ORE.-BIN

Vol. 2, 1940

That you may have

A HAPPY AND PROSPEROUS NEW YEAR

is the wish of the staff of the Oregon Department of Geology and Mineral Industries.

It is our hope that during 1940 you may be as busy and as happy in being busy as you have been and as we have been during 1939.

This Department is now 2½ years old. It is getting much of the wobbliness out of its legs, has had a reasonably lusty voice for some time, and shows occasional signs of intelligence.

At the moment this child of ours is thrilled with the prospect of new types of diversion and new worlds to conquer. In our earliest babyhood we heard strange stories about kilowatts, jigs, anodes, electrolytes, and other mysterious toys. These bedtime stories are beginning to take more tangible form. We hear about a new plant that is assured for the manufacture of aluminum metal, about plans afoot for employing these kilowatt and anode toys in doing all sorts of interesting things. We hear about Uncle Sammie diamond-drilling for chromite - and finding some - to make more bright shiny toys and tools. In fact, we hear so many things, and in the meantime note that some of them are coming to pass, that we are more enthusiastic than ever before on the kind of story we will have to tell you a year or two years from now.

On the whole, we are extremely pleased that our babyhood and youth are to coincide with the most interesting development of the country in which we live. We hope you share our pleasure in the prospect of growing with, and contributing to, this country and its future.

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TO ALL EXCHANGE LIBRARIES:

Announcement is made of the release of Bulletin No.15, entitled "Geology of the Salem Hills and the North Santiam River Basin, Oregon", by Thomas P. Thayer. Copies of this publication will be mailed from this office about January 6th, 1940. If not received within ten days from the above date, advise this office immediately; otherwise, replacement 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:

> "Geology of the Salem Hills and the North Santiam River Basin, Oregon", by Thomas P. Thayer: State Department of Geology and Mineral Industries, Bulletin no.15; 40 pp., 3 tables, geologic map in colors of the Salem Hills and North Santiam River Basin, Oregon, 8 figures.

Owing to the nature of the Act which created it, this Department functions in Oregon as a State Geological Survey, a Bureau of Mines, and a Department of Mineral Industries, all combined. In view of this rather broad scope of activities the departmental publications are divided among several categories, including geology, mining, metallurgy, state-wide mineral inventories, industrial analyses, etc.

This bulletin is confined strictly to a geologic subject and embodies an academic discussion of the structure, age relations, glaciation, physiography, and general geology of the area covered. Although a reasonable amount of areal geologic work has been done in the Cascade area from Eugene north to the Columbia river, the results of most of such work have not been made accessible to the public. The work done by Dr. Thayer and published herewith is an addition to the geology of this country and fits in with Eugene Callahan's Cascade work. We believe that the author, Dr. Thayer, now one of the geologists of the U. S. Geological Survey, has made a worthwhile contribution to Oregon's geological literature, especially by his outlining the relations between the older "Western Cascades" and the younger "High Cascades" volcanic series. The bulletin should be of interest and value to geologists and students making investigations anywhere along the Cascade belt of the Pacific Northwest.

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NEW ALUMINUM PLANT TO USE BONNEVILLE POWER.

The lower Columbia River area received, almost as a Christmas present, assurances of the installation in 1940 of a plant for the manufacture of aluminum metal. The Aluminum Corporation of America, according to our understanding, has purchased some 200 acres of land on the north side of the Columbia River just below Vancouver, Washington, for a plant location, and has signed a contract with the Bonneville Administration for some 32,500 kilowatts of electrical energy. It is stated that the plant will be completed within the next twelve months, will cost a matter of $3,000,000, will employ between 300 and 400 men, and will use raw material shipped mainly all rail from the lower Mississippi Valley and perhaps from the Guianas.

This is the first large block of electrical energy which has been contracted for by the Bonneville Administration, we are told, and should start the ball rolling toward the larger use of Bonneville power for industrial purposes. The people of the Portland-Vancouver district should feel kindly toward Dr. Raver, Bonneville administrator, for his successful work in negotiating this contract, and should themselves feel fortunate in being the recipients of such an industrial punch as the building of this plant should give to the community. Dr. Raver has openly advocated that industries that are large consumers of electrical power are the ones which should best fit into the Bonneville picture, and he has also maintained that certain industries might be encouraged to locate here, rather than elsewhere, for no other reason that the inducement offered by low-cost power.

The accuracy of his position has been fully borne out by the recently completed negotiations with the Aluminum Corporation, because so far as we now know there are no substantial deposits of raw materials in the Pacific Northwest to support an aluminum industry. All of the raw materials will be brought in from outside and a major portion of the product of this plant must be shipped away to the outside until such time as there is sufficient consumptive capacity in the Northwest to absorb it. (That's some kind of a challenge to us).

It is our feeling and prophecy that other corporations in the business of utilizing or treating mineral and other raw materials, and who require large quantities of cheap electricity, and who can operate with high load factors, may be encouraged by the example set by the Aluminum Corporation. Next in order should come such industries as ferro-alloys and electro-chemicals, with cellulose and waste wood product plants following.

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HOUSE INSULATION.

Recent experiments have been carried by the Tennessee Valley Authority in connection with the problem of saving domestic fuel bills by proper house insulation. According to information recently published, the reduction in total heat loss in a properly insulated house was 45%. Two identical four-room houses were built at the Hiawassee Dam construction community, one of the houses built in the usual way and the other insulated throughout with a type of wool batting in the walls and over the ceilings. It is stated that the total cost of construction

of the house with proper insulation amounted only to an additional $200 for both labor and materials. The heating of the two houses was done by electricity so that the cost could be accurately calculated.

This question of proper insulation is one which should be given careful thought in the Pacific Northwest, because we are large manufacturers of insulating materials from waste wood products, and because almost all of the coal and oil (and the oil to manufacture gas) with which Portland homes are heated must be purchased out of the state and shipped in.

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MINERAL WOOL.

Mineral wool is a substance composed of very fine, interlaced mineral fibers having the appearance of loose wool or cotton. It is composed principally of silicates of calcium and aluminum. This term covers a number of similar products as follows:

Rock wool, made from natural rock or combinations of natural minerals.
Slag wool, made from iron, copper, or lead smelter slags.
Glass wool, made from silica sand, soda ash, and limestone.

These products are marketed in various forms: loose wool, granulated wool, fabricated forms, and insulating cement.

Individual plants follow various practices, so only the essential steps of the manufacturing process will be outlined here. The process consists essentially of melting the raw materials, blowing the molten material into a woolly fibrous material, and preparing the product for the market. Electric cupola furnaces are the principal melting units. Slag is drawn off the furnace and is blown through nozzles or orifice plates by means of steam or compressed air. The wool fibers are screened to rid the wool or slag shot and are then prepared for market. Loose wool and granulated wool require little handling. Wool for fabricated forms and insulating cement is mixed with various binders, and pressed or molded into shapes.

It would appear from the foregoing brief outline that the process for the manufacture of mineral wool is a comparatively simple process. It is true that for an investment of from $30,000 to $50,000 a plant capable of producing about 1,000 pounds of wool per hour (12 tons per day) may be built. However, the manufacture of mineral wool to meet specifications within rapidly narrowing limits is not a simple process and cannot be accomplished without detailed and elaborate technical control. Those items which require study and control within the plant are: chemical and physical composition of raw materials, type of melting furnace, melting and blowing temperatures, blowing technique, and shot prevention and removal. Consumer specifications control the limits on the following properties: chemical composition, shot content, fiber size (diameter and length), ductility or softness, waterproofing, and thermal conductivity. These specification requirements vary considerably according to the use of the particular product.

Mineral wool is used as an insulating material in buildings of all sorts. Modern homes with mineral wool insulation not only are easier to heat, as well

as heated more cheaply, but the wool is an excellent fire-retardent. The wool may be tamped loose between walls or may be put directly in place in the form of sheets, blocks, or bats.

Mineral wool manufacture tends to be a decentralized industry because the wool may be made from a number of different kinds of raw materials and because mineral wool is a bulky material, expensive to ship great distances. In spite of the fact that small, widely scattered plants are possible, their operation must be highly technical so that the product may meet the market specification.

Mineral wool manufacturing plants in the western states are located at Torrance, Los Angeles, Watson, and Huntington Park, in California; and Salt Lake City and Sandy, Utah.

Prices of rock wool range from about $20 to $50 per ton for the finished product.

In the Pacific Northwest any manufacturer of mineral wool would have to compete with makers of wall board and several types of insulation made from waste wood products. This would be rather stiff competition. Nevertheless, the fact that mineral wool is fire-proof or fire resistant and reportedly is less affected by climatic changes and less apt to absorb moisture, may give the product a slight advantage over a product made from organic materials.

References: "Rock Wool", Furcron, Munyan and Smith: Dept. of Natural Resources, Div. of Mines and Geology, Atlanta, Georgia, November 1939.
"Mineral Wool": J. R. Thoenen; U.S.Sur.Mines, IC 6984 R, June 1939.

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HIGH EFFICIENCY ELECTRIC LIGHT BULBS.

According to SCIENCE NEWS, the research engineers of the Westinghouse Company predict, on the basis of tests, that in the future we shall have electric light bulbs which are at least three times as efficient as the ones in common use today. These new bulbs will employ the two rare metals caesium and tellurium. Caesium is now used in small quantities in photo-electric cells and it works with great efficiency. Tellurium, the engineers state, promises to make possible a lamp yielding almost the exact duplicate of sunlight, a bluish light or a yellow light as desired.

Present difficulties of manufacturing these new lamps include the fact that quartz, which must be used to confine these rare metal vapors at extremely high temperatures, is brittle and difficult to use in automatic machines. Tellurium vapor yields light efficiently on direct current but not, apparently, on alternating current, - a handicap to such a lamp's use now.

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TIN.

According to a recent announcement by a member of the American Tin Trade Association, two tin smelting plants will be in operation on the Atlantic Coast. Phelps Dodge Refining Corporation and American Metals Company have completed, on modest bases, installing equipment for furnace-smelting and fire- and electrolytic-refining of tin ores and concentrates. With this industry established in the United States, American consumers of tin will not depend entirely on Dutch smelting interests. Concentrates from Bolivia, the Far East, and China could be treated directly in the United States without shipping to England and Holland and then shipping the metal back to the United States. The United States consumption for 1938 was 50,000 long tons, or 30% of the world production.

Establishment of the industry on continental United States may stimulate domestic production from Alaska, South Dakota and Wyoming, and South Carolina.

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So many requests have come in for a little pamphlet on Sampling that we produced in 1937, that we have made a re-issue. Now, we will be pleased to send it to anyone who asks for it, and who encloses a 3¢ stamp to cover postage.

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The Industrial Minerals Chemical Company, address 6th and Gilman Streets, Berkeley, California, mine, buy, process, and deal in many types of non-metallic industrial minerals. They also act as distributors for products of other concerns. Persons looking for a possible market for non-metallic minerals may address inquiries direct to the company in Berkeley.

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WE UNDERSTAND -

That this week, "Pop" Wilmot is starting his enlarged quicksilver reduction plant at the Oregon Bonanza mine near Sutherlin. This operation will now be the largest producer of quicksilver in the United States, and the Bonanza mine represents the largest known deposit of quicksilver ore in the United States. (Wanna fight?)

That Art Champion is getting along nicely at the Mother Lode mine east of Prineville and is producing a number of flasks per week with a Gould furnace.

That the Blue Ridge property also east of Prineville is retorting about a flask a day from their workings, which are shallow.

That Ray Whiting is installing a small rotary retort at his interesting new quicksilver property across from the Ochoco Ranger Station.

That a real placer gold operation is really getting going in the Mormon Basin.

That Atlas Dredge Corporation is well along with its installation of a big 3-yard doodle-bug on Althouse creek in southern Josephine county.

That Murphy and Murray, within the last two weeks, shipped in the makings of a new bucket line dredge to operate on the left fork of Foots creek in Jackson county.

That the Al Sarena, better known as the Buzzard mine, north of Medford, recently started up their 100-ton flotation mill and should be among the interesting producers in 1940.

That the Esterly mine in southern Josephine county, one of the more consistent hydraulic placer operations of the state, started piping December 9th and is set for a good season.

That the Benton mine, 40-50 ton cyanide operation on Whiskey creek down Rogue River below Grants Pass, is running at capacity - as usual.

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Hey! You!! Try this. Make one column of all the mine operations in the state that are running along profitably. (Yes, you'll have quite a column - and an ever-increasing one). Make another column of all the mine operations in the state that have real, honest-to-God technical supervision - that is, sound scientific engineering and geological advice (and we mean SOUND, not merely "an old-head miner from the Couer-d'Alene", or a "miner from the Mother Lode").

Then see if you can tell one column from the other. You'll find they're "bloody twins".

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Assayers at the State Assay Laboratories, established to provide free assay service to citizens of Oregon, have analyzed samples of all descriptions for a great variety of elements, although mainly for gold, silver, copper, chromium, manganese, platinum, and quicksilver. The Grants Pass office opened in August 1937; while the Baker office opened in September 1937. Detailed records of the first few months were not kept, but a resume' of the records for the past two years is given in the accompanying table.

The first year, the laboratories were on trial and had to prove themselves to the mining public. As a consequence, many "test samples" were submitted by curious prospectors. However, the laboratories have proved themselves and now have settled down to stabilized operation. It is our hope that the records for 1940 will be as good as those of 1939, for they will show we are satisfactorily serving the people of Oregon.

REPORT OF STATE ASSAY LABORATORIES FOR 1938 and 1939.

	Baker		Grants Pass	
	1938	1939	1938	1939
Visitors:				
Total	6166	5347	3200	3321
Average per month	514	445	267	277
Average per working day	23	20	12	11
Assay Determinations:				
Total	4010	3062	3390	3228
Average per month	334	255	284	269
Average per working day	15	12	13	10
Correspondence:				
Total	2211	2033	1505	1293
Average per month	184	170	125	110
Average per working day	9	7	6	4

The Portland office during 1939 received 2881 visitors, received 8984 pieces of mail, and sent out 18,323 pieces of mail. The mail sent out included letters, Ore.-Bins, reports, and bulletins.

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MY DREAM HOUSE

by

Earl K. Nixon

When I was in the 7th grade - that is, during the summer vacations - I got my first real job. I mean my first REAL job, not selling papers or running errands or any of those things kids usually do. I got a job in a brick plant in our neighborhood. The consideration was four bits a day of ten hours each. Folks, that was money in those days! Do you remember what happened in 1907? They call it "depression" nowadays; the word was "panic" in 1907. Well, Dad raised Hell and put a stull under it and Mother doubled and redoubled, but I won. They both said I was too small (which I wasn't) and too young (which was irrelevant). I had already worked ten days at the plant "for love" before mentioning the fiscal angle to the manager or the job to my folks. They thought an overgrown kid must blow off steam; it wouldn't last more than a few days. It did, though. I stuck 'til school began in the fall.

I certainly learned the brick-making business from clay pit to kiln, -"as she was did" in our town. It was like this: The plant was an old one. It had produced bricks for most of the streets and half the business blocks in town, but brick pavements and buildings were going out-of-style - along with the owner of the yard. The personnel of the entire enterprise consisted of three: the owner of the works, a fine old man of about eighty; a lop-eared, mangy, gray, torpescent old jackass of about forty; and myself. When the old man would call "Jack", the rest of the force would rally round and he would take his pick. I've always suspected there wasn't much to choose between the jackass and myself, except perhaps for age.

When we needed "mud", I would take a muckstick, the jackass, and a big two-wheeled cart, trundle off down across the river to the pit, and bring back a half ton of clay. Then I'd muck the clay out of the cart into the "mill" which was no more nor less than a hopper containing a big mixing screw or paddle arrangement. Reminded me of our old-fashioned hand coffee-mill - the kind in which we used to grind Arbuckle's and Lion Head Coffee. Remember when we smart men folks would sometimes try to help the women by offering to grind the coffee? And we'd take the little brown box affair between our knees and start turning the crank . . only we'd forget which side the little drawer was on, and the cockeyed thing would come out and spill coffee all over the floor! Well, the clay mill had a crank just like that, too, only we called it a sweep. We always hitched the jackass to the sweep and he turned the mill. I turned the jackass; and the old man turned both of us. At least, that was the general idea. At the southeast edge of the sixty-foot circle-path was a spot of shade that old Jack loved, and in which he usually stopped in passing. I called it Profanity Corner and it justified its name.

Most of the time, of course, I was "off-bearing" bricks - carrying them three at a time in their mold from the molding table to the "yard". They had to be turned over out of their mold just so onto the smooth, prepared ground, otherwise they would buckle a little or go out of shape. The old man tended to the "grinding" of the clay and the molding of the bricks, cutting off the tops neatly with a wire-strung

"bow" after each mold was properly filled. Sometimes the old man would get too much moisture into the "mix", and it would go sticky and hang in the molds; sometimes I would get some rotten wood or waste into the clay when at the pit, and it would raise heck; and often the jackass would "go democrat", and no amount of tanning his ramparts would budge him. But somehow, day after day, we managed usually to turn out about our regular number of bricks. And they were good bricks. They were hand-made and each received individual attention. If one had a flaw, it was never burned.

After a brief drying in the yard, the bricks went to the sheds; and when the sheds were full, they went into the kilns. But let's skip that part of it.

Anyway, during those hundreds and hundreds of trips with a mold or tray or little truck - each trip just like the last - I came to approve of those little earthen men, rather than detest them as many workers might. They took on entities. They had a right to. They were things of substance. Each had a future, each a definite part to play in the creation of some building or object of assured utility. I came to admire them, even to respect them. I determined someday to build a house of brick, a sound, substantial house. I would have a house that I could be proud of, knowing that it contained solid, indestructible, honest materials, - materials that would not burn or crack or deteriorate rapidly with age. I'd have a house as good and substantial as those in England and France that have stood one and two and three hundred years and are as sound as ever.

I'll build that dream house someday, too, although from time to time in the last thirty years I've changed the design and the bill of materials. . . quite drastically, in fact, of late. And this is the kind of a house I envision:-

It will have a flat roof, because the base of a triangle is shorter than the sum of the other two sides: it's cheaper. Someone started building "A" roofs because he didn't know how to build one that wouldn't sag or leak or pass heat through. We've been building "A" roofs ever since. My flat roof won't sag or leak or transmit heat (or cold) through to the rooms below. In fact, most of my roof will be paved with an asbestos tile composition, and will be virtually a "boat deck" littered with colored lawn umbrellas and porch furniture in season. Of course, part of the roof, containing the stairway from below, will be glassed in like a pilot house and will be used for a sleeping porch or recreation room in bad weather. Put a house on a fifty-foot lot (which is criminal but true) and how much yard do you have left? I'm going to get back the rest of my yard - my "Juliet" yard. You Romeos can stay below. I'll take the high yard and you take the . . . well, hell, you can have the rest of the yard!

The walls of my house will be about three inches thick (not 6 or 8), and sheathed with thin sheet metal, perhaps copper - with diatomite or some other eqally good (if possible) insulating material between. These three-inch walls of the right modern material will have about the same insulating properties as a brick wall <u>two feet</u> thick (and cost a lot less to put up). For stiffening there will be studs of light, stiff steel or alloy channel-iron at intervals and properly located to accommodate windows. Very likely I'll have a few tiers of translucent glass brick most of the way around just below ceiling height. Might as well use more daylight: we're not taxed for it, yet.

And windows! Wait 'til I tell you. Of course they will be of fused quartz glass to transmit the health-giving ultra-violet rays of the sun. They will be

essentially two big parallel panes of heavy glass set into the walls with a 3-inch air space between. There will be no casings, no locks and no sash weights; the outer pane will be practically flush with the outside wall of the house, and the inner pane will be almost flush with the inside wall of each room. You can't open my windows to let in dust or drafts or germs or burglars. You won't need to open them as the house will be ventilated automatically. There will be no roller blinds to put up and take down a few times each year and thereby increase the accident rate: I'll use Venetian-type (light metal) blinds between the panes of glass in the almost hermetically-sealed air space. A little crank in the room will operate them. Then I'll have a law passed preventing the hanging of drapes, lace curtains or any similar dirt-catching, room-darkening sort of contraption in a human habitation. You don't sleep in a dust-catching, lace-canopied four-poster bed any more, do you? Your great grandmother thought she couldn't sleep in any other kind.

And furthermore, - why are our windows almost always built with their long dimensions up and down, instead of horizontal? Easy. It's so one can lower the top sash or raise the lower one to let in air in the desired way. I won't be opening my windows so it won't matter. My windows will have their long way horizontal, so that if I want to watch old lady Scraggs mince along the icy pavement, I can do it without walking clear across the room to keep the window between her and me. And mark this: the bottom of my windows will all be 36 inches above the floor; then I can locate a table, chair, divan - or bed - in front of a window and nobody outside will be the wiser. Ever watch the Object of your Affection trying to spot a davenport, dresser, or bed where it won't be in front of a window, or where a swinging door can't hit it?

Floors? Oh, what I'm going to do with them! My floor joists will be steel channel or "I" beams of not more than 4-inch section, covered with metal sheeting (shaped for stiffness, you know), then by a layer of sound-deadening (and insulating) material - like compacted mineral wool - then by composition flooring. If the pooch sneaks in from the muddy flower bed and rolls on the kitchen floor, just get the garden hose and sluice out. How much head room I'm going to save in the basement, or rather, how much excavating and foundation concrete I'll save.

The partitions in my house will be about 3 inches thick - not six. And there will be no swinging doors in the house to bump into and to take up room, each with its swinging arc. The doors will slide quietly on ballbearings, back into the partitions at a finger's touch . . and I mean SLIDE, not stick. Did you ever stop to think how much room space is taken out of your house by thick partitions, and door casings, and how much floor space you virtually lose because the doors have to swing one way or another? I did, and was I surprised! The inside partitions in my present house (8 rooms) occupy 102.8 square feet - figured at 6 inches thick; and the swing of the doors (figuring a 1/4 swing of each 32-inch door) covers 120 square feet. That makes 222.8 square feet, or about the area of an extra 14 x 16 room. With 3-inch partitions, and doors that don't swing, I'll save a lot of that space. The outside doors, of course, will be either revolving or double in entry-ways, to maintain temperature and inside ventilation. They should be anyway. Of course, the partitions will be of light steel panel with light metal channel studding for stiffness.

There will be no dangling light fixtures to catch cobwebs in my new house. (There won't be many cobwebs, either). The fixtures will be set flush, or nearly so, around the edge of the ceiling, and with a couple around the walls at appropriate places for reading. There'll be no more (or not so many) bridge lamps to

missing

there are perfectly logical and practical reasons. Wood is becoming ever more expensive because it is becoming more and more scarce. Finished mineral products are becoming increasingly cheaper as they find wider use. We are putting better and better engineering into our houses, because it pays. By proper insulation we can practically cut our heating bills in two. That has been officially demonstrated. By using mineral materials that don't deteriorate, we can cut upkeep down a great deal; and by building with incombustible materials we can cut our insurance, and increase the safety of our families.

I have not discussed my ideas with an architect. I've just let my imagination run a little; but I nevertheless predict a trend in the general direction I have indicated with some of the seemingly unorthodox suggestions. Anyway, here's a toast to our future home: May it be burnless and noiseless, and germless and mouseless, and spotless and bugless, and rotless and ageless, and dustless and wearless, and rustless and cozy! - And may it be made of Mineral Materials.

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Stainless steel with 0.25 to 0.30% silver is one of the newest alloys. It possesses exceptional salt-water corrosion-resisting properties, greatly improved machining qualities, increased heat conductivity, ability to take a higher polish, and diminished work hardening.

No longer will non-ferrous metals hold the field in coinage use. Italy has just issued a new series of coins made of stainless steel containing 22% chromium, 12% nickel, and a trace of molybdenum. About 16½ million pounds of stainless steel were used.

Aluminum wire for delicate instruments is drawn so fine that one pound will produce 20,000 miles. Although the metal sells for 20¢ per pound, the pound of wire will cost about $200,000,000.

Aluminum metal in sheets 0.003 inch thick is being used for motion picture film. Projection of images will be by reflected light, but the reflectivity factor of the metal is higher than the transmission factor of celluloid. It offers not only a fireproof and non-deteriorating means of recording copies of valuable books, drawings, pictures, etc., but a more brilliant film for motion-picture projection.

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We have a communication from the Var-Lac-Oid Chemical Company, 116 South Broad St., New York, N.Y., stating that they buy ores, minerals and concentrates and are interested in the purchase of cobalt, tungsten, vanadium, molybdenum, zirconium, thorium, titanium, antimony, elements which can be classified as scarce or rare, and that they are also interested in such ores or minerals as asbestos, monazite, mica, chromite, etc. The corporation does not indicate that they are interested in purchasing properties but only in purchasing the products or ores from the properties. We presume that this company would give proper attention to communications from individuals who have ores alleged to contain any of the elements mentioned above.

Attention is drawn to the following property for acquisition:

12-1 Placer property, western Josephine county. Reported by owner to contain 400,000 yards of 40-cent gravel. Water available. Will consider financial aid.
A. E. Miller, Wolf Creek, Oregon.

TO ALL EXCHANGE LIBRARIES:

Announcement is made of the release of Geology and Geologic Map of the Round Mountain Quadrangle, Oregon, Map Series no.2, by W. D. Wilkinson and others.

Copies of this publication will be mailed from this office about March 15th, 1940. If not received within ten days from the above date, advise this office immediately; otherwise, replacement for copies lost in the mail or elsewhere cannot be made.

NEW GEOLOGIC MAP ANNOUNCED.

Announcement is made of the publication of the following geologic map and text by the Department of Geology and Mineral Industries:

> "Geology and Geologic map of the Round Mountain Quadrangle, Oregon", by W. D. Wilkinson and others: State Department of Geology & Mineral Industries, Map Series no.2; black and white geologic map, 30 minute quadrangle, scale 1:95,000; text, column, bibliography on back. Price 25 cents postpaid.

The Round Mountain quadrangle includes one of the three main quicksilver producing areas of the state. The map may be of considerable use to prospectors in that it delimits the area in which the quicksilver can be found, and suggests the best areas for prospecting. The map and text is also a valuable contribution to the rather scanty geologic history of central Oregon. Dr. W.D. Wilkinson, of the Department of Geology of Oregon State College, is senior author and has spent many years working out the past story in the rocks of that part of the state.

Eight geologic formations, ranging in age from Cretaceous to Pleistocene, give one of the most complete Tertiary sections known in the state. These were mapped by a party of seven men, under Dr. Wilkinson and John Eliot Allen of this Department, who spent six weeks in the field with plane table and chain.

A description of the formations is followed by a study of the structures and an outline of the economic geology of the region with discussion of seventeen of the mines and prospects in the area.

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This is our Special Annual Issue of THE ORE.-BIN. In it, we are including a sort of summary of developments in mining, metallurgy, chemistry, and certain topics which are of general interest in connection with the utilization of industrial minerals - all for the year 1939. Part of the material contained herein represents information obtained by the Director in a recent trip to attend the annual meeting of the American Institute of Mining and Metallurgical Engineers in New York, then during his discussions in Washington with the technicians of the U.S. Geological Survey and U.S. Bureau of Mines, and in various industrial centers in the East and Middle West with corporations producing or treating both metallic and non-metallic mineral products. Persons interested in more complete information in regard to any of the topics below are invited to write to this Department.

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Platinum is coming into wider use of late as a substitute for gold for dental and other uses, because, especially in foreign countries, the gold supply is small. Some of the platinum group of metals, particularly palladium, are being widely used in dentistry. In the United States, increased use of platinum in manufacture of electrodes for aircraft engine spark plugs is noted. Platinum is quoted at about $40 per ounce. The price increased somewhat during 1939. World production of platinum is roughly one-half million ounces, of which nearly 1/4 comes from the Sudbury copper-nickel ores.

Zinc is being used much more widely in alloys for die-castings for special automobile parts. Metallic zinc powder is in increased demand for use in paints and priming for galvanizing. There is a large current demand for rolled zinc for dry battery cans, we learned from MINING & METALLURGY, due to increased use of dry batteries in radio for war purposes, wartime blackouts, and the popularity of the new portable radio sets. Regardless of present demand, the situation of zinc in the United States seems much less satisfactory than that of lead. The reduction of 20% in the duty on slab zinc and ore which took effect in January 1939 as a result of a trade treaty with Canada is given as a partial cause for this situation.

A new Super-finish (to remove surface defects and scratches from mechanical operations on metallic surfaces) has been developed by Chrysler Corporation, according to MINING & METALLURGY. The polishing process is applied to surfaces regardless of whether they are flat or rounded. Ordinary abrasives of the proper type in a lubricant medium are applied under pressure to the metallic surface. After the Super-finished surface has been treated, it is stated, there are no indentations deeper than a few millionths of an inch. The Super-finish also is applied to bearing surfaces in such a fashion that closer clearance can be maintained with a minimum of lubrication.

The U.S. Bureau of Mines (Information Circular no.8788) has made a study of the mechanics of lime plants. From this it appears that small plants producing less than 1,000 tons per year cut but little figure in the total lime production; that the big companies producing 50,000 tons or more per year are more sensitive to depressions and market situations and showed a wide fluctuation in the rate of operation; whereas the medium-sized plants producing from 10,000 to 50,000 tons of lime per year are the most regular in their operations.

Alaskite, a rock consisting essentially of quartz and alkaline feldspar, is a new material of much promise in the ceramic industry, according to a review in MINING & METALLURGY. This rock when ground to a powder and treated electro-magnetically for removal of dark colored minerals, furnishes a satisfactory product for the manufacture of china sanitary ware products. It is stated that the rock may provide an important source of mixed feldspars for pottery.

Nepheline-syenite is finding increased production for use in the ceramic industries. It is now supplying a portion of the material for the Canadian glass trade, and it is said that production may be stepped up to take care of the needs of new glass plants in Ontario.

In the cement industry there seems to be a trend toward manufacturing a product of increased fineness. Difficulty in final grinding is met on account of the tendency of the smallest particles to flocculate or draw together into mounds or lumps because of their taking on slight electrical charges. The Dewey & Almy Chemical Co. of Cambridge, Mass., we learn from MINING & METALLURGY, has discovered a so-called dispersing agent which is added to the clinker grinding mill in the proportion of one part to three thousand. On account of the action of this reagent the mill capacities are stepped up as much as 20-40%, with a considerable saving in grinding costs for the final product.

Garnet is finding increased use as an abrasive for sand-blasting purposes. It is competitive, states MINING & METALLURGY, with silica sand or silicon carbide powders.

Substitution of borts (low-grade diamonds of gem quality) for black diamonds is an important trend in the diamond drilling industry. Bits are being made which use from 50 to more than 100 individual bort stones, machine cast by a patented operation. These bits are much cheaper than the old-fashioned diamond bits, which usually contained 8 large-sized black diamonds. The new bort bits are being used widely in most kinds of diamond drilling where the ground or rock is not fractured too badly. In fractured ground nothing has been found to surpass the old style diamond bit, set by hand with black diamonds.

Glass wool, according to MINING & METALLURGY, is attaining increased refinement and wider use as a substitute for asbestos in heating insulation. Glass wool is in general superior to insulation made from wood waste products because the latter are not fire resistant. Owing to the bulkiness of glass wool, it is uneconomical to ship it very great distances, therefore the product is commonly manufactured in areas of large population for consumption and shipment within a radius of a very few hundred miles from the producing plant. This is an industry which might well be looked into for the Portland area, where people are becoming more and more conscious of the economical soundness of properly insulating their houses against heat losses.

About 100 tons per month of massive serpentine, according to MINING & METALLURGY, are being shipped from Nottingham, Penna., to a point in the Middle West,

presumably for utilization of its magnesia content. Perhaps we can pick out some use for certain deposits of rather pure serpentine that are located in southwestern Oregon.

General Motors Corporation in 1939 took out a patent for a brake lining manufactured from glass fiber. We understand the fiber is combined with a synthetic resin and presumably molded into brake block shapes. A number of amazing materials are now being made from glass fiber. These include cloth of various types and intended for various uses. The elasticity of glass when spun into infinitesimally fine fibers is the basis for its increased use for new industrial materials.

Pyrite, according to MINING & METALLURGY, was being shipped for some months last year from Canada into the United States at the rate of 1,000 tons per day. This material will replace in great part the importation of pyrite from Spain. Such importation, of course, has been interfered with on account of war conditions. The Wescott process for recovering sulfur from pyrite was perfected in 1938 by the Aldermark Copper Corporation, Ltd., of Quebec. The operation of the plant, however, we understand, has been delayed because of the heavy demand for pyrite for other uses.

Concrete is being used for construction of a floating pontoon bridge across Lake Washington at Seattle. This bridge will be more than 6,000 feet long and will consist of 25 pontoons each 350 feet long. A section in the middle of the bridge is removable by a telescoping mechanical arrangement so that water traffic may pass through. Anchors are attached to each of the pontoons to prevent swaying of the bridge, which is designed to resist the force set up and the waves created by a 90-mile-an-hour wind. During recent storms, with 4200 feet of the bridge in position, winds with a velocity of 50 miles per hour shifted the structure sideways only about 2 inches. It is interesting to note that the Golden Gate Bridge, a steel and concrete suspension structure, is said to sway a total of nearly 12 feet in a wind of hurricane velocity. The reinforced concrete pontoons are "poured" while in a drydock, and floated into position, where they are fastened together with heavy anchor bolts. The pontoon type of construction was selected because of the great depth of water, more than 200 feet, and because the present bridge will cost only slightly more than $4,000,000, as against the estimated cost of $20,000,000 for the conventional type of bridge. An excellent description of this pontoon bridge, the largest of its kind in the world, is given in the COMPRESSED AIR magazine, to whom we are indebted for the above thumb-nail description.

Modern Calyx drills which remove a core 6 feet in diameter are also described in the COMPRESSED AIR magazine. This drill is now being used for the emplacement of deep footings for bridges where a footing of substantial diameter is desired, and yet where it would not be feasible to sink a caisson. The drills may be mounted either on scows floating on the river, or on land locations. The Calyx is one of the two methods becoming more and more popular for rapid and satisfactory sinking of mine shafts.

Steel production of the eastern mills has been falling off rapidly very lately from a near 100% capacity around the first of the year. This is alleged to be due to a combination of causes, among which are uncertainties over the war situation and uncertainties over automobile sales for the current season.

Lead is in a strong position mainly on account of demand caused by war conditions. During December sales reached a record high of 104,000 tons, or around 2½ times the current domestic mine output. Nevertheless, the price has not increased in proportion to what the demand would indicate it should.

Cobalt imports during 1939 were almost double those of 1938, although it does not appear that the actual consumption was substantially greater than in the latter year. The increased imports went mainly into inventories.

Magnesium, according to the ENGINEERING & MINING JOURNAL, set a record world production as a result of new plants built in the United Kingdom, Italy and Japan. Military aircraft construction led in consumption of magnesium alloys but the use of high-pressure die castings as well as sand castings expanded also. The price of the metal was reduced by the Dow Chemical Co., sole domestic producer, from 30¢ to 27¢ per pound. Much work has been done by the U.S. Bureau of Mines in their research laboratories on the problem of economic production of magnesium metal from domestic magnesite.

The manganese situation has been somewhat affected by war conditions. About 700,000 long tons of manganese ore, containing about 300,000 tons of manganese, were imported during 1939. Of this, the largest amount, or 27%, came from Russia. The rest came from the Gold Coast, British India, Cuba, and Brazil. Domestic production amounted to little, only about 28,000 tons in 1939. The U.S. Bureau of Mines and the U.S. Geological Survey gave considerable attention to manganese in 1939, and will give even more attention during 1940, we were informed in Washington. Exploration is now going on in the Olympic Peninsula of Washington. Due mainly to the research work of the Bureau of Mines on the deposition of metallic manganese, one of our domestic corporations is carrying on exploration in the Artillery Peak region of Arizona on oxide ores, running only 12% to 15% Mn. It is probable that some attention will be given this year to exploration and metallurgy of manganese carbonate ores in California and elsewhere. This Department will shortly undertake an investigation of some low-grade manganese deposits in Baker county, Oregon, to determine whether they are worthy of recommendation to the U.S. Bureau of Mines for attention under the Strategic Minerals program.

Mercury jumped from less than $80 to about $160 per flask during 1939. Oregon quicksilver was sold this last week at a price of $180 per flask. Price fluctuations have been marked during the last six months as the demand for the metal is based both on the war news from European countries and on the current requirements of industry in this country. The largest individual quicksilver producer in the United States at the present time is the Bonanza Mine at Sutherlin, Oregon, H. C. Wilmot, manager. The Bonanza produced 500 flasks in February 1940, and is pegged for a continuing production of nearly 600 flasks per month. With the Bonanza producing at this rate and other operations accelerating their production, it is not unlikely that Oregon production will equal that of California for the year 1940.

According to the ENGINEERING & MINING JOURNAL, the phenomenal rise in molybdenum production was checked in 1939. The production was about 31,000,000 pounds last year, or 7% less than that for 1938. The Climax Molybdenum Corporation of Climax, Colorado, produces about 2/3 of the domestic metal. Until recently, Russia, Japan and the United Kingdom have been receiving molybdenum exports from this country, although the question of continued export to Japan especially is doubtful, since the State Department has included this metal on the moral embargo

list. The most interesting angle in the molybdenum picture during 1939 was the increased production of this metal as a by-product of the copper operations at Bingham Canyon, Utah, and Chino and Miami, Arizona.

Vanadium imports, according to ENGINEERING & MINING JOURNAL, were about 30% larger in 1939 than in the previous year. All American imports came from Peru. The principal domestic producer is the United States Vanadium Corporation, from Colorado and Utah ores.

Prospecting, it was brought out at recent meetings in New York of the American Institute of Mining & Metallurgical Engineers, is receiving increasing attention on the part of large mine operators in various parts of the world. Methods are continually being improved and especial attention is being given to geophysical methods and refinement in drilling and sampling. One of the new devices is a rotary type of prospecting drill, especially adaptable for testing placers on unconsolidated materials. It combines some of the advantages of the churn drill with certain advantages of the rotary as used in oilfield practice. It will remove, virtually intact, a "core" about 9 inches in diameter, and since the casing is rotated, will diminish the amount of contamination of sample. The machine is not yet in production. If it does what the first model tried out in the field indicates, it should be a boon to prospecting for dredge ground. . . The use of fluorescent lights for prospecting for scheelite is an interesting new development. Surface work can be done at night, and by using portable equipment an engineer can walk over a deposit and obtain some acceptable idea of the amount of tungsten contained in outcrops. The device is also used for "assaying" stopes in underground tungsten mines, and, it is said, does a very acceptable job in the hands of one accustomed to using the device in this manner.

Improvements in hard rock drilling underground were made in 1939. One of the larger manufacturers of rock drills is perfecting a high speed (3600 rpm.) type of post machine which is electrically operated and almost automatic. Special alloys or bort are used for the bits, which are cooled by a stream of water forced through the hollow drill rod, in the same manner as in a water leyner. It is estimated that the drilling cost with this new machine will be very materially reduced. . . . Jack bits or detachable bits are becoming increasingly popular for general use underground as their quality is being improved. W. M. Ross (MINING & METALLURGY) estimates that about 1/4 of hard rock drilling is now being done with replaceable bits. Jack bits, as now manufactured, are used three or four times, each time after resharpening in a grinding device, and are then thrown away or saved for scrap.

The "burnt cut" is a method of drilling and blasting a drift round of holes so that sequence of blasting first breaks a cut in the center of the face to the approximate depth of the center holes drilled. The remaining top, side, and bottom holes all break to the center cut. The unique feature of the "burnt cut" is that, of the nest of symetrically spaced holes drilled near the center of the face, some are not blasted but serve to relieve the ground so that those blasted will break efficiently. A description of the method as practiced at the Hollinger is given in T.P.No.1159 American Institute of Mining & Metallurgical Engineers.

Dredge practice did not change materially in 1939. Some operations changed over from tables to jigs, some discarded their jigs. New replaceable bucket lips are increasing in popularity. More attention is being given to refinements in gold saving than previously. Especial attention is being given to riffles. Hard rubber riffles are coming in, it appears, and rubber strips are replacing metal

stripping for the wearing top surfaces of Hungarian riffles in dredge sluices. Rubber lining for sluices is becoming quite common. One angle of dredge practice which has been sadly neglected but which is now receiving some attention, is that of accurate and automatic sampling of the tailings. . . . The new "upside-down" resurfacing type dragline dredge of H. F. England and Associates has been in operation in Prairie City, Oregon, since about the first of the year and is reported to be working successfully. In this operation the screen is at deck level and is horizontal, with the worm arrangement for discharging the oversize at the back of the boat. Undersize is pumped to a combination of riffles and jigs set above the screen. It is stated that the swell of ground in this operation is very much less than in the conventional type of dredge operation and the tailings piles are quite smooth.

Deep mining - to depths of 9,000 to 10,000 feet - according to ENGINEERING & MINING JOURNAL, which involves technical problems of humidity control, ventilation, ground support, hoisting and drainage, may be practical in the near future. This statement is based on the apparently successful solution of technical problems.

Electrostatic separation is a subject which has received much attention lately in connection with the production of industrial minerals. Mr. Jarmen of the firm of Sutton, Steele and Steele, gave a most enlightening address on this practice recently at the Institute meeting in New York. It was brought out that the capacity of machines which have been developed in recent years has been increased so that now electrostatic separation is indicated in an increasing number of operations for minerals separation. Very recently a 750-ton per day phosphate plant located in Georgia has begun operation with electrostatic separation the principal process. Whereas in the past humidity has been a difficult problem affecting the recovery in electrostatic separation plants, we are now informed that this difficulty has been much reduced. Ores are pulverized and classified to approximately minus-20 and plus-150 mesh, dried in a rotary dryer to a temperature at least 200°F., and immediately passed over the slowly revolving electrodes of the electrostatic machine. It is unnecessary to take out all inherent moisture, although the surface of the individual particles must be dry. It is stated that some materials successfully separated by this process go through the machine with 5% to 8% of inherent moisture. The writer had a long conversation with one of the principal developers of the electrostatic process. During this conversation it was brought out that electrostatic separation is apt in the next few years to cut deeply into the present wide use of the flotation process for the selective separation of metallic sulphides.

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MINING GEOLOGY IN OREGON.

The importance of detailed structural studies as guides to the finding all types of ore is being recognized both in academic and mining circles, and geological work of this nature is progressing in Oregon to a greater degree than ever before.

The Cornucopia Gold Mines, foremost lode gold producer in the state, is now completing a detailed structural and geologic map, the first to be completed in the long history of the mine. According to the MINING JOURNAL, this information is supplemented by diamond drilling, exceptionally comprehensive sampling, and by

a continuous study of the vein material in thin section by micro-geologic methods. It has been found by Dr. G. E. Goodspeed, who has studied thousands of thin sections of the veins, that the pay shoots at this mine follow veins that show micro-brecciation in the quartz, and that when this does not appear, the vein will be barren. The extension of this mine to greater depths than ever before penetrated in Oregon (over 3000 feet below the outcrop on the vein) has lent added confidence to the belief that veins in eastern Oregon will "go down".

Work done for the Horse Heaven Quicksilver Mines by Dr. Lloyd Staples has emphasized the fact that the concentration of cinnabar depends on structural conditions even more than in the case of most metals. He explains in the Mineralogist how the difference between a low-grade prospect and a good mine depends upon the absence or presence of a structural trap for the cinnabar concentration. The mapping last summer of the Round Mountain Quadrangle quicksilver area east of Prineville by the State Department and Dr. W. D. Wilkinson of the State College also showed that quicksilver properties tend to line up along major structural trends or lines of faulting. Although of entirely different origin, the chromite deposits of the state have also been shown to follow more or less this criterion.

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BLACK SANDS.

Mention Oregon black sands as a commercial possibility and you'll probably get a pitying look. This attitude is readily understandable. For every successful attempt to make a profit out of these sands, there has been a discouragingly large number of failures. The reasons for failures are well known to experienced people. The sands have been worked for gold and platinum. Some ventures have failed because of inexperience, but most of them have been due to the difficult problem of separating the gold, sometimes finely divided, from the heavy residues of black sands which accumulated in sluices or various other pieces of apparatus.

What is this material called black sands that has caused the beach placer miner so much grief? Everyone has noticed black streaks or bands in sandbars of stream beds or parts of ocean beaches. Usually the mineral forming these streaks is essentially magnetite or magnetic oxide of iron. Most rocks contain a small amount of magnetite as an accessory mineral. It is black and more than twice as heavy as the silicate rocks with which it may be associated. When surface rocks weather and the eroded portions are carried downgrade by rains and streams, the heavier magnetite grains resist the washing action more than the silicate grains, and so tend to form concentrations in black spots, streaks and bands. Ocean waves act on beach sands in a similar manner, thus forming concentrations of the heavy mineral along beaches. Ancient shorelines exist in the form of terraces, perhaps hundreds of feet above the present ocean level and back several miles from the present beach. The ancient beach terraces contain black sand concentrations similar to present-day beaches.

In regions where the rocks contain heavy accessory minerals besides magnetite, weathering and erosion result in concentration of black sands containing these heavy minerals along with magnetite. The Coast Range of southern Oregon, called by Diller part of Klamath Mountain Province, has large areas of such rocks, mainly peridotite and serpentine, which contain, besides magnetite, chromite, ilmenite, olivine, garnet, and sometimes zircon, as heavy accessory minerals. Thus the so-called black sands of both present day and ancient beaches along the southern Oregon Coast, particularly from Coos Bay south, are made up of all these minerals in varying

proportions. Since the Coast Range in this region also contains some lode gold deposits, the beaches also may have metallic gold in certain sections to form beach placers. Besides gold, some beach placers contain metallic platinum; also platinum alloys with iridium and osmium are sometimes found. The source rocks of the platinum are believed to be the basic igneous rocks of the back mountain province, although no platinum lode deposits have ever been found. No proportional relationships in the beach placers are known except that in several sections where platinum occurs in relatively large amounts, chromite is the dominant mineral in such black sand beds.

Of the heavy minerals in the black sands, the one of particular interest at this time is chromite. This is a so-called strategic mineral, that is, it is essential to our industrial machinery in time of war and this country lacks adequate proven supplies to meet all war-time needs. Oregon has various known chromite deposits other than beach sands, but even under the stress of national emergency, tonnage available would be relatively unimportant. In the case of beach sands the aggregate quantity of chromite existing is undoubtedly enormous. The critical commercial factor is whether the mineral can be made available, not only under conditions obtaining during emergency economic conditions, but also to supply the ever-growing normal industrial demand.

In order to determine the commercial possibilities, it is essential to know (1) whether the sands exist in mineable beds of economic size and grade, and (2) whether the minerals can be separated so that a product of commercial grade may be made. Incidentally, concentrates in the form of sand have not been used in the past for making ferro-chrome alloys. Lump ore is the material usually employed.

The Department of Geology & Mineral Industries has been concerned with the problem for over a year, believing that because failures were common in mining the beach sands for gold and platinum, this was no criterion to follow for evaluating chromite operation. Failing to interest chrome consumers in investigating the coastal black sands of Oregon, the Department started field studies on the problem in mid-November 1939. Knowing that the difficult metallurgy of the materials as well as the supposed lack of tonnage had discouraged investigation, work was started on the metallurgical angle first. Tests, carried out gratis by an eastern laboratory along lines suggested (the Department lacking funds to provide special facilities), indicate that the metallurgy is relatively simple. Attention was then given to tonnage possibilities. Obviously the matter of tonnage is related closely to the metallurgy, for each deposit represents a different problem in minerals separation. The Department now has enough information to justify the opinion that the available tonnage is sufficient to justify serious investigation and some exploration to obtain quantitative results. No more encouraging statement can be made at this time.

Preliminary testing results on the better grade of bank material show about 90% recovery of chromite. This chromite concentrate is low in titanium but rather high in iron. Judging by discussions Mr. Nixon, director of the Department, had recently with a number of corporation heads in the east, the concentrate has reasonable possibilities for use in the production of ferro-chrome or refractories or bichromates.

Much work has to be done yet on the mineral separation angle, but it shows enough promise to warrant our suggestion to consumers that they seriously consider some drilling and detailed sampling. The U.S. Geological Survey has agreed to do some preliminary investigation, and the U.S. Bureau of Mines has the matter of a strategic minerals drilling project under consideration, based on data supplied them by the Department recently. Decision by the Bureau of Mines as to whether

or not to carry out the drilling project must be withheld until at least early summer.

As for the possibility of recovering gold and platinum values in a chromite operation, this is also very uncertain. These values are erratic in most beach deposits, and would not necessarily correspond with the chromite value. In other words, a workable chromite bed might not show recoverable values of gold and platinum. Likewise a bed of sand containing values in gold and platinum might be unworkable for chromite.

The public should be extremely cautious about accepting statements concerning unlimited tonnages of chromite-bearing sands in beach and back-beach deposits. Such statements are misleading. One could as well say that there is unlimited gold in the ocean. While it may be literally true, no practical value is attached since gold cannot be extracted from sea-water on anything even approaching a commercial scale. Also, in the case of chrome sands, they can be worked successfully only by technically skilled operators. The unskilled man would be foredoomed to failure.

To summarize beach sand possibilities for chromite production, the Department can say only that it believes such possibilities warrant detail investigation. If all the related problems can be worked out successfully, the importance to the state and country could hardly be overestimated.

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WORK OF FEDERAL AGENCIES IN OREGON IN 1940.

One of the state appropriations for this Department is the sum of $2000 for the year 1940 to cover cooperative work by the U.S. Geological Survey in Oregon. As a matter of fact, this is more of a token payment than anything else so far as Oregon is concerned. Our state is really getting the long end of the bargain.

Nevertheless it appears that in order to get the most out of the Federal agencies, both the U.S. Geological Survey and U.S. Bureau of Mines, the director of the Department has found it pretty good business actually to go east with a long-handled spade once a year and talk directly to the powers that be. They are really mighty fine people back there, both in the "Survey" and in the Bureau, but we have found that by sitting down and talking with them about problems of mutual interest and making requests the details of which would be difficult or awkward to cover by correspondence, we can sometimes obtain special consideration on matters of critical interest to us.

On a recent trip east, the Director was able to work out details of a number of cooperative projects to be carried out in Oregon by the Federal agencies and to discuss matters pertaining to new industries in Oregon with various eastern corporations, as well as to get "wised up" on new developments in metallurgy, mining, and geology, which may be applicable in Oregon.

The following projects are on the calendar for the U.S. Geological Survey and U. S. Bureau of Mines for the 1940 summer season:

1. Airplane photographing of about one thousand square miles in southern Malheur and Harney counties for geologic control, to be followed later this same season by quicksilver reconnaissance by C. P. Ross of this area. (This costs Oregon nothing.)

2. Continuation of T. P. Thayer's geological field party in the chrome area of Grant county. This is on Strategic Minerals appropriations and costs Oregon nothing.

3. Continuation of work of Francis Wells' geologic survey in Josephine county. This is partly on "strategic" appropriation and partly cooperative.

4. Magnotometer survey of a twenty-five or thirty-mile strip across part of the Willamette Valley by the Geophysical Division of the U.S. Geological Survey in connection with possible determination of oil structure. This is cooperative and will cost Oregon less than $200.

5. Preliminary work by U.S. Geological Survey in investigation of coastal chromite sand areas. Office work has been started on this already. Cost probably to be borne by Strategic Minerals appropriation.

6. Examination by U.S. Bureau of Mines of antimony prospects in Jackson county with possibility of selecting area for a strategic minerals drilling project.

7. Early completion of geologic map of Sumpter quadrangle in eastern Oregon by U.S. Geological Survey. Survey pays cost of work, Oregon the cost of publishing map.

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MINERALS IN THE BODY.

The following is taken mainly from Science Digest, which paraphrases:

By the development of spectrographic analysis it has been learned that certain chemical elements occurring in foods in mere traces - quantities so small that they had been completely overlooked - are tremendously important. Plants and animals attempting to live without these elements are stunted and deformed, or unable to live at all. On the other hand, just a little too much of these so-called trace elements may prove equally disastrous to the health and life of the plant or animal.

The skeletal system utilizes 99 percent of the body's calcium, and the strength of the bones and teeth, as well as the normal properties and behavior of the fluids and soft tissues of the body depend upon the presence of the right amounts and proportions of this element. The requirement for an adult should be 1 gram per day, and not less than 0.45 grams.

While the amount of phosphorus in the body is not so large as that of calcium, a very much larger quantity and proportion of the phosphorus belongs to the more active tissues, and so, as would be expected, there is a more rapid turn-over of body phosphorus than of body calcium. One gram of phosphorus per child per day seems to be ample. Rickets can be induced by diets high in calcium and low in phosphorus, or by diets high in phosphates and low in calcium.

The total amount of iron in a healthy adult's body is between 3 and 4 grams, not much more than there is in a shingle nail. Over two-thirds of this is contained in the red blood cells - hemoglobin - which help carry oxygen from the lungs to all parts of the body. Most of the remainder is stored, ready for use

as hemoglobin, in the liver, bone marrow and spleen. Experiments show that only about 60 percent of the iron in the diet is absorbed by the body, so we must eat twice what we can really utilize. Anemia is the result of low iron intake or poor assimilation of iron. When the iron reserves of the body are exhausted it is very difficult to replenish them in a reasonable time from food sources. A slice of calves' liver 3x2 inches and a quarter of an inch thick will supply over 6 milligrams of available iron. Men, who eat more proteins than women, usually get from 8 to 18 milligrams of iron per day.

A deficiency in copper is rarely found in human beings. The infant is born with a reserve supply for use in the formation of red blood cells and hemoglobin, but these stores need to be refilled by addition of copper-containing foods to the milk diet during the first few months of life. Fortunately the best sources of copper are the iron-containing foods. In general, foods that will supply from 4 to 5 milligrams of iron will also supply about 1 milligram of available copper. The human body contains about 100 to 150 milligrams of copper.

The two chemically related mineral elements, iodine and fluorine, differ greatly in nutritional significance. Iodine is an essential constituent of the thyroid gland, which regulates the rate of energy expenditure and growth. Fluorine, on the other hand, cannot be considered an essential element of the human body, and its presence is probably due to its occurrence in the food supply. Lack of iodine in the food is the chief cause of goitre. Iodine is contained in large amounts in sea foods. Fluorine is dangerous in any concentrations and is to be avoided. It is especially bad for the teeth.

It appears that manganese in very small quantities is necessary to the human diet, although its particular action in the body is not yet known. Rats used in experiment, when deprived of manganese show sterility in the males and lack of maternal instinct in the females. Leg-bone deformity in chickens is accompanied by manganese deficiency. Studies indicate that as little as 1 ounce of manganese taken over a period of 12 to 14 years will furnish an adequate amount of this element for children. On the other hand,a manganese poisoning is known to occur among certain industrial workers employed in plants using considerable quantities of this element.

Cobalt is found in extremely small amounts in most of the organs of the human body. A persistent disease of sheep and cattle in New Zealand and Australia was found to be due to a lack of cobalt in the soils, and was cleared up by addition of that element to the fertilizer or to the salt licks.

About half the aluminum we eat today (about 1 ounce in six years) comes from the foods, and the other half from the aluminum cooking utensils now in common use. Although this amount has no poisonous effect upon the human body, the scientist has yet to discover what part aluminum plays in man's economy. The Aluminum Company of America has spent more than $200,000 in demonstrating the fallacy that aluminum cooking utensils poison food.

If the magnesium content of the diet is reduced to a very low level, a little less than 2 parts per million of diet, experimental animals become sick and die. There is evidence that in some way magnesium aids in the assimilation of fat. There have been a few cases in which the blood of human subjects suffering from irritability have shown low values for magnesium.

Zinc is always present in the human body, and it has been shown that the liver of an infant contains three times, proportionally, as much as that of an adult. This suggests a storage of zinc in the child before birth, as is known to occur in the case of copper and iron. A zinc deficiency in experimental animals has been produced, showing that zinc is necessary for normal growth.

There is growing evidence that arsenic, well-known poison and valuable drug, may also prove to be an indispensable element in human nutrition. It is generally found in traces in most of the human tissues. The liver appears to be the storehouse for this element.

Far less is known about bromine than the others of the halogens, but its constant occurrence in blood cannot be overlooked. In certain mental conditions, known as manic-depressive psychosis, the normal blood bromine is reduced to about half, and remains low until there is an improvement in the pathological condition. (Condensed from "Food and Life", U.S. Dept. Agr. Yearbook of Agriculture, 1939).

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Attention is drawn to the following properties for acquisition:

23-1 Quartz property, western Jackson county; patented. Reported by lessee to have 4000 tons proven ore, grade $5-$6. Mint returns on 200 tons production. Developed by 100-foot shaft and drifts. Will consider sublease. James A. Clement, Gold Hill, Oregon.

23-2 Placer property, eastern Grant county, unpatented. Owner claims extensive high-bar yardage. Water available. Will consider financial aid. E. R. Lafferty, Sumpter, Oregon.

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. Because of increase in circulation of the Ore.-Bin with re- .
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. fore the July issue. .
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Earl K. Nixon, Director of the Department, has been granted a short leave of absence to investigate iron ore possibilities in Peru, South America. He will travel by plane and return early in May.

*****

The Portland office of the Department will move to a new location on May 1. The new address will be 702 Woodlark Building, at the corner of SW. Alder Street and 9th Avenue.

*****

RUZICKA WOOD-COKE PROCESS

Dr. Stevan Ruzicka of Yugoslavia and more recently of New York was awarded Patent No. 2,184,317 on December 28, 1939, covering wood-coke and a process for making such material. Essentially the process consists of four steps:

1. Carbonization of wood at low temperature with recovery of volatile products.
2. Grinding and mixing with suitable binders.
3. Briquetting the finely ground material.
4. Coking in chambers at high temperature.

It is claimed that this coke may be made of any material consisting of wood cellulose or lignin. Waste timber and lumber, hog fuel, bamboo, etc., may be used. The raw material is subjected to destructive distillation in retorts at temperatures from 200° to 300° C., and the volatile products are recovered in the usual manner. Methyl alcohol and acetic acid are valuable by-products of the first step.

Standard disintegration machinery may be used in the preparation of the finely ground charcoal. The charcoal powder, after screening, is mixed with suitable binders which may be pitch or tar obtained from distillation of wood, coal, lignite, shale, or petroleum; or a mixture of several binders. The inventor claims conifer tar binds better than tar from leaf woods.

The binder and charcoal are then molded into briquettes of suitable shapes;- egg, spherical, or cylindrical.

Coking of the briquettes takes place in ordinary coke ovens at a temperature of 1100° C. This step also yields volatile by-products which can be recovered. During this coking step, the binder is drawn into the pores of the charcoal and is also chemically combined with the charcoal to form a solid mass.

Dr. Ruzicka believes that the resulting coke will have compression strengths above 1000 lbs. per square inch and friability of less than 5%.

The coke thus produced has no sulphur (if eucalyptus wood is not used) and phosphorus, and is low in ash. It may be used to advantage in various industries as follows:

Electric-furnace reducing agent.
Blast-furnace fuel.
Domestic fuel.
Production of silicon and calcium carbides.
Production of electric furnace electrodes.

*****

A WARM SPRING DOME IN THE SNAKE RIVER CANYON

Just above the mouth of Soda Creek, where it enters the Snake River Canyon about 20 miles down the river below Huntington, an interesting warm spring deposit forms a prominent dome on the west side of the river. The location of the deposit is on the "Soda Creek Ranch", owned by Mrs. Hortense Pinus, located in the $N\frac{1}{2}$ of section 19, Township 11 S., Range 46 E., Baker county.

The dome, which is presumably composed throughout of calcareous tufa or lime deposited from the spring waters, has a maximum diameter at its base of about 200 feet, and a height of about 50 feet. The top of the dome lies approximately 150 feet above the low water level of the river. When visited by Department geologists in December 1939, the spring issued from crevices in the summit of the dome at an estimated rate of 1 or 2 gallons per minute, and had a temperature of 75 or 80 degrees. Considerable gas accompanies the flow.

The dome is situated at the south edge of a band of limestone where it crosses the Snake river, the rock adjacent to the deposit being a much altered greenstone. It is probable that the water-channel developed along a fault at this point.

A partial analysis of the water shows that it contains 1720 solid parts per million; the material determined as being 49.7% CaO, 5.9% MgO, and 2.2% SiO_2. Calculating CaO as $CaCO_3$ or calcium carbonate, gives 39% CO_2, which totals 96.8%, leaving only 3.2% unaccounted for, which is probably CO_2 in combination as $MgCO_3$.

RUBBER

It is reported in Chemical and Metallurgical Engineering that the Standard Oil Company of New Jersey has acquired patent rights from Germany's I.G.Farben Industrie to manufacture "Buna" synthetic rubber in the United States. Possible manufacturing cost is estimated as low as 20 cents a pound, which is about the same as the present cost of natural rubber. Success of plans of Standard Oil would make this country independent of foreign rubber, imports of which in 1929 amounted to about $175,000,000 in value.

*****

SPECTROGRAPHIC ANALYSIS.

An element subjected to intense heat such as an electric arc can be vaporized, in which state it will give off light consisting of wavelengths characteristic of that element. By dispersing this light with suitable means, a spectrum is formed in which these characteristic wavelengths appear as lines. The spectrum of some elements will consist of a few lines, while other elements will form a spectrum of hundreds of lines. In either case, the lines are characteristic of each element; and no line is common to two elements. Elements may be detected by spectral lines which are emitted in vapor state; while compounds may be detected by the spectral lines which the compounds absorb from a suitable light source.

Spectrometry is the art of measuring the wavelengths of these spectral lines. It is applied to both the visible and invisible, the latter being ultra-violet, spectra. The spectroscope, an instrument for studying the visible spectrum, has been used for years by astronomers to measure the spectra of celestial bodies. The spectrograph is an instrument which records photographically the emitted spectrum-lines, principally in the invisible ultra-violet region.

Spectrographs are of two general types: those which disperse a beam of light by means of a concave grating ruled with lines in the order of 24,000 or more per inch; or those which disperse a beam of light by means of prisms of glass or quartz. The two types differ in their spectrum dispersion; i.e., the ratio of the unit of wavelength measure to the wavelength. The grating produces a uniform dispersion, while the prisms produce a decreasing dispersion with increasing wavelength. The two designs consist essentially of a suitable light excitation source, a slit through which the emitted light passes, the dispersing system, and the recording film.

Spectrographic analysis, or spectrochemistry, is the recording and interpreting of the spectrum emitted by a substance in the vapor state. Qualitative analyses are made by measuring the lines emitted and thus determining the elements present. Quantitative analyses are made by measuring the intensity of the lines and comparing with lines produced by samples whose analyses are known. With this method, it is possible to detect 70 elements. The gases and certain non-metallic elements do not emit light, so absorption is resorted to for detecting these.

The advantages of spectrographic analysis are:

1. A single spectrum recorded on the film reveals all metallic elements present. No involved technique to separate the elements is necessary.
2. Small samples may be used; a few milligrams suffice.
3. No chemical preparation is necessary.
4. Analysis depends on direct measurements and not on analyst's judgment.
5. The sensitivity is great; elements present in the order of 0.0001 percent are easily detected.
6. The method is rapid. Qualitative determinations for any or all 70 elements may be made in a few minutes.

The field of application of this method has rapidly enlarged due to its sensitivity, accuracy, and speed. Applications now include analyses of practically any solid, liquid, or powdered material. It is particularly employed for qualitative and quantitative trace analyses. In many instances, spectrographic qualitative analysis has been used to supplement chemical analysis. The fields of application will be considered briefly in the following paragraphs. An index of literature on spectrochemical analysis has been published by the American Society of Testing Materials, which indicates the large number of fields that have adopted this method.

Chemistry: Rapid qualitative analyses, on an unknown are made to indicate chemical methods to be followed; checks on qualitative chemical analyses, purity of reagents, and completeness of chemical separations; detection and determination of elements in trace amounts. The chemical industry employs the method for the detection of impurities in paints, glass, fibers, chemicals, etc. Assaying of ores, products, etc., is greatly speeded up. In the canning industry, the determination of the rate of dissolution of the metal coatings in such foods as fruit and vegetable juices, beer, etc., is of particular importance, as is also the inspection of fruits and vegetables to determine the extent to which sprays and insecticides have been removed.

Metallurgy:
Detection of impurities in metals, analysis of scrap, and continuous control of plant operation are easily accomplished by spectrographic analysis. Research metallurgy is finding more application of alloys in which elements occur in very small amounts. Rapid metallurgical analyses are facilitated.

Biology and Medicine:
Rapid determination of inorganic constituents of blood, urine, tissue, bone, etc., is an example. Presence of elements in plants and organisms is easily determined.

Agriculture:
Problems involving plant physiology are often solved by detection of trace amounts. Soils, water, fertilizer, and agents added to soils may be rapidly analyzed.

Geology:

The greatest use is in the rapid and accurate analysis of rocks and ores to determine number and amount of elements present . All the applications to chemical analysis apply here. Associated metals and unsuspected metals are thus determined. Methods of correlation have been based upon presence of associated metals. The verification of mythical "mystery" metal claims is quickly and definitely accomplished.

The recent improvements in spectrographic instruments and the methods of interpreting the spectra have resulted in an increasing number of commercial applications. It is such a simple, rapid, sensitive, and accurate method that research laboratories and progressive industries continually use spectrographic ananlysis. It provides the assay laboratory with a means of carrying out, quickly and accurately, an analysis of a substance which would otherwise entail tedious and involved methods. Many assay offices including John Herman's of Los Angeles and Lauck's Laboratory of Seattle have installed these instruments.

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NEW TYPE COPPER

(from Deco Trefoil)

Phelps-Dodge Copper Products Corporation has announced that it will produce a new type of copper which will be capable of resisting strong vibration and designed to eliminate the cause of at least 75 percent of all electrical failures. According to the statement issued by the company, "The improved metal is made without melting from electrolytic cathode copper which is plastically converted by tremendous pressure in a reducing atmosphere at elevated temperatures into smooth, dense copper bar, rod, strip, or other desired commercial shapes.

"Basically of the oxygen-free type, it is the only solid copper in the world which is not melted subsequent to the electrolytic purification process. The new method eliminates not only the casting process but also hot-rolling".

*****

METALS AT WORK

"Copper-bearing cement is a new product for structural purposes and is said to be superior to Portland cement in a number of particulars. By mixing finely divided copper incorporated with caustic magnesium in a solution of magnesium chloride a synthetic mineral is formed in the mix that is resistant to weathering. It is further claimed that the cement will take any kind of filler or aggregate and that it can be sprayed, brushed, or troweled on to any building material."

- Compressed Air Magazine

CHROMITE

According to U. S. Bureau of Mines Mineral Trade Notes (vol.10, no. 2, Feb.20, 1940), a property in Johannesburg, Union of South Africa, is able to ship chromite to the United States at the rate of 4000 tons per month after the first 3½ months (2000 tons a month at the end of the first 6 weeks). This material has a guaranteed minimum of 45% chromic acid, but the chromium-iron ratio is of the order of only 1.6 to 1 as against the 3-to-1 ratio specified by the Procurement Division of U. S. Treasury.

*****

SUPER X-RAY MACHINES

Dr. Carl T. Compton, president of the Massachusetts Institute of Technology, at a dinner given for him recently in Portland by M.I.T. alumni, described X-ray machines developed at the Institute in their application to the treatment of cancer. Three of these machines have been built successively and, to show improvements in design, the third machine occupies about a tenth of the space needed for the first machine. The latest machine, designed for use in the Massachusetts General Hospital, operates normally at 1,250,000 volts; it may, however, for special purposes be operated over a range down to 200,000 volts. The first machine built was installed about two years ago in the Huntington Memorial Hospital and has been used to give about 9,000 individual treatments. In certain cases such X-ray treatments are more desirable than radium treatments, are less expensive, and are more readily available. Dr. Compton was asked if development and use of such super-voltage machines would displace radium in cancer treatment. He replied that he thought that the two methods were supplementary and that the effect of using the X-ray machines might be to increase the use of radium, since a better understanding of special fields of each method was being developed by the X-ray treatments.

This new generator develops X-ray intensity greater than that of all of the available world supply of radium, but for certain deep-seated malignant growths the radium treatment is still necessary because of the peculiar penetrating quality of gamma rays given off by that element. One of the main objectives of research with the high potential machines by the Institute is in seeking methods to produce highly penetrating rays with properties similar to gamma rays.

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Attention is drawn to the following properties for disposal:

24-1 Placer property in Jackson county; 80 acres patented. Owner claims approximately one million yards of 75-cent gravel. Adjoining properties have produced for many years. Owner wishes to sell. T. A. Bird, 226 W. Manzanita, Grants Pass, Oregon.

24-2 Quicksilver property of two unpatented claims. Owner states engineer's report shows extensive ore body. Owner will sell. E. T. Carnegie, Route 2 Box 493, Grants Pass, Oregon.

24-3 Claims showing values in gold and zinc in Little North Santiam area. Owner reports assay values of $10 a ton with gold at $20 an ounce. John P. Hart, Mehama, Oregon.

24-4 Large semi-kaolin deposit SW. Oregon. Owner reports composition 30% alumina and 60% silica; softening temperature 2940°; white burning; plastic and low shrinkage. Coal and wood on property. Inquiries may be sent to the Portland office of the Department and will be forwarded to owner.

24-5 W. Dailey, 810 East H St., Grants Pass, Oregon, wishes to deal with persons who would be interested in working a quicksilver property in Jackson county. He reports some high-grade and average samples of 10 pounds mercury to the ton. Partnership or any reasonable offer desired.

FOR SALE: a one-yard Marion type 7 steam shovel, ready to operate, and 18 sluice boxes, 24" x 12", price $800. Contact C. W. Thurman, Route 1, Box 744, Grants Pass, Oregon.

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The Cosmo Metal Alloys Corporation, 275-281 Front St., New York City, announces that it is in the market for various kinds of metallic ores in any quantity.

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The Portland office of the Department has moved to a new location. The new address is 702 Woodlark Building, 813 SW. Alder Street - corner of SW. Alder Street and Ninth Avenue.

MINERAL LOCALITIES MAP

What minerals occur in Oregon? Where do they occur? These questions are answered on an Oregon Mineral Localities Map the Department has recently issued. It is an $8\frac{1}{2}$" x 11" paper reduction of the large map consulted frequently by visitors to the Portland office, and it shows the localities of the important minerals of Oregon.

These maps are available for 5¢ each at the Portland office or at the State Assay Laboratories at Baker and Grants Pass.

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NEW COAL BULLETIN ANNOUNCED

Many people now living in Oregon do not realize that back in 1904 and 1905 the homes and offices of the San Francisco Bay district of California were heated by coal shipped from the Coos Bay district. In those days, Oregon coal production totaled over 100,000 tons a year. However, the advent of petroleum and natural gas extinguished this market for Oregon coals, since natural gas and petroleum are so much easier to use.

In recent years, Oregon coal production has averaged around 8 or 10 thousand tons per year and supplies only a local market; moreover, Oregon coal has had to compete with hogged fuel, which is virtually a waste product, and California fuel oil.

The Oregon State Department of Geology & Mineral Industries, wishing to obtain essential facts in regard to Oregon coals, in order to be in a position to encourage more widespread utilization of this important natural resource, was fortunate in making a cooperative arrangement with the Federal Bureau of Mines for a factual study of the better known Oregon coal deposits that were accessible for sampling and study.

A report of this study has been issued in the form of a bulletin which gives analyses, results of burning tests, and other technical information, as well as conclusions that should tend to change what might be described as a defeatist attitude toward our coals on the part of many people in Oregon. In the opinion of this Department, these coals will be an increasingly valuable resource in this state.

This Bulletin no.20, "ANALYSES AND OTHER PROPERTIES OF OREGON COALS AS RELATED TO THEIR UTILIZATION", by H. F. Yancey and M. R. Geer, may be purchased from the Portland office or the State Assay Laboratories at Baker and Grants Pass for 35¢.

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LOW TEMPERATURE CARBONIZATION OF COAL*

Low-temperature carbonization of coal may be defined as the heat treatment of coal in the absence of air at temperatures of 450° C. and 700° C. as distinguished from the usual high-temperature carbonization at temperatures of 900° C. to 1200° C. 1/

The aims of the treatment are as follows:

1. To obtain a larger yield of liquid fuels than can be obtained from high-temperature processes.
2. To provide a smokeless, easily ignitible solid fuel for domestic purposes.
3. To obtain a dry, easily pulverized, highly combustible, low-volatile material for pulverized-fuel furnaces, and at the same time to recover by-products.
4. To obtain a substitute for low-volatile semi-bituminous coal for mixing with high-volatile swelling coals in order to make a suitable dense metallurgical coke.

The low temperature prevents decomposition of primary tar so that the treatment results in a larger yield of tar and light oils. Less gas is obtained than from high-temperature treatment, but the calorific value is higher.

The process will treat any coal. Although strong coking coal may be used, it is especially adapted to non-coking or weakly coking coals and fine coal that is rejected from coal preparation and cleaning plants. The process is designed to take the lowest priced product of a modern coal mine and make a smokeless household fuel.

One of the most successful of the low-temperature carbonization processes is the Disco process used by the Pittsburgh Coal Carbonization Company 2/. Present capacity of the plant is 7000 tons of coke per month and 140,000 gallons of tar. The coal is marketed through dealers for domestic consumption in furnaces or fireplaces.

Dense-grained and black, irregularly rounded balls, or fragments of balls, are the characteristic products of the process. Although the process produces coke, tar, light oil, and condensable gas, the coke and tar are the only products sold commercially since the gas and light oil vapor are burned in the plant.

The essence of the process is the continuous heating and carbonizing of coal in an inclined revolving retort to form low-temperature coke in rounded, homogeneous, ball-shaped pieces. The size of the coke balls is determined by the agglutinating property of the coal at the time it reaches its softening temperature in

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* Published by permission of American Institute of Mining & Metallurgical Engineers.

1/ A. C. Fieldner: Low Temperature Carbonization of Coal: U. S. Bureau of Mines, Tech. Paper 396 (1926).

2/ C. E. Lesher: Production of Low-Temperature Coke by the Disco Process: A.I.M.E. Tech.Pub.1176 (1940), copyrighted by the American Institute of Mining & Metallurgical Engineers.

the retort. A coal of moderate coking property will make coke balls of desired size with little or no preliminary treatment, but a weakly coking coal must be heated rapidly thru the preplastic stage if coke balls are to be produced. Bituminous material such as coal-tar, pitch or strongly coking coal may be mixed with weakly coking coal to produce coke balls.

Estimates of capital costs and operating expenses of plants using weakly coking coal are given in the following table 2/:

ESTIMATE OF CAPITAL COSTS AND OPERATING EXPENSES

	One Unit	Two Units	Three Units	Four Units
Capital Costs				
Carbonizer, roaster, storage	$100,000	$187,000	$270,000	$352,000
Outside plant (coal, coke, gas, and tar handling equipment)	110,000	143,000	160,000	176,000
Total Plant Cost	$210,000	$330,000	$430,000	$528,000
***				
Capacity, tons of coal per day	160	320	480	640
Capacity, tons per 300-day year	48,000	96,000	144,000	192,000
***				
Plant cost per ton capacity	$ 1,312	$ 1,030	$ 895	$ 825
Expenses				
Depreciation (15-year life) cents per ton of coal	29.2	22.9	19.9	18.3
Labor (day and salaried)	62.5	41.0	33.6	30.0
Supplies and Steam	10.0	11.0	12.0	13.0
Power Cost (1½¢ per Kw.hr.)	22.5	27.0	33.0	37.5
Cost per ton of coal	$ 1.242	$ 1.019	$ .985	$ .988

Oregon has sub-bituminous, non-coking coals, high in moisture, of moderate ash content, and low in sulfur. According to Yancey and Geer 3/, these coals make satisfactory low-carbonization products. It is probable that cost of plant and cost of operation may be balanced so as to permit conversion of these low-value coals into a desirable form of smokeless fuel whose value will allow competition with other forms of fuel.

2/ C. E. Lesher: Production of Low-temperature Coke by the Disco Process. A.I.M.E. Tech.Pub.1176 (1940). Copyrighted by the American Institute of Mining and Metallurgical Engineers.

3/ H. F. Yancey and M. R. Geer: Analyses and other properties of Oregon coals: Oregon State Department of Geology & Mineral Industries, Bulletin 20, (1940).

MANGANESE PURCHASES

According to the Arizona Mining Journal (April 15, 1940) the Procurement Division of the Treasury Department has announced the awarding of two contracts for 10,000 long tons of manganese ore, with a total value of $304,000. One order to L. W. Lambert of Upper Lake, California, for 5,000 long tons of Grade B (Philippine) (manganese minimum 48%, silica maximum 10%, phosphorus maximum 0.18%) brought 65¢ per long ton unit (22.4 pounds) f.o.b. Baltimore. The second order to L. L. Patrick of Los Angeles called for 5,000 tons of Grade A (domestic) (manganese minimum 48%, silica maximum 9%, phosphorus maximum 0.12%) at 62¢ per long ton unit, f.o.b. Ogden, Utah.

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(The following notes on industrial minerals and processes are taken from the U.S. Bureau of Mines Information Circular 7106).

ELECTRIC "EYE AND EAR" CONTROL

The "electric eye" and thermostatic devices now control processes that involve high temperatures. An "electric ear" regulates the load of grinding mills to the optimum point, reducing its feed when the sound is muffled and increasing it when the mill gets too noisy. Chemical control and physical tests have been extended. Better standardization and clearer understanding of consumers' requirements have reduced the variety of products and eliminated unnecessary lines. As certain specifications have grown more rigid they have actually been simplified and made less liable to misinterpretation.

CEMENT CLINKER GRINDING AIDS

Many industrial minerals are used in pulverized condition. The biggest dry-grinding job in industry is the grinding of cement clinker, and a number of Portland cement companies are now obtaining 20- to 50-percent increases in grinding efficiency by the employment of "grinding aids". It has long been known that additions of certain substances such as coal or resin, prevent packing of fine material and remove the coatings from balls and liners of grinding mills, probably by charging particles of the material with static electricity. During the last few years it has been found that an even better grain in grinding efficiency (though actually less dispersion) can be obtained by adding minute amounts of complex organic compounds. After trying a great many products, the Dewey & Almy Chemical Co., Cambridge, Mass., perfected a mixture of triethanolamine salts and certain calcium salts of modified lignin sulfonic acid which was named TDA. In addition to speeding up grinding, it materially improved the quality of cement because it also disperses the cement particles in mixing concrete and catalyses the hardening reaction. This triple-effect material is sold as dry-powder, but it is fed into the mill as a water solution very much as flotation reagents are fed into concentrating-mill circuits. For full effect on strength and workability 1 part is used to 1,520 parts of cement, but for grinding aid only, a 1:3000 ratio suffices. TDA is the only material other than gypsum whose addition to ground cement has been approved by the American Society for Testing Materials (A.S.T.M.Committee C-1). The cost is about 1½¢ per barrel for ordinary cement and 3¢ for high early-strength cement.

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COPPER IN BONNEVILLE CABLE

According to "The Mining and Contracting Review" (March 31, 1940) the Phelps-Dodge Copper Products Corporation has been awarded a contract for 114 additional miles of 110,000-volt hollow copper cable for the Bonneville Power Project. This brings P-D's total to 800 miles of copper cable for the project.

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BUILDING MATERIALS

(Mineral Trade Notes: U.S. Bureau of Mines, April 20, 1940)

Tests are being made in Germany on the use of a new type of mineral fiber developed recently from polyvinyl chloride (an acetylene derivative, with the addition of hydrochloric acid) as a substitute for iron for reinforcing concrete. If experiments now being conducted prove that mineral fiber additions are practicable, it will mean a substantial saving in iron, thereby benefiting Germany's foreign exchange situation and relieving somewhat the existing shortage of iron.

One of the chief advantages claimed for the new mineral fiber as a reinforcing agent is its great strength, which is said to equal that of ferro-concrete. Other advantages are the fiber's light weight, resistance to water, acids, alkalies, and other chemicals, resistance to rust, rotting and ignition, elasticity, and great insulating properties against heat and electricity.

****

ASBESTOS-SUBSTITUTE BRAKE LINING DEVELOPED*

Following 5 years of laboratory research work, a new type of brake lining for automotive vehicles has been developed in Germany to obviate the use of asbestos for the purpose.

The new lining consists of aluminum or steel wool as a substitute for asbestos, incorporated with synthetic "Buna" rubber as a binding material. The new lining is said to be not only equal but superior in some ways to ordinary brake-linings made from asbestos, rubber, resin, drying-oils, etc. Former brake linings required imported raw materials, and Germany feels that it is now in position to manufacture its brake linings entirely of domestic raw materials.

To make the new-type linings, fine metal fibers of about 0.03 mm. diameter are embedded in resin or synthetic rubber. In contrast to pure-metal lining, the new fiber lining does not injure, by an abrasive effect, the metal surface to which it is applied. The metal fiber lining is mechanically resistant and is no more sensitive to oils and fats in reducing its braking power than are asbestos linings. Water exerts only an inconsequential reduction of braking action, and the new lining is very resistant to wear. Another important feature is the ability of the new lining, because of its high conductivity, to dissipate excessive heat.

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* Mineral Trade Notes: U.S. Bureau of Mines, April 20, 1940.

WILLAMETTE VALLEY SURVEY

A magnetometer survey will be made this month by a geologist from the Geophysical Division of the U. S. Geological Survey, assisted by a geologist from the State Department of Geology & Mineral Industries. Work will start about May 6. Structures will be studied along two sections about 25 miles in length from east to west in the general vicinity of Salem. Field work will be completed in about two weeks.

****

OREGON EXHIBIT AT THE SAN FRANCISCO FAIR.

A mineral exhibit, representative of Oregon's minerals and mining industry, is being assembled by the Department and will be ready for the Fair's opening on May 25.

The mineral exhibit will include four transparencies 30 inches by 40 inches showing views of the state's mining and quarrying operations.

A third feature of the display will be a glass apparatus in continuous operation illustrating the retorting and condensing of quicksilver.

****

BEACH SAND SURVEY

Preliminary field work has been started by the Department on a back-beach sand area north of Bandon to determine the most feasible method of mapping the black sand accumulations along the coast. This work will be continued and supplemented by a U. S. Geological Survey party probably in June. Some drilling will probably be done, and arrangements have been made for research on the best method of concentrating chromite from these sands by U. S. Bureau of Mines metallurgists at College Park, Maryland.

****

24-6 Edward H. Lough, 3214 Odd Fellows Home, Portland, Ore., wishes assistance in financing on a partnership basis gold property on North Umpqua river in Douglas county, about 37 miles east of Roseburg. Reported high gold assays in quartz. Crosscut tunnel 184 feet; shaft 84 feet deep with crosscut 25 feet. 1¼ miles by trail from automobile road. Claims held by location in the Umpqua National Forest.

24-7 R. P. Thompson, Hotel Wabash, Portland, Ore., has chrome prospect about 3 miles west of O'Brien. Reported 200 tons high-grade chromite shipped during World War. Financial assistance desired in order to open up new lenses.

24-8 L. G. & Gertrude McKenny, 514 Isham, Grants Pass, Ore., desire to sell gold lode property comprising 6 claims, containing orebody reported to be 16 feet in width and averaging $15. Fifty assays said to have ranged from $3.85 to $26.00. Development work consists of tunnels and cuts. Price $5000 with 1/3 down.

24-9 J. T. Logan, Cave Junction, Oregon, has for sale one Brunton compass reported in good condition, price $17.50; one box compass with alidade sights, price $7.50.

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The Portland office of the Department has moved to a new location. The new address is 702 Woodlark Building, 813 SW. Alder Street - corner of SW. Alder Street and Ninth Avenue.

Earl K. Nixon, Director of the Department, has been granted a two months' leave of absence by the State Governing Board. Mr. Nixon will be occupied with matters pertaining to the development of certain types of mines and mineral industries in one of the South American countries. Due to unsettled conditions caused by the war, Mr. Nixon was unable to make any plans beyond the next two months.

The Department will carry on with the present personnel, with F. W. Libbey, staff Mining Engineer, in charge.

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"BOOMING" SUSPENDED ON WATERS OF THE ROGUE RIVER.

The Rogue River Coordination Board met in Portland on May 3, 1940, and passed resolutions affecting certain placer mining operations on the Rogue River and its tributaries. It had been determined that turbidity conditions were intermittently such as to render the river in Curry county unsuitable or unfavorable for angling and game fishing; and that such intermittent turbid conditions were due to the operation known as "booming", defined as the accumulation and sudden discharge of a quantity of water.

The Board ordered that such "booming" operations be suspended from and after May 13th, 1940, until the 1st day of July, 1940.

Notice of the Board's action was served on all persons or companies carrying on operations classed as booming and affecting the waters of the Rogue.

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ASSESSMENT WORK.

The annual assessment period commences at noon of the 1st day of July succeeding the date of location. The right of possession to a valid mining claim is maintained by the expenditure annually of at least $100 in labor or improvements of a mining nature on the claim. The annual assessment period 1939-1940 ends at noon July 1, 1940. If a mining claim has been located prior to July 1, 1939, in order to maintain the right of possession, annual assessment work must be done for the period 1939-1940, and must be started some time prior to noon of July 1, 1940. If the work is not completed by noon of July 1, 1940, work must be continued with reasonable diligence until it is completed. The term "reasonable diligence" implies that work should be continued to completion, without any undue interruptions. Failure to perform the assessment work for any year will subject the claim to relocation, unless work for the benefit of the claim is resumed before a relocation

is made. (In Alaska, failure to do annual assessment work causes a forfeiture of the claim, and resumption of work will not prevent relocation).

Oregon statutes require that an affidavit of annual labor or improvements upon a mining claim shall be recorded in the mining records of the county in which the mining claim is situated, within 30 days after the performance of such labor or making of such improvements.

****

The Portland Cement Association meeting at the Waldorf Astoria, New York City, again awarded the safety trophy to the Oregon Portland Cement Company. During the year 1939 this company operated its plant at Lime without a single disabling injury to employees. The award is made annually by the Association. The excellent safety record made by the Oregon company at Lime is a noteworthy example of the results obtained by coordinated effort of company executives and employees.

****

SUMMER FIELD SURVEYS

The "Butte Falls Quadrangle", which contains several known quicksilver deposits as well as deposits of various other metallic minerals, and lying east of the Riddle quadrangle, is scheduled for mapping this summer by the State Department of Geology & Mineral Industries, in cooperation with Oregon State College. The region to be mapped consists largely of volcanic rocks, with a narrow strip of older metamorphic rocks and granite along its western edge. The town of Tiller lies in the extreme northwest corner of the quadrangle; Butte Falls is in the southeast corner; and Trail lies in the center of the south half. Two-thirds of the area lies in Jackson county and one-third in Douglas county.

Mines within the quadrangle include all those of the Meadows area (War Eagle, Chisholm, etc.), as well as the Buzzard, Rowley, South Umpqua, Red Cloud, and numerous small prospects.

A field party under the direction of Dr. W. D. Wilkinson, of the Department of Geology of Oregon State College, will start work in the area June 10th. This party, consisting of graduates and students of the college, will be supplemented by John Eliot Allen and Wayne Lowell, geologists of the State Department of Geology, and the party will be in the field until the latter part of August.

This survey, the third annual summer field survey financed by the State Department since its inception in 1937, will add to the map series which now consists of the "Geology of the Northern Wallowa Mountains", 1938, and the "Geology of the Round Mountain Quadrangle", 1939.

*

The geologic mapping of the Grants Pass quadrangle by a U.S.G.S. party under Dr. Francis G. Wells, should be completed early this summer and the party will then move west into the Kerby quadrangle to start the mapping of that area. This work will be concerned especially with the investigation of strategic war minerals (chromite in particular) in Oregon, and it is expected that the geologic work will be continued westward to the coast, to complete a strip along the California line, extending from the Cascades to the Pacific. Geologic work in the Medford quadrangle was completed in 1938 and the map published by the State Department of Geology and Mineral Industries.

In connection with this chromite investigation the Geological Survey is also continuing the mapping of the chromite areas in the Izee and Canyon City quadrangles, under the direction of Dr. T. P. Thayer. Topographic work in this area was nearly completed last year, and the geology of a large number of the deposits themselves was mapped in great detail.

*

An investigation of beach and back beach deposits of the Oregon coast will be made this summer by a party under the direction of Dr. Wells in order to study the occurrence of chromite sands. Magnetometer surveys will be conducted preliminary to some subsurface exploration. Coos county will cooperate in carrying out this work.

*

Ray C. Treasher, field geologist, will be in Multnomah county during June finishing field work which was interrupted in 1939 when he was transferred to Grants Pass. About the first of July Mr. Treasher will return to Grants Pass and during July and part of August will do field work in the Galice mining district.

****

The Grants Pass and Jackson County Chamber of Commerce through its Mining Committee and Manager, G. L. Manuel, has initiated a movement designed to effect legislative changes in certain P.U.C. rulings as applied to trucking ore. Present regulations require that hauling of ore be under a #2 P.U.C. Permit (Contract Carrier); while owners of trucks may contract to haul logs and some other lumber products under a #4 P.U.C. Permit (Special Carrier). Definitions and synopses of Requirements issued by the Public Utilities Commissioner of Oregon are given below:

DEFINITION: "Contract carrier" means any person engaged in transportation by motor vehicle of persons or of property, or of both, for compensation, under special and individual agreements, leases, or other arrangements.

FEES: Up to 6,000 lbs. combined weight:
45¢ per cwt., per annum, payable quarterly in advance,
6% gross earnings, or 1 mill per ton mile.

FEES: (continued)

Between 6,000 lbs. and 12,000 lbs. combined weight:
70¢ per cwt., per annum, payable quarterly in advance,
6% gross earnings, or 1 mill per ton mile.

Over 12,000 lbs. combined weight:
6% gross earnings, or 1 mill per ton mile.

DEFINITION: "Special Carrier" means any person engaged in the transportation of logs, piling, poles or rough or planed lumber including shingles, by motor vehicle over the public highways from point of origin to mill, retail yard or shipping point, and such carrier may transport supplies to mills and logging operations that are operated by the carrier. The term special carrier may include also any person engaged in the hauling or transportation of cordwood in long or short lengths and/or sawdust or hog fuel by motor vehicle over the public highways. The term special carrier likewise may include trucks equipped with dump bodies and used exclusively in connection with highway and/or building construction commonly known as sand and gravel trucks.

FEES: Payable monthly in advance at the rate of 3½¢ per cwt. on combined weight. No pro rata allowed for part month.

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NEW ELECTROLYTIC MANGANESE ALLOYS

Science News Letter (April 6, 1940) reports a new alloy strong as steel, but noiseless as rubber. It is a manganese-copper heat treated alloy made from electrolytic manganese 99.96% pure. The new pure manganese has very different properties from the less pure previously produced metal. In addition to the new noiseless alloy, many alloys with a great variety of properties may be made. Alloys of high electrical resistance, low heat conductivity, and tremendous hardening range are among the new surprising combinations with this pure manganese. Possibilities for the noiseless alloys are chatterless spring suspensions, noiseless gears, and other industrial sound mufflers; the low heat conductivity alloys may be used for pot-handles and holders; and hardening properties of another alloy may be controlled to give a soft-center tool with a hard surface.

At the present time, the electrolytic manganese costs 50¢ a pound to produce, but improvements of methods of manufacture should bring the price down within commercial range.

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ITEMS OF INTEREST

A new portable placer machine recently placed on the market by the Universal Dredge Manufacturing Company of Denver is a self-contained unit consisting of an engine, trommel, riffles, pump, and water storage tank. It operates on a 1½ h.p. air-cooled gasoline engine and is said to have a capacity of 2 to 2½ cubic yards of bank-run gravel per hour. The machine is reported to be particularly adaptable to high bars and small placer areas.

*

"Metal Mining Practice", bull. 419 U.S. Bureau of Mines (60¢ from the Superintendent of Documents, Washington, D.C.), is a noteworthy publication among many valuable bulletins put out by the Bureau. Bulletin 419 is an excellent reference book for mining engineers and contains comprehensive information useful to all persons connected with mining operations. Prospecting, sampling, estimation of ore reserves, mine development, underground and surface mining methods, ore dressing and sale of ore are considered in detail in the 485 pages. Numerous references are listed.

****

MINERALS WANTED.

Minor Blythe, 1003 W. 35th Street, Los Angeles, Calif., dealer in nonmetallic and metallic minerals, has inquired of this Department about the following minerals: siliceous earth, talc, bentonite, white clay, sepiolite, kaolin, rutile, fluorspar, sillimanite, corundum, micaceous hematite, wolframite, magnesite, cryolite, colemanite, and monazite. Anyone having or knowing of such deposits should communicate with this Department or Mr. Blythe.

*

J. E. Leland, Rm. 202, 228 W. 4th Street, Los Angeles, Calif., is in touch with buyers of chromium, manganese, antimony, beryllium, quicksilver, tungsten, etc., ores, concentrates and alloys.

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Prospectors and mining men who are looking for a handy and complete guide to mineral identification will be interested in LAUCKS PROSPECTORS' GUIDE, just released by Laucks Laboratories, Inc., of Seattle, Washington.

This handy pocket-sized booklet has 48 pages full of useful information about minerals, ore testing, ore treating methods, spectrographic and petrographic analysis, proper methods of sampling and of shipping ore samples. Meat of the booklet is a 21-page table giving 18 or more identifying properties of 185 minerals.

Listed also are the "strategic" and "critical" minerals which are being purchased now by the Government for emergency stockpiles. Federal specifications for tungsten, manganese and chromium are given in Laucks' Guide.

The booklet, which is bound in weather-resistant duco finish, is available for 25 cents from the Seattle firm.

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Roy D. Johnson (P.O.Box 1262, Portland) states that he and his associates control what looks like promising nickel and antimony deposits, for which they would appreciate a market or a buyer.

Mr. Johnson will furnish data as to the location, quantity, quality, etc., for any interested inquirer.

*

26-1 Lode gold property in Lane county, Christy Creek district, composed of 11 unpatented claims developed by two tunnels and several cuts. Owner states ore assays $25 per ton across a 40-foot vein, concentrates easily. Owner will consider any reasonable proposition.
G. W. Thompson, 227 Washington St., Eugene, Oregon.

26-2 Lode gold property of 1 patented claim, Sparta district, Baker county. Shafts and tunnel caved. Owner states ore assays $5 to $10 across 50 feet of vein. Owner will consider sale or lease.
Mabel A. Mays, 2843 Forest Ave., Berkeley, Calif.

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ATOMS AND THINGS

Understanding of internal combustion engines was acquired by hundreds of thousands of people by intimate association with Henry Ford's Model T. Knowledge of radio circuits and vagaries of the ether became rather commonplace with the universal use of radio sets. Flying is becoming so ordinary that most schoolboys know their aeronautics better than their spelling. So what! Well, these are just thoughts in contemplation of how greatly scientific discoveries influence our existence and of how surely and simply scientific phenomena, at first understood by only a few Einsteins, may be brought into our daily lives and become common knowledge.

The stage being set, meet U 235, for this mysterious looking symbol (not a German submarine) is likely to be the cause of making physicists out of future generations and be the incentive for the boys and girls to get intimately acquainted with atomic nuclei, protons, neutrons, isotopes, atom smashing, gamma rays and other of that ilk, now known or partly known to only a few of the members of the inner circle of top-flight scientists. Perhaps in the not very distant future U 235, or some of its robotian relatives, will be heating and lighting the house (or bomb shelter), cooking the food, driving the automobile and airplane, propelling ocean liners, and rocketing space ships out from Mother Earth to disturb the tranquillity of our neighbors of the solar system. (Who doesn't enjoy the role of oracle!)

But to get down to cases and atoms. In the early horse and buggy days, it was scientific gospel that the atom was an indivisible particle - the smallest particle of an element that could exist. That theory is literally shot to pieces. Now, an atom is believed to be a sort of blur held together by electrical forces. There is a central atomic nucleus made up essentially of particles called protons and neutrons. The proton has a positive charge; the neutron has none. About the nucleus is a gyrating bunch of negatively charged electrons, each spinning on its own axis and arranged in concentric layers about the nucleus. In a staple atom, there are as many electrons as there are protons in the nucleus in order to have the electrical charges balance. The number and arrangement of the electrons determine the chemical properties of the atom. But it is with the nucleus that we are concerned now. The various elements have various combinations of protons and neutrons and the total of the number of these particles in an atomic nucleus equals its atomic weight. Thus, hydrogen, the lightest element, has a single proton and an atomic weight of 1. Uranium, until very recently, thought to be the heaviest element, has 92 protons and 146 neutrons to give an atomic weight of 238. Thus, we have U 238 as a symbol of the normal uranium atom. The number of protons in a nucleus determines the charge, or atomic number of an element, and there exists an element for each number from 1 (hydrogen) up to 92 (Uranium). (Recently, discoveries of heavier elements have been reported).

Physicists (and among them, a number of Nobel prize winners) have discovered that by bombarding an atomic nucleus with high speed particles, such as obtained by using very high voltage apparatus, neutrons may be added or subtracted, thus changing the atomic weight. Such changed atoms are called isotopes. What concerns us most, however, is that, in this process of atom-smashing, energy is released in enormous quantities. The isotope of particular interest at the present time is U 235, which has 3 less neutrons than U 238. While atomic nuclei may be smashed with release of energy, the energy required is usually greater than that

obtained as a result of the smashing. But the isotope U 235 is, at present at least, unique in that it may be readily smashed with the resulting release of a stupendous amount of energy. Various estimates of the quantity of this energy have been made, all showing, by comparison with our present sources of energy, the tremendous amount of released power potentially available. These figures are something of the order of comparing the force of a boy's air-rifle with that of a battleship's 16-inch gun. The picture is disturbing to the imagination, but we may as well take it calmly. U 235 hasn't been tamed as yet.

There are various hurdles to take before this atomic energy can be utilized. The present problem is how to isolate a sufficient quantity of U 235 so that it may be tested. Various methods have been tried without much success so far, but it seems rather inevitable that the problem will be solved eventually, for it is reported that over 300 scientists are at work on this and related problems. Probably other usable isotopes will also be found and put to work. Then a few ounces of U 235 or a brother isotope would be capable of driving your car or plane to New York and back and still have some power left over.

The question of control of such concentrated power naturally arises. As far as this writer is concerned, he'd prefer a nice safe dynamite factory in which to work rather than a laboratory containing a couple of grams of U 235! At this distance, investigating isolated U 35 appears to be something along the lines of jiggling a can of nitroglycerine.

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PROGRESS OF FIELD WORK

The state geologic survey of the Butte Falls quadrangle shows excellent progress. The base camp is at Trail. Under the general supervision of Dr. W. D. Wilkinson, two parties headed by Wayne Lowell and Wallace Lowry are at work. In excess of five townships so far have been covered.

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U.S.G.S. field parties under Francis G. Wells have completed field work in the Grants Pass quadrangle, and have started work in the Kerby quadrangle. Some preliminary test drilling supervised by Dr. Wells has been done on a back beach black sand deposit north of Bandon.

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Geologic mapping of the Canyon City quadrangle is being continued by U.S.G.S. parties under the direction of Thomas P. Thayer.

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Field work by R: C. Treasher in Multnomah County has been completed and Mr. Treasher has returned to his station at Grants Pass.

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The following copy of letter is of especial interest at this time in showing new developments in production of domestic manganese:

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
Washington

June 8, 1940

Hon. Homer D. Angell,
House of Representatives,
Washington, D: C.

My dear Mr. Angell:

With reference to your letter of June 3, inqu ·ing about the minimum grade of ore to be used at the pilot plant now being constructed in Tennessee for the production of electrolytic manganese, and the cost of operation:

The plant in Knoxville, Tennessee, was constructed in 1939, not as a Bureau of Mines plant, but as one independently owned and operated by the Electro Manganese Corporation, whose home offices are located in Minneapolis, Minnesota. U.S.Patent 2,119,560, which covers the electrolytic process for the manufacture of manganese metal, was granted to Stephen M. Shelton and was assigned by him to the Government of the United States as represented by the Secretary of the Interior. The Electro Manganese Corporation operates under a license to use this patent which was granted by the Secretary of the Interior.

The electrolytic method may utilize low-grade ores. It has been estimated that it can be successfully operated on ores containing as low as 10% manganese. Due to costs in handling materials the method will, of course, be less expensive with ores of higher manganese content. The Bureau of Mines does not have figures on operating costs at the Knoxville plant. However, the cost is estimated to be higher than that of producing ferromanganese from ferro-grade ores. A cost approaching that of ferromanganese can be obtained only in a large, well-integrated plant. The capacity of the plant at Knoxville is approximately one ton of metal a day. Costs in a plant of this size may exceed 20 cents a pound.

Cordially yours,

R. R. SAYERS
Acting Director.

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THE FLASK OF QUICKSILVER

The standard unit of measure used in the sale of quicksilver since early time was a "flask" equivalent to 76 pounds 1 ounce avoirdupois weight. This cumbersome figure was not popular with United States producers, so they, for many years (until 1927) calculated on a basis of the more convenient 75-pound flask; recently they have figured quicksilver on the 76-pound flask basis. H.H.Miller (The Mining

Journal, June 15, 1940) delved into the history of this weight at some length, and the following is a brief resume of its derivation.

Spain has been the world's foremost producer. The Romans were the first to mine quicksilver in Spain at the famous Almaden mine. Transportation was by slave-back; and the standard load was 100 librae (Roman pounds). The first use of quicksilver was as a medicine (calomel), so Spain adopted the libra as the standard apothecary pound. This is equivalent to 0.7607 of the modern avoirdupois pound. The standard slave-load of 100 librae is therefore equivalent to 76.07 avoirdupois pounds, which is slightly more than 76 pounds 1 ounce (76.067 lbs.). Since Spain uses the metric system, the weight of a Spanish flask is 34.5 kilograms, very close to the weight of the United States flask.

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A contract to supply 128 ore pots to the Aluminum Company of America has been given to the Steel Pipe and Tank Co. of Portland according to Commerce, published by the Portland Chamber of Commerce.

The contract totals 1000 tons of steel plate and caused the Steel Pipe and Tank Co, to make a considerable plant expansion.

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OREGON'S SAN FRANCISCO EXPOSITION MINERAL EXHIBIT

In June, a member of the State Department of Geology and Mineral Industries spent several days on Treasure Island arranging the mineral exhibit in the Oregon Room in the Hall of Western States. The central theme is quicksilver, with a model of quicksilver purification method surrounded by several large specimens of cinnabar. The model was designed by S. H. Williston, in charge of operations at Horseheaven Mines, and the apparatus was built by Marion Morris, of the Horseheaven staff. On either side of the central stand is a large display case. In one case are specimens of agates, opals, petrified wood and non-metallic minerals (including limestone, diatomite, pumice, coal, and marble and granite); while in the other case ores of metals which occur in Oregon, such as manganese, tungsten, chromium, molybdenum, quicksilver, antimony, copper, nickel, iron, lead, cobalt, and gold, are represented. Lights inside the cases illuminate the displays effectively.

On the wall above the cases are four colored transparent photographs illuminated from the rear. These translites are 20 by 30 inches and show the Alpine Coal Mine (Coos County), Cornucopia Gold Mines, Horseheaven Quicksilver Mine, and the Oregon Consuelo Dredge (Cracker Creek, Baker County). Several plaques give pertinent data as to Oregon's mineral production.

Mr. Maurice Brady, assistant at the Baker State Assay Laboratory, is at the exhibit for the duration of the Exposition. Mr. Brady has had considerable experience in giving information on Oregon minerals and will be of assistance in explaining the exhibit. Publications of the State Department of Geology and Mineral Industries are on display and may be bought or consulted by those interested in Oregon's minerals.

During the first two weeks of the exhibit 378 persons stopped to ask specific questions and to buy publications.

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FREIGHT RATES TO BE SLASHED

Change to Affect Mine Concentrates and Ores

According to the Baker Democrat-Herald (June 20, 1940), a new schedule of freight rates on ores and concentrates from Baker to Utah and Tacoma smelters, which went into effect June 27th, has been announced by the Union Pacific Railway company through Lynn V. Vermillion, Baker agent.

The schedule, worked out by the railroad company, provides a general reduction of rates, which is expected to stimulate ore shipments. Conferences recently were held between traffic representatives of the railroad, Baker county ore shippers, and the Baker County Chamber of Commerce.

The Union Pacific has shipped 70 cars of ore and concentrates from Baker already this year.

The rates are based on minimum weights of 100,000 pounds per carload. Application has been made to the Interstate Commerce Commission for through rates from Sumpter, in connection with the Sumpter Valley Railway Company, based on $1.10 per ton over Baker rates, to include transfer at Baker.

The rate schedule follows:

TO TACOMA:			TO UTAH SMELTERS:		
Aug.19,1939	Value not to exceed	June 27, 1940	Aug.19,1939	Value not to exceed	June 27, 1940
$4.40	$15.00	$3.00	$4.95	$15.00	$3.25
4.40	20.00	3.00	4.95	20.00	3.25
4.40	30.00	4.00	4.95	30.00	4.25
5.50	40.00	4.50	6.05	40.00	4.75
6.05	50.00	5.00	6.60	50.00	5.25
6.60	60.00	5.50	7.15	60.00	5.75
7.15	70.00	6.00	7.70	70.00	6.25
7.70	80.00	6.50	8.25	80.00	6.75
8.25	90.00	7.00	8.80	90.00	7.25
8.80	100.00 to	7.75	9.35	100.00 to	8.00
Value	500.00	7.75	Value	500.00	8.00

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LOCATING COAL LAND

By the Leasing Act of February 25, 1920, deposits of coal, phosphate, sodium, oil, oil shale, and gas in lands valuable for such minerals were made subject to disposition only under prospecting permits and leases issued by the Secretary of the Interior. Exceptions are valid claims existent at date of said act and thereafter maintained in compliance with the mining laws under which they were appropriated. Regulations under this act are contained in circulars of the General Land Office. Applications for permits to prospect coal land in the state should be made either of the Regional U.S. Land Offices in Oregon at Roseburg and The Dalles.

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I. C. 7118

An interesting paper has recently been issued by the U. S. Bureau of Mines, as Information Circular 7118. The title is "More Jobs for Minerals"; the author is Paul M. Tyler. Many less commonly understood facts about minerals are given; and there is much food for thought presented in this very enlightening 19-page discussion of the relation and importance of minerals to our modern existence.

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27-1 Lode gold property in southwestern Oregon composed of one unpatented claim. Property developed by 500 feet of tunnel. Owner states ore assays $100 per ton on a 12-inch vein. Owner will sell.
R. E. Paddock and T.W.Billings,Marial,Ore.

27-2 Lode property in central Oregon near Ashwood, consists of 3 patented claims. Property was operated in 1905 and again in 1935; reported possibilities of cinnabar deposit; owner will lease. Owner states he has detailed information.
Ben F. Laughlin, Yamhill, Oregon

27-3 Placer property consisting of one claim in Greenhorn district of eastern Oregon. Owner states gravel runs $1.00 per yard. Owner desires partner or to make sale.
Harry O. Smith, Route 1, Box 61-B,
Oregon City, Oregon.

27-4 Lode gold property: Rainbow Mine (formerly known as Siskron Mine) composed of 5 claims on Sucker Creek, Waldo district, Josephine County. Main workings consist of several hundred feet of drifts, crosscuts, and winzes. Amalgamation-flotation mill said to be in good condition. Abundant timber and water. Production has been estimated at $46,500. Reported assays give an average of $18.50 per ton over an average width of 14 inches.
H.W.Finch, 1516 Euclid Ave.,Berkeley,Calif.

FOR SALE: One Ainsworth Brunton Pocket Transit with head, $20.00. Although the instrument has seen considerable service, it is in good condition.
Edward Law, Route 1, Central Point, Oregon

FOR SALE: 1/6 h.p. G.E., D.C.motor, volts 110-120, r.p.m. 1725.
State Department Geology & Mineral Industries
702 Woodlark Bldg., Portland, Oregon.

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* TO ALL EXCHANGE LIBRARIES *
* Announcement is made of the release of "Field *
* Identification of Minerals for Oregon Prospec- *
* tors and Collectors", Bulletin 16, by R. C. *
* Treasher. Copies of this publication will be *
* mailed from this office about August 10, 1940. *
* If not received within ten days from the above *
* date, advise this office immediately; other- *
* wise, replacement for copies lost in the mail *
* or elsewhere cannot be made. *
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IDENTIFICATION OF MINERALS

What are psilomelane and limonite? What are the distinguishing features of cinnabar and hematite? of chromite and manganite? What are the differences between graphite and molybdenite? What minerals have commercial possibilities?

These questions are readily answered in "Field Identification of Minerals for Oregon Prospectors and Collectors", bulletin 16 of the State Department of Geology and Mineral Industries, compiled by Ray C. Treasher. It is designed to be an elementary reference book containing, as far as possible, the essentials of field identification of minerals by simple physical means only.

A mineral is defined as a "natural inorganic substance which, when pure, has a definite chemical composition, usually a definite crystal form and specific physical properties such as cleavage, fracture, color, hardness, luster, and specific gravity". This bulletin is concerned chiefly with these physical properties. Chemical and blowpipe tests are omitted because they require equipment seldom with the prospector in the field. Prospectors, collectors and recreationists will find this bulletin contains information each desires.

Copies of "Field Identification of Minerals", Bulletin 16, may be purchased for 50¢ at the State Assay Laboratories at Baker and Grants Pass, and at the Portland office.

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BONANZA MINES WILL INCREASE CAPACITY

Grading has been finished in preparation for the installation of a third furnace at Bonanza Mines, outstanding Oregon quicksilver producer. This new furnace will be a duplicate of the Gould rotary installed last year. Plant capacity will be thus increased to around 200 tons a day.

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PIPELINE FOR COAL

In line with efforts to reduce transportation costs on low-value commodities such as coal, it has been mentioned that fine- to nut-coal can be mixed with water or other suitable fluid and pumped thru pipelines. Remote deposits may thus be brought into production with pipelines leading to centers of consumption in the same way that oil is pumped hundreds of miles from wells to refineries. Arriving at the pipeline terminal, the coal and liquid could be easily separated and the coal marketed.

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GOLD BRICKS!!

Many times most of us have wished we could walk through the Mint and pocket a nice shiny gold brick! But few realize what a load that would be - assuming we could get into the Mint, past the guards both human and mechanical, and out again. The standard Mint bar is larger than a common red building brick - 8 x 4 x 2¼ inches, but we will use the latter for illustration. The volume of this common brick is 72 cubic inches. Assuming the specific gravity of refined gold to be 19, the brick would weight 49½ lbs. avoirdupois or 720 troy ounces. This golden hoard would have a value of better than $25,000.

During the depression and just before the Gold Act of 1933 was enacted, it was reported that two men were seen walking out of one of Portland's banks with their savings of $200,000 in money bags. Some men we say! - carrying better than 400 pounds in one trip!!!

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NATIONAL DEFENSE

There are, of course, various essential jobs in the program of National Defense outside of service in armed forces. Providing this country with necessary raw materials is one of these jobs, and the required mineral raw materials are perhaps most important. If because of age, training, or some physical disability, one cannot serve in the military or supporting industrial forces, he might, if qualified, do a real service by prospecting for minerals required by the defense program.

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The small permanent magnet known as Little Giant made of Alnico - an aluminum-nickel-cobalt alloy - is a powerful magnet; but the Bell Telephone Laboratories have developed a still stronger magnetic alloy. It has been named "Vicalloy"; it contains 6% to 15% vanadium, 30% to 52% iron, and 36% to 62% cobalt. It is said this alloy can be made more powerful than any other commercial magnetic material. It can be drawn into wire, rolled into tape, and machined. It is heat-treated to develop its magnetic properties, so it may be welded to other alloys and then heat-treated.

****

STRATEGIC MINERALS

There are 33 minerals included in the revised Preparedness Materials List of the Army and Navy Munitions Board. Of these, 9 are classed as strategic, 5 as critical, and 19 as essential. The strategic minerals are so classed because dependence in war must be placed in whole, or in part, on sources outside continental United States. Domestic productions of seven of the strategic minerals in percent of consumption are as follows: tungsten 50%, quicksilver 40%, antimony 10%, manganese 6%, chromium 1%, nickel o.5%, and tin 0.2%.

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PUBLIC - No.667 - 76th CONGRESS.

A bill, carrying appropriation of $47,500,000 for the purchase of strategic and critical materials, includes $2,000,000 earmarked for Bureau of Mines' use for the erection of a pilot plant or plants for the beneficiation of manganese ores and production of metallic manganese.

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PUBLIC - No.664 - 76th CONGRESS

Another law authorizes R.F.C. (Reconstruction Finance Corporation) to make loans to purchase the capital stock of any corporation for the purpose of producing, acquiring, or carrying strategic and critical materials. This act would also provide funds for the manufacture of supplies and equipment essential to the national defense. In addition, the R.F.C. is authorized to assist in producing such materials. (Mining Journal, July 15, 1940)

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The Procurement Division had purchased up to July 1, 1940, the following strategic materials:

Material	Quantity	Cost
Chromium Ore	64,500 Long Tons	$2,106,250
Manganese	86,500 Long Tons	2,757,868
Quartz Crystals	11,800 Pounds	100,000
Pig Tin	6,124 Short Tons	6,084,828
Tungsten	449 Short Tons	500,944

- The Mining & Contracting Review, July 15, 1940.

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IRON ORE

Magnetite iron ore of the Zeballos District on Vancouver Island is dealt with in a preliminary report by John S. Stevenson, British Columbia Department of Mines.

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CHROME ORE INVESTIGATIONS

Results of an investigation of the concentrating characteristics of Oregon and Montana chrome ores were given by members of the staff of the U. S. Bureau of Mines Metallurgical Division at the dedication of the Bureau's new experiment station in Salt Lake City on May 21, 1940. (Engineering and Mining Journal, July 1940).

This investigation was undertaken to determine various data in small electric pilot furnaces: (1) chromium recovery, (2) power consumption, and (3) grades of chromium products possible by several electrothermal methods of reduction as applied to domestic high-iron ration chromium ores. Briefly summarized, the conclusions were:

1. Domestic high-iron chromite concentrates, when smelted and reduced with petroleum coke in the Boulder laboratory electric-pilot furnaces, require 2.9 kw.hr. per pound of ferroalloy. The analysis of the product is 54.3 percent chromium, 33.3 percent iron and 6.04 percent carbon. Chromium recovery was of the order of 94 percent.

2. Forty percent of the iron containing only 8 to 10 percent of the chromium, in the high-iron chromite charge, can be selectively reduced and separated from the chromium. This product, containing 75 percent iron, 20 percent chromium, and 2 percent carbon, makes heat-resistant castings.

3. An industrial-size electric furnace for the production of standard ferrochrome from high-iron domestic chromites, should be preferably the standard direct arc type used in steel making. It would be designed to tap from the bottom the high iron-chromium alloy. The molten chromium-enriched slag left in the furnace would then be reduced to standard ferrochrome without transfer and consequent loss of thermal energy.

4. Basic refractories of the chrome-magnesite type can be made from the domestic concentrates which compare favorably with the present commercial basic refractories.

This work has furnished enough data so that further study of slag composition, decarbonization, and possible products, is justified.

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Because of stimulation of domestic production in some materials, the Army and Navy Munitions Board recently revised the Preparedness Materials list. Aluminum, optical glass, and wool have been moved from strategic to critical classification; while eight commodities, including cadmium, cryolite, fluorspar, and titanium were changed from critical to essential status. The strategic list now includes the metals antimony, chromium, manganese (ferrograde), mica, nickel, quartz, crystal, quicksilver, tin, and tungsten. The list of critical materials includes the metals and minerals aluminum, asbestos, graphite, platinum, and vanadium.

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For interesting and timely information, peruse "Strategic Buying Planned" in Engineering and Mining Journal, July 1940.

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MINERAL NOTES

According to Mineral Trade Notes (U. S. Bureau of Mines), July 20, 1940:

Aluminum: Production of bauxite in Jugoslavia declined 60%, due to inadequate transportation facilities to its principal consumer, Germany. However, it is reported an arrangement has been made whereby freight cars carrying bauxite to Germany will return to Jugoslavia loaded with coke.

Chromite: The Turkish Government has authorized the Eti Bank to give financial assistance to chrome producers by advancing funds against ores stored at ports of exportation.

Copper: Cancellation of French contracts with Chilean copper producers would have a catastrophic effect on Chile since copper provides the chief source of Chile's dollar exchange. Italy, unable to obtain Chilean copper, its chief source, has resorted to drastic measures for salvaging copper scrap and copper kitchen utensils. It is said Italy can hope to produce domestically only about 6% of its consumption of primary copper.

Iron and Steel: Germany and Italy are practicing rigid economies in the consumption of steel. Railings not essential to public safety or of historic value, of iron or other metals,are being confiscated.

Lead: A direct result of the war in Europe may be a chemo-electric storage system requiring no lead, if German inventors are successful in developing a storage battery which will dispense with or reduce the demand for lead, nickel, cadmium, and mercury.

Apatite: The concentration of apatite (tricalcium fluophosphate) by the Brazilian Government at Ipanema in an American-equipped plant is proceeding at a rate of 250 tons of ore per day, or 50 tons of concentrate per day. The concentrate will be converted into superphosphate and other fertilizers for Brazilian consumption.

United States Export Licenses: Included in the Presidential Proclamation of July 2, 1940, designating certain materials which may not be exported after

July 5, except when authorized by license, were the metals, ores and mineral products: aluminum, antimony, asbestos, chromium, graphite, manganese, magnesium, mercury, mica, molybdenum, platinum, quartz crystals, tin, tungsten, and vanadium. The Proclamation was designed to curtail the exportation of any military equipment and to insure the United States of adequate stocks.

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OREGON EXHIBIT ON TREASURE ISLAND

Maurice Brady, the attendant at the mineral display, reports that during the month of July over 1700 persons stopped at his table to ask specific questions. This figure does not include the thousands of people who were "just looking" and had no questions.

Opal, agate, petrified wood, and black marble specimens are attracting most attention, with specimens of the strategic metal (nickel, chromium, manganese, and quicksilver) ores receiving a smaller share. One of the most frequent comments is "I didn't know they did any mining in Oregon", and a surprising number think the Cascades form the state boundary.

So after visiting the small but comprehensive mineral exhibit, Fair-goers ought to be "Oregon-Mining" minded as well as hep to all the other attractions and features of our state.

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DEPARTMENT PERSONNEL CHANGE

Mr. Leslie C. Richards, recently of the U. S. Engineers and formerly with various mining companies in Idaho and Montana, has filled the vacancy caused by the resignation of W. T. Burns, assayer at the State Assay Laboratory at Baker. Mr. Richards, a graduate of O.S.C., comes to the Department with several years of practical assaying, mining, engineering experience. Hugh Lancaster continues as field engineer operating from the Baker office.

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28-1 Copper property in southeastern Coos County composed of four unpatented claims. Property developed by 1000 feet of tunnels. Ore averaging $30 per ton is claimed. Owner will sell on reasonable terms.
W. L. McAboy, administrator, Brockway, Oregon.

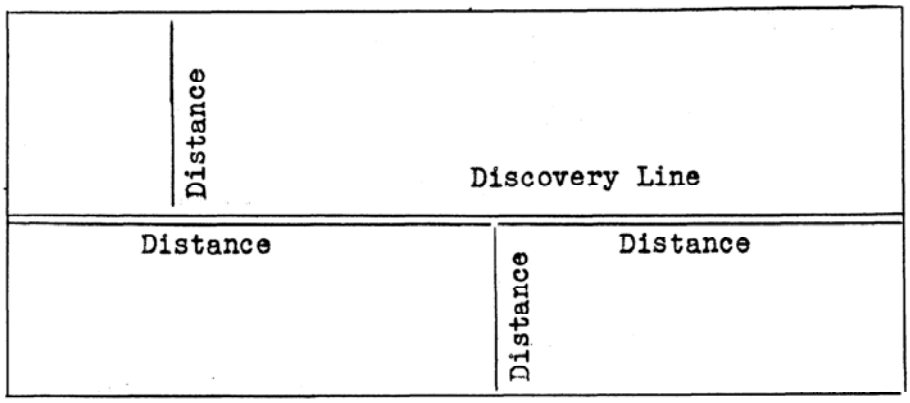
Mr.D.E.Decker, 507 N.19th St. and 341 N. Commercial St., Salem, states he is conducting an assaying school and is giving a course in practical mineralogy. Two nights a week are devoted to these courses. He states that he also has a course in photography which is given three nights a week.

Var-Lac-Oil Chemical Co. of 116 Broad St., New York City, buys ores, minerals, concentrates, residues, sludges, fume dust, and by-product materials containing most of the metallic elements. Of particular interest are ores of chromium, tungsten, vanadium, titanium, etc.

H.L.Coombs,1765 W.25th St.,Los Angeles,states he "will contract for large tonnage of manganese, tungsten, chromium, antimony, quicksilver, vanadium, or beryllium ores. Wil also purchase desirable properties,or a well-developed gold property".

(The following is a simplified claim location notice advocated by the Washington State Chamber of Mines. If locators would put all distances and directions on the claim drawing, the usually confusing volume of descriptive matter on the common form would thus be eliminated).

Locaters shall indicate on attached claim drawing approximate distances and general direction of Discovery from one or more natural features in adjacent territory. An arrow should be drawn to indicate North.



Locaters shall mark point of discovery on Discovery Line and indicate distance of discovery from each end line and how all corners are marked with the direction of each from Discovery Line which shall correspond with the vein formation.

NEW APPROVED FORM

MINING CLAIM LOCATION NOTICE

Name of Claim _____

Date of Location _____

Name of District _____

Name of County _____

Name of State _____

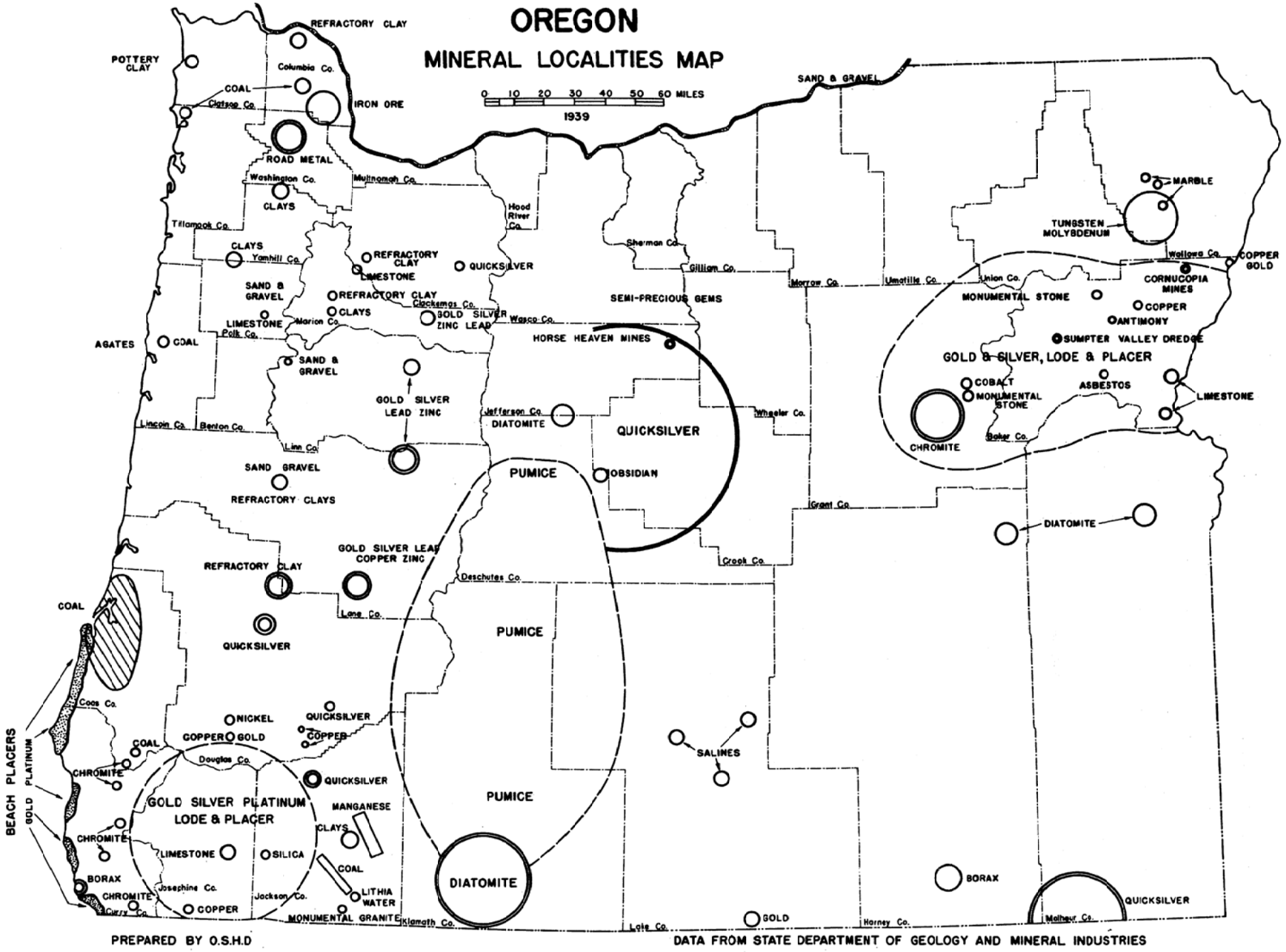
Notice is hereby given that the undersigned have complied with the Federal and State Acts governing the location of mineralized land and have this day of above date filed on the area described by attached diagram. All right and title to any minerals in said area is claimed by the locaters.

Signed _____

Pardners _____

Witness _____

_____



PREPARED BY O.S.H.D

DATA FROM STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

OREGON MINES' OUTPUT SOARS.

Oregon's mining industry is increasing very rapidly, probably faster than any other basic industry in the State. Judging by official figures just released by the U.S.Bureau of Mines, the value of Oregon's production of metallic minerals and ores increased 16.6% in value from 1938 to 1939. For the current year 1940 this same metallic mineral production of the State will be increased by 50% over the 1939 figures, according to an estimate by the State Department of Geology and Mineral Industries. Adding in the value of non-metallic production for 1940, including limestone for cement, stone, gravel, diatomite, etc., of around $6,000,000, the State's total mineral production will be well in excess of $10,000,000 for the current year - perhaps nearer $12,000,000.

The actual value of gold, quicksilver, lead, zinc and copper produced in Oregon in 1939 was $3,828,243.00; for the previous year, 1938, the corresponding valuation was $3,282,970.

The rapid advance in 1940 has been due mainly to the greatly increased production of quicksilver (having a value of about $1,650,000), and to the increased number of gold dredges operating in the State. Oregon now has the largest producing quicksilver mine - the Bonanza Mine near Sutherlin - in the United States.

Counting gold producers only in the year 1939, there were 116 underground quartz producers and a total of 201 placer producers, consisting of 15 dredges, 13 non-floating washing plants, 76 hydraulic gold producers, 13 underground drift placers and numerous miscellaneous placers. Baker County was the largest gold producer and Grant County second.

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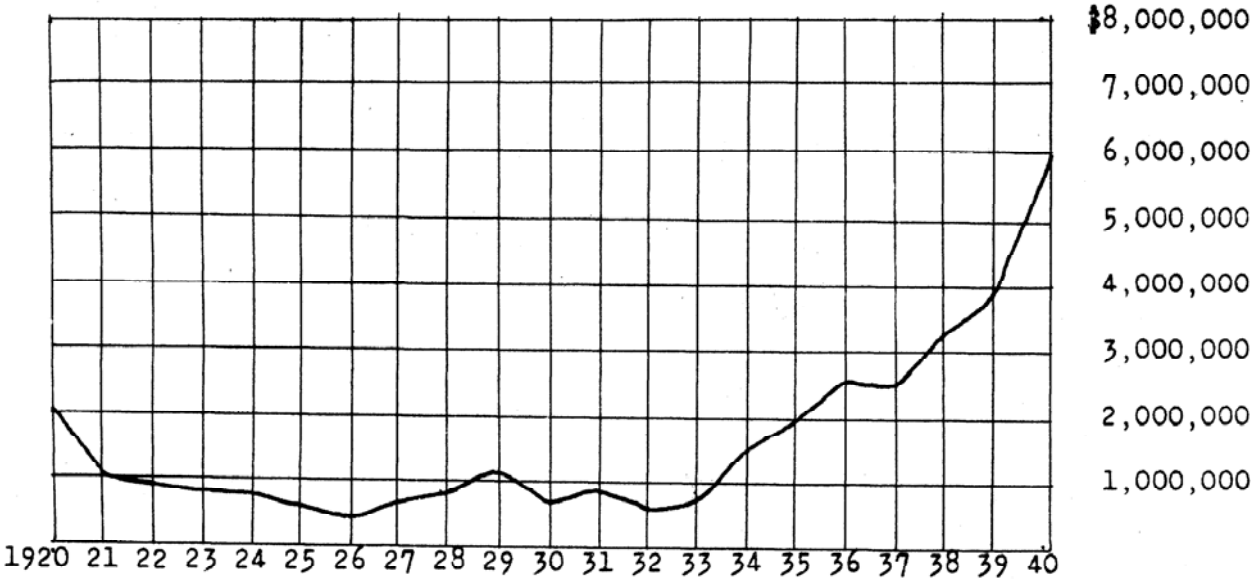
Value of Oregon Metallic Mineral Production
from 1920 to 1940.



Actual value of metallic production is $2,392,133 for 1937.
" 3,282,970 for 1938.
" 3,828,243 for 1939.
Closely estimated " 6,000,000 for 1940.

Note: Non-metallic production of Oregon runs about $6,000,000 additional, making a total mineral product of the State of around $12,000,000 for 1940.

(NOTE: - 'Bout every few months the Director of this Shebang comes in and submits some of his so-called "copy" for possible inclusion in our otherwise staid and gentlemanly publication. This time, it's excerpts from his diary written during his recent trips in South America where he was carrying out consulting mine examination work. Maybe it don't hurt to jazz up our sheet a little now and then. We don't know, - - anyway, don't say we didn't warn you.

--------The Ore.-Bin

SOMEWHERE IN THE PERUVIAN ANDES

"July 28, 1940. Diary of Earl K. Nixon

Did you ever sit nonchalantly down at a table and, in subconsciously arranging a yarding space for your feet, poke an innocent toe into a soft,yielding object that you knew instantly could be nothing else than the shapely shank of a nearby Venus? And, just as instantly, you retracted your offending landing gear and blurted idiotically, "My Heaven, I thought it was the table leg." Then, still woozy, but compelled by something, you looked down - just as Venus looked - and saw that the table had one of those single, 12-inch, quarter-sawed oak affairs in the middle? You say, "It couldn't happen here!" (-that is, way back up in the Andes). The Hell it couldn't.

I sat down to a "dinner" this evening in a tin-roofed, adobe hut - the only dwelling in a "town" that begins with "Q" at the end of a narrow-guage railroad high in the Andes - and poked my aching legs under the table, (aching, because I had just been in the saddle six hours on the roughest kind of Andean trails), -- and stuck my toe into one of those "soft, yielding objects". Momentarily, I felt ashamed, embarrassed, abashed, etcetera, etcetera, but not for long as there was no one else at the table. I gave "Venus" a heck of a kick by way of exploration (a matter in which I am supposed to be adept), and did I get results? Amidst squeals and yeows, two sows (authentic American for female swine, size 44) and a tom cat came charging out from under the table and darn near wrecked the place.

I might mention that the place had a dirt floor - late Pleistocene alluvial - and that flies had been using the originally whitewashed adobe walls for bleachers since the time of the Incas. The little boy who brought in my dinner was about 10 years old, judging by the amount of "stain" he had accumulated. My dinner consisted of a can of sardines and a bottle of mineral water out of my knapsack, two "huevos pasados por agua cinco minutas" (5-minute eggs), and a small bowl of rice. I have always found boiled rice to be satisfactory in such out-of-the-way places. Being white and thus less susceptible to the possibilities of protective coloration, one can more easily segregate any "meat" or gangue that might render the chow less delectable.

I'd gone up there to look at a series of veins - never mind what kind - and to get a preliminary slant at the geology and general mining economics. . .

July 21, 1940.

Left Lima yesterday morning with D., B., and del G., and drove about 200 kilometers, half of it along the macadamized Pan-American highway, to the town of J--- where we had lunch. I ate black coffee, boiled rice and two eggs fried

in butter or grease, possibly left over from Pizarro's last meal, judging by the aroma. Then 60 kilometers along a winding canyon road, deeper into the Andes, to the town of C---. The latter, a village of 300 or 400, is really clean, and, set in a niche between high mountains, looks as much like a Swiss hamlet as anything I have seen.

This morning, on horseback, we traversed a winding, but wide, canyon trail, 20 kilometers to the "city" of O---, where we deposited most of our duffel in the patio of a thatch-covered, adobe residence - then on to the principal coal areas, another 15 kilometers.

At and beyond O--- at an elevation of 11,500 feet, we began seeing llamas, instead of burros, used for beasts of burden. Burros are real hay-burners and must have their water frequently, though they seem to carry heavier loads and are a little tougher than the llamas. The latter, seemingly a cross between a camel and a deer, carry fair-sized loads over the highest Andean trails and, it is said, can carry on a couple of days if absolutely necessary without water and with a minimum of food.

One mine I visited was unique in my experience, although not unlike other coal operations in the district. It was located at an elevation of about 14,500 feet. Entrance was through a cross-cut tunnel about $2\frac{1}{2}$ by $4\frac{1}{2}$ feet in cross section. (The miners - Cholo Indian types - are small fellows on the average). From the point where the entry cross-cut reached the vein a narrow slope or winze, cut in the coal, leads downward on an angle of 30°-40° to the first sub-level. The gangways - as we would call them in our coal regions - are very narrow drifts only large enough to get through by stooping and are driven in the coal, more or less on the contour of the vein. With head ducked, my shoulders brushed both sides of the passageways in places.

Although the coal - anthracite - was so shelly that one could break up any chunks in his hands, nevertheless there was a minimum of timbering in the mine. I noted in places that they had put in short sets and stulls of gnarled and crooked eucalyptus wood, the average size of the timbers being that of a man's arm. I crawled about, sometimes stooping over, sometimes on "all fours", down ladders and through "gangways", sometimes merely using hitches in the inclined passages to keep my boots from slipping. The mine was dry, although at greater depths, judging by the dampness at the bottom, they will have to pump or carry out a few gallons of water per day.

The mine was especially unique in several respects: not a stick of powder they told me had ever been used since the mine was begun; I saw neither pick nor shovel nor any kind of hoist, pulley or mechanical or metal apparatus of any kind with the exception of four or five 3/4-inch, pointed iron rods about five feet long. These were used to bar down the soft, shelly anthracite coal.

The coal in turn is scooped by hand into bag-like, home-made leather contraptions the miners use to carry the coal - the hard way - out of the mine. Of course they do not use chutes for loading coal out of the breasts under these circumstances.

I cut a channel sample of the coal at one point where the vein was of average texture and about two meters thick. The sample, weighing nearly 200 pounds, was hand "shoveled" into six clean, five-gallon gasoline cans and carried out through the maze of raises and "gangways" on natives' backs. The sample reached the surface long before I did, as I had to sit down and pant because of the elevation after climbing each incline between sub-levels. At the portal of the mine, the six big tins were soldered up - in about four hours - by a peon using an antique piece of copper heated in an open coal fire. Then the cans were placed on the backs of llamas and started on their long trip to the outside to the United States for metallurgical and coking tests.

About 400 tons per month are produced at this mine. The coal is bagged at the portal and placed in 100 pound sacks, one to an animal, on the backs of llamas and thus transported 35 kilometers (21 miles) over a 15,000 pass to point of consumption at a property owned by an American corporation. The coal is delivered for about $3.30 gold per ton, which covers, transportation, mining and a small profit to the producer. (We may neglect overhead, depreciation, amortization and obsolescence on such operations).

Miners are seldom injured in these mines but if they are they are taken care of properly because of good governmental regulations.

I suspect that these miners are just as happy, possibly more so, as the miners in the United States, but it isn't the American way, and we wouldn't care to trade.

Oh, yes, about the cockroach! Last night, I stayed at a little hotel in a certain town before catching the plane back to Lima. Just before dozing off, I heard something stomping down the hall! It hesitated just before entering my open door - I reached down beside my cot and clutched an oxford - having no other weapon. "It" stomped on in, and what do you think - a cockroach! I heaved the shoe, but did I crush it? Hell, no. It stood up on its hind legs, caught the missile in mid-air, tossed it over toward third base, emitted a sound suspiciously like a Bronx cheer, then stomped off down the hall again. (This last yarn was a little tall, I realize, but many things like the mountains, for example, come big in this country, and you can make allowances when I give you permission).

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KLAMATH FAULT EXPOSED.

Borrow pit excavation by the Highway Department just east of The Dalles-California Highway between Fort Klamath and Chiloquin Junction has exposed a west-dipping fault plane nearly 50 feet high and over 100 feet long.

In removing the fine talus material from the foot of the north-south trending escarpment, the smooth and polished fault surface of basalt was exposed. This fault dips about 80° W. and has been exposed for a considerable distance. The fault escarpments along the east side of Klamath Lake have been described, and a small portion of the fault surface itself appears on the south side of Algoma Point, but this is the first time that the main north-south fault plane has been actually seen.

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MINING AND GEOLOGICAL SOCIETIES MEET.

A field trip of the Oregon Section of the American Institute of Mining and Metallurgical Engineers, in which members of the Geological Society of the Oregon Country participated as guests, was taken over the Labor Day week-end. Visits were made to the Bonanza Mine, southern Oregon's largest lode gold mine, numerous dredges, and Crater Lake. Dinner meetings were held at Roseburg and Grants Pass.

The group numbered about 40 persons and was supplemented at the dinners by attendance of members of the staffs of the local mine.

After lunch, served at the Bonanza Mine by Mrs. H. C. Wilmot, the party was guided through the mine workings and furnace plant. The program at Roseburg was headed by a talk by Albert Burch on the History and Ore Deposits of the Benton Mine, followed by a discussion of Nonmetallic Deposits by Fay Bristol.

Sunday morning members and guests drove to the Benton Mine and were shown over the mill, after which they were guests of Mr. Mason Bingham at lunch. During the afternoon the party was shown through the mine. The dinner at Grants Pass that evening was followed by a program arranged by the Oregon Mining Association, and consisted of talks on the History of the Oregon Mining Association by F. W. Watson, the Effect of the Excess Profits Tax on Mining by S. H. Williston, Transportation Problems in Nonmetallic Mining by Fay Bristol, and the Muddy Water Problem in Southern Oregon by Senator Wipperman of Grants Pass.

On Monday part of the group was conducted on a tour of dredge operations in southern Oregon by Ray C. Treasher and Albert Lewis; the rest went to Crater Lake and thence to Portland via the Willamette Highway.

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This Department acts as a clearing house for those who wish to buy or sell or lease or operate mineral properties within the state of Oregon.

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29-1. Lode gold property near Grants Pass, consisting of six patented claims. Owner states there is considerable $15 to $20 ore developed by open cuts and a 250-foot tunnel. Owner will consider any attractive offer.

E. T. Carnegie, Route 2, Box 493,
Grants Pass, Oregon.

29-2 Gold property of three unpatented claims on Ogle Mountain, Clackamas county. Owner states there are 400,000 tons of $9.00 ore in a decomposed porphyry developed by open cuts and short tunnel. Financial aid will be considered.

W. C. Daly, 16 SW. 3rd Ave., Portland, Oregon

Cosmo Metal Alloys Corporation, 275 Front St., New York City, purchases tungsten ores and concentrates. Correspondence with possible producers in regard to quotations is solicited by the corporation.

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OREGON MINING ARRIVES

When one of the State's basic industries attains an actual, tangible value to the state of $10,000,000 measured in value of actual material produced in a twelve-month period, we feel that it can be said to have "arrived".

Arrived in the sense that it can no longer be referred to by the citizens of the State, or others, as a fledgling or anaemic member of the State's economic family that rates an occasional apology for its backwardness. The growth of mining in Oregon in the last few years has been rapid but based on sound principles. As the production curve will show, and making due allowance for the lag in time necessary for exploration and installation of equipment, there has been an enhancement in value of gold output as a result of the increase in the price of gold in 1934. There has been, also, during the past year, a rapid increase in the production and value of quicksilver due to the increased price of the metal as a result of war conditions.

While these two factors are given due weight as providing the incentive for increased production, other factors of possibly equal importance are plainly evident and lead to the belief that the State's mineral industry is on a much firmer foundation than ever before in its history.

The writer, since returning from two or three months in South America where his mind was entirely detached from the mining situation in Oregon, has been taking stock of the mining and mineral industry situation in this State. We have recently visited the mining areas in eastern, central and southwestern Oregon with the principal object of determining the reasons for the increasing eminence of Oregon mining, the attitude of mine operators themselves toward the industry, the attitude of the public - especially investors - toward mining, and the evidence of growth materially and psychologically in the entire setup of mineral production in the State.

Certain points stand out as we view the matter - first, and most important, we are finding an ever increasing number of sound, experienced mine operators and mineral producers in this State. They are men, for the most part, who are experienced in the business of making money out of the ground because of their technical and business capacity. For example, in the case of a lode-gold operation, if they put jigs after the classifier, they know why they are putting jigs after the classifier, and are not doing it purely because they think a jig is put in the circuit somewhere; if they grind their ore to minus 100 mesh instead of minus 50 mesh, they know why they are grinding to that fineness because of metallurgical test work carried out by them or by some custom metallurgical laboratory; if a placer producer digs his ground with a carry-all instead of with a shovel and trucks, it is because of careful calculations and perhaps past experience in handling ground; if a quicksilver operator adds an extra furnace or extra condensing capacity, it is quite certainly because he has carefully figured in advance all factors involved. Perhaps he wishes to handle a larger tonnage of somewhat lower grade ore - a matter of conservation and economics - or it may be that he has discovered a way to plug a leak in his profit-bag. In any event, there is a sound basis for making the change.

We note the very definite trend on the part of operators toward making their mills, mining methods and production schedules fit the mine rather than the wishes of lay directors. How often in the past have we seen improper financing, misunderstanding of mining economics, and the determination on the part of an

inexperienced directorate to control mining details from a distant board room. A not infrequent procedure has been to cause a mine superintendent to "pick the eyes" out of his property and find himself with the mill paid for perhaps, but with the chutes empty and no ore developed. Usually the project ends in failure as a result of neglect to recognize technical essentials.

Another reason that Oregon mining is growing is that Oregon capital in ever increasing amount is going into Oregon properties. That must be on a basis of faith - well justified faith.

Mining investors are beginning to realize more fully that developed ore in a mine is exactly analagous to a back log of orders for a manufacturing plant. They are beginning to realize, thank heaven, the soundness of doing adequate, and I mean ADEQUATE, and careful preliminary work of exploration and development. For that is really the most important money spent at a mine. On it depends the future prosperity of the operation.

Two years ago, we could count on the fingers of two hands the quartz, quicksilver and placer operations in this State that had definitely developed and pegged advance ore for a six-month or longer mining operation. We certainly could not do it now, and that really is the essence of the present soundness of mining in this State. For example, "A" is a certain cyanide operation we have that knows quite definitely where its mill ore is coming from for the next two or three years; "B" is a dredge operation that has its gravel explored for the next ten years of operation - there are more than one in this "B" group; "C" is a quicksilver operation that knows where its ore is coming from two or three years from now whether the price of quicksilver is $175 per flask or $75 per flask; "D" is a quartz property with flotation mill with proved ore for many, many months - and there are several of these; "E" is a big mechanical placer with two years or more gravel explored ahead; and "F" is a doodle-bug dredge digging merrily away, soundly operated and making money- there are also a number of these. We could mention non-metallic operations of the same satisfactory nature. Each is a credit to the State, to the operators and investors who brought about its existence.

Three years ago "promotion" was a term that seemed almost a byword in this office, whether used by ourselves or by visitors. Now, we don't hear the word once a week. There must be a reason - and it's a healthy sign.

Adding up the totals, Oregon mining and mineral production are now something to be reckoned with. No apologies need be offered. We are handicapped by lack of smelter facilities, by high cost transportation, by lack of a larger consuming population, etc., but we see light on the horizon. We see possibilities for a zinc smelter, for a chrome plant, for early increased production of limestone for agricultural fertilizer and for manufacture of carbide, increased demand for Oregon refractory material, etc. Incidentally, manufacture of carbide opens up a wide vista of possible industries resulting from acetylene by-products.

It seems also pertinent to remark here, as we have stressed before, that probably the greatest possibilities for growth in the State's mineral industry is in the field of non-metallics. Growth will be steady as population increases and new industries are established. The field is largely virgin; the potential supplies are enormous. While usually less spectacular than production of metals, the fundamental usefulness of non-metallics cannot be overemphasized.

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An index as to the trend of things is a large increase in the demands made on this Department for geological and engineering advice, for facts and figures on the availability of mineral products, on markets, and, in general, on the feasibility of divers projects involving use and production of Oregon minerals. It's a mighty healthy trend.

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SOME MINERAL INDUSTRY ABBREVIATIONS

Certain abbreviations, not commonly understood, are sometimes used in mineral market reports and in specifications for particular mineral products. The Department of Geology and Mineral Industries frequently is asked for the meaning of such abbreviations, and the following brief explanations are given.

c.i.f. stands for "cost, insurance, freight." This term is commonly used in the market quotation of mineral imports. It signifies that the quoted price includes all charges to the port of destination. For example, on an ore at so much per ton c.i.f. New York, the quotation would include (1) original per ton price of the ore; (2) cost of insurance to New York; (3) cost of freight to New York.

f.a.s. is the abbreviation for "free alongside ship". That is, the price of a metal f.a.s. is the price delivered within reach of a ship's tackles, thus including lighterage.

B.P.L. is the abbreviation for "bone phosphate of lime" and is used in specifying grades of phosphate rock; thus 75% B.P.L. means that the rock contains 75% tricalcium phosphate which has a chemical formula of $Ca_3(PO_4)_2$. 75% B.P.L. would be equivalent to 15% elemental phosphorus.

P.C.E. stands for "pyrometric cone equivalent" and gives the approximate temperature at which a material softens when subjected to heat. Pyrometric cones are a series of small standardized ceramic cones which form a scale of fusing points and are used in determining the approximate temperature of kilns as well as the refractory characteristics of ceramic materials. The P.C.E. value of a test piece is determined by the cone of highest P.C.E rating which softens at the same time as the test piece when they are placed side by side. The two common cone series are Seger and Orton.

pH is a symbol which denotes hydrogen ion concentration in solutions and thus when accompanied by a number is a measure of acidity or alkalinity. pH7 signifies a neutral solution. An increase in the number, for example pH8, means that the solution is acid; pH6 denotes an alkaline solution. The measure of the acidity or alkalinity may be interpreted from the pH scale which was introduced by Sorenson.

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ALUMINIZING.

The astronomer depends upon reflecting mirrors to concentrate the faint light of far-off stars so that the photographic record will show the behavior of these celestial bodies. These mirrors are carefully prepared ground glass surfaces covered with a thin film of silver or aluminum. While silver initially has a higher percentage of reflectivity (about 90%), the aluminum film retains its initial percentage of relfectivity (88%) for a much longer period. In addition aluminum has a reflectivity in the ultraviolet of 60% as compared to 8% for silver.

Because of the effectiveness of these aluminum films a method devised at the Massachusetts Institute of Technology for aluminizing mirrors as reported in the Technology Review, Cambridge, Mass., is of great practical interest. Under the direction of Prof. John Wulff several mirrors have been aluminized for the Harvard Observatory and other institutions.

Essentially the process consists of evaporating aluminum from tungsten filaments charged with aluminum by means of an electric current in a stainless steel tank under a high vacuum. Seventy-two filaments are arranged on the glass disc so that evaporation produces an aluminum film of uniform thickness. Two to four hours time is required to give the glass the necessary thin opaque coating.

Similar apparatus has been built at the University of California and in some other institutions for researches on the evaporation of metals and formation of extremely fine metal powders.

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PITTMAN AMENDMENT

Oregon quicksilver producers were greatly relieved to learn that the Pittman Amendment to the excess profits tax bill had been adopted in the report of the Senate and House Conference Committee, and the bill sent to the President. This amendment exempts mining of strategic minerals from provisions of the Act. Thus new strategic mineral operations may be planned and extensions of plant could be made without fear that high income taxes would prevent repayment of capital expenditures. The nation sorely needs such products in these critical times, and the excess profits tax bill without the Pittman Amendment would have stifled expansion in the industries the Government wishes to encourage.

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MINING CONGRESS OFFICIALS VISIT OREGON

Mr. Julian Conover, Secretary of the American Mining Congress, accompanied by Mr. P. D. McMurrer of the A.M.C. Staff have been travelling through the Northwest getting first-hand information on mining conditions. On Wednesday, October 2nd, they were guests at luncheon at the Multnomah Hotel, Portland, of Oregon members of the American Mining Congress and representatives of the State Department of Geology and Mineral Industries. Those present besides Mr. Conover and Mr. McMurrer were:

H. C. Wilmot, General Manager, Bonanza Mines
S. H. Williston, Vice-president in charge of operations, Horse Heaven Mines
W. H. Cullers, President, Sumpter Valley Dredging Co.
Harvey Dick, Treasurer, " "
F. Whalley Watson, Consulting Engineer, and Secretary Oregon Mining Associatio
Claire P. Holdredge, Consulting Geologist.
Earl K. Nixon, Director, State Department of Geology & Mineral Industries.
F. W. Libbey, Mining Engineer, " "

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HARDNESS OF MINERALS

Until the development of refined methods for the determination of the hardness of metals, hardness remained a strictly relative term. The "Mohs" scale of mineral hardness, grading minerals from 1 (talc) to 10 (diamond) is the best example of this.

Ore minerals have been graded as to hardness by the ease with which they are scratched by a needle, into three groups, "soft," medium", and "hard". More delicate methods use a needle balanced on a graduated bar with a sliding weight which governs the pressure of the needle, and gives a scale from A to G: Argentite, Galena, Chalcopyrite, Tetrahedrite, Niccolite, Magnetite, and Ilmenite.

In metallurgy, more or less absolute scales of hardness have been developed, which bring out strikingly the great relative differences in hardness between the upper members of the Mohs scale. Two such machines have been developed by Brinell (commonly used) and Vickers. A third recently presented by Peters and Knoop (Metals and Alloys, vol.12, no.3, p.297, 1940) show the old Mohs scale in relation to the new numbering system.

Mohs Number	Material	Peters and Knoop Number
1	Talc	
2	Gypsum	32
3	Calcite	135
4	Fluorite	163
5	Apatite	360-430
6	Orthoclase	560
7	Quartz	710-790
8	Topaz	1250
9	Corundum (Alundum)	1620-1680
10	Diamond	8200-8500

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Antimony Buyer:

Mr. Fred H. Dakin, Mining Engineer, an ore buyer for the Texas Mining & Smelting Co., is interested in purchasing antimony ore. He quotes a price for antimony of $1.40 per unit f.o.b. cars in Eastern Oregon for ore containing 40% antimony. The price will be increased one cent per unit for each percent increase in grade up to 60%. Any ore running 60% or over in antimony is quoted at $1.60 per unit. The ore will be purchased in car load lots (40 ton car minimum).

Mr. Dakin's address is 2811 Hillside Drive, Burlingame, California.

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TO ALL EXCHANGE LIBRARIES

Announcement is made of the release of G.M.I.SHORT PAPER NO.3 "Advance Report on Some Quicksilver Prospects in the Butte Falls Quadrangle, Oregon". Copies of this publication were mailed from this office on September 25, 1940. If not received within ten days from the above date, advise this office immediately; otherwise replacement for copies lost in the mail or elsewhere cannot be made.

An advance report on some quicksilver prospects in southwestern Oregon has just been published by the State Department of Geology and Mineral Industries. This report is called G.M.I. SHORT PAPER NO. 3 and is the result of field studies made during the past summer by geologists of the State Geological Survey headed by Dr. W. D. Wilkinson of Oregon State College. The survey mapped an area designated by the United States Geological Survey as the Butte Falls Quadrangle and lies in the general region extending from Tiller in Douglas County to south of Trail in Jackson County. The quicksilver prospects described are in that part of the quadrangle north of Gold Hill, Jackson County.

Publishing this preliminary report is in line with the Department's policy of making available to the public at the earliest possible time matters of economic interest resulting from Department surveys.

The complete report of the State Geological Survey of the Butte Falls Quadrangle will be published later in bulletin form accompanied by a geologic map.

G.M.I.Short Paper No.3 will be sent postpaid upon receipt of the purchase price of 10 cents. Address the State Department of Geology and Mineral Industries, 702 Woodlark Building, Portland, Oregon; or either of the State Assay Laboratories at Baker or Grants Pass, Oregon.

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TO ALL EXCHANGE LIBRARIES

Announcement is made of the release of the revised edition of BULLETIN NO.8, "Feasibility of a Steel Plant in the Lower Columbia River Area", by Raymond M. Miller. Copies of this publication were mailed from this office on November 4, 1940. If not received within ten days from the above date, advise this office immediately; otherwise replacement for copies lost in the mail or elsewhere cannot be made.

STEEL BULLETIN REVISED

A revised edition of a bulletin covering an investigation of the feasibility of a steel plant in the lower Columbia River area by Raymond M. Miller, consulting metallurgist, has just been published by the Oregon State Department of Geology and Mineral Industries. The original report was issued by the Department in June 1938. Since that time much new statistical information on consumption of steel products as well as other market data has been assembled by Mr. Miller, who is now a metallurgist with the Bonneville Power Administration, and in the present revised edition the Bonneville power rates as they apply to an integrated steel operation are accurately outlined.

The above bulletin (No.8) may be obtained from the head office of the State Department of Geology and Mineral Industries, 702 Woodlark Building, Portland, Oregon, or from either of the State Assay Laboratories in Grants Pass and Baker. The postpaid price is 40 cents.

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GLASS

So commonplace is it that, without a reminder, we seldom give a thought to the universal application - the absolute necessity - of glass to our daily lives. It probably has contributed more to the progress of modern existence than any other substance. Of ancient lineage, it is only in relatively recent times that its use has expanded so rapidly. The research worker, the chemist, the electrical industry, all would be helpless without it, to say nothing of its ever-expanding application in the building industry, domestic use, as food and drug containers, in scientific and photographic apparatus, and for ornamental purposes. Over 3,000,000 tons of glass products are used in the United States annually.

The usual glass is made from silica, soda and lime, together with various substances such as borax, lead, selenium and barium to give certain desired special properties.

The molecules in glass are not arranged in regular patterns as in common solid materials, and from this characteristic comes its valuable properties. It has the characteristics of a solid solution in which the molecules take random positions. Glass flows like an ordinary liquid if its temperature is raised sufficiently. Thus it may be blown, moulded, spun, and formed into various shapes and articles.

The valuable insulating properties of glass are well known. If it were not brittle it would be as strong as steel, even so it has been stated that a glass window only one inch thick can be so constructed that it will stop a machine-gun bullet. Research work, notably by the Corning Glass Works and the General Electric Company has accomplished most remarkable results in the production of various types of glass and in glass making machinery. There is the fascinating procedure of producing a huge telescope mirror which requires many months of annealing at a controlled temperature; there is the case hardening of plate glass which gives it the strength of steel; there is the production of light globes on a scale comparable with the laying of salmon eggs. Light bulbs are blown by such machines at the rate of 800 a minute. Such machines have been inadequately described as almost human in their work. Such a description is flattering to humans; continuous production of the fragile bulbs, each with its own tiny filament coil, is little short of magic.

We are so familiar with the result that it is commonplace; we do not consider the months and years of scientific research responsible for the perfection of a near miracle.

To show striking comparisons we speak of such and such if placed end to end would reach so far on the surface of the earth, but if you want to get analogies for lengths of glass wool fibres, you must go into the solar system for distances. A pound of glass will make three thousand miles of fibre. Six million miles of glass wool a day is produced in a single large glass wool factory and a single cubic foot of the wool weighs only 24 ounces.

A wonderful human tool - glass; so universally useful is it that even though the many present glass products fill a need that no other substance could supply, the glass industry offers a most fertile field for research to produce new and better glass products.

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QUICKSILVER PRODUCTION

According to United States Bureau of Mines' monthly Mercury Release dated November 2, 1940, domestic production of mercury in September amounted to approximately 3,600 flasks, an increase of 100 flasks over August and 400 flasks over the July production. Domestic consumption was reported to have totaled about 2,100 flasks, so that the output of domestic mines was in excess of domestic requirements and allowed for substantial exports. Consumers' and dealers' stocks at the end of September were reported as about 13,100 flasks compared with 12,900 flasks on hand at the end of August. This would be equivalent to over six months' domestic requirements.

Companies that were responsible for 98% of Oregon's total in 1939 reported that the August total was 121% higher than the monthly average for 1939 and 2% below the August production, which was 14% above the July output. According to the Bureau of Foreign and Domestic Consumers there were no imports of mercury for consumption in August and September. Exports totaled 799 flasks in September compared to 633 flasks in August. Of the September exports, 42 flasks went to Canada; 646 to the United Kingdom; 38 to Colombia, and 26 to Australia. Domestic production increased from 1800 flasks in January 1940 to 3600 flasks in September. Domestic consumption was as follows:

January 1940	2,300 flasks	May 1940	2,100 flasks
February "	2,000 "	June "	2,400 "
March "	1,800 "	July "	2,200 "
April "	1,900 "	August "	2,100 "
		September	2,100 "

Consumers' and dealers' stocks in January 1940 amounted to 13,000 flasks. In September the figure was 13,100 flasks. Producers' stocks were 582 flasks in January and 377 flasks at the end of September.

The above statistics showing excess production over domestic consumption, are reflected in market quotations for quicksilver - prices have continually softened. About August first, market price was $188-$190 a flask. At the end of the month, quotations were $183-$185. Present market quotation at the beginning of November is slightly under $170 a flask.

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ASSESSMENT WORK - MILITARY SERVICE.

Congressional representatives have been asked to pass appropriate legislation which would exempt those inducted into military service from doing annual assessment work on mining claims during the time of military service. So far as known, no legislative action has been taken, but it has been stated in the press that it is believed no new legislation is necessary to accomplish this.

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CHROMITE REPORT

The U.S. Geological Survey has issued Bulletin 922-D, Chromite Deposits of Grant County, Oregon, A Preliminary Report, by T. P. Thayer. The bulletin consists of 113 pages with several maps and illustrations. The area described is in the Strawberry Range, which borders the John Day Valley on the south. Dr. Thayer describes general geology, ore deposits, and makes estimates of ore reserves. The report is for sale by the Superintendent of Documents, Washington, D.C. The price is 45¢.

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To all interested in Northwest industrial development we commend "Traf Fact", a pamphlet published by the Traffic Department of the Union Pacific Railroad, Omaha, Nebraska. In number 21, issued in October, are several meaty short articles and news items connected with the mineral industry. Also, the U.P.R.R. has recently issued a pamphlet giving a partial list of mineral properties tributary to the Company's lines. The title is "From Antimony to Zinc."

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DIATOMITE

At the Knob Hill Cyanide Mill, Republic, Washington, where about 575 tons of ore per day are treated, diatomite is used as an aid in clarifying cyanide solutions before precipitation. New filter cloths of the clarifying filter are coated uniformly with diatomite by pumping diatomite slurry through the leaves. This coating forms a pervious layer and inhibits slimes from penetrating the cloths. 4 to 5 pounds per 100 square feet of filtering area are used. Mining and milling operations at the Knob Hill property are described in U.S. B.M. Information Circular 7123.

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QUICKSILVER SHIPMENT

According to the Oregon Journal, Portland, Nov.7th, the American-Hawaiian freighter Virginian, scheduled to sail from Astoria to U.S. North Atlantic ports, loaded 500 flasks of Oregon-mined quicksilver. This would be about nineteen tons of quicksilver and have a present market value of about $85,000.

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DEPARTMENTAL NOTES

Earl K. Nixon, director of the Department, is recovering satisfactorily from an appendicitis operation performed October 22nd.

E. F. Burchard, geologist in charge of Section of Iron and Steel Metals, U.S. Geol. Survey, recently inspected iron ore deposits in Columbia County. Mr. Burchard has been studying iron ore occurrences throughout the Northwest.

Thomas P. Thayer of the U.S.G.S., who spent the last two seasons in a survey of chromite deposits of the John Day region, recently called at the Portland office on his way to California to engage in another chromite project.

"Oregon's Quicksilver Industry" is the title of an article by F. W. Libbey in the October issue of the Mining Congress Journal.

Mr. Wessley Paulsen has joined the staff of the Portland office as Junior Geologist, succeeding Wayne R. Lowell, who is doing graduate work at the University of Chicago.

Albert A. Lewis, analyst at the Grants Pass Laboratory, was married October 5th to Miss Lily Ann Nelson of Grants Pass.

Maurice Brady of Baker, who was in charge of the Oregon Mineral Exhibit at the San Francisco World's Fair, is now employed at the Portland office as multigraph operator.

Capt. Leslie L. Motz, metallurgical chemist with the Department since early in its organization in 1937, has entered active Army service with the Ordnance Department and is stationed at Fort Stevens, near Astoria.

Messrs. Hobbs and Pecora, of the U.S. Geological Survey, were in Portland Nov.8th, on their way north into Washington. For the past two months they have been studying the garnierite area on Nickel Mountain, near Riddle.

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CLEARING HOUSE

Mr. R. H. Russell, 227 Hutton Building, Spokane, Washington, desires to find placer properties suitable for dragline or bucketline dredge operations. If owners of placer ground in Oregon wish to contact placer operators, Mr. Russell would like to have them get in touch with him.

Minerals Research Co., 316 West Colorado Blvd., Glendale, California, is in the market for tungsten concentrates or tungsten crude ore in grades from 5 percent up regardless of impurities.

GOLD IS WHERE YOU FIND IT

(from Traf Fact)

In a summer long since over
There appeared in certain parts
A geologizing rover
With an aptitude for charts;
His manners were patrician
And his speech collegiate,
And his rock-wise erudition
Seemed both deep and up-to-date.

He spoke of schists and sulphides
And of sedimentary zones,
Of sphalerite and sericite
And correlated stones;
He was eloquent on shearings,
Displacements, dips and stresses,
On major faults and minor faults,
Intrusions and buttresses.

He named the varying strata
With familiar nonchalance
And was liberal with data
On their known significance.
He scheduled ores micaceous
And discoursed of diorite
Of shales carbonaceous
Hornblende and hematite.

His work was scientific,
He excelled in taking pains,
And, while loth to be specific
In assessing any veins,
He in one place gave the ruling
"Little hope of values here".

And some roughneck, short on schooling,
Mined a million there last year.
Not mine to science underrate,
Wealth follows oft behind it;
This tale is but to illustrate
That "Gold is where you find it".

- Author unknown.

TIN

In National Geographic Magazine for November, Alicia O'Reardon Overbeck traces the history, occurrences and production of tin under the title "Tin, the Cinderella Metal". It is needless to state that the article is illustrated adequately. That is taken for granted in National Geographic.

Historically tin goes back into antiquity. Biblical references are numerous. Its industrial importance dates from the time when an ancient metallurgist discovered that by adding tin to molten copper the resulting alloy possessed greatly desired properties of hardness and strength. The Bronze Age resulted which meant a step or several steps forward in the social conditions called civilization. The end of the Bronze Age came with the discovery of iron, but that did not mean a lessening in the importance of tin, for its uses have continually expanded.

The fabulous voyages of the Phoenicians are connected with commerce in tin, probably with ancient Britons in Cornwall, famous for its tin mines. On down through the ages, the Bible, Herodotus, Pliny, Homer, writings of ancient Chinese and Egyptians, and the more modern writers which seem ancient to us now, mention tin or its alloys such as bronze, pewter and bell metal.

Known commercial occurrences of tin are really confined to a relatively few localities - the Federated Malay States, the Netherlands Indies, Bolivia, Siam (Thailand), Burma, China, Nigeria, and Cornwall. It is thus remarkable that it was one of the first metals discovered.

The romance of tin is intimately associated with early explorers and adventurers. Pizarro conquered Peru, and he and his associates gutted it and Bolivia, insofar as they were able, of all treasure. On Potosi Hill, Bolivia, in the 17th century, rich silver ore was mined through shafts by thousands of slaves - human ants - who passed endlessly up the notched poles used as ladders, each with a load of silver ore on his back. His life was valued about on a par with the ants. When he fell exhausted or made a misstep in the shafts, another slave was forced in to replace him.

Tin ore which occurred with the silver was thrown away as worthless and accumulated in huge dumps; it was not until the next century that tin in the dumps became of commercial importance. These dumps have continued to be worked over for tin minerals down to the present day.

Not all the dramatic stories of rags to riches are confined to gold mining or wild-cat oil wells. One of the most spectacular is that of the rise of Senor Simon I Patino, the Bolivian Tin King. As related in National Geographic, in the early part of the last century Patino was a young, impecunious clerk in a general merchandise store, owned by a German, in Chochobamba. Heavily in debt to the store was a Portuguese, and it devolved upon the clerk to collect the debt. After tracking down the debtor with much effort and difficulty, Patino finally made with the Portuguese the best bargain he could, which was that the Teutonic proprietor should accept title to a tin claim the Portuguese owned in settlement of the bill for merchandise. However, Patino's employer was enraged at the bargain and threw him out on his ear, telling him to keep the tin claim in

payment for back wages. Without a job and with no money the clerk turned to the tin claim as a means of livelihood. A friend staked him to some food and tools, and he started work. For many months he endured hardship and privation. With some Indians to help him, he mined the ore and concentrated it in the icy streams, packing the concentrate out on his back. Finally he struck some rich ore valued at over $500 a ton. It proved to be a real strike and soon he received an offer of a million dollars for his property. Counseled by his wife, he refused the offer. By mining his rich ore he was able to buy surrounding property which also proved to have valuable tin deposits. The Patino mines today supply about half of Bolivian tin production, and the Patino fortune is one of the world's largest.

The history of canning food really begins with Napoleon's determination to solve the problem of providing portable food. He offered a reward of 12,000 francs to anyone who could devise a satisfactory method. Nicholas Appert, after many experiments, discovered that by heating and sealing, foods could be preserved. But he knew only of glass as a container which was not practical for use of an army on the march.

Knowledge of tin plating goes back to antiquity. In more recent times, tin plate was made in Bohemia and Saxony between 1240 and the 1600's. A plant was started in England in 1673. In 1720 the industry was started in Wales, and by 1776 Wales led the world in tinplate manufacture. Wales maintained its leadership until the industry in the United States took over because of the McKinley Bill of 1890.

In 1825, an Englishman, Thomas Kensett, living in New York, obtained an American patent for a tin can to be used as a container. In 1810 a patent had been granted in England. From these beginnings has sprung an industry which now uses around 50,000 tons of tin annually in the manufacture of tinplate.

We take the tin can for granted without giving thought to its importance in our scheme of things, but if we pause a bit and think about our reliance on it for making possible the various human activities of the present day, the tin can then assumes gigantic proportions. We then realize something of our dependence on the metal tin.

* * *

In Metals and Alloys for November, under the title "Tin Plate and Solder - from the Strategic Viewpoint", H. W. Gillett gives some timely facts about United States' requirements of this much publicized metal.

The tin content for finished products in the United States for 1937 was about 90,000 tons of which 73,000 tons was primary and 17,000 tons secondary metal. About 39,000 tons, all primary, was used in tinplate.

The most important use of tinplate is in tin cans for food products, in which industry about 60% of all tin cans are used. In cans used for food containers, the tin coating serves three purposes, (1) protection of outside from rusting, (2) protects inside from corrosion by contents, and (3) allows soldering of the body seam with great facility in can-making machinery.

Under war conditions, the amount of tin used in cans could be reduced very

materially without cutting down the number of cans required. Lacquer-enamel can be used for protection on the outside of cans. Also a large number of oils, dryfoods, and non-corrosive materials do not require tin for protection; "enamel" lined cans could be used. It is estimated that not more than 10% of the total cans made require tin for protection against corrosion due to contents.

In an emergency, silver might be substituted for tin in the food industry where protection against very corrosive materials is desired. Generally speaking silver would be uneconomic. Aluminum could not be used, since no solution of the problem of soldering on aluminum has been found.

The most essential need for tin is in soldering tin can joints. If required by shortage of tin, it would be feasible to tin and solder only the joints, thus saving the tin on about 95% of the area.

The use of solder is so varied and widespread that it affects nearly all industrial activity. In a 4,000,000 car year, about 9,000 tons of tin is required for radiators.

Some substitute solders which could be used under certain conditions are lead-silver and cadmium-zinc combinations. Also, a solder may be made by substituting cadmium for some of the tin in the usual 62% lead-38% tin solder.

* * *

In U.S.Bureau of Mines' Mineral Trade Notes, dated Nov.20th, 1940, the following item shows measures taken in the United Kingdom for conserving tin supplies:

> "The Ministry of Supply has issued an order prohibiting the use of tin containers for face powders, shaving sticks, cigarettes, boiled sweets, and many other articles. The Ministry hopes thus to save approximately 50,000 tons of tinplate and sheet steel per annum, which can be diverted to the manufacture of munitions. In the case of biscuits, boiled sweets, coffee, cocoa, and drinking chocolate, retailers will receive supplies in large tins, which will have to be returned to the manufacturers after the contents have been sold to the public in small paper containers. Tin boxes and cans in general will be replaced by paper containers and bags. The public is urged to return all used tin cans at once to retailers or other authorized persons or agencies. (Vice Consul M. A. Colebrook, London, July 25, 1940)."

QUICKSILVER

According to the U.S.Bureau of Mines, domestic production of quicksilver in October was 3,600 flasks - the same as reported for September. Consumption was given as 2,700 flasks which showed an increase of 600 flasks compared to September consumption and was the highest for the year. 757 flasks were exported; there were no imports. Stocks in the hands of consumers and dealers at the end of October amounted to 13,200 flasks compared to 13,100 flasks at the end of September; while producers' stocks were reported as 855 flasks, an increase of 478 flasks over the September amount.

Companies in Oregon responsible for 98% of Oregon's total in 1939 reported that the October total was 133% higher than the monthly average for 1939, and 5% higher than in September.

Of the October exports, 581 flasks went to the United Kingdom, 9 to Canada, and 94 to Australia.

Quoted prices continued throughout the month at about $170 a flask.

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NON-METALLIC MINERAL PRODUCTION

C. P. Holdredge has been employed by the Department to make a canvass of non-metallic mineral production of the state for 1940. Statistics of metallic production made by the U.S.Bureau of Mines are accurate and made available to the public with reasonable promptness. The Bureau's figures for non-metallics, however, are not complete for Oregon and are often delayed two years before being published.

In order to gauge the importance of the state's mineral industry and to answer intelligently the many inquiries concerning it, some of which are from industrialists, it is essential that the value of production of non-metallics be known. To get real value out of such statistics, they should be as nearly as may be current figures. Thus an accurate, up-to-date picture of the state's mineral industry is obtained.

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ASSESSMENT WORK - MILITARY SERVICE

The following item in the Oregon Journal, Portland, Dec.9th, is of interest to mining claim owners in military service:

"WASHINGTON, Dec.8 (Washington Bureau of The Journal). Holders of mining claims who were in military service on October 17 or enter at

"later date will not be required to perform the usual $100 worth of assessment work during their service.
"Regulations issued by Secretary Ickes of the interior department also permit time in military service to be credited for residence and cultivation of land under the homestead laws, suspending payments which fall due during the period of military training. Those claiming the benefit of this suspension should file notice of military service with the district land office on or before April 17, 1941, or within six months after entering the service.
"Those desiring suspension of assessment work on mining claims will be required to file notice in the county office where their certificates are recorded, before the end of the assessment year, which will be July 1, 1941".

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MINERAL FERTILIZER BROUGHT TO THE NORTHWEST

From the Oregon Journal, Portland, Dec.9th:

"The Weyerhaeuser line freighter Winona was at McCormick terminal Monday discharging 3000 tons of super-phosphate, the largest shipment of this mineral ever to be unloaded here. A total of 7000 more tons of the mineral is slated to come here in the near future on Weyerhaeuser and McCormick line vessels.
"Consigned to the agricultural adjustment administration, the superphosphate comes from Baltimore for distribution to Oregon and Washington farmers for replenishing soil employed for growing clover and legumes.
"A total of 20,000 tons of the mineral is destined for shipment to Portland and Seattle."

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Mr. B. H. Coffman, 1918 E 81st St., Cleveland,Ohio, desires to contract for large tonnage of manganese ore of 48% manganese minimum. Could use 3,000 tons or more per month.

Cuban American Holdings, Ltd., 367 Mills Bldg., San Francisco, wishes to acquire deposit of white diatomaceous earth running 90% plus in silica. Send samples, analyses, and full particulars to above named company.

Mr. F.S.Minshall, Philomath, Oregon, desires to get in touch with someone experienced in prospecting for gold, silver, and cinnabar, with whom he could go on a prospecting trip next spring. Share expenses.

Minor Blythe, 1003 West 35th St., Los Angeles, states that he is in the market for and wishes to receive information on the following ~~#~~ minerals: Molybdenite concentrates, 80-85% MoS_2 containing not over 0.5% copper; vanadium concentrates containing not less than 15% V_2O_5; beryl of a grade not less than 10% BeO; fluorspar, sillimanite, rutile, corundum, micaceous hematite, wolframite, magnesite, cryolite, monazite, colmanite, white talc free of carbonates, sepiolite, siliceous earth testing 85-90% silica and 10% alumina, pure white clay, bentonite suitable for filtering, and various other minerals.

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