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Many Uses Found for Zonolite

An immense deposit of a mineral, until recently unknown, is located in the Kootenai valley of northwestern Montana. Practically the entire top of a moderately high mountain is covered with this deposit, which has been proved to a depth of 400 ft. The mountain lies 2 miles distant from the Kootenai river, a major tributary of the Columbia, and 9 miles northeast of Libby, a town on the main line of the Great Northern Railway.

This interesting mineral deposit itself had long been supposed to be either Phlogopite mica or Biotite mica; even the U. S. Geological Survey in making a mineral survey of the district some years ago had classified it as Phlogopite mica, and mentioned it as being "exceptionally abundant." It did not appear to have any value or use.

Some 4 years ago a man who had spent many years developing mining projects was attracted to this immense deposit of apparently valueless material. It seemed that it should have some commercial use. After trying it out in various ways with no result, it occurred to him to try it by fire. This test produced astonishing results. The dark, heavy material began to swell and to turn a beautiful golden color, the transformation continued until it had become about 15 times its original size; each leaf separated by a tiny air space. In short, a perfect insulation material made in Nature's own way. A variation in the treatment makes the product a silver color.

What Analysis Shows

Further tests determined that after the expansion process was completed, heat had no further effect upon it up to a high temperature. It has been proved that it is fireproof up to 2500 degs. F., a temperature high enough to merit most metals, including iron.

Analyses of the material determined it to be composed mostly of silica, magnesium and aluminum in the form of a silicate, and insoluble in most acids. Such material would seem to have possibilities of vast use in the world of manufacturers.

Four years of experimental work proved that zonolite, as the new material was named, could be satisfactorily used as an insulating material for plastered walls, as a fireproof roofing substance, and also for admixture with wood pulp, hemp fiber or other inflammable substances, in wall paper, wall board, paint and various cement products, in pipe and boiler coverings, and as a fireproof and insulating packing in hollow wall spaces.

As a heat insulator, tests have shown that nothing on the market excels it; whereas the cheapness and easy working qualities of zonolite make it possible to secure greater efficiency at a much lower cost.

As a decorative material, when finely ground [illegible] with [illegible] applied to plastered walls [illegible] golden color [illegible] and a soft gloss much more effective than ordinary flat wall finishes. It readily assumes any shade desired by the addition of a small quantity of any water soluble color.

The use of zonolite for sound-proofing and insulation purposes has been demonstrated by local builders who are using it in modern residences and other buildings recently constructed in Libby, Mont.

As an Insulator

Zonolite is now being used as an insulator by one of the large safe companies in our country and several other companies making safes and filing cabinets have requested large samples for test purposes.

A safe manufacturing company using zonolite in carlot quantities in its product, made a test in a safe packed with zonolite by placing therein a quantity of steel shavings. After a period of one year, in which time the safe was opened but a few times, no rust could be detected on the shavings.

Its refractory properties have proved satisfactory in safes, while its insulation properties are much higher than any insulator now used for this purpose, it is said. It has been found that varying percentages of hydraulic cement are the best medium so far discovered for a binder with zonolite in products of this character. It reduces the weight of a safe or similar products materially, owing to its great bulk. It is much cheaper per cubic foot than any other insulating material.

Paint made of zonolite is a beautiful gold product and is being manufactured in commercial quantities. A plant is now being erected by a manufacturing company to produce an all zonolite wall board and a zonolite roof tile.

Still another company is producing a roofing composition called Zonoasphalt and which is described as a permanent roof and fire-proof, guaranteeing this product for 20 years without painting or repairing. Its use as a body in grease and other heavy lubricants has been proved.

As a filler in linoleum and similar floor coverings, it cannot be excelled, is a further claim.

Many carloads of zonolite are being shipped to the largest wallpaper manufacturer in the country for use in wallpaper as a decorative material.

The owners of the deposit, the Zonolite Co., Libby, Mont., decided that, having a large deposit of the raw material which was apparently useful in so many products, it would stay out of the manufacturing field and confine itself strictly to mining processing zonolite for sale to manufacturers located nearer to the large centers of population, who were in the business of making these various lines.

The first step was the opening of the deposit and the construction of a good road to it, one that could be negotiated by trucks. This work has [illegible] shown up [illegible] deposit of zonolite, practically pure, [illegible]

nage running into many millions already developed.

Then came the question of freight rates. It was recognized that the long haul, with the light weight of treated zonolite, might mean a rate that would make it impossible to compete with other insulation materials located nearer the large manufacturing centers. Finally, freight rates were granted that would, in connection with volume shipments, permit the delivery of zonolite to the Atlantic seaboard, or points between, at a low price.

From the nature of zonolite it could be much more easily and cheaply shipped in the raw state as mined than after it had been heat treated and rendered light and fluffy. But no manufacturer could use it in its raw state. A heat treating plant had to be designed and built. Cheap fuel was essential. That was at hand in the refuse from a large sawmill located at Libby, cutting and shipping many carloads of Western pine daily to the Eastern markets.

Therefore, the heat treating plant was located near the sawmill and so designed as to burn shavings, saw dust and other waste from the mill. These economies enabled zonolite to be delivered to most parts of the United States at a cost of about 2 cts. per lb. A pound of zonolite is of considerable bulk. A ton of it as it comes from the furnace makes more than 150 bus.

So there is now going forth from this heretofore useless and unknown mineral deposit in northwestern Montana, a product that may save millions of dollars in heat losses, beautify countless homes and reduce fire hazards in many used products.

Report on tonnage on the Zonolite Co.'s property by C. L. Wickstrom, mining engineer, is as follows:

Area and Tonnage.—This shows a width from north to south of approximately 1800 ft. and a length from west to east along the ridge of approximately 3000 ft. Several experiments were made to determine the weight of the material. The specific gravity of the pure "ore" was found to be 2.5 and a cubic foot of the material, well settled in a box, weighed exactly 100 lbs. per cu. ft.

The volume of the hill here considered would be 168,500 cu. ft. per foot length, or represent on above basis 8425 tons per foot; and for the 3000 ft. here assumed, represent a tonnage of 25,275,000 tons of ore.

This is a lot of material, and to realize the volume these figures represent, it may be noted that if one had a production of 1000 tons per day, requiring 20 railroad cars to transport it, it would require 70 years working every day to mine out the portion shown.

A test of zonolite made by C. O. Meyer, chief chemist of the Great Northern railway, is as follows:

Loss on ignition	[illegible]
Silica	[illegible]
Iron and aluminum oxides	[illegible]
Calcium oxide	[illegible]
Magnesium oxide	[illegible]
Sodium and potassium oxides	[illegible]
	100.0

A test made by Dr. D. W. Fetteroof, a chemist in the government service, gave a specific gravity of .08705.

Freight rates on the treated zonolite have been established at $15 the ton in carloads to Chicago and $17 the ton to New York and Atlantic ports. To the West the company has been granted a rate of $9 a ton in carlots to Seattle, Portland and Tacoma on treated zonolite. A tariff of $12 the ton has been fixed on the crude material in carlots to Chicago and it is expected that a proportionate rate will be shortly granted on the raw material to Atlantic ports. Rates on the crude material in carlots to the north Pacific ports have been fixed at $5.50 a ton.

The Zonolite Co. has applied for distributing rates throughout the United States and this is under consideration by the various railroad associations.