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DIATOMITE

by

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Diatomite, diatomaceous earth, and diatomaceous silica are common names given to deposits of minute tests of siliceous plants that accumulated in large quantities in marine waters and fresh water lakes. There is an increasing demand for diatomite for certain industrial uses to which it is admirably adapted. Of that used in the United States during 1942, about one-half was for filtration, one-quarter for insulation, and one-sixth for filler, and the rest for many other purposes. California produces by far the greatest tonnage; Oregon is in second place. Florida, Idaho, Nevada, New Mexico, New York, and Washington produce small tonnages. British Columbia has perhaps the largest deposits in Canada, at Quesnel, but they have not been worked to any degree comparable to the California deposits.

The following description of diatoms is given by Eardley-Wilmot[2]:

> "The diatom, which belongs to a group of flowerless aquatic plants called algae, secretes for itself an external case or box of clear silica consisting of two valves which slip over each other like the lid and bottom of a box. The form of the box may be any one of the 10,000 shapes and designs to which reference has been made. The two valves of the box are identical and are bound together around their edge by a separate ring or hoop called the girdle. Each valve consists of two, or in some species three, plates, or layers, separated from each other by hollow pockets. The numerous dots or lines which can be seen on the valves are believed by some to be pores through which the diatom 'breathes', but the general theory is that they are lumps covering internal hollows and that the breathing takes place through the girdle and through the raphe, which in many forms is the main central line.
>
> "There appears to be several methods of reproduction, the commonest of which is brought about by the separation of the individual, longitudinally, into two along the median dividing line. The bottoms of a box are formed back to back along this line, push outwards, slip snugly into the upper and lower valves of the parent, thus forming two new boxes which separate, and each repeats the process, and so on. This method of formation is the origin of the name diatom, from two Greek words meaning, 'to cut through'. Other species grow in chains and are attached to each other by various kinds of horns or tentacles."

Light is necessary for the reproduction of diatoms; therefore they are not found growing in very deep water. The degree of salinity is important in marine forms.

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[2] Eardley-Wilmot, V. L., 1928, Diatomite, its occurrence, preparation, and uses. Canada Dept. Mines, Mines Branch, p. 2.

Becking and others[3] in their studies of diatom "epidemics" that occurred at Copalis Beach, Washington, noted that the masses of diatoms washed ashore occur (1) toward the end of the rainy season in April and May, (2) after a heavy rain, (3) when the rains are followed by gentle westerly winds, (4) and they reach a maximum when the rain is followed by clear weather and bright sunshine. The water off Copalis Beach is quite shallow so that the addition of considerable rain may have temporarily diluted the sea water facilitating the growth of diatoms. Their laboratory experiments showed that greatest diatom development actually occurs at salinities between 2 and 2.5 percent.

The present salinity of the sea water along the west coast is about 3.5 percent. It seems probable that marine diatomite was deposited in embayments near the mouths of streams where a dilution of the sea water might have facilitated the growth of diatoms.

As many of the freshwater forms are found associated with volcanic tuffs and flows, there is probably a direct relation between the abundant growth of the diatoms and the silica contributed by volcanism[4]. Disruption of drainage by volcanic flows might result in lakes in which the deposits form.

Diatoms are even more plentiful in Arctic and Antarctic seas than elsewhere. The deposits of diatomite range in age from Cretaceous to Recent, although the commercial deposits are all Tertiary or younger. The largest marine deposit in California is at Lompoc. It is Miocene in age. Diatomite deposits in northern California, Oregon, and Washington are nonmarine and largely of Miocene and Pliocene age, with a few Pleistocene and Recent deposits known but as yet unexploited.

The deposits are composed of hydrous or opaline forms of silica which, when pure, is usually white. They occur as chalklike masses, either stratified or massive, and colored white, light shades of gray, buff, or green. Some impurities such as clay, calcareous material, volcanic tuff, flint, and carbonaceous material may be present. The true specific gravity is 1.9 to 2.34 but the apparent specific gravity or apparent density of the dry block form is 0.4 to 0.6 (25 to 37.5 lbs. per cu. ft.) and the apparent density of the dry powder is 0.08 to 0.25 (5 to 16 lbs. per cu. ft.). Pure diatomite contains about 96 to 97 percent silica. The remaining part is water, but small amounts of iron and aluminum oxides are always present. Pure diatomite is much like opal in composition.

Diatomite has many properties that make it useful in industry. It is insoluble except in hydrofluoric acid and strong alkalies; it has low thermal conductivity, and it will absorb 1.5 to 3.5 times its weight of water. The absorptive power can be increased by calcination, as this drives off the combined water. The melting point varies from 1400° to 1750° C. according to purity and compactness. The index of refraction is usually between 1.44 and 1.46.

The size and shape of the diatoms themselves determine to a certain extent the use to which they are put. For filtering, a mixture of round honeycombed and thin rodlike acicular or "needlelike" diatoms are probably the best, but for polishing and mild abrasives the small spicules appear to be better. Many of the freshwater deposits are made up of disc-shaped and short rodlike diatoms which have greater compressive strength than the needlelike forms and when compact may be cut in blocks for building purposes.

When evaluating crude diatomite, the following properties should be noted: freedom from sand, volcanic ash, crystalline silica, organic matter, lime, clay, or other impurities; the microscopic structure (types of diatom forms and their condition, whether broken or whole, relative abundance of different forms, whether disc or acicular, and presence or absence of exceedingly fine particles); the friability; color; and the opaline silica content.

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[3] Becking, L. B., and others, 1927, Preliminary statement regarding the diatom "epidemics" at Copalis Beach, Washington, and an analysis of diatom oil: Econ. Geol., vol. 22, no. 4, pp. 356-368.

[4] Taliaferro, N. L., 1933, The relation of volcanism to diatomaceous and associated siliceous sediments. Univ. Cal. Pub. Bull. Dept. Geol. Sci., vol. 23, no.1, pp. 1-56.

The list of products that are filtered is far too long to enumerate. Sugar, oils, water, fruit juices, liquors, etc., are among the more common. Rapid strides have been made in research pertaining to filtration with diatomite. Many users have developed special processes requiring certain types of products which are made directly by the producers without release of the specifications for business reasons. The deposits near Terrebonne, Oregon, produce high-grade filter material.

Although the extent to which diatomite acts as a bleach is still in question, it can be treated chemically and then becomes a bleaching agent. Diatomite is used as an insulator for both heat and sound. It is light in weight, fireproof, and its many minute enclosed air cells form a very efficient thermal barrier. It is used in the form of a coarse or finely granular powder, natural sawed bricks, and as burnt bricks made with a mixture of clay or other bonds. In the case of sawed blocks, the more compact beds are utilized.

Finely pulverized diatomite is used as a filler by many producers of paints, varnishes, paper, battery boxes, rubber, portland cement, tooth paste and powders, phonograph records, plastics, and hundreds of other products.

Diatomite is an important constituent in many concretes, stuccoes, and plasters. The addition of 1½ to 3 percent increases the workability and the strength. High-grade material does not appear to be essential. In fact, tuffaceous diatomite such as occurs in parts of Oregon may be suitable. The diatomite helps to remove excess water.

Diatomite is used as a catalyst in the process of hydrogenation of oils necessary for the manufacture of soaps, edible fats, and grease. It is also used as an absorbent of wax, fats, and oils. Among other uses, it is an excellent polishing material, as the fragile tests give way under pressure, preventing harmful scratching. Much of the silver polish on the market is diatomite. It may be used as a mild abrasive for painted surfaces but continued polishing will wear through the paint eventually. It is a carrier for insecticides and a filler for explosives.

Most diatomite contains a certain amount of moisture, particularly diatomite that is dredged out of bogs. However, most of the western deposits are relatively low in moisture because they occur in regions of low rainfall.

Diatomite is quarried by power shovel or dragline, mined in underground stopes, or sawed into blocks. Hand quarrying is used when more careful handling and selection of material is desirable. The excavated diatomite is usually allowed to air dry but where climatic factors are not favorable or more complete and rapid drying is desired it is put through a drying shed or kiln. Deposits that are used mainly for insulation or for construction need not undergo the intricate processing that is necessary for that which is sized, pulverized, and packaged for filtration or fillers. Calcination which involves heating to about 900° C., or even higher temperatures, drives off the water of chemical combination and other volatiles. If iron is present, calcination produces a pink color.

The flow sheet of diatomite from deposits in western United States begins with excavation and haulage either to a drying field or place of storage. The material is run through grizzlies, crushed, heated to drive off water, recrushed, and then classified. Some is then packaged directly for use, whereas some is calcined and given chemical treatment, classified, and then packaged for more specialized use. Sizing of the diatomite is described by Skinner and others[5] as follows:

> "Size classification is important, and three methods are generally used: (1) wet- or dry-screening, (2) settling in water, and (3) air-separation. Dry-screening below 200-mesh is impractical, and wet-screening is uneconomical because excess water has to be removed. Hydraulic settling requires tests

[5] Skinner, K. G., and others, 1944, Diatomites of the Pacific Northwest as filter-aids, U.S. Dept. Interior, Bur. Mines, Bull. 460, pp. 8-9.

for each diatomite. Although air-separation is not entirely satisfactory, it is the method generally used. Three types of flow sheets, one for each of different sections of the United States, are common, and the many patents issued covering diatomite processing are only modifications. The patents cover such things as blending, reduction of hammer mill speed to reduce diatom shattering during milling and final breaking by attrition during air transportation, and removal of chert and larger diatoms by means of air separators in series..... Filtration tests indicated that diatomite sized to minus 250- plus 325-mesh gave the highest flow rates and the highest clarities....."

Diatomite Occurrences in Oregon

The commercial deposits of diatomite in Oregon occur in strata of Miocene or Pliocene age, although a few younger deposits are known. Moore[6] has given the most detailed information on their occurrence and it is from his study that much of the following information is obtained. Skinner and others[7] have tested many of these deposits and given additional data.

A few of the more important diatomite deposits are listed below.

Baker County

Diatomite occurs near Durkee in beds about the age of the Mascall formation (middle Miocene). The Swayze Creek deposit in the SE¼ sec. 34, T. 11 S., R. 43 E., is massively bedded and 50 feet in total thickness. The Manning Creek deposit is in the SE¼ sec. 13, T. 11 S., R. 43 E., contains tuff, and is of doubtful quality. Diatomite which contains altered basaltic bombs is present along Clover Creek in T. 8 S., Rs. 42 and 43 E. Small samples obtained by the Oregon Department of Geology and Mineral Industries from the vicinity of Keating, in sec. 9, T. 8 S., R. 42 E., proved to be very pure.

Deschutes County

The best known deposit of diatomite in Oregon is located along the Deschutes River about 6 miles west of Terrebonne. This deposit is now being worked by the Dicalite Company which also has a quarry and plant near San Pedro, California. The Terrebonne diatomite occurs in beds of the Dalles formation of Pliocene age, which is composed of a series of tuffs, agglomerates, diatomite, and lava flows interbedded with sands. The diatomite ranges from 67 feet to a knife edge in thickness. It is in places capped by later flows.

The following description of the Terrebonne deposits is based on a report by Dr. A. C. Boyle[8], chief engineer of the Union Pacific Railroad. The deposit is covered by an overburden averaging somewhat less than 11 feet in thickness. It is tabular in form and was probably laid down in a spring-fed freshwater lake which may have been caused by lava-damming of a stream. The Deschutes River has cut through the deposit exposing it on both sides of the valley. In a few places the upper part of the deposit has been channeled before burial by younger sediments.

The deposit is banded with layers ranging from a few inches to several feet in thickness. The banding is probably due to slight variations in the composition of the diatomite, in particular the content of iron oxide.

Dr. Boyle describes the deposit as follows:[9]

"The stratum of highest grade, known at the quarry as No. 6, is characterized by the absence of bedding planes and by good conchoidal fracture.

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[6] Moore, B. N., 1937, Nonmetallic mineral resources of eastern Oregon, U.S. Geol. Survey Bull. 875, pp. 1-180.

[7] Skinner, K. G., and others, op. cit.

[8] Stearns, H. T., 1931, Geology and water resources of the middle Deschutes River basin, Oregon, U.S. Geol. Survey Water-Supply Paper 637, p. 151.

[9] Idem., p. 154.

It is extremely soft, very white, and massive and is easily distinguished from every other member of the deposit by the peculiar pitch of sound produced when a sharp-pointed stick is thrust into it. This stratum is found in most of the pits and varies only slightly from 6 feet in thickness. It is made up of practically one species of diatoms and is almost free from injurious impurities.

"Vertical fissures, in places curved, break up the mass and are probably due to shrinkage. Water percolating through these fissures has deposited foreign substances, chiefly iron oxide, along their faces. The fissures aid considerably in the mining operations."

The volume is estimated to be 15,391,200 cubic yards, spread over more than 265 acres.

An analysis of the diatomite from the Terrebonne deposit shows 86 percent or more silica, between 5.15 and 7.60 percent moisture, and small amounts of aluminum and iron oxides.

Grant County

Considerable high-grade diatomite is exposed in the railroad cuts in sec. 28, T. 11 S., R. 35 E., just west of Austin. The diatomite is relatively pure, massively bedded material with thin partings of volcanic ash. According to Moore, this material might be used for most purposes for which diatomite is fitted, although it is not tough enough to be used for sawed natural brick.

Some diatomite occurs in the Mascall formation of middle Miocene age which overlies the Columbia River basalt in the John Day Valley. The diatomite is probably too impure to be utilized.

Harney County

The Otis Basin diatomite district covers about 65 square miles along Otis Creek in Northern Harney County. These deposits are located near Beulah, Juntura, and Drewsey. The deposits, like those of Malheur County, are a part of the Payette formation of upper Miocene age. The higher grade deposits are restricted to the central part of the basin. The diatomite of this district includes varieties of a fairly high degree of purity which might be used for concrete admixture, insulation, and filtration.

Jefferson County

Diatomite is reported from the NW¼ sec. 25, T. 11 S., R. 11 E., on the Warm Springs Indian Reservation. The deposit is about 45 feet thick and lies between lava flows which are exposed in a river gorge. The overlying basalt is reported to range from 3 to 15 feet in thickness.

Klamath County

Deposits of rather impure diatomite occur in and around Klamath Falls, near Chiloquin, along the western border of Poe Valley, in the broad valley of Sprague River, in Alkali Valley, in the Olene district which lies along the Lost River, and in several other places within Klamath County. The diatomite in the Klamath region usually contains very fine volcanic glass which disqualifies it for many purposes.

According to Moore:[10]

"The quality of Klamath diatomite, according to accepted standards, is in general poor. A great field, however, is open for the utilization of much of this material for clay-bonded insulating bricks and forms if a sufficiently large market should be found for the products."

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[10] Moore, B. N., op. cit., p. 51.

Recent deposits of diatomite of quite good quality are present in Klamath Lake. These deposits which are as much as 10 feet thick could be utilized for most of the purposes for which diatomite is commonly used. It could be recovered by dredging.

Linn-Lane Counties

Diatomite has been recently discovered in the eastern part of Linn and Lane Counties between the McKenzie and Santiam Rivers.[11] These deposits are as yet unexplored but they appear to contain sufficient tonnages of good quality diatomite to be utilized commercially.

Malheur County

The Harper diatomite district reaches from the Malheur River northwestward to Westfall, a distance of about 12 miles. The diatomite occurs in an irregular basin cut out of the Payette formation by the Malheur River. The diatomite underlies most of an area of 50 square miles. It is a part of the Payette formation.

The deposit is described as follows by Moore:[12]

> "The diatomite of the Harper district occurs in massive condition in beds separated by partings of gray ash. The lack of lamination in this material is noteworthy, as well as the surprisingly large percentage of very pure material. Comparatively little of the diatomite carries an appreciable percentage of ash or clay..... The diatomite of this district is noteworthy for its high purity, its brilliant white color, its remarkable toughness, and its low apparent density. The better grades of it form more than half of the total in each measured section and have a general appearance in the hand specimen of brilliant white plaster or chalk. Toughness and freedom from lamination are combined with other desirable qualities to make the Harper earth of particular interest to the manufacturer or user of sawed natural blocks, bricks, and other forms."

Summary of quality of Oregon diatomite

Much of the Oregon diatomite is of excellent quality. It is of good color, with but few exceptions. There are several deposits which are of marginal value because of impurities, particularly volcanic ash. The texture of the deposits varies widely. In general, the quality of the deposits may be told by the presence or absence of gritty material, color (although this is not always determinative), and the apparent density. High apparent densities usually indicate a large amount of impurities. In general, a gritty feel of the sample, coupled with an apparent density of more than 35 pounds to the cubic foot, indicates a poor quality. The deposits in general have a conchoidal fracture because of the massive nature of the deposits. The Harper deposits are surprisingly strong which, like many of the other deposits, lends itself to the manufacture of sawed natural brick.

Most of the Oregon deposits are near to railroad branches which lead to main lines. The costs of transportation may be slightly higher than those in other parts of the country which have more favorable transportation. Then too, the largest users of diatomite are not in the Northwest, a region in which the location of the Oregon diatomite would be favored by location. However, an increase in northwest industrial development should, when coupled by an ever-widening use of diatomite, lead to greater development of Oregon deposits.

There is a shortage of diatomite in the Portland market. This may be a result of wartime labor shortages but it is probably due in large part to an increased demand for the material.

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[11] Smith, W. D., personal communication.

[12] Moore, B. N., op. cit., pp. 77 and 87.

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Cummins, A. B., and Mulryan, H., 1937, "Diatomite," pp. 243-260, Industrial Minerals and Rocks, A.I.M.E., New York.

Smith, W. D., 1932, Diatomaceous earth in Oregon: Econ. Geol., vol. 27, pp. 704-715.

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BUYERS OR USERS OF DIATOMITE IN PORTLAND AREA

A. McMillan & Co.
220 S. E. Ankeny

E. J. Bartells Co.
611 N. Tillamook

Calif. Spray Chemical Corp.
2109 N. Albina

Miller Products Co.
1932 S. W. Water Ave.

Miller & Zehrung Chemical Co.
2201 N. W. 20th

Fisher Thorsen & Co., Inc.
2100 N. W. 22nd

Van Waters & Rogers, Inc.
433 N. W. York St.

McCracken Ripley Co.
2221 N. Albina Ave.

La Grand Industrial Supply Co.
2603 S. W. Front

Western Industrial Supply Co.
208 S. E. Hawthorne

Blitz-Weinhard Co.
1133 W. Burnside

Portland Paint & Lacquer Products
7835 S. W. 37th Ave.

Duncan Paint Co.
4246 S. E. Belmont

W. P. Fuller Co.
2181 N. W. Nicolai

Miller Paint & Wallpaper Co.
317 S. E. Grand Ave.

General Paint Corp.
838 S. W. 2nd

J. E. Berkheimer Mfg. Co.
9111 N. Denver

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OREGON MINING NEWS

The B-H Company of Medford, Oregon, under the direction of Tom Gerety, is installing a dredge on Sucker Creek, Josephine County, which will be in operation in 1946.

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Charles Stearns is preparing to start dredging on the Applegate River at the Kubli ranch in Jackson County.

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Mr. L. V. Riddle of Medford is assembling a dragline dredge on Kane Creek south of Gold Hill for the Crescent Pacific Company. It is reported that enough yardage is available to keep the dredge operating for 1½ to 2 years.

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Mr. Bruce Murray, of Rogue River, and associates are testing dredging ground east of Highway 99 on Graves Creek.

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Mr. Charles Lyons of Grants Pass has moved his suction dredge from the Salmon River, Idaho, to Merlin, Oregon, where he plans to install it in the Rogue River at the mouth of Hog Creek.

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Mr. I. R. Perry of Grants Pass has erected a plant adjacent to the plant of the Rogue River Sand and Gravel Company to manufacture concrete building blocks and tile. The plant will supply local construction requirements.

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Mr. W. F. Kernin of Roseburg is reopening the old workings of the Levens Ledge Mine northwest of Canyonville, and is driving a crosscut to explore the vein below the present workings on the millsite level.

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Everett Gray and Don Griffith of Grants Pass are erecting a sand and gravel plant on the Rogue River north of Grants Pass.

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The Bristol Silica Co. is installing a crushing and screening plant at the company's granite quarry near Gold Hill to produce poultry grit. This will supplement the quartz-grinding plant which has been in operation at the town of Rogue River for several years.

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The Porter & Company bucket line dredge on Granite Creek in eastern Grant County will be put into operation as soon as weather conditions permit. A crew is now opening roads and re-establishing the camp which was closed when the WPB Order L-208 went into effect.

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WITHDRAWAL OF LANDS IN NEWBERRY CRATER, DESCHUTES COUNTY

(Public Law 267 - 79th Congress)
(Chapter 586 - 1st Session)
(H. R. 608)

AN ACT

To exclude certain lands in Deschutes County, Oregon, from the provisions of Revised Statutes 2319 to 2337, inclusive, relating to the promotion of the development of the mining resources of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, THAT WITHIN THE FOLLOWING-DESCRIBED REAL PROPERTY SITUATED IN DESCHUTES COUNTY, OREGON, NAMELY, SECTIONS 13 TO 16, INCLUSIVE, SECTIONS 21 TO 28, INCLUSIVE, SECTIONS 33 TO 36, INCLUSIVE, TOWNSHIP 21 SOUTH, RANGE 12 EAST, WILLAMETTE MERIDIAN; SECTIONS 16 TO 21, INCLUSIVE, SECTIONS 28 TO 33, INCLUSIVE, TOWNSHIP 21 SOUTH, RANGE 13 EAST, WILLAMETTE MERIDIAN; SECTIONS 1 TO 4, INCLUSIVE, SECTIONS 9 TO 12, INCLUSIVE, TOWNSHIP 22 SOUTH, RANGE 12 EAST, WILLAMETTE MERIDIAN; AND SECTIONS 4 TO 9, INCLUSIVE, TOWNSHIP 22 SOUTH, RANGE 13 EAST, WILLAMETTE MERIDIAN; DEPOSITS OF ALL MINERALS ARE EXCLUDED FROM THE OPERATION OF REVISED STATUTES 2319 TO 2337, INCLUSIVE (RELATING TO THE PROMOTION OF THE DEVELOPMENT OF THE MINING RESOURCES OF THE UNITED STATES): Provided THAT NOTHING IN THIS ACT SHALL DISTURB ANY VESTED RIGHTS OF ANY PERSON OR PERSONS IN OR TO SAID REAL PROPERTY OR ANY PART THEREOF.

Approved December 21, 1945.

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OREGON SOURCES OF BUILDING-BLOCK MATERIALS

Building blocks made of a light weight aggregate and portland cement are becoming popular for houses and small business buildings. The aggregates in most common use are mixtures of sand with either pumice, volcanic tuff, volcanic cinders, or calcined shale. Aside from their light weight, these blocks have certain advantages such as good insulating qualities and fire-proof characteristics. A number of people have been investigating the possibility of starting up small plants to make these blocks. The market situation is especially favorable at present because of shortage of lumber and the large unsatisfied demand for building materials.

In order to provide some basic facts connected with making these blocks, especially sources of supply of aggregate, the State Department of Geology and Mineral Industries has just issued a brief report entitled "Notes on Building-Block Materials of Eastern Oregon", by Norman S. Wagner, field geologist. This report, G.M.I. Short Paper No. 14, may be obtained at the Portland office of the Department at 702 Woodlark Building or from the field offices at Baker and Grants Pass. Price postpaid 10¢.

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MERCURY

The following items are taken from U.S. Bureau of Mines Mineral Trade Notes, issue of November 20, 1945, and give evidence of the influence which the Italian production will have on the United States quicksilver industry.

Italy: The production of mercury in Italy was greatly expanded during the war - from 42,732 flasks of 76 pounds each in 1936 to a maximum of 94,160 flasks in 1941. Production, which was completely suspended owing to demolition of power plants and some of the reduction plants in Tuscany by the Germans before retreating, and the loss of the Idrian mines, has been resumed, and current production is about 2,600 flasks a month from the Tuscany region. According to information obtained from the Allied Commission, stocks of mercury on September 30, 1945, were 26,500 flasks. Since Italy normally consumes only a small part of this output, the resumption of sales will provide foreign exchange and benefit Italy's economy. (Minerals Attaché C. A. Botsford, Rome.)

When the mercury mines in Tuscany are in condition to operate at capacity, they should again be one of the world's principal sources of this metal for many years. In 1938 these mines produced 58,800 flasks, or 88 percent of the total Italian output and 40 percent of the world's production. Based upon the 1940 output, the developed ore reserves are sufficient for about 8 years, and the tonnage of probable and possible reserves indicates that these mines will continue to be productive for many decades. The grade of the ore mined has averaged 1.29 percent mercury in recent years. The main mineral zone is defined by small mines and prospects starting at a point about 3 miles north of Abbadia S. Salvatore and extending to San Martino, 16 miles to the south. Exposures of mercury ore occur across a width of 5 miles. Outside of this zone, about 14 miles southeast of San Martino, is the Cerreto Piano mine, which for several years has produced over 5,000 flasks annually. The Idria mine has now been taken over by the Yugoslavs. Idria's annual output from 1938 to 1943 averaged 11,000 flasks, and the grade of the ore was 0.6 percent mercury. Reserves are said to be limited to less than a decade at a normal rate of production.

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The Abbadia San Salvatore on the east slope of Monte Amiata, owned by the S.A. Monte Amiata, in which the Italian Government has a controlling interest, has been and is the most productive mercury mine in Italy. Its annual output dropped sharply from 35,500 flasks in 1940 to 12,110 flasks in 1944. The 1945 output is estimated at 20,000 flasks. The war damage caused by the retreating Germans consisted of the destruction of the surface plant, including the furnace and the principal power plants, upon which the mines were dependent. A small hydroelectric plant, however, was not damaged, and with this the mine can operate at one-half capacity. Present capacity, however, is about 70 percent of normal. The main mercury deposit is developed by adits, shafts, and several levels to a depth of 165 meters below the surface. The horizontal cut-and-fill method is used to extract the ore. Waste is sorted from the ore in the stopes and used for back filling. Compressed-air rock drills and electric locomotives were temporarily replaced by pick and shovel, hand drills, and hand tramming and animal haulage because of the power shortage, but this situation is being eased. In 1939 the tonnage of ore extracted per man shift was 0.6 ton for underground labor and 0.47 for all labor. A total of 1,298 workmen were employed underground and 310 on the surface.

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Italy is in a difficult situation in reference to the foreign market for mercury. The bank rate of exchange for the dollar is 100 lire, and for the pound sterling 400 lire. The quoted open-market exchange is about 300 lire for the dollar and 1,200 lire for the pound. The Italian sale price for mercury is fixed at 25,000 lire a flask, or $250. However, sales by requisition to Germany were made at $180 a flask during the war. A shipment of 4,418 flasks was made to France in 1944 at 25,000 lire a flask. To overcome the exchange difficulty, producers are studying a barter system or the possibility of selling the dollars or pounds they receive to the Italian Government at a premium. There is a government tax of 2,000 lire for each flask produced, which is paid at the time of sale. Ways and means for the adjustment of the official and effective rate of exchange to permit the export of mercury on a more profitable basis are being discussed with the Instituto Commercio Estero in Rome and the principal producers in Italy.

A representative of the Italian producers was recently in Spain, and it was decided to re-establish the Cartel arrangements as before the war, giving Italy 45 percent and Spain 55 percent of the export trade and to reduce the price to $130 a flask. (Charles Will Wright and Mineral Attaché Clarence A. Botsford, Rome.)

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GEOLOGIC MAP ADVISORY COMMITTEE

The Governing Board of the Oregon Department of Geology and Mineral Industries has appointed the following geologists to serve as an advisory committee on the construction of a State geologic map: Dr. E. L. Packard, Head of Department of Geology, Oregon State College; Mr. A. M. Piper, District Geologist, Division of Ground Water, U.S. Geological Survey; Mr. L. L. Ruff, geologist, Portland District, U.S. Engineers; Dr. W. D. Smith, Head of Department of Geology and Geography, University of Oregon; Dr. F. G. Wells, geologist, U.S. Geological Survey.

Although a large part of the State has not been mapped in detail, it is believed by the Department that enough geological information is available to warrant construction of a preliminary geologic map of the State. There is a continual demand for such a map. Dr. W. D. Lowry of the Department staff will be in immediate charge of the map work.

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URANIUM

Governments do not know where they are going in control of uranium sources, but they are on their way. Some time ago the United States and Canada placed natural sources of uranium under strict government control. Russia, of course, does not need to give any notice that uranium ores are nationalized, as everything is nationalized. According to Mineral Trade Notes* Spain, Union of South Africa, and Venezuela have clamped down on prospecting for or production of uranium and other radioactive minerals. Some features of the regulations in a proclamation of the Union of South Africa are noteworthy, as showing a pattern of government control which may be followed in other countries. One of the rules is as follows:

(1) No person shall, without the written authority of the Minister of Mines -

a. Search or prospect for or mine any uranium referred to in the Schedule to these regulations, or by any chemical or metallurgical process, extract or isolate any such uranium from any substance whatsoever;

b. Export any such uranium from the Union.

(2) An authority under sub-regulation (1) may be granted subject to such conditions as the Minister of Mines may deem fit to impose.

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*U.S. Bureau of Mines Mineral Trade Notes: Vol. 21, no. 5, p. 21.

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