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STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

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OREGON'S PUMICE INDUSTRY

Progress Report for 1949

By

N. S. Wagner*

The present pumice industry is a postwar development. It was started in 1945 and first gave indication of assuming important proportions during 1946. An investigation of the then prevailing situation was made by the State Department of Geology and Mineral Industries and the results were summarized in the Ore.-Bin.** Subsequent development of the pumice industry in 1948 was again summarized in a report on the lightweight aggregate industry in Oregon (Wagner and Mason, 1949).

For those not familiar with the earlier articles just mentioned, and not otherwise acquainted with the pumice occurrences in Oregon, it can be stated that Oregon has extensive deposits. The most notable area includes parts of Klamath, Deschutes, and Lake counties in the southwestern portion of the central part of the State. For anyone interested in more detailed geological descriptions of the deposits, reference is here made to reports by Moore (1937) and Williams (1942).

Seven established operations were actively engaged in the production of pumice aggregate during 1949. Two of these produced 8,500 cubic yards in conjunction with company-owned block plants. One of these plants retails a limited amount of aggregate. The number of operations engaged in competitive commercial production is therefore six.

A comparison with preceding years is as follows: In 1946 there were also six established operations. As many as twelve are understood to have been active during 1947. A total of nine operations were engaged in full or part time production in 1948. This shows a considerable fluctuation for the 4-year period together with a progressive decrease in the number of operations from the peak year of 1947.

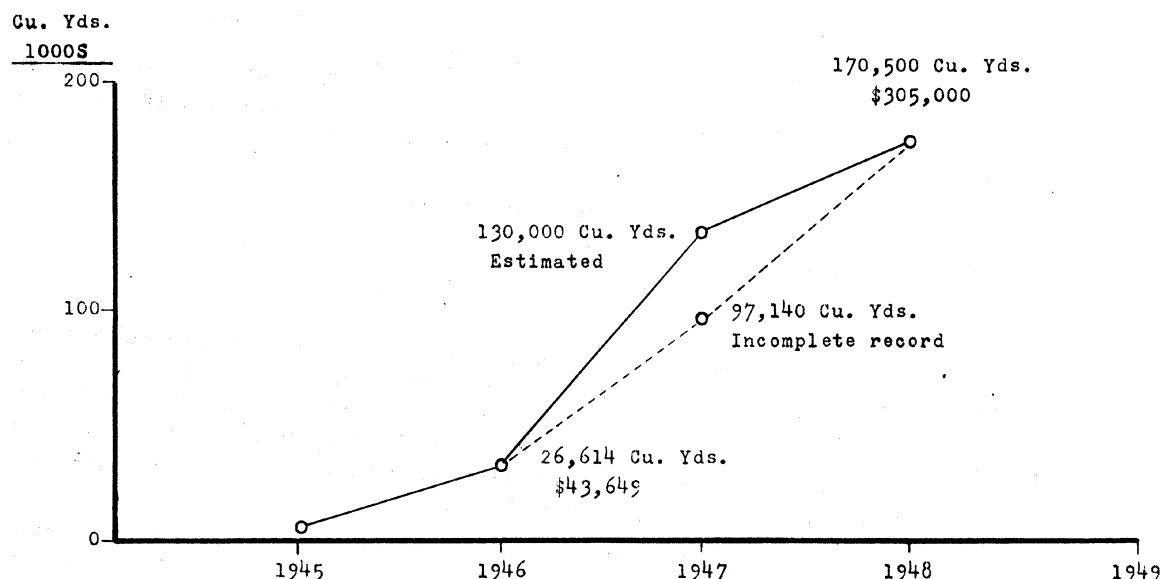
Production for 1948 totals 170,500 cubic yards. This figure is based on production statements given directly to the writer by the various operators. In most instances the individual production figures are understood to have originated from sales records. In only one operation is a production record known to be erroneous. Here the present owner had taken over the property during the year and was able to supply only figures for the aggregate he himself had produced, as records for the previous owner's production were not available. If an estimate of this unknown production were to be added, the yearly total given above would be boosted by several thousand yards.

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**References at end of this report.

The value of the 1948 production amounted to about \$305,000. This figure is subject to adjustment as the production figures were not in all instances sufficiently itemized by product grades to permit accurate calculations; nor was the author in possession of a full list of grade prices and the discounts offered by some producers for cash payments and quantity orders.

The accompanying graph shows increase in volume of production from 1945 to 1948, inclusive.



Individual production figures for the year 1947 were also obtained* by the writer directly from company representatives. For this year, however, the data gathered are known to be less complete than the 1948 record. Estimates of the missing figures on production (estimates believed for various reasons to be quite accurate) indicate that the actual 1947 production was in the neighborhood of 130,000 cubic yards. This is more than double the production given by the U.S. Bureau of Mines in their preliminary figures for the Mineral Production of Oregon in 1947. The Bureau gave the pumice production as 33,240 short tons valued at \$111,380. Converted to cubic yards by using a weight of 1250 pounds per cubic yard, this tonnage figure equals 53,184 cubic yards. Although the U.S. Bureau of Mines figures available at this time represent preliminary figures, it is probable that the wide spread between the Bureau's figures and those obtained by the writer reflect the effectiveness of personal contact as compared to questionnaires. Even the incomplete 1947 production, as based on actual records collected, amounted to 97,140 cubic yards. Both the "estimated" and the "incomplete" totals are indicated on the graph. The production statistics for 1945-46 were gathered by the Department during an earlier investigation (Wagner, 1947).

A wide range of specially sized or blended aggregates is now available to the consumer. Common block aggregate can be obtained in sized and segregated condition and blended block aggregate is made under controlled conditions. This contrasts markedly with the state of affairs prevailing at the outset when only an unsegregated block aggregate was produced with little or no control exercised with respect to balance of proportions of fines. That the producers are now specification conscious stands as perhaps the most significant development at this time. This fact is important because it contributes to future stability of the industry. The ultimate popularity of pumice aggregate will depend upon the quality of products made with it, and therefore only by coordinated effort between the aggregate producers and those engaged in incorporating it into structures or structural units, can the

* For the most part during the late 1949 investigation.

highest level of quality of product be attained. In this respect it is to be noted also that the popularity of block plants as quick money-making ventures has dwindled. Many of the plants which sprang up early in the game are now out of business. Those remaining generally represent operations under managements which recognize that the concrete products business is one of exacting requirements insofar as quality of product is concerned. Cooperation between aggregate producers and consumers is essential as each is handicapped by shortcomings of the other. It is fortunate that a measure of cooperation appears to exist. Research on the many problems connected with the use of pumice as a lightweight aggregate is essential and it is encouraging to know that such studies are being conducted at Washington State College. Research on the use of pumice as a pozzolanic material is being carried out at Oregon State College.

In addition to block aggregates several producers now offer a 3/4-inch minus aggregate for monolithic pours, and two producers are offering a pumice plaster sand. Entrance into the plaster sand field is new. Both of the operators had just embarked in this phase of production at the time of the writer's visit, and neither had at that time any appreciable backlog of production statistics. About all that can be said on the subject is that one of the operators advertises a product conforming to the A.S.T.M. standards. The plaster sand produced by this company is kiln dried and weighs approximately 28 pounds per cubic foot. It is sold sacked in sacks of 2½ and 3-cubic foot sizes. The other producer offers a 3/32-mesh product weighing 1250 pounds per cubic yard and sold in bulk. Block aggregate prices prevailing during midsummer of 1949 ranged from \$1.25 to \$1.62 for blends to \$1.80 for segregated sizes.

Plants are still rather simple and unpretentious in design. Crushing by commercial producers is done by rolls. In one plant where the operator owns his own pumice pit a Symons horizontal disc unit is used. Screening is done by means of shaker or vibratory screens at all plants except one where a rotary screen is employed. Segregation is controlled largely by manipulation of screen sizes and regulation of roll output. A substantial improvement in plant buildings is to be noted, particularly in the case of some of the larger operations. Present buildings are durable structures with storage bunkers and loading-out facilities.

Several of the producers have more than one working pit. In some places these pits are rather widely separated. This multiple pit operation is maintained both in deference to certain rail shipment considerations and to wintertime operating conditions. Freezing of the pumice constitutes a mining problem in the case of wet, poorly drained deposits, and substitute pits are therefore advisable in some places.

One operator digs with a shovel and believes that it furnishes a more uniform pit-run plant feed owing to the vertical shovel cuts across horizontal bedding and that less fractured and shattered material is created than is created by dozers. Less adverse wintertime mining conditions are claimed in favor of shovel-operation because stripping large areas of overburden ahead of mining operations is not required. All other producers employ dozers and carryalls or comparable materials handling equipment. A slackline set-up formerly used by one of the producers has been replaced by "cat" and carryall units.

Both rail and truck facilities are still employed for product shipment. All long-haul movements are by rail, and Oregon pumice is now regularly sent to surprisingly distant points. Vancouver, British Columbia, San Jose and Modesto, California, and several points in Montana represent some of the more distant areas served.

Labor is engaged on both a payroll and contract basis. The contracting system is rather extensively used for pit-to-plant hauling and also for mining in some operations. The number of men engaged on a contract basis is a variable factor, and the total number of men employed by the industry either directly or indirectly, is relatively small.

From a long range standpoint the importance of the industry to the community lies not so much in the number of men employed, but rather in its prospects of permanency. That pumice aggregate is becoming a widely accepted commodity is indicated most pointedly by the fact

that the decrease in the number of operations has been accompanied by a notable expansion of activity and a large increase in production. The net effect of the decrease in operations from a numerical standpoint therefore reflects a state of healthy stabilization and consolidation rather than a slump. Such a readjustment of operations is to be expected considering the newness of the industry and the fact that it had its inception during the period when the postwar demands for building materials were most acute and risk capital for investments of this type was relatively plentiful. Further consolidation of operations may yet be made as markets and distribution channels become more clearly defined and as the producers themselves become more firmly entrenched. While a leveling-off of production will certainly occur, and may even have occurred during the past year, for which production records are not yet available, it is believed that the market for pumice aggregates has become sufficiently established to insure continued operation of this new Oregon industry.

A list of producers (established and active in 1949) is as follows:

Central Oregon Pumice Company	Harney Concrete Tile Company
William E. Miller	Don Robbins
c/o Miller Lumber Company	Burns, Oregon
Bend, Oregon	
Chrystallite Aggregates	Lloyd A. Williamson
Wisby Brothers	114 Oregon Avenue
P.O. Box 61	Bend, Oregon
Chemult, Oregon	
Deschutes Concrete Products Company	Pumice Engineering Company
Chester T. Lackey	Merle Sleeper
Redmond, Oregon	P.O. Box 808
	Bend, Oregon
	Volcanic Materials
	C. R. Badger
	P.O. Box 302
	Bend, Oregon

References

- Moore, B. N.
1937 Nonmetallic mineral resources of eastern Oregon: U.S. Geol. Survey Bull. 875.
- Wagner, N. S.
1947 The lightweight aggregate, pumice: Oregon Dept. Geology and Min. Industries Ore.-Bin, vol. 9, no. 4, pp. 29-34.
- Wagner, N. S. and Mason, R. S.
1949 Lightweight aggregate industry in Oregon: Mining Engineering, Am. Inst. Mining and Met. Eng., New York, vol. 1, no. 11, pp. 385-87.
- Williams, Howel
1942 The geology of Crater Lake National Park, Oregon: Carnegie Inst. Washington Pub. 540.

NEW HYDRAULIC MINE

Spanish Gulch Mines, Inc., Sidney Zintner, President, has started hydraulicking operations in the old Spanish Gulch district of southeastern Wheeler County, Oregon. Five men are employed. Ground has been leased from Mr. Everett Waterman, Mitchell, Oregon.

NORTHWEST EARTHQUAKES

The major earthquake of near disastrous proportions which shook the Northwest on April 13, 1949, at 11:55 a.m. was one of the strongest ever experienced in that area and was felt over an area of approximately 150,000 square miles. Major intensity in the Puget Sound area has been rated at VIII by the U.S. Coast and Geodetic Survey which issued a brief report on November 30, 1949. In the area of greatest intensity eight deaths were caused either directly or indirectly by the earthquake and at least sixty-five persons were seriously injured. Estimates of damage range from thirty to fifty millions of dollars; it was confined largely to areas of marshy, alluvial or filled land, and to older structures. In the State of Oregon an intensity of VII was felt in an area extending roughly from Astoria to Portland and eastward to Hood River County. The limit of the felt area in the State extended roughly from Pendleton through Bend and southwestward to Coquille.

The map on the succeeding page shows the pattern of the various intensities during this earthquake. The irregularity of outline of the different areas is partly due to variations in subsurface and surface conditions, and partly to the inability of human beings to evaluate an unexpected and disturbing experience equally. The cross-sections appearing below the map show graphically the unevenness of the transmission of earth tremors originating directly beneath the epicenter.

* * * * *

An earthquake of rather severe intensity was felt over a wide area in the Pacific Northwest at 8:01 p.m., Pacific Standard Time, August 21, 1949. The center of the disturbance was located in the Queen Charlotte Islands. The shock was felt as far away as the Idaho line and Portland. The U.S. Coast and Geodetic Survey reports that maximum intensity in the State of Washington was VI on the modified Mercalli scale, which grades earth tremors into 12 degrees of intensity. In Seattle, power lines snapped and boats were torn from their moorings. In Tacoma water sloshed out of a swimming pool, and lakes in eastern Washington showed strong wave action.

CARBORUNDUM PLANT STARTS UP

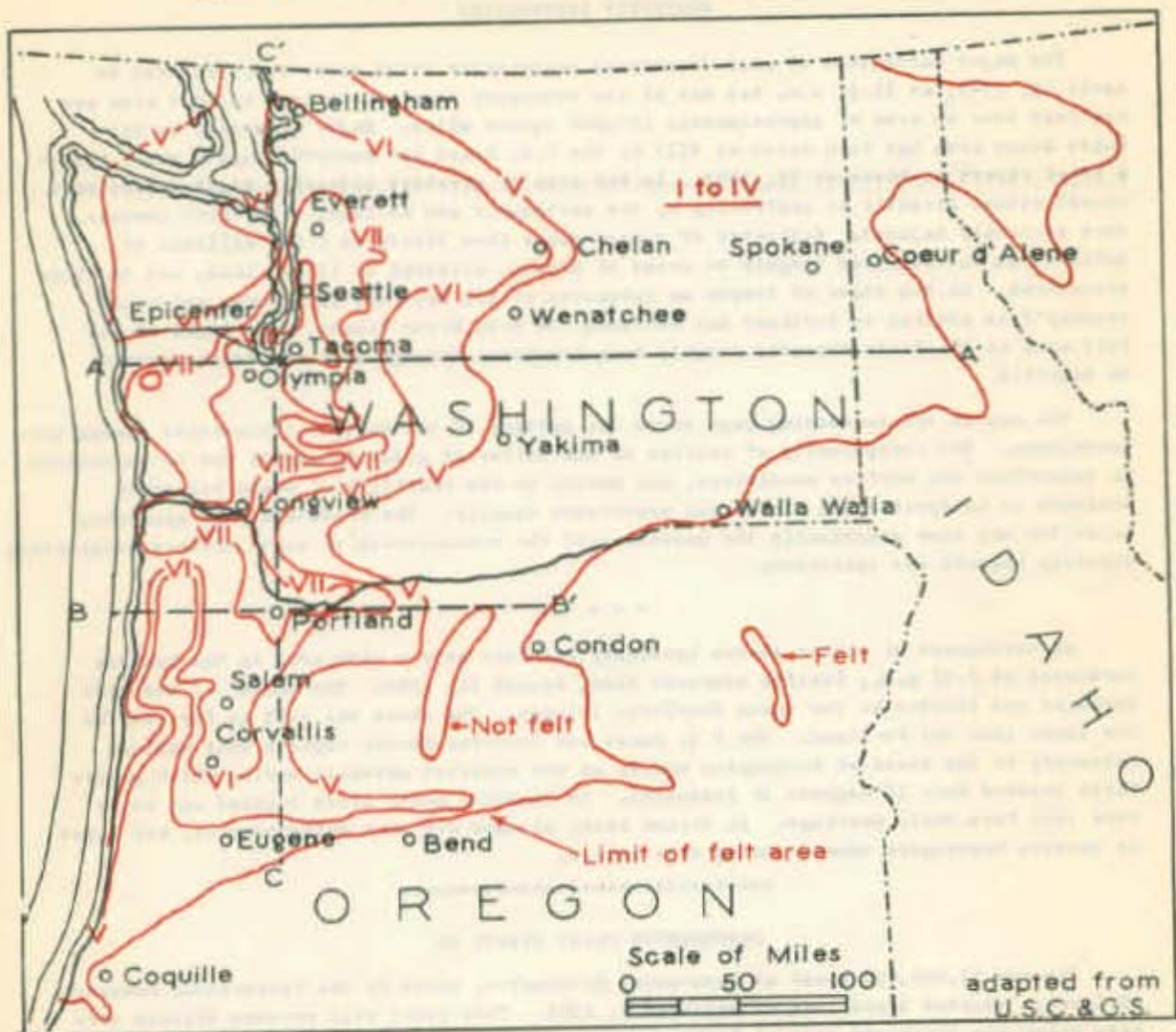
The new \$2,000,000 plant at Vancouver, Washington, built by the Carborundum Company of America started operations on December 5, 1949. This plant will produce silicon carbide which has the trade name of Carborundum.

Silicon carbide is an important artificial abrasive used widely in industry. The product is made by fusing the raw materials coke, silica sand (or ground quartz), sawdust, and salt in an electric furnace. The Vancouver plant has 15 such furnaces. The coke, which is carbon, and the silica fuse together at a high temperature forming the compound silicon carbide. The sawdust is needed to make the furnace mixture porous so that gases may escape readily, and the salt is needed to combine with various impurities in the mixture to form chlorides which are eliminated by volatilization. The temperature required in the furnace is about 2200° C. or nearly 4000° F. The raw carbide will be crushed and processed to form the great variety of abrasive products used so widely in industry.

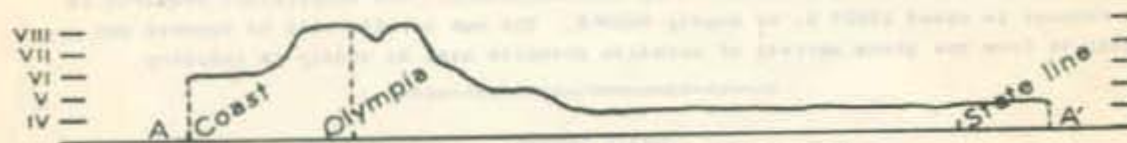
METAL PRICES

The E&MJ Metal and Mineral Markets reports the following metal prices as of December 15, 1949: copper, 18½ cents Connecticut Valley; lead, 12 cents New York; zinc, 9-3/4 cents East St. Louis; mercury, \$71-73 per flask; tin, 78-3/4 cents^{per pound}; foreign silver, 73¼ cents an ounce troy; ingot aluminum, 17 cents per pound; antimony, bulk 32 cents per pound Laredo; nickel, 40 cents per pound cathodes f.o.b. Port Colborne, Ontario; platinum, \$69-72 per troy ounce.

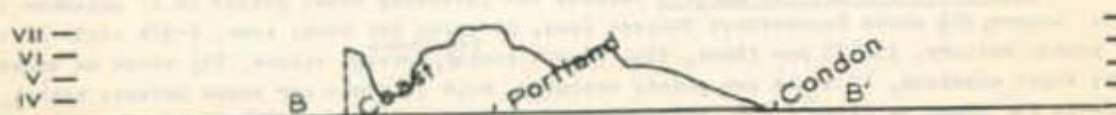
Isosismal Map for Earthquake of 13 April 1949 at 11:55:41 PST.
Adapted from map prepared by U. S. Coast and Geodetic Survey.



N-S Section through Portland



E-W Section through epicenter



E-W Section through Portland