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Portland, Oregon

## STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

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## AN EXPANDED OREGON CERAMIC INDUSTRY

By

C.W.F. Jacobs\*

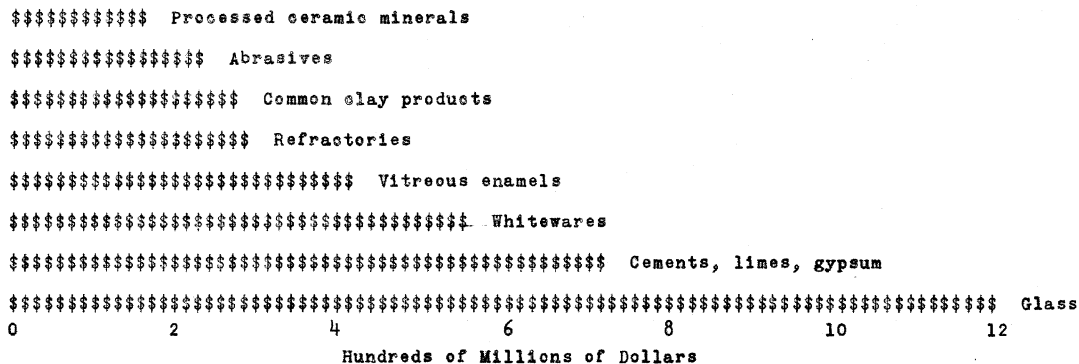
The accompanying informal report was written by Mr. Jacobs at the request of the Department. Making electrical insulators as a possible new industry for the Portland area was discussed several times with Mr. Jacobs while he was on the Department's staff. Such a project should be preceded, of course, by a market survey to determine possible outlets for insulators in this area. If the survey proved encouraging, a small plant employing eight or ten men could be established and expanded into making specialty electrical items including, possibly, high-tension ware as future demand warranted. The other industries listed in the report are presented as potential ones that ought to be given consideration. Bringing natural gas into the area would be an important element in interesting capital to establish new ceramic industries. Growth in population is always an important factor in demand for ceramic products.

Editor

Introduction

The ceramic industry in the United States has an output of approximately three billion dollars annually. It is closely associated with our everyday living, both in the home and in industry, since it provides us with glass for windows and utensils; brick and tile for building; vitreous enamels for sinks, tubs, stoves, and refrigerators; chinaware, pottery, and tile; electrical and chemical porcelain; refractories and abrasives.

The following graph shows the relative order of production of specific ceramic products based on approximate dollar sales (average since 1947):



\*Formerly ceramic engineer with the State Department of Geology and Mineral Industries; now engaged research for Titanium Alloy Manufacturing Division, National Lead Company, Niagara Falls, New York

The essential requirements for the establishment of a plant which will manufacture a ceramic product or process a ceramic material are listed in order of importance.

1. Low-cost fuel (natural gas, oil, electricity).
2. Raw material supply - local supply or low-cost transportation to make material accessible.
3. Ready market for product.
4. Ready supply of labor.

In the east, where most of the large manufacturers are located at the present time, the above requirements are becoming less and less easily fulfilled.

1. Fuel supplies are becoming short. This is particularly true of electric power.
2. Cost of raw material transportation by rail is increasing.
3. Labor is becoming difficult to obtain due to expanded industrialization.

Thus the Portland area, due to its excellent harbor facilities, enlarged power supply, and increased labor pool, is a logical place for the ceramic industry to develop.

#### Present industry in Oregon

While the manufacture of common clay products such as brick, tile, etc., is rather well established in the State of Oregon, especially in the Willamette Valley, the quality of some of the products produced could be improved. This is not the fault of the raw material but rather the methods of production. Therefore in the field of common clay products the development of more modern methods of manufacture should be investigated to try to improve the product as well as to decrease the cost by increased production.

#### Future ceramic industries in Oregon

From the standpoint of commercial supplies of raw material within the State and raw materials accessible to the Portland area by ocean freight as ballast or cargo, the most likely industries to be considered first are refractories, abrasives, and whitewares.

Deposits of refractory clays, described in Wilson and Treasher's report "Refractory Clays of Western Oregon,"<sup>1</sup> could supply a manufacturer with sufficient raw material to produce a very good grade of firebrick or fire-clay products which could be used throughout the Pacific Northwest and would find new markets as industry developed in that area.

The abrasive and refractory industry is already established, in part, at Vancouver, Washington, where the Carborundum Company has built a plant for the production of silicon carbide grain for abrasive and refractory use. The abrasive industry is producing at the present time more than ever before. However, they cannot meet the huge industrial demands. (The Carborundum Company has announced plans for doubling the present capacity. Ed.)

With the potential of more electric power from the new installations in the Columbia River Basin area, the electric furnace operation for the manufacture of silicon carbide and alundum grain could provide a real incentive to other manufacturers to move into the Portland area and not only produce the raw material (as is Carborundum at the present time) but also manufacture abrasive wheels, coated product refractories, etc.

The whiteware industry is one of the most varied branches of the ceramic industry and includes the following products (not necessarily in order of importance).

1. Sanitary ware
2. Vitreous floor tile
3. Wall tile
4. Dinnerware
5. Electrical porcelain (low and high tension)
6. Chemical stoneware and porcelain.

<sup>1</sup>/Wilson, Hewitt, and Treasher, Ray C., Preliminary report of some of the refractory clays of western Oregon: Oregon Dept. Geology and Min. Ind. Bull. 6, 1938.

Considering the growth of power in the Pacific Northwest, one of the most essential needs at the present time seems to be a local supply of electrical insulators both of low- and high-tension type for use in the many power projects now under construction including the REA program. Raw materials used for this industry are various clays, talc, and more recently zircon and rutile (or titania) products.

At the present time a small plant equipped to produce a line of low-tension insulators would probably succeed in the Portland area. Low-tension ceramic insulators may be considered as those which are used in homes, on farms, and for routine power loads in factories, mines, and similar establishments. Such units are powered with voltages not exceeding 440 volts. A few of the products which a plant of this type would produce are as follows: unglazed nail knobs, tubes, cleats, outlet boxes, sockets, and switches.

If a specialty item is possible, the manufacture of appliance parts is very suitable to this type of plant. Other items could be glazed products such as farm fence insulators, telephone and utility outlets, neon sign parts, and radio receiver parts.

After a firm market is established in the low-tension field, the plant could develop a line of high-tension insulators for transmission purposes.

Chemical porcelain can also be produced in a plant which is equipped to manufacture electrical porcelain, although the production of chemical ware is usually a specialty type of production involving a very high-grade type of ware and very pure raw materials. However, there is a very good profit possibility in the production of this type of ware.

Due to the competition from California the development of a tile, dinnerware, or sanitary-ware industry would not be wise at this time. Recently the Crane Company and Universal Rundel Company, Inc., both manufacturers of sanitary ware in the past, have built new plants in the Los Angeles area to produce for the western market.

The manufacture of glass containers is another part of the ceramic industry which has possibilities in the Portland area. Bottles for milk and other beverages can be produced from readily available raw materials that can be obtained from local sources or shipped in by boat from outside sources. Also with proper research and development a use could be made of the locally obtainable volcanic ash as a raw material for brown or green bottle glass.

#### Manufacture of ceramic raw materials

There are many products which are considered raw materials for the ceramic industry. We have mentioned silicon carbide and alundum for abrasive and refractory uses; others are as follows: zircon, zirconia, chromite, rutile, pigment-grade titania, and titanium and zircon chemicals for use in the manufacture of radio and television parts.

With the development of Oregon beach sands plus the tremendous supply of zircon and rutile obtainable from Australia, the manufacture of electric furnace products of zircon and rutile, the grinding of zircon for opacifiers and zircon porcelains, and the manufacture of fluxes from rutile for welding rods would be practicable.

The establishment of a ceramic industry in the Portland area can be accomplished in two ways:

1. Procurement of local capital to establish a manufacturing plant which would compete with the eastern manufacturer on the western market.
2. Interesting eastern firms in the development of a West Coast manufacturing area that would produce and supply their wares to a western market without the need of shipping the finished product across the country thus providing slightly lower costs to the consumer due to decreased transportation costs.

Raw materials

The raw materials available within the State seem to be of relatively low grade as far as kaolins or clays of whiteware type are concerned. However the lack of pure clay material has not prevented the industry's development in California. With the port facilities that are available in Portland, clays can be shipped in from the east as well as from England very cheaply as ballast, or payload if there is a sales market for them in the form of an industry using them to manufacture ceramic products.

Feldspars are available from Montana, Idaho, and possibly British Columbia; and the local volcanic ash, perlite, and other volcanic products could be used as low-cost substitutes in many products.

A new locally organized industry would have to compete with the pressure of established trade names in addition to having problems connected with the development of a product from new material sources. This combination of a new product plus the development of a new market could defeat an organization which is not in excellent financial condition and possessing good technical assistance so that it could weather the first years of development.

The matter of interesting eastern firms to establish ceramic plants in the development of a new western manufacturing area means a selling job. It means pointing out what Oregon has to offer so as to make an eastern manufacturer want to establish a plant in Oregon rather than in Washington or California.

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DEPARTMENT GOVERNING BOARD MEETS IN BAKER

The Governing Board of the State Department of Geology and Mineral Industries held two meetings in Baker on March 1. These meetings were planned so that the Board could meet and become acquainted with people interested in mining and receive suggestions regarding Departmental work and methods. A Chamber of Commerce luncheon meeting had been arranged and the luncheon Chamber President, Herbert Chandler, welcomed the Board. He asked Mr. Hendryx to make the introductions following which Mr. Allen outlined briefly the Department's functions. Mr. Libbey gave a picture of Oregon's mining industry including important exploration projects. He described the government's chromite buying program now in effect in southwestern Oregon. Mr. Bingham described the Department's part in discovery and development of high-iron bauxite in northwestern Oregon.

In the afternoon the Board held an open meeting in the Circuit Court Room of the Court House. At this meeting about 40 people attended. Members of the Board stated that they wished to become acquainted with the mining people and to hear first-hand their problems in order to determine how the Department might be of assistance. Mr. Hendryx, who was in charge of the meeting, asked for statements from the floor by anyone who wished to make comments, and a round-table discussion developed. Many comments were made regarding the difficulties manganese property owners have in attempting to produce and sell manganese ore. High freight rates prevent economic shipment and the principal problem appeared to be that of obtaining a local government ore purchasing depot. Miss Nadine Strayer, President of the Eastern Oregon Mining Association, had discussed the situation with the Spokane office of DMPA and stated that that office had promised to follow up with field investigations in order to determine whether or not exploration loans as well as a purchasing depot were warranted. This examination work will be done as soon as snow conditions permit. Mr. Norman Wagner, field geologist for the Department stationed at Baker, outlined the geological mapping work in which he was engaged during the 1951 field season and which will be continued mainly in southern Umatilla County in 1952.

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## NIEL ALLEN REAPPOINTED

Governor McKay has reappointed Mr. Niel R. Allen, Grants Pass, as a member of the Governing Board of the State Department of Geology and Mineral Industries for a four-year term beginning March 17, 1952. Mr. Allen, a prominent attorney, has long been connected with the mineral industry of the southwestern part of the State. He has also been directly concerned with reclamation and recreational activities, and has been very active in American Legion work both locally and nationally. He has served on the State Board since 1944.

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## NEW DEPARTMENT GEOLOGIST

Lenin Ramp, a graduate of the University of Oregon in geology, has joined the Department's staff. During the field season of 1951 Ramp assisted Hollis Dole in geological mapping work in the Dutchman Butte quadrangle in southwestern Douglas County. This project by Dole and Ramp will be continued in 1952. Mr. Ramp, a Navy veteran, is from a pioneer Roseburg family and was prominent in track athletics both at Roseburg High School and at the University.

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## ORR ENGINEERING COMPANY GETS NAVY CONTRACT

Mr. James Orr of the Orr Engineering and Chemical Company has been awarded a contract amounting to \$217,000 by the Navy to supply for Korea petroleum coke produced by the Portland Gas and Coke Company. The coke is pushed from storage to the dock with a bulldozer and then loaded on a barge by means of a clam shell. A portion of the river had to be dredged to allow the barge to dock. The barge is moved to an ocean-going steamer in another part of the harbor for cargo transfer.

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## HEARING ON SNAKE RIVER DREDGING PROJECT

On Saturday, March 1, a hearing was held before the Idaho State Land Board at Boise on the application of Mr. S. K. Atkinson for a lease on the bed of the Snake River for a dredging project. As reported in the Baker Record Courier, some opposition developed from fish interests and also from the Idaho Hells Canyon Association interested in promoting the Hells Canyon dam. A representative of the Corps of Engineers testified by letter that such a project would need to be approved by the Engineers. The Idaho Power Company reportedly did not protest the application but asked the State of Idaho to protect its dam sites. The Secretary of State for Idaho proposed that a disinterested agency make an examination before application is granted. Representatives of small mining groups testified that they thought dredging might be done without hindering dam developments.

Mr. Atkinson had stated that he proposed to recover values in the river sands from an estimated 528 million yards. He reported that preliminary testing work had shown, besides gold, magnetite, chromite, ilmenite, garnet, zircon, monazite, and uranium minerals. Over a period of 18 years he said that \$4 million in royalties could be returned to the states of Idaho and Oregon, and \$31 million in local and federal taxes would be paid. About 50 miles of river bed is involved in the application.

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## CUBAN NICKEL PLANT REOPENED BY GOVERNMENT

Government officials have announced the reopening of the U.S.-owned Nicaro (Cuba) nickel plant. Four of the twelve furnaces are now working 24 hours a day. Each has a capacity of over 200,000 pounds of nickel a month. The remaining furnaces are to be brought into production during the next four months. The plant is being operated by the Nickel Processing Co., a joint enterprise of N. V. Billiton Maatschappij of The Hague, Netherlands, and the National Lead Company.

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## ORIGIN OF PETROLEUM

Petroleum geologists have always been in doubt as to just where and when organic matter is transformed into petroleum. It has been assumed that a long period of time following deposition in marine or brackish water sediments, pressure and perhaps heat, and possibly radioactivity have been required. This line of reasoning is logical since all known petroleum-bearing strata are of considerable geologic age. Recent studies<sup>1/</sup> have shown, however, that liquid hydrocarbons do occur in very recent sediments in the Gulf of Mexico. The percentage of the hydrocarbons is small, but on the basis of results obtained by the Standard Oil Company of New Jersey a cubic mile of these sediments would contain 13,000,000 barrels of a paraffin-naphthene, aromatic, and asphaltic mixture resembling crude oil.

Having established the presence of these hydrocarbons in recent sediments, Mr. Smith<sup>1/</sup> discusses their origin. Three sources are possible: (1) by contamination of the sediments during collection and analysis, (2) by migration or diffusion, or (3) by deposition or genesis in the sediments themselves. Of these three theories the last seems the most credible since analysis of the hydrocarbons by means of the Carbon 14 method indicates the recent origin of the hydrocarbons. Further work must be done before it can be definitely stated that liquid hydrocarbons are generated in recent sediments, but it seems likely that one of the geologists' most debatable questions will be answered at last.

Editor's note: Biochemical action very probably starts soon after time of deposition and continues throughout a long period of time during which increasing effects of pressure and heat come into play.

The conclusion (last sentence) of Smith's article does not disprove the traditional conception that the formation of petroleum involves a rather long period of time. It simply states that "liquid aliphatic and aromatic hydrocarbons, similar to those found in crude oil (very possibly the earliest stage under the traditional conception), have been extracted from recent marine sediments for the first time."

<sup>1/</sup>Abstract from Preliminary notes on origin of petroleum by Paul V. Smith, Jr.,  
Bulletin of the A.A.P.G., vol. 36, no. 2, February 1952.

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## GOLD

H.R. 6470 - GOLD STANDARD ACT, 1949 - Reed (Rep., N.Y.). Committee on Banking and Currency. Stated purpose to restore right of American citizens to freely own gold and gold coin; to return control over public purse to the people; to restrain further deterioration of our currency; to enable holders of paper money to redeem it in gold coin on demand; to establish and maintain a domestic gold coin standard.

Declares standard monetary unit of United States shall be gold dollar of fifteen and five twenty-firsts grains nine-tenths fine. Gold coins of not less than \$10 denomination, as Secretary of Treasury finds desirable, shall be minted and issued upon demand. Nothing in Act shall be construed to change size, weight, or fineness of present lawful silver coins. Standard gold coin and gold certificates shall be full legal tender. All other money of U.S. shall be maintained on a parity with standard gold dollar by freedom of exchanges at par with standard gold.

Standard gold bullion and coin as well as gold certificates shall be lawful money for reserves against deposits in Federal Reserve banks and in the 5 percent redemption fund against Federal Reserve notes. Standard gold bullion and coin as well as gold certificates shall count as part of minimum reserve of 25 percent to be held by Federal Reserve banks against their Federal Reserve notes in actual circulation.

All legally issued Treasury currency, except (a) fractional silver and minor coins (permissible up to \$10), and (b) bank notes and Treasury notes in the process of retirement, shall have quality of full legal tender. Specifically, following shall have quality of full

legal tender: Gold coin and gold certificates, silver dollars and silver certificates, and U.S. notes. Federal Reserve notes shall be receivable for all debts, public and private, but they may not be counted as reserves against other notes or deposits of issuing banks.

All provisions of law authorizing President to alter size, weight, or fineness of gold and silver coins would be repealed. Mint charges for assaying and coining gold and silver, limits of tolerance, and alloys in gold and silver coins shall be those in effect in 1932.

(From The American Mining Congress Bulletin Service, Washington D.C., February 21, 1952.)

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#### IDEAL CEMENT COMPANY APPROVES STOCK EXCHANGE PLAN

Stockholders of the Ideal Cement Company of Denver have approved the plan for reorganization involving an exchange of stock with the Pacific Portland Cement Company of San Francisco, a recent issue of the San Francisco Examiner reveals.

Ideal is expected to file a registration statement with the Securities and Exchange Commission. The transaction has been approved by the directors of the Pacific Portland Cement Company, which numbers among its holdings the plant at Gold Hill, Jackson County, and the Marble Mountain quarry operations in Josephine County. Ideal stockholders also voted to increase the board of directors to 13 from 9 and to add Pacific officials.

Under the plan the Ideal Company will offer to Pacific stockholders the right to exchange two shares of Pacific stock for one share of Ideal stock.

(From Daily Courier, Grants Pass, Oregon, October 25, 1951.)

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#### CHROMITE IN FOURTH QUARTER 1951

Consumption of chromite in the United States reached an all-time high of over 1,200,000 short tons in 1951, a 24-percent rise over the former record established in 1950, according to the Bureau of Mines, U.S. Department of the Interior. Production from domestic mines - highest since 1945 - was less than 7,000 tons. Receipts from foreign sources, although dropping drastically in the fourth quarter, totaled 1,435,000 short tons in 1951, second only to the 1,542,000 tons imported in 1948. Four countries - the Union of South Africa, Turkey, Philippines, and Southern Rhodesia - accounted for over 86 percent of total imports. The Union supplied 350,000 short tons in 1951, slightly less than in 1950, but during the same period, the other three countries increased their shipments to the United States by 29 to 50 percent. Imports from the Philippines and Turkey in 1951 were the highest on record and receipts from Southern Rhodesia were the largest since 1943.

The tonnage of chromite used in the United States in the fourth quarter (303,000 tons) was about the same as in the three previous quarters. Production from domestic mines increased sharply towards the end of the year following the opening of a General Services Administration Purchase Depot at Grants Pass, Oregon. The entire output was from the states of Oregon and California.

Salient statistics of chromite in 1950-51, in short tons

	<u>Domestic production</u>	<u>Imports</u>	<u>Total new supply</u>	<u>Consumption</u>
1950 . . . .	404	1,303,713	1,304,117	980,369
1951				
1st Quarter	74	359,474	359,548	1/ 303,259
2nd Quarter	576	319,371	319,947	300,694
3rd Quarter	637	477,463	478,100	1/ 305,107
4th Quarter	2/ 5,610	278,761	284,371	303,420
Total 1951	6,897	1,435,069	1,441,966	1,212,480

1/Revised figure.

2/Includes some chromite produced earlier.

(From U.S. Department of the Interior Bureau of Mines Chromite Report No. 24.)

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OREGON NATIVE STONE FOR ROOSEVELT MEMORIAL MUSEUM  
AT WARM SPRINGS, GEORGIA

As requested by Governor Douglas McKay, the State Department of Geology and Mineral Industries has prepared an Oregon stone for presentation to the Franklin D. Roosevelt Memorial Foundation museum at Warm Springs, Georgia. Typical stones from each state in the United States will be placed in the walls of the museum building. The Oregon stone is made out of a rectangular block of gray Ashland granite approximately 18 inches by 13 inches by 4 inches. One polished face, on which OREGON is etched, outlines the boundaries of the state. The stone, which has been on display in the Department's museum in the State Office Building, Portland, will be shipped in a few days to Warm Springs where a simple presentation ceremony has been planned.

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WESTVACO CHEMICAL FORMS MINERAL DIVISION

Westvaco Chemical Division of Food Machinery and Chemical Corporation has formed a Mineral Development Department with headquarters in Pocatello, Idaho. The new department will be managed by O. A. Power, formerly manager of the J. R. Simplot Fertilizer Company. Associated with Mr. Power are a number of men well known in intermountain mining circles, including geologists H. B. Fowler, Ace Allen, and W. C. Peters and mining engineers E. L. Spencer and W. A. Young.

Food Machinery is becoming an increasingly important factor in Western mining operations. Its first mining venture was the development of magnesite deposits near Porterville, California, in the early twenties. Today its Westvaco Division operates barite, magnesite, and dolomite properties in California and Nevada; a fifteen million project is under construction at Westvaco, Wyoming, to develop the large trona deposit there, and the company uses large tonnages of phosphate shale from the Fort Hall deposits in its expanding phosphorus production near Pocatello, Idaho.

In addition to developing raw materials for present operations, the Mineral Development Department will conduct a diligent search for mineral deposits on which new industry may be based.

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SALEM MANGANESE - AMMONIUM SULPHATE FERTILIZER PLANT  
TO CONTINUE

As announced by the Oregonian in its March 20 issue, the Continental Chemical Company plant, which has been operating in Salem to make high-grade manganese dioxide for dry batteries and ammonium sulphate fertilizer, will not close April 1 as previously announced. It was stated by D. W. Tyrell, President of the Ray-O-Vac Company which controls Continental, that an arrangement has been made with General Services Administration so that the plant could continue operation.

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TO ALL CHROME MINERS IN OREGON AND CALIFORNIA

The Oregon Department of Geology and Mineral Industries brings to the attention of all chrome producers the following:

- A. The DMPA wants to know how much chrome you can reasonably expect to produce (1) this year and (2) over the next three years.
- B. What would be the result in your opinion if total purchase of chrome was raised from 200,000 tons to 500,000 tons?
- C. What would be the effect in your opinion if each individual quota was raised from 2,000 tons to 5,000 tons maximum per annum?

This Department is eager to make representations to the proper department in Washington as to facts and prospects regarding chrome. However, in order to do so we must have information from men who are in the business of getting out chrome as well as milling it. We want to help you but you must cooperate as we have neither the money nor the staff to carry this out alone. Please reply to Department office at Portland or field offices at Grants Pass and Baker.