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DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES
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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.

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.

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 $\text{Ca}_3(\text{PO}_4)_2$. 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.

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 reflectivity (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.

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.

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 Association
Claire P. Holdredge, Consulting Geologist.
Earl K. Nixon, Director, State Department of Geology & Mineral Industries.
F. W. Libbey, Mining Engineer, " "

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.

<u>Mohs Number</u>	<u>Material</u>	<u>Peters and Knoop Number</u>
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

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 *
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* 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 replace- *
* ment 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.

State of Oregon

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