ pounds to 50 gallons of water for heavy timbers. Sprayed on the lumber, the coating of chemicals protects the wood and prevents the entrance of sap-stain-producing fungi through the surface of the wood during the early part of the air-seasoning period. It is understood that lumber manufacturers using mechanical dipping apparatus can treat a thousand feet of lumber for about 10 or 15 cents.

Additional information about this interesting chemical may be obtained from Dr. E. E. Hubert, of the Western Pine Association, and Mr. V. R. Diamond, the du Pont representative, both of Portland.

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METEORITES

Simple Test

Meteorites are a constant source of wonder to most people. They flash across the sky in their brief period of existence, and sometimes penetrate to the earth's surface. They have considerable scientific as well as commercial value, and the discoverer of one of them is usually well rewarded.

Specimens are constantly being received, labelled as meteorites. This Department is always glad to be of service, and desires a record of such finds. But the general public may save themselves many false hopes and disappointments if they had some simple means of testing the suspected meteorite.

There are two general types of meteorites; those composed of iron and nickel and known as iron meteorites, and those composed of various elements and known as stony meteorites. Both kinds usually have at least small amounts of nickel and a nickel-test may eliminate a large number of objects commonly mistaken for meteorites. This test is not conclusive in an area that has nickel-bearing rocks.

The test requires four chemicals:

Dilute nitric acid
Ammonium hydroxide (ammonia)
Alcohol
Dimethyl-glyoxine

A small sample of the material to be tested is ground to a fine powder and dissolved in nitric acid. Then add ammonium hydroxide until the solution is distinctly alkaline. A test for alkalinity is accomplished by using litmus paper, preferably red, and the color will change to blue when sufficient ammonium hydroxide has been added. If a reddish brown mass forms at this point, it is an indication of the presence of iron.

Allow the reddish-brown mass to settle, and then carefully pour off the clear liquid. The clear liquid can also be filtered from the solid material.

While the liquid is clearing, or filtering, the dimethyl-glyoxine solution may be prepared. Dissolve this chemical in about an ounce of alcohol until the alcohol will hold no more. This is a saturated solution. Add a few drops of this solution to the clear liquid and a scarlet-red precipitate indicates the presence of nickel.

Dimethyl-glyoxine can be obtained from any chemical supply house at a cost of about 75¢ per ounce. This is a dry chemical. The alcohol may be purchased most anywhere.

The presence of nickel in the specimen indicates that it has a possibility of being a meteorite, and you can then contact some agency who can assist you further. If it has no nickel, you may feel reasonably sure that your rock is no "wanderer from heaven", and it probably will not pay the next instalment on the new car.

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MINERAL PRODUCTION

Referring to the production of gold in the United States, preliminary estimated figures for which have just been released by the United States Bureau of Mines, it is interesting to note that the increase in production in 1938 over 1937 is relatively small, about 5%. During 1937, 4,834,062 fine ounces of gold were produced, and 5,106,109 (estimated) in 1938.

It is significant that certain states had a considerably less production in 1938 than in 1937. Utah, for example, is down about 34% in the one year. The largest change is the state of Washington, which is up about 100%, from 36,000 ounces in 1937 to 73,000 ounces in 1938. This amazing increase is due principally to one mine, the Chelan, property of Howe Sound.

Oregon is next among the states in the production of gold with an increase of nearly 50%. This is due in considerable part to the fine showing of the Cornucopia mine in Baker county, but also due to the doubling of the number of dredges operating in this state.

Idaho with an increase of about 25% in its gold production, is next among the states which show an increase.

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NEWS NOTES

George P. Sopp, of the Colorado School of Mines, has accepted the job of geologist at the Al Sarena mines (more often called the Buzzard mine) and located north of Medford.

William and Hugo von der Hellen are operating the Lance property on the right fork of Foots creek, near Rogue River, Oregon. This is a dry land mechanical operation, in which trucks and power shovel are used in connection with a washing plant. This equipment was last used by Mr. von der Hellen on Althouse creek in southern Josephine county.

The Greenback Consolidated Co., which has been carrying on development work on the Jim Blaine and Yellow Horn claims, adjacent to the old Greenback mine on Grave creek in southwestern Oregon, are making plans to build a mill and place the property in regular production.

The Morris Mine Co., Mr. C. G. Smith, president, Stanfield, Oregon, is preparing to finance and carry on exploration work at the Morris property in the Greenhorns.

A Seattle group has been driving a tunnel to intersect a quicksilver deposit on the Westerling prospect in the Ochoco mountains east of Prineville. This is an old property located about a mile from the Blue Ridge mine. Considerable production is reported in the past, and the present work is designed to cut the lode at some distance below the old workings.

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ELECTROSTATIC SEPARATION OF MINERALS

NEWER DEVELOPMENTS IN MINERAL SEPARATION

Advances in metallurgy are making well known deposits usable - deposits which were too low grade, too complex, or were handicapped by any one of several difficulties. Electrostatic separation, a new or reasonably recent advance in the metallurgical field, is beginning to find rather a wide use in the separation of minerals, both metallic and non-metallic. It is believed that some details of this method will be of interest to readers of this pamphlet. Below is a brief outline of what electrostatic separation is. It is to be noted that electrostatic is quite different from magnetic separation, which is a very old process.

Electrostatic separation of minerals is based on the theory that objects can store charges of electricity, either positive or negative, if not grounded so as to complete a circuit. Like charges repel, while unlike charges attract, each other.

These charges, and their attractive forces, should not be confused with magnetic attraction. In order that a magnetic field, and therefore magnetic attraction, may exist, the material of which the magnet is made must be magnetic and there must be two magnetic poles of opposite sign reasonably close to each other. The object being attracted need not be magnetized but it must be a conduction of magnetic lines of force, and is considered magnetic.

An electrostatic charge may be developed on any object not grounded. Glass, which is extremely non-magnetic, will store quantities of static electricity. Objects may accumulate a static charge while passing rapidly through air; thus an automobile or truck may develop a static charge while in motion, and become a miniature thunder cloud. Oil and gasoline trucks carry a dragging chain which grounds any static charge developed on the truck, and thus prevent a disastrous spark from developing. It is not necessary that another "pole" be present, but the object being affected must have a static charge.

It seems apparent, then, that if crushed particles of rock or ore are passed by an electrostatic charge that they will be repelled or attracted according to the charge developed on the particles. There have been many attempts to make use of this principle but a critical feature was the inability to develop a sufficiently high electrostatic charge on the pole piece.

This handicap has been surmounted, and experimentation along these lines has proceeded with some success. Crushed particles of rock and ore are dropped over a "material-conveying electrode" in such a manner that if no charge were on the electrode, the particles would fall in a vertical line. An electrostatic charge is now placed on a "charged electrode" which is a short distance from the "material conveying electrode" and the latter is grounded. As the crushed particles passed between the two "electrodes" they are deviated from their path of vertical fall, some to the right and some to the left. The amount of deviation depends on the strength of the charge on the "charged electrode" and the electrostatic conductivity of the particle.

Certain minerals always are repelled from the "material-conveying electrode" regardless of the positive or negative charge on the "charged electrode." These minerals are classed as non-reversible. Others are always repelled from a positive electrode, and are classed as reversible-positive while a third group is always repelled from a negative electrode, and is classed as reversible-negative. This phenomenon of reversibility is entirely new and offers possibilities for electrostatic separation heretofore unknown.

Experiments were performed with some 90 minerals. The feed was sized between 16 and 150 mesh as representative of the usual size of crushed feed in commercial mills. It was heated to 17? ° F., and dried immediately before placing in the hopper for observation in the electrostatic field. This procedure was followed to assure uniformity in surface moisture. Each mineral, in turn, was fed through the feed-hopper into an electrostatic field. A low static voltage was applied to the "charged electrode" and the voltage gradually increased until all the particles in the stream were deflected away from the line of gravity fall. The voltage necessary to deflect each stream of minerals was then recorded as its "electrostatic conductivity". Each mineral was investigated several times under varying atmospheric conditions to check the results.

It was then necessary to pass all of the minerals that had been observed in the first investigation through the separator, to test them for what has been termed "reversibility". The majority of them behaved in the same manner regardless of the positive or negative charge on the "charged electrode". These were listed as non-reversible. Those which had their direction of deviation from line-of-gravity fall changed were classed as reversible-positive.

Subsequently, the machine was set as a separator, using mixtures of minerals, and certain ores. It was found that a difference of 3000 volts usually assured fair separation with close sizing while a difference of 5000 volts usually assured good separation even on unsized materials. If the minerals to be separated belonged to different groups, that is non-reversible, reversible-positive, reversible-negative, separation could be effected with little or no difference in voltage. For example, anthracite coal requires a voltage of 3588 (non-reversible) and bituminous coal requires 4056 volts (reversible-positive). The voltage differences of 468 volts is too small for ordinary separation, but excellent separation was possible by giving the "charged electrode" a positive charge. Bituminous coal was deflected to the left and anthracite coal was deflected to the right.

It should be remembered that these experiments were made with one "pass" through the electrostatic field. Some arrangement as is used in magnetic separators, of passing the material through successive fields may effect separation of minerals that have less than 3000 volts difference.

As long as the surface of the minerals was dry, practically no difference was found in the action of the minerals in the electrostatic field or in the voltage required to deflect the stream. Internal moisture seems to have no effect as long as the surface is dry.

Sunlight, or darkness, had no effect on operating conditions as long

as the surface of the minerals was dry and the voltage constant.

The depth of the stream of minerals fed into the electrostatic field had no observable effect on the action of the stream in the field.

These conclusions are important as they offset many objections that have been presented for the inability of electrostatic separators to function as commercial machines.

Experimental data, then, indicates that electrostatic separation of minerals is feasible if there is a 3000 volt difference for sized material in the same group (non-reversible, or reversible-positive, or reversible-negative) and a 5000 volt difference for unsized material in the same group. If the minerals are in different groups, little or no voltage difference is necessary. The action of the minerals in the electrostatic field is not affected by sunlight, humidity, internal moisture, or depth of particles in the stream, if the surface of the minerals is dry. (It is also necessary that the feed into magnetic separators be dry).

TABLE OF COMPARISON OF MECHANICAL PROPERTIES OF MINERALS FOR MINERAL SEPARATIONS.

	Electrostatic Conductivity 1/	Magnetic Attractive Force 2/	Specific Gravity for Sink-and-Float 3/
Almandite	12,480 Non		3.5-4.2
Aluminous Oxid	13,572 RP		
Amphibole Hornb ıde	7,020 RN		3.2
Anglesite			6.1-6.4
Anhydrite	7,800 RP		2.9
Anthracite	3,588		1.3-1.7
Antimony	7,800		
Apatite	11,700 RP	0.21	3.15-3.27
Aragonite	14,800 RP		2.9
Argentite		0.27	7.3
Arsenic	6,552		
Arsenopyrite		0.15	6.0
Asbestos			2.2-3.3
Azurite			3.7-3.9
Barite	5,772		4.3-4.7
Bauxite	8,580 RN		
Bentonite	3,588		
Beryl			2.68-2.76
Biotite	4,836	3.2	2.90
Bismuth	4,680		
Bituminous coal	4,056 RP		1.1-1.5
Bituminous coal (coking)	6,240 RP		
Bornite	4,680	0.22	4.9-5.4
Braunite			4.7-4.9
Calamine	9,048	0.51	3.3-3.5
Calcite	10,920 RP	0.03	2.71

	Electrostatic Conductivity 1/	Magnetic Attractive Force 2/	Specific Gravity for Sink-and-Float 3/
Cassiterite			6.8-7.
Celestite		0.10	3.9
Cerargyrite		0.28	5.5
Cerussite		0.30	6.5-6.6
Chalcocite	6,552	0.09	5.5-5.8
Chalcopyrite	4,680	0.14	4.1-4.3
Chromite	5,616		4.3-4.6
Chrysocola			2.0-2.2
Chrysolite (olivine)	9,204 RP		3.3
Cinnabar		0.10	8.0-8.2
Corundum	13,728	0.83	3.9-4.1
Covellite			4.6
Cryolite	5,460 RP	0.05	3.0
Cuprite		0.08	5.7-6.1
Diamond, black			2.75-3.42
Diamond, gem			3.5-3.56
Dolomite	8,268 RP	0.22	2.83-3.0
Enargite		0.05	4.4
Enstatite	7,800 RN		3.3
Ferberite			7.5
Fluorite	5,148	0.11	3.0-3.2
Franklinite	8,112	35.38	5.0-5.2
Galena	6,864	0.04	7.3-7.6
Garnet	6,864	0.40	3.5-4.3
Garnierite			2.3-2.8
Gold			15.6-19.3
Graphite, flake	2,800		2.1
Graphite, plumbago	3,588		
Gypsum	7,644 RP	0.12	2.31-2.33
Halite	4,056		2.1
Hematite	6,240	1.32	4.9-5.3
Hubnerite			6.7-7.3
Ilmenite	7,020	24.70	4.3-5.5
Iron		100.00	7.3-7.8
Iron, in basalt	7,800		
Kaolinite	6,708 RN		2.6
Kyanite	9,204		3.5-3.7
Labradorite	4,992		2.71
Lepidolite	4,992		2.84
Limonite	8,580	0.84	3.6-4.0
Magnesite	8,580 RP	0.15	3.0-3.3
Magnetite (sand)	7,800	40.18	4.96-5.18
Malachite			3.8-3.9
Manganite	5,616	0.52	4.3
Marcasite	5,460		4.9
Microcline	7,488		2.5
Millerite			5.3-5.9
Molybdenite	7,020	0.23	4.7-4.8
Monazite Sand	6,552		4.7-5.3

	Electrostatic Conductivity 1/	Magnetic Attractive Force 2/	Specific Gravity for Sink-and-Float 3/
Muscovite	2,964 RP		2.83
Nephelite	6,240		2.55-2.65
Niccolite	7,800	0.04	7.3-7.8
Oligoclase	6,240 RN		2.65
Orpiment		0.24	3.48
Orthoclase		0.05	2.57
Pentlandite			4.6-5.1
Phosphate Rock			3.15 (varies)
Platinum			14-19
Psilomelane			3.7-4.7
Pyrite	7,800	0.23	4.95-5.17
Pyrolusite	4,680	0.71	4.73-4.86
Pyroxene	6,084 RN		
Pyrrhotite	6,552	6.69	4.5-4.6
Quartz, chert	8,892 RN	0.37	2.65-2.66
smoky	9,672 RN		
flint	10,140 RN		
gold	10,140 RN		
crystal	13,416 RN		
milky	14,820 RN		
rose	14,820 RN		
Rhodochrosite	8,580		3.3-3.76
Rhodolite	16,380 RP		
Rutile	7,332	0.37	5.9-6.2
Rutile, beach sand	8,892		
Rutile, beach sand	7,488		
Scheelite	8,580		2.38-2.75
Senarmonite		0.05	
Serpentine	6,084 RP		
Shale			2.38-2.75
Siderite	7,176	1.82	2.83-3.88
Silver Ore	6,552		
Slate			2.45-2.70
Smaltite	6,396		6.2
Smithsonite	12,480 RN	0.07	4.30-4.45
Sphalerite	8,580 RN	0.23	3.9-4.2
Spodumene			3.1-3.2
Stannite			4.3-4.5
Stibnite	6,864	0.05	4.5
Sulfur	10,920 RN		2.07
Talc	6,552	0.15	2.7-2.8
Tetrahedrite		0.21	4.4-5.1
Topaz	12,480 RP		3.5
Tourmaline	7,176 RN		3.0-3.25
Vanadinite			6.6-7.10
Wad			3.4-4.26
Willemite		0.21	3.9-4.3
Witherite		0.02	4.2-4.3
Wolframite	7,332		7.1-7.5

	Electrostatic Conductivity 1/	Magnetic Attractive Force 2/	Specific Gravity for Sink-and-Float 3/
Wulfenite	11,700		6.7
Zincite		0.10	5.4-5.7
Zircon	11,700 RN	1.01	4.7
Zircon, beach sand	11,076 RP		

1/ Johnson, Herbert Banks, "Selective Electrostatic Separation": Am. Inst. Min. & Met. Engrs., Mining Tech., Tech. Paper no. 877, pp.8-9, Jan. 1938.

2/ Crane, Walter R., "Investigations of Magnetic Fields, with Reference to Ore Concentration": Am. Inst. Min. & Met. Engrs., Trans., vol. 31, p. 405, 1901.

3/ Pamphlet on Sink-and-Float, released by E. I. du Pont.

4/ RP represents reversible-positive.

5/ RN represents reversible-negative.

6/ No symbols after electrostatic conductivity indicates non-reversible.

* *
* TO ALL EXCHANGE LIBRARIES *
* *
* Announcement is made of the release of Bulletin no. *
* 11, entitled "The Geology and Mineral Resources of *
* Lane County, Oregon"; by Warren D. Smith in colla- *
* boration with Lloyd Ruff. Copies of this bulletin *
* will be mailed from this office on March 6th, 1939. *
* If not received within 10 days from the above date, *
* advise this office immediately, otherwise replace- *
* ments for copies lost in the mail or elsewhere can- *
* not be made. *
* *

NEW BULLETIN ANNOUNCED

Announcement is made of the publication of the following bulletin by the State Department of Geology and Mineral Industries:

> "The Geology and Mineral Resources of Lane County, Oregon"; by Warren D. Smith in collaboration with Lloyd Ruff; Oregon State Department of Geology & Mineral Industries, Bulletin no. 11, 65 pp., 27 figs., 1939."

Copies may be obtained from the Department's office, 329 S.W. Oak Street, Portland, upon receipt of 50¢, which is partially to cover the cost of printing and mailing.

Lane County covers an area from the coast to the summit of the Cascade Mts., and offers an unusually good cross-section of the geology of western Oregon. The rocks are entirely of Tertiary age and the sequence begins with Eocene on the coast through to Miocene, and later, rocks in the eastern portion. One of the rare occurrences of marine Miocene sediments is found in the extreme northwestern corner of the county.

Rocks of Eocene age are the Umpqua formation, consisting of shale, sandstone, and some conglomerate, occurring in the western half of the Blackbutte-Elkhead area; the Calapooya formation, consisting of tuffs, lava flows, congbmerates, and mud flows, occurring in the Calapooya Mts.; and the Tyee formation consisting of sandstone, calcareous tuff, conglomerate, thin coal partings, and shale, and occurring throughout much of the Coast Range. The Oligocene formations are represented by the Fisher formation, - terrestrial material such as tuffs, agglomerate, clays, sand and gravel, in the Coyote Creek region; the Eugene formation, consisting of sandstones, conglomerates, tuff, with felsic intrusions, occurring in and around

Eugene; and the Goshen Beds, near Goshen. The Miocene is represented by Heceta Head Beds, heavy conglomerates, tuff and conglomerate, basalt flows, agglomerate, and sandy shale, of marine origin; the Columbia River lava of the McKenzie and Willamette river drainages. Pliocene and Pleistocene are represented by the Cascade formation of andesitic lavas intruded by the Nimrod Granite. Pleistocene and Recent formations are mainly glacial and alluvium. The fossils of the county are described and pictured.

The physiography of the county, which is quite diversified, is well described. The divisions are: The Coastal area, the Coast Range, the Calapooya Mtn. section, the Willamette Valley, and the Cascade Mountain region. The Coastal area is characterized by wave-cut terraces and dune topography. The Coast Range features valley-in-valley erosion, accordant ridge tops, which have resulted from a peneplained area having been uplifted and tilted to the east. The Calapooya Mts. are in late maturity and have no definite stream pattern. The Willamette Valley, a most fertile farming area, is characterized by a broad flood-plain with braided or anastomosing stream channels, Yazoo type streams, and glacial erratics. The Cascade Mtn. region supplies Lane county with its most picturesque scenery, mineralization, water supply, and numerous other advantages.

The principal economic metals are quicksilver, gold and silver, copper, lead, zinc, and antimony, concentrated in the Calapooya Mts., and the Cascade region. Of the non-metallic resources, refractory clay, brick clay, sand and gravel are the principal deposits; others, of lesser importance, include coal, lime and calcite, mineral hot springs, and ground water.

The scenic resources are discussed in detail and pictured with excellent illustrations. Seven appendices tabulate a great deal of factual information that will be of value to those interested in the county.

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The Grants Pass Courier in its issue of February 28th notes that three new mining operations recently started in the Grants Pass mining district:

One of these is the C.R.C. Co., Inc., operating with a dragline shovel on the right fork of Foots creek in the area formerly dredged by the Rogue River Gold Co.

William von der Hellen is operating a dry land plant, using a power shovel and trucks, also on the right fork of Foots creek.

The Pleasant Creek Mining Corporation dredge, a standard bucket line type, is getting under way at a point on Pleasant creek.

It is stated the above three operations will move between five and six thousand yards each 24 hours, and use about 35 men on the regular crews, exclusive of workers clearing ground and incidental labor.

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Mervin Packard of Yreka, Calif., has purchased some placer ground in the town of Jacksonville and expects to move his plant up from California this spring.

J. H. Garner and Chas. Dallerup of the Crescent Oil Company, San Francisco, have purchased the Rippey and Dick Head ranches on the Upper Applegate. They expect to make a dragline set-up on these ranches this spring.

The Bull of the Woods lode mine, about 2 miles northeast of Gold Hill, has again been leased to J. A. Clement of Gold Hill. Mr. Clement has a five year lease and has just completed a new 100' shaft; he also has equipped the property with a compressor and 2-stamp mill. On his former lease he produced 112 oz. of gold during 1934-35.

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COAL TESTING

The Director of this Department, in Washington recently in connection with discussions of cooperative projects between the U. S. Geological Survey and the U. S. Bureau of Mines, and this Department, made a tentative arrangement whereby the Bureau of Mines will test bulk samples of the Coos Bay coals for their by-product possibilities. The samples for test purposes must be taken in a certain way, sealed in clean oil barrels to prevent escape of moisture, and shipped to the testing station at Pittsburgh, Penna. Normally, about 3,000 pounds of coal are required for the sampling tests. Under the arrangement made by the Director, all costs of the testing will be borne by the U. S. Bureau of Mines. with the exception of those in connection with the taking of the samples and their transportation to Pittsburgh. Because of the necessity of taking the samples according to the Bureau of Mines' standard method, it is not unlikely that Dr. H. F. Yancey, Supervising Engineer of the U. S. Bureau of Mines Non-metallics Station at Seattle, may be asked to supervise the sampling in question.

The socalled carbonizing properties of the coals are determined by the U. S. Bureau laboratory after careful analyses, both proximate and ultimate, are made. Analyses are made for moisture, volatile matter, fixed carbon, ash, hydrogen, nitrogen, oxygen, sulfur, heating value, softening temperature of the ash, etc. Samples are placed in an especially-designed retort and heated under conditions of careful control to certain temperatures, and the by-products collected and analyzed at the various stages. The following products are obtained from the samples tested: Coke (or briquet product), gas, tar, light oil, ammonia, and liquor. Calculations are then made and amount of the various products are expressed as per cent by weight of the coal and in yields per ton of the coal.

More of the details of the tests which have been made on eastern coals will be given in the next issue of the Ore.-Bin.

In the past year the testing service on coals offered by the U. S. Bureau of Mines, according to its Director, have been so popular and valuable that the test station is nearly one year behind schedule on account of the large number of samples already received from the eastern coal fields. Because of the critical nature of the situation in Coos Bay field and the need of the community, Director Nixon made a special request that samples from this Oregon field be given a priority. He was given to understand that this probably can be arranged.

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UNITED STATES GEOLOGICAL SURVEY TO CONTINUE WORK IN OREGON THIS SUMMER.

The Director of this Department received assurances in Washington recently that the U.S.G.S., which completed the areal geological work of the Medford quadrangle last fall, would continue this work by quadrangles westward, toward the coast, this following summer, unless it happens that the Oregon Legislature declines to approve a small segregation of funds to be allotted this Department for cooperation with the U. S. Geological Survey. Francis G. Wells, who was in charge of the U.S.G.S. surveying in the Medford district last summer, is prepared to come west in April or May and organize the field work this coming summer. He was able to cover part of the Grants Pass quadrangle last summer, and he expects to complete that area this coming season. Much of this area is mountainous, and the work will be somewhat more difficult, but according to the present plan it is expected the area can be completely finished in 1939. The following field season, that is to say during 1940, the Kerby quadrangle should be covered, and following that the fractional quadrangle west of the Kerby reaching to the coast in Curry county, - if topographic maps are available by then.

The U.S.G.S. was willing to grant a preference for the southern Oregon country in the light of the fact that it would cover important areas known to contain chromite, a strategic mineral.

On account of the plan to get this southern tier of quadrangles in the Grants Pass-Medford area mapped by the U.S.G.S., the State Department of Geology & Mineral Industries will stay out of the area in question, but plans tentatively to have a field party this summer mapping the areal geology of the country immediately to the north of the area covered and to be covered by the U.S.G.S. party.

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STRATEGIC MINERALS

During the recent discussion between the Director of this Department with the Director and various geologists of the United States Geological Survey in Washington, the fact was brought out that Oregon appears to be almost at the head of the list among the states of the nation as a potential producer of strategic minerals. These include principally, of course, chromite and quicksilver, but it was brought out that Oregon also has some known deposits of tungsten, antimony, nickel, and manganese. The Oregon State Department of Geology & Mineral Industries has been urged by the Federal agency to stress as much as possible the work on, and searches for, these strategic minerals, - particularly quicksilver.

The situation is complicated by the fact that a great deal of the state where quicksilver occurrences are known, is not covered by topographic maps. Furthermore, the principal chromite area in eastern Oregon, namely the serpentine belt in the Canyon City district, is not covered by topographic maps. Under the circumstances, we were in a position to request that the U. S. Geological Survey give preference in its priority plan for topographic mapping to the critical areas mentioned, and we are led to believe this will be done.

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TOPOGRAPHIC MAPPING IN OREGON

Last year a grant of some $80,000 of PWA funds, the bulk of it ear-marked for topographic work, was allocated to Oregon. Most of this is being used for aerial topographic mapping of the coastal area from about opposite Eugene north to the Columbia river, on account of the need of maps in that area for War Department use in connection with coast defense. Whether or not more funds will be available this coming year is not known, but since the funds were intended to be used in part in connection with the Federal government's study of strategic minerals, it is hoped that a substantial part of any further funds from this source may be utilized in covering a large part of certain Oregon areas now unmapped, where strategic minerals, particularly chromite and quicksilver, are known to exist.

To assure that critical areas in Oregon not mapped topographically may be covered in the next ten to fifteen years, it would be highly desirable if the State of Oregon through its Legislature would adopt a long-range program whereby the state would allocate a certain amount of funds, say not less than $10,000 each year, to be matched by the U. S. Geological Survey, to carry out this topographic mapping plan. We have assurances that the Federal agency will match our funds for this purpose. It goes without saying that the State Highway Commission, the State Engineer, and the Soil Department and various other state and county agencies, would be materially benefitted by such a program. Massachusetts began five years ago putting up $50,000 each year for cooperation with the U. S. G. S. in remapping that state. They are getting a splendid job of mapping of the state as a result. In going into details of the cost of topographic mapping, we find that by letting a contract of substantial size, as would be advisable in the case of central Oregon, the cost per square mile would be reduced to $20 or $25. Oregon could well afford to consider very seriously indeed a program which would contemplate topographic mapping of these critical areas.

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SUMPTER QUADRANGLE MAP

The areal mapping of the Sumpter quadrangle was started previous to 1910. In 1913-14 further work was done toward completion of the job. Since then, certain additional areas have been mapped and the total area covered, but the final map has not been issued because of the desire of the Survey to catch up tag-ends and make a letter-perfect job. The details which remain to be done pertain primarily to the south end of the quadrangle where the rocks are mainly Tertiary lavas, and where little is to be expected in the way of economic interest. After some discussion of the matter, the U. S. Geological Survey agreed to let the State Department of Geology & Mineral Industries issue within the next few months a geological map in colors of the northern two-thirds of the quadrangle which are of greatest interest to mining men and engineers. Since mining is particularly active in this area, it is our belief that the Department is well justified in carrying out this work for the benefit of mining people, rather than wait, possibly several years, for the completion of certain details which are of more interest academically than economically.

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BY-PRODUCT VANADIUM

Vanadium is a very useful metal in forming special iron and steel alloys, and the name vanadium steel has become a synonym for rugged strength in machine parts. Ores of the metal are mined in Peru, southwest Africa, the United States, and northern Rhodesia (in order of quantity of production in 1937). That vanadium is derived from another source than that of its ores is the interesting information given by the Vanadium Corporation of America. About 200,000 pounds yearly are recovered from smoke deposits of boilers and smoke-stacks of oil-burning steamships.

Nearly all crude oils contain traces of vanadium, but those of Venezuela and Mexico contain enough so that flue deposits have from 5 to 25 percent of the non-volatile vanadium oxide, making it profitable to recover the vanadium from such accumulations.

This is one of the many instances in which valuable by-products are recovered from flue gases, and illustrates also the wide variation of elements sometimes associated with natural hydro-carbons. Witness the reported presence of beryllium in some Russian coals. This case of vanadium by-product recovery represents a value of about $100,000.

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POWDER METALLURGY

An important development in the metallurgical arts which has received relatively little publicity is that of so-called power metallurgy. Essentially this is the art of forming metallic objects by compacting finely divided component parts without melting.

Metal powders may be compressed in very hard steel, tapered dies to form briquets which, after annealing at subfusion temperatures, become homogeneous billets. Such briquets may then be used to make various desirable products which cannot be made so efficiently by the age-old method of fusing and moulding.

Some high lights of this important development in metallurgy are given by Dr. John Wulff in the December issue of Technology Review. Making usable metal briquets by compression is not a recent discovery, for the method was used early in the 19th century, but the development and industrial application of the art is of quite recent date.

Powders of metals used may be produced by a variety of methods, both chemical and mechanical. These powders, either of one metal or - after suitable mixing - two or more metals, are placed in suitable, tapered, very hard steel dies, and subjected to extremely high pressures, thus forming briquets or metal compacts. They are then given a heat treatment in controlled atmospheres or in a vacuum, usually at temperatures below the melting point of the briquet. The resulting metal compact is of greater density than the original mass and possesses a remarkable strength because of a welding or sintering action. It also possesses a uniformity of grain sometimes difficult to distinguish from

that of equivalent composition made by melting and casting.

Dies used to form the briquets must be made with special care and must be able to stand pressures up to 350 tons per square inch. Presses with a capacity of from five to one hundred tons are used and may be of hydraulic-, cam-, friction-, or knuckle-type. They compress the powder to as little as one-third or one-eighth of its original depth.

There are many important applications of this new development in metal fabrication. High melting point metals such as platinum, tungsten, molybdenum, and tantalum, used in electronics, are so treated. High-speed cutting tools are made by compressing very hard substances such as carbides, borides or even diamonds with more malleable materials such as cobalt. Electric contact and welding accessories having especial physical properties have been formed by compressing silver or copper with tungsten, graphite, molybdenum, titanium, and zirconium. So-called oilless bearings are made by compounding metal powder with a volatile salt which is expelled by annealing, leaving a certain porosity and at the same time retaining sufficient strength for the bearing. The pores soak up oil and form a reservoir for the lubricant. All these products can be produced in usable form only by the powder technique, and many other metallic articles can be made more efficiently by this method than by melting.

The Massachusetts Institute of Technology has established a laboratory for the study of powder metallurgy. Research will be carried on in related basic scientific problems such as cohesion, diffusion in metals and like phenomena as well as the more practical problems of the manipulation and manufacture of powders and the physical and chemical properties of metallic compacts.

The field of powder metallurgy is necessarily confined to certain fields because the high pressures involved limit the size of the dies which may be used; nevertheless there appears to be an ever-widening scope for its application. In certain instances it is the most economical method to use, but the matter of economy is not generally considered its most important feature. The outstanding quality in the development of this art is the ability to obtain certain sought-for characteristics in metals or combinations which may not be obtained by the usual standard methods.

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LIST OF MINES IN OREGON

The State Department of Geology and Mineral Industries announces issue of a list of the mines and mining properties in the state of Oregon. Those properties which are known to be active are so indicated. The type of property - whether gold placer, quicksilver, chromite, etc. - is indicated, but no description of the property is given, other than the name and address of the operator and the county and district. The list is alphabetical by counties and by mining districts within the counties. The total number of properties listed is 1,621. Of these, more than 200 are shown as being producing mines or active operations.

Because of the tremendous number of properties located over the state, it has been quite a task to assemble the list now available. It is reasonably accurate, but changes will be made and the list will be brought up to date from time to time. The list covers 32 pages of single-spaced, legal size paper.

A charge of 25 cents is being made to cover cost of printing and mailing only. Parties desiring to obtain a copy of the list may address the State Department of Geology and Mineral Industries, 329 S. W. Oak Street, Portland, Oregon.

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ATTENTION -- MINERAL PRODUCERS

We have frequent calls for commercial offerings of minerals of various types. We are asked to supply the names of persons who produce such minerals as antimony, mercury, chromite, clays, titanium, ground vermiculite, bentonite, tungsten, tin, lead, zinc, mica, etc.

We shall be pleased to keep on file the names of persons in Oregon who have such minerals for sale so that we can assist them in finding buyers for their minerals or prospects.

We do not guarantee to find you a buyer (nor do we guarantee to the buyer that you are able to produce the grade and quantity of mineral he is looking for), but it is our wish to get buyer and seller together. That is our job and there is no cost connected with it so far as we are concerned.

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THE PROSPECTOR

(Dedicated to All Prospectors and Miners Everywhere)

I'm only an old, old prospector
Who has his hopes and dreams,
Searching for the rainbow's ending
Where a golden mountain gleams.

I've roamed the hills and valleys
And climbed the craggy peaks,
Learning the lore of Nature --
She alone her language speaks.

I've seen the Sago Lily,
Like jewels on the desert bloom.
And dug out the mastodon's bones
From his deeply buried tomb.

Nome's sands, too, have known me;
I've poled up the Kuskoquin,
And run the angry rapids,
Taken many an icy swim.

I hope when my work is finished,
And I lay down my battered pan,
That some few here will say of me,
"He has been of use to Man".

- by C. W. Curl
January 23, 1959.

OREGON'S GOLD PRODUCTION

Oregon does not have the reputation of a mining state among those who are not well informed on the subject. As a matter of fact, Oregon has a substantial mineral production, the sum-total of which adds materially to the wealth of the state each year.

Oregon has one of the six largest gold lode-mines in the United States and Alaska, the Cornucopia mine in Baker county. Oregon ranks eleventh in a list of 24 states and territories in the production of gold; if Alaska and the Philippines and Puerto Rico are eliminated, it ranks ninth in a list of twenty-one.

The following tabulation is based on preliminary figures for the year 1938 released by the Denver office of the U. S. Bureau of Mines:

		Ounces (1938)
1.	California	1,294,000
2.	Philippines	862,397
3.	Alaska	667,000
4.	South Dakota	594,000
5.	Colorado	370,000
6.	Arizona	310,000
7.	Nevada	289,000
8.	Utah	210,650
9.	Montana	197,200
10.	Idaho	101,000
**11.	OREGON	77,000
12.	Washington	73,000
13.	New Mexico	38,600
14.	South Carolina	11,125
15.	Virginia	2,814
16.	North Carolina	1,870
17.	Pennsylvania	1,402
18.	Wyoming	877
19.	Maryland	847
20.	Georgia	833
21.	Texas	455
22.	Tennessee	300
23.	Alabama	30
24.	Puerto Rico	9

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BAKER OFFICE CONDUCTS MINING SCHOOL

The State Department of Geology and Mineral Industries and the Board of Vocational Education are cooperating in conducting a mining school at Bend, Oregon. The mining school work is being carried out by John Eliot Allen, field geologist, and Leslie Motz, analyst, of the Baker office of the Department of Geology.

The original request for mining school work came from Baker. The two men in the Baker office prepared a series of lectures and demonstrations covering the subjects of mineralogy, identification of rocks, methods of prospecting, and economics. The work is designed to be of practical value to the prospector in the field and is kept as non-technical as possible. The school has been given for two seasons, with great success, at Baker, and was attended not only by prospectors but by people who wished some general knowledge of rocks and minerals.

Parties in Bend have requested that this work be given, and the result of cooperation with the Board of Vocational Education and the Department of Geology & Mineral Industries is the school at Bend. Classes will be held on Tuesday and Wednesday nights of each week, over a period of six weeks. Local arrangements are supervised by the Deschutes Geology Club, and all lectures are free to the general public.

Mr. Allen and Mr. Motz have spent a great deal of time and thought, much of it on their own time, in the preparation of their lectures. The classes are a real benefit to the people of Oregon and the lecturers should be commended for their efforts.

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ALUMINUM FROM CLAY

Numerous requests are received by this office for information on the amount of "aluminum" that a clay should contain in order to be an ore of aluminum. To date, there is no known process in the United States which can be used to extract profitably aluminum from Pacific Northwest clays, in competition with existing manufacturers.

A great deal of experimental work has been done to discover a commercial process of this type. Aluminum metal has been extracted from clay. In fact, the U. S. Bureau of Mines station at Pullman, Washington, has some aluminum pellets which were reduced from eastern Washington clays. The cost of this process, however, is so great that the process is not commercially practical.

The answer to the question - Can aluminum be economically extracted from Pacific Northwest clays? - is "No". That is, until such time as a process is perfected which can compete with the process using bauxite. In Germany aluminum reportedly is made from clays, but also it is reported that the cost of production is much higher than it is in the United States where bauxite is exclusively used.

Bauxite is, at present, the only commercial ore of aluminum. This ore has the following generalized chemical composition:

	Percentage
Alumina (Al_2O_3)	55-65
Silica (SiO_2)	2-5
Iron (Fe_2O_3)	1-25
Titanium Oxide (TiO_2)	1-2
Combined water (H_2O)	10-30

It should be noticed that the silica content is very low, and furthermore the silica that is present must be soluble in hot alkalies by means of which impurities are removed leaving pure Al_2O_3. Aluminum is not made directly from bauxite but from alumina (Al_2O_3) which is extracted from bauxite by chemical processes and the purified alumina then reduced to aluminum in electric furnaces.

Analyses of some of the western Oregon high-alumina clays is given:*

	I	II	III	IV	V
Alumina (Al_2O_3)	37.6	39.2	38.8	41.3	39.9
Silica (SiO_2)	43.6	36.4	45.9	42.2	47.0
Iron (Fe_2O_3)	5.3	5.9	2.8	2.9	0.46
Titanium Oxide (TiO_2)	1.1	0.3	0.2	0.6	0.2
Ignition Loss	12.6	17.4	12.4	13.4	12.5

I - Fransen Pit
II- Ellis Pit
III-Dibble Pit
IV - Macleay Locality
V - Hobart Butte Flint Clay

* Wilson, Hewitt, and Treasher, Ray C., Preliminary Report on some of the Refractory Clays of Western Oregon: Oreg. State Dept. Geol. & Mineral Industries, Bull. no. 6, p. 84, 1938.

First of all, it should be noticed that the analysis gives alumina percentage, not aluminum percentage. Pure alumina consists of 53 percent aluminum, so that the actual amount of aluminum present in these clays is approximately one-half the alumina content. This point is frequently overlooked by many people.

Secondly, it should be noted that the percentage of silica is high, usually higher than the alumina percentage. Furthermore, the silica is in chemical combination with the alumina and the two are separated with extreme difficulty. In other words, the process of preparing pure alumina

(from which aluminum is made by electrical methods) from the complex aluminum silicates present in western Oregon clays is too expensive to justify the use of these clays as ores of aluminum at the present time.

The use and production of aluminum is constantly increasing. It has been estimated that there is now a 30 to 40 years' supply of bauxite in the United States at the present rate of production. As production expands it is probable that more research will be done on high alumina clays in order to supplement the domestic supply of bauxite.

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MINING REGULATIONS
MINING METHODS

The U. S. Bureau of Mines has just released a technical paper dealing with Federal placer-mining laws and regulations, and small-scale placer-mining methods. The information contained therein is similar to that in Information Circulars issued by the Bureau, to which additions have been made, and certain changes. The pamphlet is 6 inches by 9 inches in size and contains 49 pages and is printed (not mimeographed). Copies may be secured from the Superintendent of Documents, Washington, D.C., for 10¢.

This publication is particularly valuable to anyone desiring information about the Federal placer-mining laws, and the explanation of small-scale placer-mining methods is extremely helpful to the "little fellow". The pamphlet is officially designated as follows:

Johnson, Fred W., "Federal Placer-Mining Laws and Regulations"; and Jackson, Chas. F., "Small-Scale Placer-Mining Methods"; U.S.Bureau of Mines, Technical Paper 591, 49 pp., 26 figs., incl.maps of placer districts, 1938.

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NEW USES FOR THE FLOTATION PROCESS

Application of the flotation process began with the concentration of sulphide ores. First a bulk concentrate was made; then with the development of selective flotation, different sulphides were separated from the bulk concentrate. It was at first assumed that the process was practical only in sulphide ore treatment, but the field of application has been progressively widened by research, and at present embraces a large number of substances other than sulphides. In fact it may be said with fair accuracy that the process now is applicable throughout the whole field of beneficiating natural mineral products, both metallic and non-metallic, and is branching out into still other industrial fields. Examples of the latter are in removing ink in reclaiming news print paper, separating fibre in waste water from paper mills, eliminating impurities in sugar refining, and in differential separation of certain crystalline substances, such as sodium chloride and potassium chloride, thus avoiding tedious recrystallizing procedures.

The broad scope of the flotation process applied to industrial processes is outlined in U.S.B.M. Report of Investigations 3397. Especially noteworthy is its expanding use in chemical engineering fields. This subject is of especial interest at a time when studies are being made in an effort to prevent or lessen the discharge of industrial wastes into streams.

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MEDFORD GEOLOGIC MAP OUT.

The new geologic maps of the Medford quadrangle, representing work completed last November by field parties of the U. S. Geological Survey under Mr. Francis G. Wells, geologist, are ready for mailing. The maps are in several colors, show the various geological formations in the Medford-Ashland district, as well as the location of the mines in the district. On the back of the map appears a rather thorough description of the geology and notes on the occurrences of chromium, gold, quicksilver, coal, clays, etc.

The preparation of this map by the U. S. Geological Survey so soon after the completion of field work represents a concession requested by this Department and very kindly made by the director of the U. S. Geological Survey. The Department is carrying the cost of the color lithostating and is issuing the maps. Copies may be obtained by writing to the head office of the Department, 329 S. W. Oak Street, Portland, enclosing 40 cents to cover printing and mailing.

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STREAM TIN IN OREGON.

Cassiterite, tin oxide (SnO_2), is commonly known as "stream tin" from its occurrence in placer deposits. A nodular variety, known as "wood tin", is found in some localities.

The United States lacks known commercial deposits of cassiterite, or stream tin, and the supply has to be imported. There are few occurrences in the United States, and these supply a certain amount of museum specimens but little, if any, commercial ore.

A group of placer miners operating on Pine creek, south of Baker, Oregon, had been finding heavy brown pebbles in their sluices. Unable to decide definitely what the brown material was, they sent samples to the Baker Assay Laboratory of the State Department of Geology & Mineral Industries, and Mr. Leslie Motz, assayer, determined the samples to be cassiterite.

Mr. Earl K. Nixon visited the placer property and collected a few pieces of the stream tin. These represent the first authentic occurrence of cassiterite in Oregon. Mr. Nixon states that the miners are working a gulch where the metal values have concentrated from an old Tertiary channel heading in the Greenhorn mountains, and that the stream tin represents the accumulations of many, many centuries of time. There is an insufficient amount to justify commercial development of the tin, so far as now known.

There have been many reports, from time to time, of cassiterite occurrences in Oregon. Some of these have originated in the Wallowa mountains and the Department's field survey parties made particular search for cassiterite pebbles last summer. None came to their attention. The occurrence on Pine creek may give new incentive to a search for this important, strategic war mineral.

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SAMPLING OF OREGON COALS

Mr. Geer, technician of the U. S. Bureau of Mines, arrived in Oregon on May 1st and is now working with Mr. J. E. Morrison, engineer of this Department, on the job of sampling Oregon coals. At the moment these engineers are in the Coos Bay district, where the most important mines are located. The sampling itself must be done in a certain standardized method developed by the U. S. Bureau of Mines, and the samples are placed in air-tight cans for shipment to the laboratories of the U. S. Bureau of Mines.

Proximate and ultimate analyses will first be made of the various types of coal and then further studies and utilization tests will follow. It is the desire of the Department to demonstrate the best uses of coals existing in various parts of the state. Known occurrences of coal beds will be visited in Coos Bay, Medford, Salem, Molalla, Columbia county, Heppner, and perhaps other districts.

Dr. H. F. Yancey, of the U. S. Bureau of Mines, will join Mr. Nixon of the Department the second week in May for a trip to the various coal areas for definite planning of the sampling job, to be carried out by Messrs. Geer and Morrison. It will take three or four months to complete the tests after the sampling is done. The results of the work will be published by the Department in cooperation with the U. S. Bureau of Mines as soon as final data are available.

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U.S.GEOLOGICAL SURVEY GEOLOGIST COMING FOR GRANTS PASS WORK.

The Department has just received word that Mr. Francis G. Wells, geologist of the U. S. Geological Survey, who will have charge of the field parties of the government work in the Grants Pass district, will arrive in Portland around May 20th, to lay out plans for the summer field season. Work will be concentrated on the Grants Pass quadrangle, which area carries from a point just north of the city of Grants Pass south to the California line. Considerable work as now planned will be done on the Kerby quadrangle, which adjoins the Grants Pass on the west.

The work this summer fits in to a plan which contemplates cleaning up in proper detail much of the geology of the mineralized area in southwest Oregon. The Medford quadrangle was finished last year and the map is now being issued; the Grants Pass quadrangle will be finished this summer, and a colored geologic map of it is expected to be issued about this time next year; the Kerby quadrangle will be finished next, in the summer of 1940.

The State Department of Geology & Mineral Industries is undertaking a detailed geological survey of the Tiller quadrangle, which adjoins the Medford on the north and the Riddle on the east.

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ROGUE RIVER COORDINATION BOARD ACTIVE.

The Rogue River Coordination Board, consisting of Charles E. Stricklin, State Engineer, as chairman, Senator W. H. Strayer of the Governing Board of the State Department of Geology & Mineral Industries, Mr. E. E. Wilson, chairman of the State Game Commission, as members, with Earl K. Nixon as secretary, was established by the passage of Senate Bill 385 in the last legislature. The first meeting of this Board was held in Grants Pass on Tuesday, April 18. After this meeting the Board spent three days covering the mining areas in Josephine county and observing conditions along streams there and at the mouth of the river. Another meeting was held in Corvallis on May 1st. At that meeting it was decided that a standard of turbidity of 50 parts per million of solids in suspension would be considered as the point beyond which conditions would not be favorable for salmon fishing in the lower river. If the turbidity is higher than 50 parts per million at Grants Pass, it is the opinion of the Board that the turbidity is caused by natural conditions; if lower at Grants Pass and higher at the mouth of the river, then it is the opinion of the Board that it should take some action toward coordinating or rotating the operation of some of the placer mines in order to make conditions near the mouth of the river comparable with those around Grants Pass.

Inasmuch as the snowfall this winter was relatively light in the Siskiyous many of the placer operations have already been obliged to close down, so it is improbable that any termination of mining activities will be required this year.

Another meeting of the Rogue River Coordination Board will be held in Portland Sunday, May 7th.

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RICH QUICKSILVER STRIKE.

According to a source which has always been unusually reliable, a very important quicksilver strike has been made recently at one of the mines in the western Cascades. Details are being withheld in deference to the mine development now going on, but they may be announced in the next issue of the Ore.-Bin.

It would appear to us that with the quicksilver production diminishing somewhat in California and the Oregon production increasing quite rapidly, Oregon will run neck and neck with the state of California in the production of quicksilver for 1939. With the increased price of quicksilver -- it is being sold now at $90 per flask -- somewhat of a rush is on to obtain quicksilver properties.

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UNITS OF GOLD BULLION VALUES.

Troy weights are used as the basis of gold and silver values, and the ounce is the primary unit.

Troy Weights

1 pound	-	12 ounces
1 ounce	-	20 pennyweight
1 pennyweight	-	24 grains

The gold content of the dollar is now fixed at 15 5/21 grains of gold 9/10 (usually designated as 900) fine, so that one dollar is equivalent to 13.714- grains of pure gold. Since there are 480 Grains in 1 ounce, an ounce of pure gold is valued at $35. Following are the gold values of different Troy weights.

1 pound	has a value of	$420.
1 ounce	"	35.
1 pennyweight	"	1.75
1 grain	"	0.0729

In order to convert Avoirdupois to Troy weights:

1 Avoirdupois	pound	= 14.58333	Troy ounces
1 "	ounce	= 0.91146	"

Therefore:

1 Avoirdupois	pound	has a value of	$510.42
1 "	ounce	"	31.90

The metric system is used in nearly all countries outside of the United States and British Empire.

1 gram - 15.432 grains - 0.03215 oz. Troy

Therefore:

1 gram is valued at $1.125.
1 kilogram is valued at $1125.

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BERYLLIUM *

* Digested from Mineral Trade Notes, vol. 8 no. 2, Feb. 20, 1939, published by the United States Bureau of Mines.

The metal, beryllium, has attracted public fancy, probably on account of the comparatively high sales price and the peculiar properties of the metal. Beryllium is virtually as hard as tempered steel, it melts at about the same temperature, yet it is scarcely two-thirds as heavy as aluminum. It resists atmospheric attack (similar to the rusting of iron)

about the same as aluminum since it forms an oxide film over the surface that stops further attack.

Beryllium alloys have attracted the attention of Congress. A recent radio broadcast by a prominent news-commentator stated that an appropriation bill is being prepared to permit the accumulation of reserve stocks of strategic war minerals. This appropriation, according to the broadcast, has been greatly increased to allow financial assistance to industries which are producing certain materials likely to be of great importance in national defense. The particular materials mentioned were beryllium alloys. These have certain unique properties, and undoubtedly the United States has lagged behind Europe in the development and application of these valuable alloys.

The pure metal is costly to produce ($35 to $50 a pound). The commercial metal (99.5 percent beryllium) is quite brittle, and that factor, coupled with the high cost, eliminates it as a structural material. An effort has been made to alloy the metal with other light metals such as aluminum and magnesium but these experiments have not yet been commercially successful. The use at present is largely confined to alloying beryllium with the heavy metals, principally copper, and to a minor extent, nickel and other nonferrous metals. Almost the only use for the pure metal itself is for "windows" in X-ray tubes and electrodes for neon signs; the targets for the latest atom-smashing machines are also made of beryllium.

When beryllium is alloyed with copper it is soft and ductile before being heat treated, and is therefore easily machined. This alloy can be made hard and highly elastic by a one-stage heat treatment, or "tempering" as it is frequently and incorrectly called. After heat treating, the alloy resists "fatigue", that is, it can be bent or subjected to stress repeatedly without breaking. It has been found that drill steel, for example, does not break as readily if it is used one day, and then allowed to "rest" a day; if used continually the total number of working days of its use is lower, and the failure is diagnosed as "fatigue". The beryllium-copper alloy also has good electrical conductivity, and other properties which make it valuable for flat and coil springs.

Other useful beryllium alloys are typically as follows: nickel with 2.5 percent beryllium; 18-carat gold (75 percent gold, 25 percent silver) with varying percentages of beryllium; and nickel-steel (36 percent nickel, with trade name Invar) with 1 percent of beryllium. Beryllium added to nickel makes an extremely strong, hard alloy; added to gold it makes a hard alloy; and in the case of nickel-steel beryllium makes a rustless and machinable alloy, yet, like Invar, it does not expand or contract like other alloys with changes of temperature.

These uses, and the possibilities that may develop from researches being conducted, have caused many people to place an inflated value on beryllium ores. No matter what the sales price, little can be sold if there is insufficient market for the material. Gold might still have a sale price of $35 an ounce in a desert, but to what end, if there were no buyers? It is a fact that more beryl (principal beryllium ore) is being offered for sale than can be consumed at present demand levels. The sales price ranges from $30 a ton at the mine to $50 a ton at the consuming plant, where sales are made.

The cost of converting beryllium ore to metal is not excessively high, as suitable methods have been developed and they are not inherently expensive. It is necessary to expend large sums upon research, educational campaigns, patents, and other expenses incident to the development of any new metal, and the burden of these expenses has had to be borne by a relatively small volume of actual sales.

Beryllium metal undoubtedly has a bright future, but quoted sales prices of $30-$50 a ton for the ore should not mislead the uninformed investor into becoming over-enthusiastic about the profits resulting from a beryllium deposit.

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The California Mining Journal reports that according to the Air Hygiene Foundation in Pittsburgh, a survey made in England indicates that stone masons who are clean shaven are commonly afflicted with silicosis; that those with mustaches suffer less, and that those with both beards and mustaches are commonly immune from this occupational disease, caused by silica dust.

This might serve as a basis for a facetious order by the Industrial Accident Commission.

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Ed Stovall, address Grave Creek, Oregon, has 500 feet of 11" hydraulic pipe and one No. 2 Hoskins type giant without deflector, which he will sell for a price of $75 cash.

The equipment is near the road and can be got out easily.

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RE-SURFACING GOLD DREDGE MODEL COMPLETED

A working, scale model of a new gold dredge that, it is claimed, will not destroy farming land nor create unsightly piles of tailing gravel has been completed by Harry England, Oregon dredge operator at Prairie City. The completed all steel, 6-foot model of the radically new type "boat" will, if successful, re-surface the ground that has been dug by putting the boulders and coarse material on the bottom and fines and silt in levelled-off fashion on the surface.

The finished model was examined in Prairie City last week by Earl K. Nixon, director, and John Eliot Allen, field geologist, of the State Department of Geology and Mineral Industries. "It looks as if England 'has something' here," Nixon commented. "Of course, there will be bugs to work out, but I believe both the design and basic idea are essentially sound. . . and if so, this new development may have a far-reaching effect on dredge practice, not only in Oregon and California but wherever dredges are used to recover mineral wealth."

England, operating a drag-line dredge near Prairie City, is a pioneer in the design of the common type of gold dredges, his experience dating from the birth of "doodlebugs", or drag-line dredges, near Oroville, California, about seven years ago. The present new model, a drag-line type, could be adapted to standard bucket line operation without impairment of its most desirable feature - re-surfacing.

New and unique features of the present design are: placement of the gold-saving apparatus above the screen so that the fine tailings will run out by gravity to a point some distance behind the boat; elimination of the stacker completely, with dumping of the boulders and oversize from the end of the screen directly into the pond where they form a dam to prevent the fines crowding under the boat; pumping of the fines from the sump under the screen, up to the recovery apparatus, and lowering by $7\frac{1}{2}$ feet the height to which all gravel as dug must be hoisted into the hopper.

It appears that the lowering of the screen and hopper by several feet will materially reduce the power consumption of the digging shovel, and also speed up the digging, thus increasing the capacity of the boat. Several innovations are incorporated in England's design. The screen, instead of being inclined, is horizontal and the passage of the oversize through the length of the screen is accomplished by a spiral flange welded to the inside of the screen. By using a sand pump to elevate the fines from the screen to the tables above, plenty of head room is available for rougher, cleaner, scavenger jigs, and amalgamator. Overflow devices are provided so that if any or all jigs plug, the gold-bearing fines are returned to the sump and back into the circuit where they cannot get away without going over the riffles. The main pump for supplying water to screen jets is submerged in a compartment in the hull where it is always in prime and requires no suction. There is practically no plumbing on the boat, as the supports and braces of the superstructure are hollow, being made of welded angle iron, and serve as piping. A by-pass in the tailings sluices permits the operator to control the amount of fines that are returned to the top of the tailings pile or to the pond.

Most important, of course, is the fact that England's dredge is designed to put the boulders and coarse rock back into the bottom of the tailings piles and the fines on top where little or no leveling should be required. The designer believes that, by proper control of the sluice by-pass, the land behind the dredge can be "made to order" by adjusting the deposition of the finer material. He believes also that by reversing the order of deposition, namely, placing the boulders and coarse material on bottom and the finer gravel and silt above, that the swell of the ground - the height of the tailings piles will be considerably reduced.

It is the designer's belief that the cost of operating a re-surfacing dredge of his new design will compare favorably with the cost of present types of operations.

England has taken steps to protect his design and process against copy.

Nixon stated that, although about 90% of the dredge land in Oregon is either waste or marginal land, a re-surfacing dredge would be a desirable development, especially in certain places in California and in certain parts of the John Day valley in Oregon. In the latter place, he stated, some of the land raises good stock feed and there is some basis for objection to dredging without reseiling; but, on the whole, he continued, dredging is opposed by a relatively few persons who are not well-informed concerning the economics involved, such as land values, financial benefits to the State of Oregon and local communities derived from dredge operations, and the very small percentage of farm land which may be comsidered as potential dredging ground. In this connection, Nixon said, the State Department of Geology and Mineral Industries has for several months been accumulating data and making a study of dredging economics in relation to land values with the idea of issuing a report dealing with the economic feasibility of re-surfacing where certain unusual conditions obtain.

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BORON AND FARM CROPS.

The use of boron in western Oregon soils and the necessity for its presence in order to produce certain crops successfully are subjects treated in two circulars recently issued by the Agricultural Experiment Station, Oregon State Agricultural College, Wm. A. Schoenfeld, Director.

Boron has been found essential to the nutrition of certain plants, notably alfalfa, celery, and beets. Its use in connection with various other crops is being studied. In these circulars recommendations are made and definite directions given for the application of boron to soils.

In Oregon boron in the form of borax is found in considerable quantities in the marsh deposits near Alvord Lake in Harney County. During the latter part of the last century and early in the present one a considerable industry in borax production was built up, but competition from the more favorably situated California deposits caused abandonment of the enterprise. A company called the Rose Valley Borax Company produced at the rate of about 400 tons of refined borax yearly. The finished product was hauled 130 miles by mules to the shipping point at Winnemuca, Nevada.

The deposit was described in U.S.G.S. Mineral Resources for 1901, as occurring in a ground layer several inches thick and consisting of sodium borate, sodium carbonate, sodium sulphate, and sodium chloride, together with small amounts of other salts. The boric acid content of the crude material is reported to be from 5 to 20 percent.

The Department of Geology and Mineral Industries is planning an economic survey of the occurrences of salines in southeastern Oregon. Such a study would include the economics of supply, manufacture, and markets of the various commercial products which could be made from these deposits.

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STRATEGIC MINERALS LEGISLATION

Communications just received from Washington, D.C., indicate that the strategic minerals bill now in Congress will be passed this session. It was thought originally that the total appropriation would be $40,000,000, but we learned that the conferees representing both House and Senate have agreed on the sum of $100,000,000, and that they have also agreed that the final bill shall contemplate purchases for stock piling of strategic minerals under the terms of the "Buy American" Act of 1933.

It is understood that a substantial allotment of the total appropriation will be made to the Federal agencies - the U.S.G.S. and the U.S. Bureau of Mines - for field investigation and process study of domestic strategic minerals. We also understand that if these allotments are received, that certain projects involving chromite investigation are slated for Oregon. This is indeed good news.

It seems proper to suggest that readers of the Ore.-Bin who are earnestly desirous of increasing or encouraging Oregon mineral industries, may do the state a good by writing to our Congressmen in Washington directly and asking them to lend their influence in seeing that substantial allotments out of the strategic mineral appropriation be made to the U. S. Geological Survey and the U. S. Bureau of Mines for their investigations.

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COAL SAMPLING PROGRESS.

The sampling of the more important Oregon coals by the U.S. Bureau of Mines engineers in cooperation with this Department is progressing nicely. The Coos Bay, Medford, Salem, Wilhoit Springs, Columbia county, and Morrow county areas have been visited so far. In some cases it has been impossible to take samples because the coal has not yet been properly opened up. Arrangements are being made for opening up the veins in these places so that later the coal can be properly sampled in the occurrences with the standard practice of the U.S. Bureau of Mines.

Dr. H. F. Yancey, Supervising Engineer of the Northwest Experiment Station of the Bureau of Mines at Seattle, spent a week recently with Earl K. Nixon,

going over the coal districts in Oregon and checking the samples being taken. Preliminary results in the way of analyses of the samples taken are beginning to reach the Portland office; the final results, however, will not be available for some time.

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CRESCENT CITY HARBOR IMPROVEMENT

On May 10th Director Nixon was present at a hearing of the U. S. Army Engineers in Crescent City, California, in connection with the proposed harbor improvement. Nixon gave evidence in support of the harbor plan as it might affect and favor the future of the mining industry in southwest Oregon. Heretofore, the lack of an adequate harbor at Crescent City has caused the Interstate Commerce Commission to object to approving a permit for the completion of the railroad from Grants Pass to Crescent City, and the lack of the railroad has been a drawback to the justification for harbor improvements.

It now appears that the Army Engineers are taking the lead in bringing about the harbor improvement. As present planned, a small but secure harbor of 20-feet minimum depth will be provided at Crescent City. No objection was expressed at the hearing to the plan as contemplated at present.

The completion of the harbor plan and the railroad from Grants Pass to Crescent City would be of very substantial value to the mining and mineral industry in southwestern Oregon and northern California. This is the essence of Nixon's testimony at the hearing. In addition to the testimony, a formal brief giving favorable facts, figures and estimates, was forwarded to Colonel Dorst, who was in charge of the hearing.

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A man in Portland has an assortment of engineering instruments and assaying equipment which he is willing to sell at a sacrifice price. Among other items are: a large bullion balance; a light mountain transit, English make; a Short & Mason aneroid, 8000 ft., new; a Troemmer, no. 3, button balance; another Troemmer button balance, needing some repairs; a Becker pulp balance; a light mountain transit,made by Leupold and Volpel, new; a Cooke F 4.5 camera lens in barrel; a prism compass with swivel head; hand crusher; steel tape; et cetera.

Anyone interested in purchasing this entire lot will be referred to the owner if they communicate with this office.

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NEW BULLETIN ANNOUNCED

Announcement is made of the publication of the following bulletin by the State Department of Geology and Mineral Industries:

Oregon Metal Mines Handbook: Northeastern Oregon, East Half. Bulletin 14-A.: by the Staff. 125 pp. with map of the area. Price 50 cents.

This is the first of five parts to be issued of the Oregon Mines Handbook, or so-called Mines Catalog. Other bulletins will include 14-B to E inclusive, and will cover Southwestern Oregon; Northeastern Oregon, West Half; Northwestern Oregon; and Central and Southeastern Oregon. The present handbook carries a geological introduction pertaining to the state as a whole, a chapter on the metals, and a bibliography. Then each district in the area covered by the bulletin is taken up,and various mines within the district are described.

Inasmuch as no mines handbook for Oregon has been issued since 1916, this publication should fill a long-felt need. Engineers and mining men are continually inquiring for up to date information regarding the various mines and mining properties in the district in question, which would cover the Baker territory.

Copies of this Bulletin may be obtained by addressing the headoffice of the Department in Portland, or either of the State Laboratories, in Grants Pass or Baker.

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U. S. BUREAU OF MINES WORKING IN CENTRAL OREGON.

Mr. O. H. Metzger, mining engineer of the U. S. Bureau of Mines, has been making examinations for the past several weeks of a number of chrome properties in the area south of Canyon City in Grant county. The purpose of Mr. Metzger's work, we understand, is to get definite figures on available tonnages of chromite. The extent of the work to be done and exploration to be carried out by the Bureau under Mr. Metzger's direction has not been announced, but it is understood that some of the properties may be reopened and some drainage and test pitting may be done, with the idea of ascertaining the continuity of ore bodies and their geology. It is even hinted that some diamond drilling may be done to determine conditions at depth. It is not understood that the Federal government is intending to purchase any ore from property owners, but rather to do the work for the determination of tonnages which may be available. Presumably tests will be carried out by the U.S.Bureau of Mines to determine whether or not some of these ores can be concentrated, and whether the leaner ores are amenable to reduction by some of the more recently developed metallurgical methods.

No announcement by the Bureau of Mines of their plans or intentions has been made, so far as we know, and the above is not to be construed as an announcement, but merely as our impression of what the Bureau is doing in the area.

Needless to say, this Department is tremendously pleased to know that the Federal Bureau is interested in chromite in this state, and has offered to cooperate in the work in every possible way.

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STATE GEOLOGICAL SURVEY PLANS.

Ford Young, a geologist, and Herbert Harper, a plane-table man, have been working for the last three weeks in the area southwest of Prineville, doing preliminary geologic work ahead of the regular summer geological field parties.

Two parties, one under John Eliot Allen, field geologist of this Department, and one under Dr. W. A. Wilkinson, geologist of Oregon State College, with both parties under charge of Dr. Wilkinson, will start work July 12th or 13th in the quicksilver area southeast of Prineville. The area to be covered is called the Post Quadrangle, which is south of the Mitchell and west of the Dayville, and covers territory about 20 miles wide east and west, by 33 to 34 miles north and south. A number of quicksilver mines and prospects are included in this district and it will be studied in some detail during the course of the work.

Eight or nine men will be employed on this work for at least a month, after which the crew may be diminished, and the leaders may carry on for a short time to clean up tag ends.

Dr. Wilkinson has been in charge of field work in the Dayville and Supplee districts for a number of years and his familiarity with the area makes him the logical geologist to direct the work.

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A.I.M.E. TRIP TO BAKER.

A group of members of the American Institute of Mining & Metallurgical Engineers left Portland Friday noon, June 30th and drove to Corvallis, Eugene and Prineville, and stayed all night at Prineville, on their way to the dredge areas of Grant county. Saturday, July 1st, the group, further augmented by other engineers and geologists, drove to John Day, visiting the dredges of Ferris and Marchbank and the Western Dredge Co. That night was spent at the John Day Hotel, and the group left early Sunday morning for Granite. There the party inspected the dredge of Porter Brothers, had lunch, and drove on to Sumpter, where they saw the dragline operation of Mr. Nutting and visited the big standard dredge of the Sumpter Valley Dredging Co.

Sunday evening the group, now numbering about thirty, were the guests of the Baker Chamber of Commerce and the Baker Miner's Jubilee officials at a banquet at the Baker Hotel. Later in the evening the formal meeting of the members of the AIME took place in one of the chambers.

Monday morning, July 3rd, a group of engineers and geologists from among the members made a trip to the Cornucopia Mine as guests of Mr. Leverett Davis, General Manager, and A.V. Quine, Superintendent, of the Cornucopia Mines Corporation. This trip through the Cornucopia, the largest mine operation in the

state and also the largest underground mine, was an especial treat to the group. Following this, the members returned to their homes (in Portland or elsewhere).

All in all, the trip was described by the various persons making the journey as a very pleasant experience and quite instructive. At Baker especially, the group appreciated the friendly hospitality of the Baker Chamber of Commerce and the officials of the Miner's Jubilee.

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PIONEER OREGON INDUSTRY.

One of the very first of Oregon's industries was the production of salt from salt springs, and the following description of the enterprise is taken from Mineral Resources of the United States, published in 1868.

"The Willamette Salt Works are located about 13 miles from Portland, half way between that city and St. Helens, and half a mile from the banks of the Willamette Slough. A range of low hills at this locality extends nearly east and west for about 20 miles, at the base of which are the salt springs. From one of them the brine used by the works is obtained. By means of a single furnace this spring yielded from 600 to 700 pounds of salt daily when the works were commenced; but for several months past it has yielded 4,000 pounds per day.

"This salt is pure and white. Samples of it analyzed by Professor W. P. Blake were found to be free from lime and magnesia, making it peculiarly adapted for use in preparing butter, fish and meats.

"Mr. Blake took samples to the Paris exhibition, where it was admired for its crystallization, purity and color.

"Springs in Jackson county produce about 10,000 pounds annually of a similar quality of salt.

"Beds of rock salt are reported to exist near the base of Mount Jefferson, in the Cascade range of mountains."

Incidentally, this 1868 report was the second of its kind published by the Federal Government. In 1866 J. Ross Browne was appointed special commissioner to collect statistical information concerning mines of the west and the first report published was in 1867.

There is little definite information on the exact location of these wells or deposits. If anyone has this information, it would be extremely valuable to the Department.

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TOPOGRAPHIC MAPS.

The United States Geological Survey announces the publication, without revision, of the Albany and Sumpter topographic maps. These areas were surveyed many years ago and the printed edition has been out of print for some time. Announcement is also made of the Hood River plan and profile, consisting of two plan sheets and two profile sheets.

Copies may be obtained from the many stores retailing these maps to the public or may be secured directly from the United States Geological Survey. The Albany and Sumpter quads are 10¢ each, and the set of four sheets for Hood River is 40¢.

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CANADA'S GREAT RADIUM MINE. [1]

Salient features of the unique operation on Great Bear Lake, near the Arctic Circle, Northwest Territories, where high grade silver-bearing pitchblende is being mined, are given below.

Mining rate is 125 tons a day.

The ore is concentrated by hand sorting and flotation.

40 tons of mine ore make 1 ton of pitchblende concentrate, which is shipped to Port Hope, Ontario, for refining.

In summer the concentrate is moved out by water via Mackenzie river, Great Slave Lake, Lake Athabasca, and connecting rivers. In winter concentrate is shipped by air.

At Port Hope 10 tons of concentrate produce 1 gram of radium, about 10,000 oz. of silver, and 7,800 lbs. of uranium, marketed as uranium oxide and sodium uranate. By-products are radio active lead (valued as a source of radium D), polonium[2], copper, and cobalt.

In 1937, recoveries of about 90% of both uranium and radium, and 96% of silver, were made. Total production has been about $850,000.

Ore reserves are now valued at about $15,000,000 and are adequate for about 15 years. It is believed by the operators that this is only a fraction of the ore which can be mined from the property.

Radium refined in Canada,	1923	3,021 milligrams
"	1937	23,770 "

(1) Abstracted from U.S.Bureau of Mines Mineral Trade Notes, May 20, 1939.
(2) Polonium (Radium F) radio active element discovered by M. and Mme. Curie in pitchblende - named from Curie's birthplace, Poland.

UTILIZATION OF LIGNITE COAL
BENEFIT TO OREGON INDUSTRIES FORESEEN.

Oregon, in common with other Pacific Northwestern states, has quantities of coal that have difficulty in finding a market. Reasons are principally: heat (B.t.u.) values are not as high as desired, and ash content is high. A recent study indicates that coals of this type may have economical use.

The method suggested would use two raw materials that Oregon could supply readily. One is electricity, the other is lignitic and sub-bituminous coal. The process as described by H. Stevens to the Electrochemical Society consists of heating the coal by electricity to secure coke, gas, and oil. The charge is heated from within by electricity, otherwise the process is generally similar to that used in the old byproduct coke-oven operations. Advantages of the electric process is that: (1) construction and maintenance costs are lower; (2) coke with uniform burning qualities is produced; (3) the oil is of superior quality; (4) the process is particularly useful to off-peak electric power.

Bonneville generators can turn up more power than can be disposed of at present. Even when this power is utilized, it will be on the basis of peak loads and some utilization of off-peak power will be a decided advantage. Utilization of Oregon coal that has difficulty in finding a market will be possible, to produce by-products that should find a ready consumption.

It should be remembered that this process has just undergone the experimental stage, and undoubtedly there are many "bugs" that must be ironed out before it will function under varying conditions. However, it does hold hope of future utilization of some of our raw materials. The Oregon State Department of Geology & Mineral Industries, in cooperation with the U. S. Bureau of Mines, has already undertaken a study of the characteristics of Oregon coal so that data will be available for any agency that may wish to use this fuel.

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ROCKY MOUNTAIN SPOTTED FEVER

Rocky Mountain Spotted Fever is a disease caused by the bite of an infected tick. It was originally discovered in the northern Rocky Mountain area but since that time has spread so that it has been reported from 31 of the 48 states. Originally the death rate was as high as 85% of authentic cases. It has since been reduced to about 20%. Nevertheless, the disease is one to be feared, and the following suggestions are made to guide prospectors in its prevention.

The United States Health Service has prepared a vaccine which protects against the disease. This vaccine may be obtained through the local physicians, is usually administered in three shots - a week apart - and takes about a month to build up immunity. This immunity will last about a year and the treatment should be repeated each field season. Those who are unable to take advantage of the vaccine for any reason should be constantly on the alert for presence of these ticks. They do not transmit the infection until about from 2 to 8 hours after getting on the skin, andprompt removal will save one from infection. The body and clothing should be examined at 2 to 4 hour intervals and any ticks removed by the use of tweezers or a piece of paper. Do not remove the ticks with the bare fingers

as the fingers may become infected. Further protection consists of wearing clothing in such a way that ticks cannot get on the body. High-topped leather shoes with the trousers tucked inside is a good preventive. Ticks are especially apt to fasten themselves on the back of the neck and along the hair line and it is seldom that one feels the presence of the tick.

To summarize the situation, Rocky Mountain Spotted Fever is transmitted by the bite of infected ticks, not by any certain species of tick. Protection may be secured by means of vaccine or by prompt removal of ticks from the body or clothing. Careful examination of clothing should be made at 2 to 4 hour intervals. The ticks should be removed with tweezers and never with the bare hands.

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* *
* TO ALL EXCHANGE LIBRARIES *
* *
* Announcement is made of the release of Bulletin No. *
* 14-A, entitled, "Oregon Metal Mines Handbook, North-*
* eastern Oregon, East Half": by the Staff. Copies of*
* this bulletin will be mailed from this office on *
* July 12, 1939. If not received within 10 days from *
* the above date, advise this office immediately, *
* otherwise replacements for copies lost in the mail *
* or elsewhere cannot be made. *
* *

THE BOSS'S NUMBER OF THE ORE.-BIN

Note:

Ever notice that once in a while at any man's mine the lead mule kicks hell out of the trammer boss, or the track tender drops a Jim Crow on his foot, or the timber gang comes to work on the night shift soused to the ears, or the motorman forgets to duck a chute timber -- anyway, once in a while the boss of the outfit (who never does anything but look down the backs of employees' necks) has to don slicker and hard hat and really do a little work?

Well, this is the Boss's number and he hopes you'll like it. If you don't, remember it doesn't cost you a cockeyed cent, and (he says) it may be worth all it costs.

All right, send her down to the ninth level, and if the bloody rope breaks let's pray that the dogs catch.

WHAT'S NEW IN MINING.

by EKN.

When I was a kid 40 years ago, my mother said she would never really enjoy riding in a top buggy until it could be pulled by some kind of an engine - not by a tired horse - and could go a mile a minute. -- Said she expected to see it before she died, too. Dad and granddad and Uncle Fred and the rest said she was whacky, that it stood to reason you couldn't build any kind of a buggy that would stay together at 60 miles an hour, and further there wasn't a 40 rods of smooth, straight road in the country that you could drive that fast without turning end over applecart, and further you would kill all the chickens, cow brutes and old women in the country tearing 'round like that, not to mention scaring hell out of every farmer's team within a quarter mile of the road. That was in 1900.

Well inside of 20 years, mother rode comfortably at 60 miles an hour in the family "machine", but she didn't say "I told you so". She said, "it was inevitable. Man will always seek and find easier and cheaper and more logical ways of doing things. How I wish I were a little girl and could live the next hundred years. We little dream of what will happen." How truly she spoke.

Take mining . . . . Twenty years ago a miner with muck stick and wheel barrow would handle a few tons of ore in a shift . . three or four tons per man for the mining labor was pretty good; now any miner with half a chance,using a slusher or mechanical loader, will handle ten to twenty tons per shift, and the tons per man figure in average operations has been upped as much as 100 per cent.

Time was when we used a Cornish pump and a 30-foot column line and pump rod going all the way down the shaft, and the pump engine on the surface would just about fit inside a county courthouse; or we conveyed steam down the shaft to a set of steam pumps about a half block long to pump a thousand gallons per minute from a medium deep mine. Now we use 85% or 88% efficiency multi-stage electric pumps you could easily put in your bathroom and they kick out more water at a lot less cost than any of the slow-motion giants of forty years ago.

Time was, many years ago, when a 500-foot shaft was pretty deep and hoisting was slow because they thought that hoisting a cage much faster than a man could climb a ladder was mighty risky business. Now, ore and men are hoisted from shafts a mile deep in 3 or 4 minutes. I knew of a case in the anthracite field a few years ago where a top man kicked a car of coal off the cage, rang the cage down, then in some dizzy manner the shaft gate didn't come down and the top man walked into the open shaft. He fell 300 or 400 feet, landed on top of the cage and -- broke his leg! That is how fast the cage was going down.

As to handling material . . . the old time miner used a 1-ton car, and a glance at his punch-board at the shaft or portal told very close to how many tons he had mucked in a shift or a week. The old miner kicked out the catch in the front gate and up-ended the car of ore with a terrible bang against the back stop, the ore going directly into the skip, - or into the ore bin if he was tramming from an adit. Nowadays 4- and 5-ton cars with motor haulage are standard underground, 10-ton cars running on 80-pound rails are not uncommon, and in a few of the larger underground operations 20-ton air-dump cars on standard guage heavy railway track bring the ore out -- 'tons per day'.

In the open pit iron mines in Minnesota we used to rack our brains trying to figure some means of getting approach tracks into the ever-deepening pits. Now they bring the ore out on long conveyor belts and mine out the approach tracks.

Contractors in surface operations and quarries commonly use bulldozers, carryalls and Le Tourneaus that haul 10 or 12 cubic yards of material at a trip. In one large operation in Arizona they are using special trucks with huge pneumatic tires that haul 35 tons at a trip many hundred feet at a cost of a few cents per ton.

At Grand Coulee Dam they have been pumping more than 20,000 yards of concrete per day through a 14-inch pipe, a distance of more than 7,000 feet and lifting it 500 feet. It is an old story to move such materials as dry powders, wheat, lime, phosphate, cement aggregates, etc., through pipes from car or boat to bin or silos. Now, a certain company submits a proposal to elevate rock crushed to 3/4 inch, by their Airveyor system, up a 1,600 foot shaft, at the rate of 125 tons per hour, through a 12-inch pipe, using a vacuum at the collar of the shaft of less than 5 pounds per square inch - with no compressed air used at the bottom of the shaft. (E. L. Oliver of San Francisco is authority for the above).

What would that do to hoisting costs and methods? You'd put the crusher underground - not uncommonly done now - and shoot the product of the mine up through a pipe in the corner of the shaft or through a drill hole. Only a small shaft for men and supplies would be needed.

And shafts . . . they are now being sunk by diamond drill methods -- bored with a rotary type drill arrangement using steel shot for the cutting. A core $5\frac{1}{2}$ feet in diameter is brought out and no powder used in sinking. The speed of sinking is equal to that of the conventional manner of shaft sinking, or faster, and the cost of the order of $20 per foot. In normal ground, it is stated, no timbering is required, and in bad ground less timber is needed than is usually the case because of the shape of the shaft and no shaking up of the ground due to blasting while sinking.

Diamond drilling technique is being constantly improved and the costs lessened. Twenty years ago you could tell from the sound of a drill a block off whether it was in hard rock or not. The bit normally turned over a couple of hundred times a minute and when hard rock was hit the drill would slow down and groan as the driller fed it pressure. A setter would set a couple of 8-stone bits in a shift using several carats of black diamonds worth $150-$200 per carat. Nowadays the bit turns over several hundred times per minute, takes a tiny rock "shaving" off each turn, instead of a real bite, and gets more footage at less cost. The bit now is probably set by machinery with a few dollars' worth of bortz and if a piece of it turns out of the bit the rest goes to powder and up the casing; formerly, if a diamond twisted out of the bit was apt to wreck the rest of the bit, and both driller and setter wondered if they would be hunting a new job.

Oil drilling technique has changed and been improved probably more than any other type of operation employed in mineral extraction. Twenty-five years ago in the mid-continent field, a 3,000 foot oil well was considered as a deep hole. Practically all deep drilling was then done with cable tools. A heavy drill bit and shank weighing a couple of tons were lowered into the hole on the end of a long cable. The drill was "jobbed" up and down until the hole was deepened a few feet, then the bit was hoisted out and the hole cleaned with a dart-bottomed bailer. Nowadays the rotary drill with a fish-tail or a rock bit, fastened on the end of a string of hollow "rods", bores down through rock and shale like a carpenter's bit goes through pine. Heavy (or light) mud is pumped down through the rods, out through a hole in the bit and back up the hole on the outside of the rods, thus keeping the hole from caving until the casing is lowered. A few months ago a hole was completed in California at a depth of 15,004 feet - the greatest depth below the surface of the earth ever penetrated by an instrument of man - and we are told that it may be possible and desirable to go even deeper. In such deep drilling the driller is guided in his various actions by a series of delicate and clever gauges that tell him at all times what is going on in the hole and what his tools are accomplishing. What above all that has made deep drilling possible is the advanced technique in manufacturing special alloy steels for making up drill rods, casing, and cables that must carry such tremendous strains.

Rock drilling ... When we see a miner or prospector take a hand drill and single jack and start drilling a hole "the hard way" we are reminded that he is doing almost precisely what the Grecians were doing 500 years before Christ. Of course, we now have air drills or jack hammers, but if you will consider the cost of electricity you buy to run a motor, to turn a belt, to turn a compressor, to force air several hundred feet through an iron pipe, to actuate the inefficient mechanism of an air drill, to hit one end of a piece of drill steel, to hit a very few hundred licks per minute against a hard rock . . . you will probably fail to see more than a few per cent of efficiency in the entire process, yet it is the best we have today.

But . . . we are told about the latest idea for drilling - the use of vibrations of supersonic frequency (6,000 to 10,000 per second) having an amplitude of about 1/16 of an inch at the cutting face. These vibrations would be created by vacuum tube rectifiers and transmitted to the special drilling device, presumably, by rubber-covered lamp cord. It wouldn't be necessary to have a compressor on surface and an air line down the shaft and out to the face.

Enough work has been done on this idea so that it seems reasonable to predict that something revolutionary will come of it in the not too distant future.

Then, there are extremely hard special steel alloys which are beginning to be manufactured. Tungsten carbide is one of them. I heard an engineer recently tell about seeing a 2-inch diameter hole drilled through one inch of hard glass in three minutes with no dulling of the steel bit.

Some day I expect to see a miner drill a 10- or 12-hole round in a breast of hard rock in 30 minutes. Sounds crazy, doesn't it? But how did your radio work in 1918? (You didn't have one).

How about blasting? . . . When you and I were kids and we went hunting rabbits with the old muzzle loading "zulu", we poured 3 or 4 drams of black powder down the hole, rammed down some paper, spit half a mouthful of soft shot in, rammed down some more of the weekly paper, put a cap on the firing tube, drew a bead on the bunny, and WHAM! Pretty soon the smoke cleared away and we looked out to see what had happened.

That is about what we do underground now. Our powder has plenty of kick but the powder smoke doesn't improve the underground ventilation a bit. And then, caps, either electric or regular, are tricky to handle and fuse may burn a foot a minute as it is supposed to, or, rarely, the fire may "run" in the fuse and the blast may "follow you out" of the drift. Who knows what we will be using for blasting one of these days? Liquid oxygen is being used somewhat and has a number of advantages. Of course it would improve underground ventilation in any mine. Its cost is being reduced so that it, or some other similar product, may come into common use in mining one of these times.

Now, as to prospecting . . . . nothing will ever take the place completely of the old sourdough prospector, especially in the out of the way places or new mining areas (if any). More power to him. However, in the last twenty years the smart lads with shiny leather boots, slide rules, formulae and electrical gadgets are really going places in finding concealed orebodies and oilfields. As a youngster in school I was a plane table pusher and rodman "geologist" for a season with a well known consulting oil geologist. I belonged to a clique of fellows each of whom thought he was a pretty smart oil geologist if he could stay on one limestone member all day over several square miles of broken country. Now, with some instruction I could probably just about keep notes for a modern petroleum geologist operating a seismograph or magnetometer, but I couldn't begin to interpret the notes. It takes a schooled geophysicist and mathmetician for that. On visiting the field camp of a well known oil company in the interior of South America a few years ago I found that they had imported two Russian geophysicists, who spoke very little English, and an "Einstein" mathematician from England (whose English I could understand littler better than the Russians') to interpret seismograph results in an undrilled area.

In the last few years engineers are following deeply-concealed fault breaks, the extensions of dikes and orebodies, contacts between rocks of different kind, concealed salt domes, deeply buried intrusive masses, and they can calculate often with a fair degree of accuracy the depth to bedrock, and the depth and courses of concealed gravel channels -- all by electrical means. This geophysical work is rather expensive at present, so it can only be carried on by the larger mining and oil companies. It is becoming less expensive,

as time goes on, and as methods are better perfected.

Let us not forget that airplane mapping and geological reconnaissance are becoming extremely important in mining and mineral investigation. Air reconnaissance has done wonders in Canada and in South Africa in the more inaccessible regions. Topographic mapping by air is slowly replacing the standard method of ground mapping by plane table. In many cases it is much cheaper and in some cases more accurate in detail than ground methods.

And lastly, metallurgy . . . . Forty years ago chlorination of gold ores was quite a process. It recovered the metal from ores which refused to give up their values by amalgamation. Cyanidation was just coming in and great things were expected of it. A few years later, some one - allegedly the wife of a miner - while washing her husband's pants discovered in some manner the particles of sulphide were - or seemed to be - held in the soapy froth in the washtub. That was the start of flotation. It became possible to separate sulphides from siliceous gangue by the new method of flotation. Within the last fifteen years new re-agents and new types of machines have made it possible for flotation experts not only to separate ordinary sulphides from siliceous gangue, but to "drop" or "select" any given desired or undesired sulphide, thus separating various sulphides which occur in a given ore. There are also "floating" oxidized ores and non-metallics, and a host of things which no one suspected in the beginning could be separated by flotation or any other means. Recently, a keen metallurgist has been able by the flotation process to take the ink out of certain types of waste newspaper so that the material could be used over again. Especially in the cement industry in the east, limestone is being treated by flotation to eliminate the silica and other undesirable ingredients.

This Department has recently concluded the first of a series of experiments on flotation of medium grade limestone of the Willamette Valley in the hope of raising the grade, so the rock may be used for agricultural fertilizer. Considerable encouragement has been met with in this work so far.

It has been found that magnetic separation is adaptable to the treatment of various types of ores and materials which were not supposed to be magnetic. It has been found that almost all metallic minerals have a degree of inherent magnetism, most of them very slight as compared with magnetite, of course. Some of them, however, are sufficiently magnetic to permit of satisfactory separation with the more recently developed magnetic separation machines.

Electrostatic separation, which differs considerably from magnetic separation, has come into a special use in a wide range of both metallic and non-metallic minerals. The operation is relatively cheap. The practice was described in a previous number of the Ore.-Bin and will not be repeated here.

The "sink-and-float" method of separation announced last year by the Dupont Company has commercial possibilities in the treatment of certain ores, or for the reduction of cost of some of the common methods of mineral separation. This practice, too, was covered in a recent issue of the Ore.-Bin.

The U.S. Bureau of Mines has practically perfected a method of depositing metallic manganese electrolytically. This appears to have very definite commercial value, especially in connection with replacing ferro-manganese,

which is widely used in blast furnace practice, and in the manufacture of ferro-alloys. It appears that there is hope of adapting this same practice to the deposition of other metals such as chromium and magnesium, and making a commercially economic process of it. A research chemist is now working in this state on a process of extracting chromium from the low grade chromite ores in Oregon. Up to this time chromium has been very difficult to get into solution, but the chemist referred to is making some progress. Another chemist at a different laboratory is working on the preparation of the commercial manufacture of anhydrous aluminum chloride from the high alumina clays in Oregon. Preliminary work has been completed and a pilot plant is now being built. Anhydrous aluminum chloride is a standard commodity and has some market demand at the present time. To make metallic aluminum from this product requires electrolytic methods which would suit the facilities present in Oregon to a T. Another group in a laboratory in Oregon is setting up to make a series of products from the complex sulphide ores of this state. Some progress has been made and new data are being obtained, in regard to the chemical reactions that take place in a high temperature combustion chamber.

The most revolutionary metallurgical process which has appeared on the horizon is that of minerals separation employing supersonics or high frequency electrical impulses referred to above under the head of rock drilling. Much work has been done on this new practice in the last few years and there has been encouragement from results obtained in the laboratory. A plant is now being built in Utah for the separation of oil from shale, using this high frequency adaptation, and it appears that former costs of extraction may be tremendously reduced. The process itself may be described as effecting a sort of atomic or molecular dissociation of the material being treated. After this dissociation, the elements themselves have a tendency to segregate in such a fashion as to permit of collecting the various elemental substances. If the process can be worked out to apply generally to mineral separation, it will be so revolutionary in nature and presumably so cheap as compared with other methods that mineral-bearing rock not formerly classed as ore because of being so low grade may be treated commercially. That will mean that those who shout and cry about the exhaustion of mineral deposits will be extremely comforted. As a matter of fact, I heard a nationally famous technician state recently that he expected to see within a couple of decades basic igneous rock of the gabbro or diabase variety being used as an ore to produce such contained elements as iron, magnesium, platinum, chromite, lead, zinc, etc., which the rock contains in infinitesimally small quantities.

The spectroscope is coming into greater use yearly as an aid or tool in geological and mineralogical studies. It is being used in mineral separation also and as a guide in assaying. The accuracy of its determinations is being increased from year to year by the manufacturers who are able to make the extremely delicate grids with greater precision.

In summary, the business of mining and metallurgy is changing and improving rapidly from year to year. Costs are being lowered, new processes are being developed, and new materials are being found which greatly ease the manner of life of many of us who do not realize the thought and effort consumed in working out these various processes. The trend is distinctly toward more technical and more complicated methods of attack. Specialized knowledge is required, and the old luck element in mining is being eliminated rapidly, since, with all of the new practices

and methods of analyzing conditions in any mine or on any property, the more easily and accurately can the ultimate answer to the commercial aspect be obtained.

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REED COLLEGE SPEAKER.

Mineral resources of the Pacific Northwest were discussed in a talk by Ray C. Treasher, geologist of the State Department of Geology and Mineral Industries, before the Institute of Northwest Affairs at Reed College on July 13.

Getting away from merely cataloging the various mineral occurrences, Mr. Treasher approached the subject from two allied points of view - (1) the use of power, and (2) the importance of the area in occurrences of so-called strategic minerals. The need for low power rates was stressed as essential in order to attract electro-metallurgical industries, and the availability of essential minerals for such industries was discussed.

A skeleton list of some of the principal metals and ferro-alloys peculiarly adapted to electric furnace manufacture was given by the speaker together with northwest occurrences of those metals so used. An analysis of the availability and application of such essential minerals as ores of aluminum, magnesium, mercury, nickel, manganese, chromium, and tungsten was made.

Mr. Treasher spoke of the importance of coal, silica, refractories, limestone, diatomite, salines, and especially clay occurrences in Oregon and Washington, as well as the vast resources of phosphate rock in Idaho.

The Institute of Northwest Affairs in this its second annual session held at Reed College from July 10th to July 21st covered a very broad field of subjects intimately connected with Oregon's present and future. Each subject was treated by the best informed speaker available.

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SILVER.

The new monetary bill which became a law July 6th provides that the U.S. Treasury shall receive domestic silver mined on or after July 1, 1939, for coinage into dollars at the rate of $1.29292 per ounce, retaining 45% as seigniorage charge for governmental services relative to handling and coinage and returning the balance to the owner or depositor of the silver. Thus 55% of $1.29292 or 71.11¢ per ounce is returned to the owner.

Under the previous law domestic silver had to be tendered to the mint prior to July 1st. The new law applies only to silver mined on or after July 1, but provides that the President's power under the old law of fixing the price shall apply to the silver mined prior to July 1 but not delivered to the mint before that date. For silver of this category a price of 64.64¢ per ounce has been fixed by the President.

The new law makes 71.11¢ per ounce equivalent to a statutory price for domestic silver mined on or after July 1. There is no time limit; the price continues indefinitely and is subject to change only by Congressional action.

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Congress passed, and the President approved, House Resolution 6977, the effect of which is to set ahead the deadline for assessment work from noon of July 1st, 1939, to noon of September 1st, 1939. The law as passed affects the doing of work for this season only.

This legislation means that in order to retain possession of governmental land held by location until noon of July 1st, 1940, assessment work if not completed must be started before noon of September 1st of this year, and prosecuted with reasonable diligence until $100 worth of labor has been performed, or improvements made equivalent to that amount on each claim or fraction of a claim so held.

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NOTICE

Demands for this monthly publication have been so great that the facilities of the Department for issuing it are beginning to be sorely taxed. We are also beginning to feel the pinch of the cost of postage involved in sending out nearly a thousand of these each month.

In the interest of economy and with the idea that there may be a goodly number who receive this and who may not be particularly interested, we are asking that each of you drop us a penny postal card and state your desire to keep on receiving this publication.

This notice will be carried for two months and those who have not indicated their interest in the publication or their wish to be kept on the list will be dropped after the September issue.

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SILICEOUS ORES WANTED.

The Department has just received a communication from the American Smelting and Refining Company, with smelters at Tacoma, Washington, and Selby, California, indicating that the A.S.& R. is desirous of obtaining for their Tacoma plant a series of shipments of siliceous ore. They are anxious to know if there is present an ore reserve of this type of material, and mentioned 200,000 to 300,000 tons, which would assure a supply for a considerable period of time.

Most shipments of ores and concentrates from Oregon mines are of basic type, containing a high percentage of sulphide. A considerable amount of silica must be used in the smelter burdens and this can be either in the form of raw silica added at the smelter, or in the form of siliceous or quartz-bearing high grade ores or concentrates. As flotation concentrates are altogether of sulphide content or basic nature, the smelting company desires shipments of direct shipping ore containing considerable quartz, and the communication states that to get this silica the company might make a concession in smelter charges to the shipper. They might even take over and operate a property which suited their needs.

There may be properties in this state which would normally produce ore of marginal grade,and thus could not be operated at a profit, but which, if some concessions were made in smelting charges, could be developed and operated at a profit. It is this type of property which should receive attention in the light of the above desire for siliceous direct shipping ore.

MINERAL WORLD.

A new publication devoted to mining in the West made its appearance with its July 1939 issue. Its title is "Mining World". It is published monthly by Miller Freeman Publications, with Portland address at 1220 Southwest Morrison Street. The company maintains other offices at Seattle, Los Angeles and San Francisco. The "World" is printed on good paper, in clear type, carries a large number of cuts illustrative of mining and metallurgical activities, pertinent articles of interest to mining people and mining news of the western states. The August issue carried forty pages of material, and among others a record of the recent A.I.M.E. meeting in San Francisco, an article entitled "The Problems of Mining", another by E. L. Oliver of San Francisco on new engineering developments, one by Herbert Hoover on "The Engineer and Unemployment", an article on Phelps Dodge, another on Alaska Juneau, and an excellent write-up on Oregon dredging.

The new publication seems to be well balanced, and has our compliments and best wishes.

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SHORTITE.

A NEW MINERAL.

The following item is reprinted from "The Mining Journal" of July 15, 1939:

A new mineral, officially named shortite, was announced by the Geological Survey, United States Department of the Interior. The new mineral is composed of a double carbonate of sodium and calcium and was found and identified by J. J. Fahey, chemist, in the geological survey laboratory. It was discovered as disseminated, well formed crystals in sections of core from the John Hay oil and gas well, drilled by the Mountain Fuel Supply Company on leased government land in Sweetwater county, Wyoming, at depths of 1,250 and 1,800 feet. Shortite was so named in honor of Dr. M. N. Short, a former geologist of the survey, who is now professor of optical mineralogy at the University of Arizona.

If the new mineral should ever be found in sufficient quantities, geological survey officials say it might be adapted to use in glassmaking and ceramics work. Additional samples for further laboratory examination will be collected. The department reports that this find will probably be one of the few mineral discoveries for the year. The earth has been searched so thoroughly that during the past two years only about twenty new minerals were discovered in the entire world. A full technical description of the new mineral will be published in "The American Mineralogist."

U. S. BUREAU OF MINES ESTABLISHES NEW STATION.

The U. S. Bureau of Mines has established an experiment station at Pullman, Washington, in connection with the College of Mines, Washington State College. The station is in charge of Mr. Henry A. Doerner. A temporary station has been established at Pullman for several years, dealing principally with experiments on the production of metallic magnesium from Stevens County magnesite ores. It is understood that work will be continued on this project and on other projects requiring electro-metallurgical solution.

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A CORRECTION.

In the last issue of the Ore.-Bin, in the paragraph where mention was made of the Cornish pump, some old-timers who read this blurb may have wondered what the writer meant by a "thirty-foot column line and pump rod going all the way down the shaft." That would have been SOME Cornish pump. Obviously, it should have been thirty-inch column line, which is a pretty good sized pump column at that. Most of them were somewhat smaller. Someone has written - we cannot recall where - a story of the Cornish pump as developed in Cornwall, and it is well worth reading.

We may take pardonable pride in acknowledging receipt of a surprising number of kindly comments on the last issue of the Ore.-Bin. . . . . but isn't it just as well to get away now and then from the commonplace, stereotyped method of doing things, and express ourselves humanly and intimately, perhaps even breezily, rather than in the cut-and-dried manner of the news reporter?

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WASHINGTON FLOOD CONTROL.

The U. S. Engineering Department, Bonneville District, is preparing plans for the Walla Walla flood control project. Main items are a $900,000 earth-fill dam and $100,000 for intake canal construction.

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INTERESTING LIMESTONE DEPOSIT.

We know of a deposit of limestone and travertine in eastern Oregon which would deserve serious consideration by any group or individual desiring to go into the fertilizer business with a relatively small amount of money. The deposit is well located within reasonable reach of a large area of farming, which usually makes use of this type of material, and should be worthy of serious consideration. The rock is high grade stuff and can be handled by open pit methods, starting in with a small power shovel.

Anyone interested may obtain details by writing to this office. We shall be pleased to put inquirers in communication with the owners of the property.

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USE OF SODA ASH INSTEAD OF MANGANESE.

(Digested from Mineral Trade Notes, volume 9, no. 2, August 19, 1939).

Germany's mineral resources and reserves are a matter of considerable concern as a result of the recent military activity in Europe. Iron and steel are the inanimate sinews of war.

Among the various problems of reducing iron ore to pig iron, that of eliminating sulphur is of considerable importance. Manganese is frequently used as a desulphurizing agent. Introduction of newly developed smelting processes in Germany permits the use of soda ash for the desulphurizing pig iron. It is reported that Germany's annual consumption of soda ash for this purpose already amounts to approximately 80,000 metric tons. This process makes possible the more economic use of domestic low-grade iron ore with high silicic acid content and greatly reduces the need for manganese. The soda ash method of desulphurization will allow Germany to produce high-grade steel during war time. It also produces a slag of much finer quality, free of the undesirable manganese and, therefore, much more valuable for the manufacture of cement and burnt bricks. The cost of soda ash is admittedly higher than that of manganese, but the higher cost is more than offset by the economies resulting from the greater effectiveness of soda ash as a desulphurizing agent, decreased consumption of coke in the blast furnace, cheapening of the mixture, increased output of blast furnace, and improved commercial utilization of the soda slag.

The chief and apparently only disadvantage in the use of soda ash in place of manganese for desulphurizing iron is that somewhat larger amounts of ferromanganese are required for deoxidation. However, processes designed to reduce the consumption of manganese for deoxidation are now in the course of development.

Although data are unavailable, there has been a marked increase in the consumption of salt for manufacturing soda ash since 1937-38 due in large measure to the rapidly growing use of soda ash for desulphurizing iron.

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INTERESTING METALLURGICAL REPORTS.

The following are references to recently published articles on various phases of metallurgy. Abstracts of these various papers are on file at the head office of the Department, 329 S.W. Oak Street, and any parties interested in seeing these may call there.

Metals and Alloys - p.403 (July 1939) German.
Methods of recovery of Al_2O_3 from clay, etc.
A survey of patent literature.
A commercial process described.

Metals and Alloys - p.403 (July 1939)Swedish.
Modern Electric Smelting.
Iron Electric Smelting.
Iron Equal to Charcoal Iron.
2400-3000 kw.-hr./metric ton.
Can compete with blast furnace when 1 kw.-hr.= 2.2 lbs. of coke.
Low grade coke and breeze.
Plants in use in Norway, Sweden, Finland, Italy, and Japan.

A.I.M.E. Mining Technology (January 1938) T.P.877.
Selective Electrostatic Separation.
Very valuable paper with values and discoveries.

A.I.M.E. Metals Technology (February 1939).
Direct Production of Metallic Zinc by Electrothermic Process.

A.I.M.E. Mining Technology (July 1938) T.P.959.
Special Methods for Concentrating and Purifying Industrial Minerals.

A.I.M.E. Mining Technology (May 1938) T.P.901.
65-mesh Grinding in Closed Circuit with Stainless-Steel Screens.

Metals and Alloys - p.404 (July 1939) French.
Present Status of the High-Frequency Furnace in Industry.
Rev. Gen. Elec., vol.45, January 21, 1939.

Metals and Alloys - p.451 (July 1939)
Applications of Supersonic Waves.
Metallurgist (Suppl.Engineers) December 1938 - pp.177-179.
Review.

Metals and Alloys - p.202 (April 1939) - Supersonics.
Use of an Alternating Pressure Field in the Wet Preparation of Ores.
Metall.u.Erz, vol.35, no.18, 1938, pp.471-474.

Metals and Alloys - p.202 (April 1939)
Electrostatic Separation III.
The Process, Recently Improved, Now Invites Wider Application.
From "Eng.Mining J.", December 1938, pp.41-45.

Chemical and Metallurgical Engineering (July 1939)
p.343 - Production of Low Temperature Coke, by C. E. Lesher.

Chemical and Metallurgical Engineering (May 1939)
p.273 - Electric Carbonization of Coal.

Chemical and Metallurgical Engineering (May 1939)
p.269 - Electric Furnace Production of Phosphate.
by Victor Chemical Works.

Readers Digest - (July 1939)
p.81 - Take a Look at the Future.
High Frequency Waves, Infra-red Rays, etc.

Chemical and Metallurgical Engineering (March 1939)
p.124 - Air Flotation Statement of Their Table,
Ad. by Sutton, Steele and Steele, Inc., Dallas, Texas.

Abstract in Science News Letter, July 22, 1939, p.57.
(July (?) 1939 issue of Civil Engineering A.S.C.E.
Wind Tunnel for soil and sand classification.
May have practical application in ore concentration, especially in dry countries.
Cheap to Install. See also Science News Letter, July 22, 1939, for digest.

May 1938. U. S. Bureau of Mines, R.I. 3400, p.51.
Sonic Flosculator as a Fume Settler.

May 1938. U. S. Bureau of Mines, R.I. 3427, p.31.
Flotation of Feldspar - Quartz.

October 1938. U. S. Bureau of Mines, R.I. 3419, p.7.
Production of Pure Sponge Chromium at Low Temperatures.
Very Interesting.

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TO ALL EXCHANGE LIBRARIES

Announcement is made of the release of Bulletin no.18, entitled, "First Aid to Fossils, or What to Do Before the Paleontologist Comes", by John Eliot Allen. Copies of this bulletin were mailed from this office on September 23, 1939. If not received within 10 days from the above date, advise this office immediately; otherwise replacements for copies lost in the mail or elsewhere cannot be made.

NEW BULLETIN ANNOUNCED

Announcement is made of the publication of the following bulletin by the State Department of Geology and Mineral Industries:

"First Aid to Fossils, or What to Do Before the Paleontologist Comes", by John Eliot Allen, field geologist, State Department of Geology and Mineral Industries, Bulletin no.18; 28 pp., 2 plates, 1 map; 1939.

Copies may be obtained from the Department's office, 329 S.W.Oak Street, Portland, upon receipt of 20 cents to help defray cost of printing and mailing.

ABSTRACT.

Lack of general public knowledge of the simpler procedures used in the collection and care of fossil material has frequently led to the destruction of valuable specimens. This paper attempts to fill the need for an inexpensive non-technical handbook which will furnish the casual finder or the amateur collector of fossils with information on the proper methods for the collection and preservation of his finds.

A fossil is any evidence or record of past life. It may be original animal or plant matter; it may be carbonized or petrified material; or it may be only impressions, imprints, molds, or casts of the shape of the animal or plant. Fossils are most commonly found buried in rocks which were originally formed as sediments on the floors of shallow seas. They are of value in telling us what the animals that lived in the past were like, and in helping the geologist sort out the layers in the crust of the earth. Departments of paleontology at the various coast universities and colleges are always anxious to learn of new discoveries, and can sometimes help the amateur in his work.

Various tools can be used to remove the fossil from the rock, depending on the type of fossil and the rock itself, but a geologist's pick and some small punches and a brush are indispensable. The fossil is usually painted with shellac to preserve the surface as it is removed, and when especially delicate, it is taken out in a block and then cleaned in the laboratory. It is very important that the exact location of the specimen in the rock and on the map be recorded in a notebook or on cards, in the field at the time of location.

Invertebrate animals (shellfish, etc.) are the most common type of fossils found in western Oregon, and require the least careful treatment.

Vertebrates include all the higher types of animal life, and their skeletons are found preserved in volcanic ash in Eastern Oregon and in gravels in Western Oregon. The bones require more care in removal from the rock, and are usually shellacked as they are found. Large specimens require a special procedure, and the exact position of the bones must always be recorded.

Plant remains appear in clays or ash, and may be split out with chisels, and the surfaces shellacked.

Fossil remains of microscopic life are of greatest importance to the oil geologists, as they enable him to date the formations in the deep wells. The rock in which they appear is dried and crushed and the fossils screened out; the fossils then being mounted on microscope slides for study and identification.

The collector should not try to clean the fossil in the field, as this work should be done in the laboratory where proper tools and time are available. Large fossils can be mounted on convenient tables under bright light and can be delicately cleaned of the rock with small scratchers and needles. Fossil fragments can be fitted together and cemented to form a complete specimen, or lost pieces may be reconstructed with modeling clay. They may be then labeled and mounted for display.

Appendices to the paper include lists of "Don'ts for Diggers"; authorities in the various fields of paleontology upon the Pacific Coast; reference books for those who wish to go into the field of paleontology a bit farther, and a map of some of the fossil localities in Oregon.

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NEWS ITEMS.

W. C. Fellows of Baker is bulldozing a road into the Windsor property in the Greenhorn district. A shaft is being sunk, and a small amount of high-grade ore has been taken out.

M. D. Rombough of Baker has installed 500 feet of hoisting cable at the Hidden Treasure Mine. The shaft is being sunk below the 135-foot level and is now down 60 feet below this level. A station will be cut and a drift run to tap ore developed on upper levels.

Eastern interests are considering placer ground at Weatherby. It is planned that the property will be worked on the high benches by bulldozers.

Ike Kusisto has been prospecting in the Steens Mountain area north of Field in Harney County and reports some interesting finds in the way of quicksilver prospects. We understand that Kusisto is looking for financing for development of his prospects. Anyone interested may communicate directly with him, Box 14, Dee, Oregon.

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HEARD OVER THE DIRECTOR'S TRANSOM.

Some day I'm gonna take my hair down and release a flock of picturesque invective about some of the things that have been itchin' me for some time.

First is about run-of-mine citizens "breaking" into the mining business, and how they do it. "Breaking" is right. They have the same chance I would of going broke in the wholesale grocery business, or starting a filling station. That, by the way, would be a real gamble - as I view it.

So many people seem to think that getting into mining is like playing a slot machine. You drop in a coin, pull and lever, and "Bing!" the jack drops, or it doesn't. Usually it doesn't. Getting into mining is like a slot machine for those who play it that way. Point is, they haven't any business playing it that way. It isn't fair either to them or to the mining industry.

Some years ago a man who had become wealthy in the wholesale grocery business came to me and said, "There are some men in town selling stock in an oil shale proposition in Kentucky. It looks fool proof and I'm tempted to shoot a few thousand. Is there any oil shale in Kentucky?" I replied, "Sure". "Have you seen it?" he asked. "Yes."

"Can they really make oil out of oil shale like they say?"

"Certainly", I answered.

"Then it looks pretty good. Thanks", and he started off.

"Hey!" I called. "I've been thinking (I lied) about a little investment in starting a wholesale grocery business - ".

I didn't get any farther. He threw up his hands. "For God's sake, don't! It's over crowded, there's no money in it, it's a cutthroat business, you're crazy. you don't know anything about grocers, wholesale or dovetail. You'll lose your - "

By that time he had noted that I couldn't keep my face straight any longer. "I get it," he said.

I rubbed it in. "What in hell do you know about oil shale? You didn't ask me what it costs to mine, or to produce oil from shale, or the plant cost of product per unit, or anything about competition. Fact is, there is so much overproduction of natural oil now that you couldn't possibly produce oil and credit by-product cheaply enough to compete."

I went on. "If you want to get into the mining business and run a good chance of winning, I'll tell you how. And mind you, mining is a good business with plenty of profits. First get you a mining expert to advise you - a mining engineer or geologist. And I mean a good one. Pick him like you would a doctor if you wanted your appendix out. Don't pick him out of a phone directory - and don't expect him to work for four bits an hour. If you can get a doctor to take out your appendix at four bits an hour, then get the same kind of an engineer."

"Give your engineer an idea of the type of property or kind of mine you think you are interested in, and say about how much money you are willing to spend. If

properties are brought to you, let the engineer pass on them and take his word just like you would the word of a doctor."

"Remember, mines ordinarily are "made", not found. Pick a likely prospect and develop it. But for heaven's sake, get it properly engineered, or you will indeed just be playing a slot machine".

- E.K.N.

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QUICKSILVER.

During the last week in August 1939 the price of quicksilver was between $80 and $90 a flask of 76 pounds. Within four weeks this price was doubled. The writer knows of one shipment that sold in New York at $155 per flask, and there are reports of other sales at $160 or slightly higher. It is understood that Spain is prepared to dump about 2,000 flasks in the New York market, and the price as of today (October 5) has been diminished, presumably because of this rumor, to around $135 per flask.

We are led to believe that the German Government in some way has its finger in the commodity exchange setup in Spain so that it will have something to say about the disposition of Spanish quicksilver. Presumably Germany whose deposits are meager, can obtain necessary supplies from Italy and would not thus necessarily prevent Spain from selling a certain amount of this metal to foreign countries for the purpose of establishing credits which she needs badly.

Inquiries for Oregon quicksilver have come in from several foreign countries, which leads to the belief that there really is a healthy demand for this metal, representing critical scarcity of supplies. It is our feeling that Oregon producers may expect a price of in excess of $100 per flask for many months unless, of course, there should be a sudden cessation of hostilities in Europe, which would cause the bottom to drop out of the market. This appears unlikely.

Production is being stepped up in this state as rapidly as possible. The Bonanza Mining Company at Sutherlin is adding a rotary furnace to its present plant, which includes a Herreshoff. The Mother Lode mine in the Ochocos, Art Champion Manager, is said to be ready to go into production with a revamped plant. At least four other properties in the Ochocos are now under development. A considerable number of inquiries are coming into this office for quicksilver properties, and we are suggesting to inquirers that they look into the merits of properties listed in our quicksilver bulletin no. 4, where the properties are idle, and to consider seriously plans for developing other prospects in well-known quicksilver areas.

Oregon probably has brighter prospects for future production of quicksilver than any other state in the Union, and we are happy to encourage all interested in developing Oregon quicksilver mines and prospects.

GALLIUM.

There seems to be considerable misinformation or lack of information about this element. The following, derived mainly from Mineral Trade Notes, may be of

interest:

This metal is somewhat similar to quicksilver in some respects in that it is resistant to chemical influences, is used for a backing for optical mirrors, and as an alloy for dental fillings. The metal was extremely expensive until a few years ago. It was quoted at around $50 per gram and was produced in very small quantities on a laboratory basis mainly from zinc residues.

Germany now claims to have almost a monopoly on the production of gallium. It appears that Germany, having developed a process of which we have no details, is manufacturing the metal from a smelter by-product of her copper industry. The production is given as about 50 kilograms or 110 pounds per year, and the price has been reduced to about $2.50 per gram.

This Department has no facilities for making quantitative determinations of gallium or indium. Although we have made a few qualitative tests within the last few weeks, we have, however, made an arrangement with the Rare Metals Division of the U.S. Bureau of Mines whereby we may send them samples from time to time for assay where our tests indicate that the metal is present.

It is suggested that any persons having ores or materials in which they have definite reason for suspecting the presence of gallium, send their samples to some accredited spectroscopic analyst for a report.

METHODS OF GOLD RECOVERY.

The seat of a man's pants have been known to serve many uses, not only that of offering a certain amount of protection to the individual's hide but also as flags of distress, and now we find them used to recover gold. A recent bulletin by the U. S. Bureau of Mines 1/ gives tests on the use of corduroy for saving gold in small and large milling plants throughout the world. The mines that produce siliceous ores low in sulphides and gold recover the gold by amalgamation or in traps or jigs or on corduroy and shaking tables. For the small operator inexpensive equipment, such as a corduroy table, sometimes may be adapted to give good recovery of gold and associated minerals.

The corduroy used, however, is not that from which wearing apparel is made. The weave is too narrow, the ribs too closely spaced, and the fibers or threads are not free. Milling corduroy has a slightly wider rib and a space between the ribs with the high side of the rib laid below the pulp flow.

Unclassified and free, coarse pulp may be run over the corduroy. The concentrates are much bulkier than gold amalgam from copper plates. As the strip of corduroy may be easily folded and stolen, it is recommended that tables equipped with corduroy blankets be protected by locked screens or doors. Experience has shown that there is considerable difficulty in securing assays that will check from these corduroy blankets.

The circular mentioned above gives plant practice for many states in the Union, including California, Idaho, Montana, and Oregon; in Canada - British Columbia, Nova Scotia, Ontario, and Quebec; the Phillipines; Costa Rica; Africa;

1/ Bernewitz, M. W. von., "Saving Gold by Means of Corduroy", U.S. Bureau of Mines, Information Circular 7085, August 1939.

Australia; and New Zealand. The Oregon property is the White Swan plant in the Virtue district.

Data are also given on the use of corduroy in recovering platinum concentrates.

Copies of the circular may be obtained free of charge from the United States Bureau of Mines, Washington, D.C.

DIATOMITE.

We are informed that Mr. E. N. Bennett, Box 741, Ontario, Oregon, is processing diatomite from deposit near Harper and that he is in quest of buyers of this product. Details of grades, prices, etc., may be obtained by communicating directly with Mr. Bennett.

BERYLLIUM.

Our May issue of The Ore.-Bin carried a brief discussion of beryllium. Whether this or something else was responsible we don't know, but we have been receiving inquiries and occasional samples from various parts of the state, particularly from southwest Oregon, and letters indicating that people have "mountains" of the material ready to be dug and sold at so many dollars a pound.

It is not our wish or habit to deflate the ideas of people who are enthusiastic about Oregon's mineral resources, but we believe it advisable to caution the uninformed in regard to this matter of beryllium. In southwest Oregon especially we have noted that parties have been led to believe that they have deposits of beryllium by finding greenish rocks. In every case that we know of the green stain comes either from a small amount of copper or one of the two common nickel minerals, arsenide or garnierite (the first a nickel arsenide, and the second a nickel silicate), or from green-stained quartz of the chalcedony variety. If the green stain comes from copper or nickel, it can be determined very readily indeed in the laboratory by simple qualitative tests. If the stain comes from chalcedonic quartz, the nickel and copper tests will be negative, but a light iron reaction should be obtained for the reason that this green stain, in almost all cases, is caused by a small amount of ferrous iron in the vein and not from beryllium.

Because the metal beryllium has so definite a habit of association, that is to say, it is not known to be found in commercial quantities except in an acid igneous environment, we can say pretty well that there is just about a Chinaman's chance of finding a commercial deposit of beryllium in southwest Oregon.

When one recognizes that the metallurgy of beryllium is very difficult and expensive and there are only one or two buyers in the United States, so far as we know, it is our feeling that Oregon prospectors are probably wasting their time looking for beryllium, especially in the southwest part of the state.

We may suggest instead that prospectors who confine their work to the serpentine areas, while looking for chromite, keep their eyes peeled for asbestos. They should remember that this is a low value commodity, and a deposit would have no value unless it has substantial tonnage. We will be pleased to assist any prospectors who find samples of asbestos and who will take them in to the Grants Pass laboratory or the Baker laboratory or send them to the Portland office for inspection.

COBALT.

Demand for cobalt is increasing, but all of the metal consumed in the United States has, so far, been imported. In 1937 slightly over 2½ million pounds of cobalt ore, metal, and oxide were imported for use by United States plants. There has been no marketed production of cobalt from domestic deposits. The U.S.Bureau of Mines Minerals Yearbook for 1938 reports the discovery of a deposit in the Tombstone district, Arizona, from which samples assaying up to 21% cobalt were obtained. The Cobalt Gold Mining Company, Gold Hill, Colorado, was reported to be considering exploration of its nickel-cobalt properties by core drilling.

The July 1939 California Mining Journal reports a recent discovery of cobalt in the Turnbull district west of Stafford, Arizona. The new find is in the Bluebird property which has been leased by Ralph L. Crothwaite of Shepherd Chemical Company of Chicago, who has already started development. The Journal also reports a cobalt property owned by Preston Nuner, Mokelumne Hill, in the southern part of Amador county, California.

Oregon has several reported occurrences of cobalt. One of the most famous of these is the old Standard Consolidated Mines in the Quartzburg district, Grant county, north of Prairie City. The proper location, however, is section 12, T.12 S., R.33 E. Assays of 6.34% cobalt and 0.75% nickel have been reported. Apparently no effort has been made to produce the ore commercially.

Cobalt has also been reported from Jackson county by Dr. W. P. Chisholm in Gold Hill near the "Meadows". The ore is reported to carry 4-4½% cobalt.

In Josephine county samples from the Cobalt Group in the Illinois River district, are reported to carry cobalt. Curry county is reported to have erythrite (cobalt bloom) in the ore of the Bunker Hill Group, Collier Creek district.

A more recent deposit was reported in the Mining and Contracting Review of June 28, 1938, which states that "Gus Schermer continues to develop recent cobalt-nickel showings on his Clover Creek property, located about six miles from Keating."

Considering the fact that large amounts of cobalt are used each year in the United States, it is important that domestic deposits be developed to compete with imported ore. Occurrences and evidences of cobalt and nickel should be reported so that some effort can be made to obtain commercial production in the United States.

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STRATEGIC MINERALS.

(Note: This article was prepared recently for the Oregon Journal, Portland, and appeared in the Feature Section of that daily on Sunday, October 27, 1939.
It is here reprinted through the courtesy and with the permission of the Oregon Journal.)

Only a few minutes' consideration of the changes in methods of warfare since early times will convince anyone that mineral raw materials play a most important part in any present-day military program. Going back even farther, to the Dawn times as depicted in the current comic strip which shows Alley Oop and his pet dinosaur, it will be noted that Oop's fighting equipment consists simply of a stone-headed war club. The stone is doubtless the hardest Oop could find, probably a piece of obsidian.

Shortly after the stone ax days, some primordial coward devised the bow and flint-tipped arrow - so he could fight his adversary at longer range. Again a mineral was the lethal substance. Later, Caesar, with his Roman legions campaigning against the Helvetii in the area now occupied by the Maginot and Siegfried lines, devised a tarowing machine which pinked a bucket-sized boulder a still greater distance to crash the enemy ramparts. At that time, the science of copper, iron and steel metallurgy was in its infancy.

During the Middle Ages the Knight Crusader with his Damascus blade showed that he had a better chance of justifying Peter the Hermit, if his spear and armor were of the finest steel rather than from inferior material.

In the last war-to-end-wars, armies shot complicated projectiles with still more complex machines to greater distances than ever before. Laymen marveled at the intricate mechanical and fighting equipment with which the armies were provided. The situation had changed immeasurably from the dim old days when might was measured by the number of men and the strength of their muscles.

The importance in war of mineral raw materials and the equipment, armament and devices made therefrom has been increasing almost in geometric ratio since men first began quarreling. Lieutenant Commander Harrison, a United States naval expert, is authority for the statement that in the present war in Europe about 30 times the amount of mechanization and accessory equipment are required for a soldier than was the case in the World War. Practically all of this equipment is manufactured from mineral raw materials.

What, then, are those so-called "strategic minerals" which play so important a part in the European war, and what is Germany's position with regard to her supplies of them? Briefly, the most important are iron and steel, the metallic base of almost all types of armament, projectiles, cannons, rifles and ground transportation units as well as of machines for manufacture of such equipment; aluminum, which now is extremely important in military aircraft; chromium, for strengthening and toughening steel; nickel, which is alloyed with steel in making almost all armorplate and cannons and rifles; manganese, most essential in the manufacture of steel and to a smaller extent later in the alloying of special steel; quicksilver, for which no substitute that is both economical and satisfactory has ever been discovered, for making detonators for projectiles, and which is used also for camp disinfectant

and for medicine as calomel; petroleum, to power the war engine, and a few other mineral products - no less essential but of somewhat less critical supply.

Germany has entirely adequate deposits of only two mineral products, potash and coal; she is, on the whole, poorly supplied with minerals. In war time she is estimated to need about 26,000,000 tons of steel each year; she is producing one quarter or, at best, one third this amount, using very low grade ores that require great amounts of fluxes. Her high-grade iron ores - from which her armaments are made - came from Lapland, one third down the Baltic and two thirds down the west coast of Norway. This latter route is now cut off. The Militar Wochen blatt estimates that Germany (without Lorraine which went to France) controls toda about one fifth the iron she did in 1914 when she controlled both Austria and Hungary.

In 1938, Germany was the world's largest producer of aluminum (186,000 short tons), about 27 per cent more than the United States, the second largest producer. Yet she mines less than one tenth of her aluminum ore. She now has to resort to using clay as source material - a high cost operation. She has no chromite and presumably is using from stocks shipped in from Southern Africa, a source now cut off. She has no nickel deposits although in 1938 she shipped in 34,000 tons (metric) of ore mainly from India, some from Canada. She has virtually no manganese and has been shipping from Russia - who needs it herself - and from other countries. Her quicksilver deposits are meager, but presumably she could buy from Italy who has plenty, if she has money or credit.

The Deutsche Wehr's estimate of 13,000,000 tons of gasoline as Germany's wartime requirement is about seven times more than her peace-time production from natural wells, coal and all sources. Her production has been upped to nearly one third of her present needs, according to late advice, but the loss to Russia of Southern Poland and the declining production of Rumanian wells, owned mainly by allied interests, make Germany's oil supply extremely doubtful.

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Getting back home, what mineral raw materials do we <u>not</u> produce in sufficient quantities in the United States? What would be covered by the war department's definition of strategic minerals, which is "those minerals essential to national defense, for the supply of which in time of war, dependence must be placed in whole or in part on sources outside of the continental limits of the country?"

The list, so far as the United States is concerned, is as follows:

Aluminum	Nickel
Antimony	Optical Glass
Chromium	Quartz Crystal
Iodine	Quicksilver
Manganese	Tin
Mica	Tungsten

These minerals are of strategic nature for one of three reasons:

(1) They are not known to be present in commercial quantities in the United States. Includes nickel, tin and quartz crystal.

2. They are present but insufficient (so far as is known) to meet needs in time of emergency. Includes antimony, aluminum ore, chromium, mica and possibly iodine.

3. They are probably present in sufficient quantities but are undeveloped because the foreign product is brought in so cheaply there is little incentive to develop domestic deposits. Includes manganese, quicksilver, tungsten and optical glass.

(Some lists of deficiency minerals include the following in addition: Cobalt, cryolite, diamonds (black), graphite, platinum, titanium and zirconium. Most of these have strictly military uses, but even so they are less critical than those in the first list).

The reasons why these various minerals must, in the United States, be regarded as of strategic importance are outlined in the following paragraphs:

Aluminum. - The United States contains some ore, principally in Arkansas, but produces only about one third of its requirements, importing the remainder from South America.

The cost of producing aluminum from clays, as carried out in Germany, is excessive, but we have enough faith in the American metallurgists to feel that some day, perhaps right here in the Northwest with Bonneville power available, we may have an aluminum industry using available Oregon clays as raw material. One research laboratory in Portland is now occupied with this problem.

Antimony. - This material is used mainly for making storage battery plates, in the manufacture of shrapnel, and for bearing material. During the World War Germany found she could substitute calcium in bearings and so used several thousand tons of alloy of this nature.

The United States has few antimony mines and no known deposits of particular promise. China, Mexico and Bolivia - in that order - are the world's principal antimony producing countries. In an emergency it is probable that the United States could maintain its imports of antimony from Mexico and, in time, develop substitutes.

Chromium. - It is used in the so-called rust-resisting or stainless steels and as alloys for cutting tools, ordnance and armor plate, projectiles and refractory brick.

In 1937 the United States produced about 2000 tons of chromite and imported 550,000 tons from foreign countries, mainly Cuba, New Caledonia and South Africa.

Chromite is one of the most important of the strategic minerals because we have limited deposits, and these are mainly undeveloped since foreign ores, mined cheaply by coolie labor, can be brought into this country duty free.

Iodine. - Used as an antiseptic and germicide, it is a most essential drug for which no satisfactory substitute has so far been found. Formerly produced from kelp or seaweed, it is now produced in the United States from brines obtained from oil wells in the Los Angeles and Michigan areas. It is classified as

strategic because it is not known whether or not in war-time the United States could produce its requirements.

Manganese. - This is probably the most important of all strategic minerals. It is essential in making of steel and is used in various alloys. The United States has rather substantial but undeveloped deposits of a lower grade - undeveloped because the ore can be brought in over a low tariff barrier from foreign countries where it is mined by cheap labor. Manganese is a most critical mineral because the cutting off of foreign supplies would soon cripple our steel industry.

Mica. - Its use is principally for electrical insulation where it is found to be practically indispensable. Domestic production is sufficient for the lower grades but not for the high grade, for the mica commonly used in electrical insulation is of the high grade sheet mica variety which comes principally from India and Madagascar.

Nickel. - Used principally for alloying with steel (for armor plate, cannons, etc.), with cast iron, and with non-ferrous alloys, and for electroplating, nickel is indeed a strategic mineral.

The United States has no producing mines or any known commercial deposits. We produce about 200 tons a year as a smelter by-product and import 500,000 tons a year, practically all from Canada, which produces about 90 per cent of the world's nickel. Two United States deposits - one in North Carolina and one near Riddle in Douglas county, Oregon - are regarded by the geological survey as worthy of careful investigation.

Optical Glass. - This is classed as a strategic mineral because it is imported from Europe, even with a 50 per cent duty, more cheaply than we can make it in normal times. Only about half our requirements are made in this country and that by one producing firm. In an emergency the production could be stepped up but not rapidly.

Quartz Crystal. - Brazil is practically the sole world producer of the highest grade quartz crystal, such as is used in delicate instruments and in frequency control radio apparatus.

Quicksilver. - The principal producers among the foreign nations are Italy, Spain and Mexico. Last year Italy produced about 68,000 flasks; the Spanish production is unknown, due to the chaos in that country; the United States produced about 18,000 flasks. So far as we know, neither Italy nor Spain is exporting quicksilver now and may hardly be expected to unless to establish credits in this or some other country.

Oregon is believed to have brighter prospects for the continued and future production of quicksilver than any other state. It now ranks second only to California and its production is increasing rapidly, whereas California's production is decreasing, according to U.S. Bureau of Mines figures. The fact that the price has increased from around $80 a flask to $160 recently has given impetus to this important Oregon industry. Inquiries for Oregon quicksilver have come from five fore countries within the last few weeks. This indicates a healthy condition of the market for the local product, and, unless peace in Europe should be declared at an early date, Oregon quicksilver should enjoy a price of better than $100 a flask for many months.

Tin. - Tin is not an essential ingredient in armament or military supplies other than that it is used widely in the United States in the canning of food for shipment and storage. There is no production of tin in the United States; all is shipped in from foreign countries, mainly from the Malay States and Bolivia. Some deposits, located near the western tip of Alaska, are now being opened and some production is expected for this coming year.

Tungsten. - Tungsten is used principally for alloying steel and making special cutting tools, dies and machine parts. United States production was nominal up to a few years ago because it could be brought in more cheaply from China where it is mined by coolie labor. Early in the recent China-Japanese conflict a tungsten scare developed at home and many deposits were opened up. We now produce at least half our requirements - could produce more but tungsten is, nevertheless, considered a strategic mineral.

- Earl K. Nixon, Director,
State Department of Geology
and Mineral Industries.

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The following properties have been called to our attention as being available for negotiation:

1. Quartz property near Powers, Oregon; assay values stated to run to the tenor of $12 to $25 per ton. For particulars write to W.W.Coy, Powers, Oregon.

2. Talc property for sale. Address W. R. Allen, Box 11, Canyonville, Ore.

3. Talc property for sale. Address E. L. Moyer, Canyonville, Oregon.

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We heard this story the other day.

Three men - a geologist, a mining engineer, and a mining promoter - were going hunting. They were all dressed up with red hats, checkered shirts, choke-bore breeches, yaller boots, and shiny rifles.

When they had arrived at a point deep in the woods they came upon a series of bear tracks. The geologist immediately started back-tracking in order to find out where the bear had come from. The mining engineer started following the tracks ahead to find out where the bear had gone; but the mining promoter started back on the road to town to bring a truck to carry out the carcass of the bear after it was shot.

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The following write-up pertaining to the Department Bulletin No.18, "First Aid to Fossils", appears in the department "The Drift of Things" in the November issue of Mining and Metallurgy, the monthly official magazine of the American Institute of Mining and Metallurgical Engineers. It would seem that the attitude of the editors of Mining and Metallurgy toward technical publications as outlined in the following write-up is worth reproducing here.

We are indebted to Mining and Metallurgy for the text as quoted below:

"WHAT MOST OF US NEED".

"Geological publications, especially those devoted to paleontology, are so uniformly highly technical and dry so far as the general reader is concerned that the appearance of a bulletin on fossils that any one at all interested in geology can read with interest and profit is worthy of note. John Eliot Allen, field geologist of the Oregon Department of Geology and Mineral Industries, is only a Junior Member of the A.I.M.E. and evidently young enough not to write a learned paper that few could understand. He is the author of the Department's Bulletin No.18 entitled "First Aid to Fossils, or What to Do Before the Paleontologist Comes." Earl K. Nixon, director of the department, writes in the foreword:

'Judging by the condition of fossils shown us by amateur collectors, there is a definite need for instruction in regard to gathering, care, and preparation of these interesting and sometimes very valuable bits of geologic evidence. Many laymen have a habit of picking up fossils or parts of fossils, carrying them home and letting them lie about, considering them merely as curiosities, as one would a "funny shaped rock from Mount Hood". This custom is of course unfortunate. It is fair neither to the fossil nor to some geologist or stratigrapher who might come along and make some very valuable use of the specimen if he found it in place.'

The bulletin then tells what you and I should know before we stoop to pick up an unusual piece of rock that looks as though it might contain a piece of a dinosaur. An appendix contains 'Don'ts for Diggers' and the names of some paleontological authorities in the West that one can question in case of doubt. Readers of the 'Drift' can get a copy of the bulletin by sending 20¢ to the department at 329 SW Oak St., Portland, Oregon; to others not so choosy in their reading the price is also 20¢."

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TO ALL EXCHANGE LIBRARIES:

Announcement is made of the release of Departmental publications:

BULLETIN NO. 19, entitled "Dredging of Farmland in Oregon"; by F. W. Libbey.

G.M.I. SHORT PAPER NO. 1, "Preliminary Report upon Oregon Saline Lakes", by Dr. O. F. Stafford.

Copies of Bulletin No.19 were mailed from this office on December 2, 1939, and copies of G.M.I.Short Paper No.1 will go forward from this office about December 12, 1939. If these are not received within 10 days from the above dates, advise this office immediately; otherwise, replacements for copies lost in the mail or elsewhere cannot be made.

NEW BULLETIN ANNOUNCED

Announcement is made of the publication of the following bulletin by the State Department of Geology and Mineral Industries:

> "Dredging of Farmland in Oregon", by F. W. Libbey, mining engineer, State Department of Geology and Mineral Industries, Bulletin no.19; 40 pp., 10 plates (map, photographs, and graphs); 1939; 40 cents.

Copies may be obtained from the Department's office, 329 S.W. Oak Street, Portland, or the State Assay Laboratories at Baker and Grants Pass, upon receipt of 40 cents to help defray cost of printing and mailing.

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Persons who have had occasion to discuss the good or detriment to the state of dredging croplands have raised such questions as: What is the value of various kinds of lands being dredged for gold in this state? What is the average amount of gold obtained from an average acre of dredge land? How much of the gold recovered goes into local wages, supplies, taxes, etc.? What percentage of the land being dredged yearly in this state is waste land, meadow land, cropland, etc.? How much gold is being produced annually by the dredges in the state? What is the answer to the question of resurfacing after dredging in Oregon? Is the statement that dredging takes land out of production for future generations defensible? Is the statement that "dredge tailings look like hell" defensible? How can the costs of stripping overburden and resoiling after dredging be calculated? What are the pertinent facts connected with dredging in the John Day Valley? How can we compare the destruction of farm land by dredging with its destruction by other agencies?

These and other questions relating to dredging in this state are answered in the bulletin above referred to. The report includes a compilation of facts pertaining to dredging, an unbiased engineering analysis of these facts, and conclusions which should be of value to persons interested in dredging, not only here but wherever dredging is carried on.

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NEW SERIES OF PUBLICATIONS

The Oregon State Department of Geology and Mineral Industries herewith announces the first of a series of reports to be known as G.M.I. Short Papers.

> G.M.I. Short Paper no.1, "Preliminary Report upon Oregon Saline Lakes", by Dr. O. F. Stafford, Department of Chemistry, University of Oregon. Price 10 cents.

This paper discusses and reaches conclusions as to the feasibility of the utilization of salt lake deposits in Oregon under present conditions of transportation, competition, and market demand. It is not an exhaustive study but a report made for the purpose of determining whether this Department would be justified in undertaking at this time or in the near future a series of detailed tests of research nature on the utilization of salt deposits in the Lake County district of Oregon. Dr. Stafford's findings will be of interest to many persons who have, in the past, given consideration to the possibility of developing and using these well-known salt deposits.

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THE G.M.I. SERIES

Occasionally the Department finds it desirable to issue and make available to the public the text of brief reports, the result of field investigations by members of the staff, or the result of office compilations pertaining to the mining and mineral industry of the State which may be of general interest. This G.M.I. (Geology and Mineral Industries) series is a corollary of the Technical Paper series of the U.S. Geological Survey and the Information Circular and the Report of Investigation series of the U.S. Bureau of Mines and fulfills the need for a vehicle of publication which can be more quickly and inexpensively produced with Department facilities. The G.M.I. series will not replace but will supplement our regular Bulletin series. A price of 10 cents postpaid has been established for each of the issues of this new series. The Short Papers will be issued irregularly. Notice of publication of each will be carried in the monthly issues of the "Ore.-Bin" and occasionally in the press.

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CHANGES IN DEPARTMENT STAFF.

The Department announces the following changes in its personnel set-up:

Mr. Jewel E. Morrison, Mining Engineer with headquarters at Grants Pass since 1937, has resigned to accept a mine operating job as superintendent at

the Al Sarena Mine - locally known as the Buzzard - located about fifty miles north of Medford.

Mr. Ray C. Treasher, Geologist with headquarters at Portland since 1937, is being transferred January 1st to southwest Oregon with residence at Grants Pass. Treasher will be Field Geologist and carry on the department's regular field inspection service, with special emphasis on strictly technical and geological phases of mining problems.

Mr. Leslie L. Motz, formerly assayer at the Baker State Assay Laboratory, was transferred December 1st to the Portland office staff and, as Metallurgical Chemist, will be occupied principally with studies and problems of metallurgical nature in connection with mining, milling, and industrial activities. The Department's desire to be in a better position to give attention to problems of metallurgy comes from its belief that such studies will fit in properly with new electrochemical and electro-metallurgical development which Bonneville power will doubtless encourage in the Columbia Area.

Mr. Hugh K. Lancaster has been employed as Assayer at the Baker State Assay Laboratory to fill the vacancy left by Mr. Motz's transfer.

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GOVERNMENT STRATEGIC MINERAL SPECIFICATIONS AND BIDS

The Procurement Division of the U.S. Treasury Department recently opened bids for supplies of ores of manganese, tungsten, and chromium to be placed in military reserve stock-piles as provided for by the Thomas Act - the so-called Strategic Minerals Bill - passed last summer.

Manganese:

Three grades of manganese ores, provided for in the request for bids, are listed below with minimum and maximum chemical analysis requirements for each grade:

Grade	Manganese (Mn)	Iron (Fe)	Zinc (Zn)	Silica (SiO_2)	Phosphorous (P)	Alumina (Al_2O_3)
	Minimum %	Max. %	Max. %	Max. %	Max. %	Max. %
A	48	7	1	9	0.12	3
B	48	7	1	*10	0.18	6
C	48	7	1	7	0.15	6

* For each additional 1% Mn over 48%, an additional 0.2% SiO_2 is allowed.

Deliveries of manganese ore under the bids requested by the government were to be made either at Ogden, Utah, or Baltimore, Maryland.

Sixteen bids for supplying manganese were opened by the government on October 19 and 20. The bid prices ranged from $0.42 to $1.67 per long ton unit of Mn in lots of 3,000 tons or more. Two bids were accepted by the government, one by the Cuban American Manganese Corporation for 25,000 long tons at the contract price of

$765,000, or $0.612 per long ton unit, for delivery c.i.f. Baltimore, Maryland; the other, the bid of the Green Brier Mining Company of White Sulphur Springs, West Virginia, for 5,000 tons of domestic ore to be delivered at Baltimore, Maryland, at a contract price of $180,000, or $0.75 per long ton unit.

Tungsten:

The tungsten chemical analysis requirements in bids requested by the government were as follows: Tungsten tri-oxide (Tungstic acid, WO_3), 60% minimum, tin - 1% maximum, copper - 0.05% max., phosphorous - 0.035% max., arsenic - 0.50% max., antimony - 0.05% max., bismuth - 0.12% max., molybdenum - 0.40% max., and sulphur - 0.50% max.; ores to be delivered at bid prices at Columbus, Ohio.

The prices quoted by bidders ranged from $23.50 to $24.50 per short ton unit of WO_3 in lots of 100 to 400 tons. One bid was accepted for a lot of 425 short tons of Chinese ore offered by Wah Chang Trading Corporation of New York City at $23.75, including a $7.93 duty, per short ton unit.

Chromium:

The chromium chemical analysis requirements of the government bids are given as follows: Chromium oxide (chromic acid, Cr_2O_3) - 48% minimum, iron - maximum not more than one-third of actual percentage of chromium metal (in other words, an ore running 48% chromic oxide, which would contain only 33% metallic chromite, could not run more than 11% iron to meet the specifications), sulphur - 0.50% max., and phosphrous - 0.20% max.; deliveries of chromite ore to be made at New Cumberland, Pennsylvania.

Prices quoted by bidders were in the neighborhood of 3.2 cents per pound of contained chromic acid in quantities of 6,000 tons or more of ore. The two bids on chromium ore were cancelled on the grounds that neither bidder could meet the government terms.

Certain physical and other requirements are stipulated in the bids as published by the government. These conditions are outlined on page 72 of the Engineering and Mining Journal for October 1939, and page 29 of the November issue of the same publication. In very brief outline the additional requirements are as follows: for manganese - preferably ore should pass 4-inch screen and contain a minimum of fines; no ore to be accepted which will not pass 6-inch screen nor which contains more than 12½% of fines which will pass a 20-mesh screen. For tungsten - acceptable in lumps or fines or a mixture of both; ore to be delivered in heavy oak barrels or suitable steel drums, weight of each filled container not to exceed 500 pounds. For chromium - to be furnished in lumps; all lumps to pass a 6-inch screen and not more than 10% to pass a ½-inch mesh screen; all ore to meet federal specifications for manufacture of ferro-chromium without blending.

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ARTICLES OF INTEREST

"Equipping a Small Gold Mine on the Mother Lode", by O. H. Rolfs; Engineering and Mining Journal, October 1939. This gives a good write-up of the cost and details of equipping a small gold mine anywhere.

"Bleaching Clays Find Increasing Use", by G.A.Schroeter; Engineering and Mining Journal, November 1939. This gives an outline picture of classification, utilization, and geology of these clays. Reading of this article along with this Department's Bulletin no.6, "Some Refractory Clays of Western Oregon", will give anyone an informative picture of the clay possibilities of western Oregon.

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Attention is drawn to the following properties for acquisition or disposal.

112-1. Wanted to lease: Small free gold mine for 20-ton mill operation.
Byron Brown,
Stanfield, Oregon

112-2. Morning Mine in Greenhorn District, Baker county. Well developed mine. Water, timber, and power available. Will consider sale, lease, or financial aid. W. W. Gardner, Whitney, Oregon.

112-3 Gold property of 2 unpatented claims located in Granite District, Grant county. Developed by 25-foot shaft and 150-foot tunnel. Water and timber available. Will consider sale or financial aid.
John Leuck, Granite, Oregon.

112-4 Gold and scheelite property in Lower Burnt River District, Chicken Creek, Baker county. Will consider sale or financial aid to put in small mill.
Geo. E. Morin, Allegany (Coos Co.) Oregon.

112-5 Gold property of 3 unpatented claims in Grant county. Developed by 33-foot shaft, 40-foot tunnel, open cuts. Water and timber available. Will sell. Floyd Sherwood, Austin, Oregon.

112-6 Gold property of 4 unpatented claims in Upper Burnt River district, Baker county. Developed by 150-foot drift and surface cuts. Will consider sale or financing. W. T. Thomason, Baker, Oregon.

112-7 Clay deposit of 2200 acres, patented, near Curtin, Douglas county. Developed by surface cuts. Water and timber available. Will consider sale or financing. C.Wolfer and A.E.Miller, Canyonville.

112-8. Limestone deposit of 4 unpatented claims near Riddle, Douglas county. Developed by surface cuts. Water, timber, power, railroad available. Will consider sale or financial aid. (See 112-7 above).

112-9. Molybdenite deposit of 3 claims near Rogue River, Jackson county. Developed by surface cuts. Water, timber and power available. Will consider sale or financing. (See 112-7 above).

112-10 Gold property of 8 claims 20 miles south of Powers, Oregon. Developed by tunnels and open cuts. Water and timber available. Will sell or consider aid in development. W. W. McCoy, Powers, Oregon.

BENTONITE.

The name bentonite has been applied to a group of clays that have been derived from volcanic ash and that contain as their chief constituent the clay minerals montmorillonite (a complex silicate of aluminum, calcium and magnesium) and beidellite (aluminum silicate). The broad term bentonite includes the two general classes: (1) the standard bentonites which absorb large quantities of water and swell to many times their original volume, and (2) the subbentonites which absorb practically no water and swell no more than ordinary clays.

Bentonite occurs principally in Wyoming, California, and South Dakota; and lesser deposits exist in Montana, Arizona, Utah, and Idaho. It originated as deposits of volcanic ash or dust which settled in the salt seas of the Northwest. The glassy ash particles were gradually devitrified by chemical decomposition and hydration as the region alternated between land and sea.

Bentonite has no definite chemical formula, and the composition will vary greatly between the different kinds even from the same deposit. Montmorillonite forms more than 75 percent of the mineral content; while feldspar, gypsum and calcite, quartz, volcanic glass, biotite, and zeolites form the remainder.

As with most nonmetallic minerals, physical properties control utilization and price. High-grade bentonites of the standard, or Type 1, class absorb as much as 5 times their weight of water and swell to as much as 15 times their orignal volume. Additions of 6 parts water make a gelatinous paste of bentonite, while 20 or more parts make a colloidal solution in which particles of bentonite will remain in suspension indefinitely. The subbentonites of Type 2 do not swell, and they settle rapidly in thin water dispersions.

The principal uses of bentonite are as a bonding agent in foundry moulding sands; oil-well drilling mud; for bleaching petroleum products; in the manufacture of cement and ceramic products, soaps, paper, cosmetics and pharmaceutical products and roofing; for clarifying wines; as a suspending, thickening, and paste-forming agent in laundries, water softeners, and newspaper manufacture; for sealing irrigation dams and ditches and subsurface building walls against seepage of water; for clarifying turbid water and purifying sewage; and many other uses which are continually being found.

The best developed Oregon occurrences of bentonitoid clay are located in the Molalla region some 20 miles south of Oregon City. However, bentonitoid clays, as defined above, are derived from volcanic ash; so therefore, any area containing altered volcanic tuff is a possible bentonite deposit. Simple tests for absorption and swelling of a sample of clay will indicate the likelihood of its being a bentonite, and time may be saved by the prospector by making these tests in the field .

The commercial value of a bentonite deposit depends upon the type or class of bentonite, thickness and dip of clay seam, amount of overburden, and cost of transportation.

Bentonite has decreased in cost during the past few years until it is now quoted at $7 to $8 per ton in dried, coarsely crushed form in carload lots.

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