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Report of Ore Dressing and Metallurgical Laboratories.

Report No. 309

The Preparation of a fine grained limestone from L'Etang, N.B.

R. H. Carmichael.

Shipments. Two shipments of ~~calcite~~ fine grained limestone were sent in by Mr. J. Sutton Clark, Saint George N.B. owner and operator of the Canadian Calcite Mines, L'Etang N.B from whence the shipments originated. The first shipment was received Nov. 22nd. 1927 shipping weight 500 pounds, the second received March 26th. 1928 shipping weight 820 pounds.

Purpose of Experimental Tests. The purpose of the tests was to determine to what fineness the ~~calcite~~ limestone could be ground dry and wet, and to find what kind of products would be produced. It was also desired to obtain some samples of the finished products to submit to prospective consumers.

Characteristics of the ~~calcite~~ limestone. The ~~calcite~~ limestone in the large pieces in which it was received is greyish white in color with a very small amount of rust stains in the fractures. It is not crystalline but fine-grained and massive. When ground fine in an agate mortar it is pure white in color.

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Sampling and Analysis. The first lot received which was called lot no. 1. was crushed in a large gyratory crusher to about 2".

The discharge from the gyratory was crushed in a small hammer mill to about 4 mesh. A head sample was cut out by means of a Jones riffle. This head sample when ground and analyzed gave insoluble 2.35%.

Experimental Tests.

Dry Grinding A part of lot no. 1, 160 pounds was ground in a 2'x3' cylindrical mill lined with porcelain and carrying 120 pounds of pebbles. The mill discharge was fed back to the mill, and grinding was continued for 20 hours at which time 69% of the ~~calcite~~ limestone was -325 mesh. The mill was cleaned out and the ground ~~calcite~~ limestone fed to a 30" Gayco air separator at the rate of 250 pounds per hour. The oversize from the Gayco was fed back as long as any fines were obtained from it, six times in all. The products from this test were,-

Gayco fines	66 lbs.
Gayco oversize	74 lbs.
Gayco cleanup	9 lbs.

The fines are 99.85 % -325 mesh and are pure white in color.

Wet Grinding. The remainder of lot no 1 and all of lot no 2, which had been crushed in the gyratory and hammer mill, were used up in wet grinding tests. The 2'x3' mill was used in all the tests for grinding. At first for classifying a 3' Dorr-bowl classifier was used but it was found of too large a capacity to work properly with the 2'x3' mill. A launder classifier 8" wide was then tried out but the oversize had to be shoveled out and returned to the mill by hand. A 15" Dorr simplex classifier was then tried.

At the test with the simplex classifier 330 pounds of pebbles were used in the mill the feed rate was 40 lbs of calcite per hour. The mill discharge was about 21% solids and the classifier overflow about 1 of solids to 23 of water, this large amount of water had to be used as the 6" classifier is much too large for the 2'x3' mill and to get a current fast enough to lift calcite = 32 mesh a certain quantity of water had to be used. The mill was run 39 hours during which time, due to the limited amount of calcite left for the test and to the classifier not raking out its oversize, it was necessary to stop twice and clean the classifier by hand to get feed for the mill. The classifier did not clean itself out properly because the rake could not be lowered nearer than 1/2" to the bottom because at this height it struck the rivets used in making the joints in the bottom of the classifier tank.

During the run the classifier overflow was thickened in a large Dorr thickener the clear water from the thickener being used over again. After the run the contents of the thickener were filtered in a large press, the press cake was then dried and broken up by running it a short time in the 2'x3' pebble mill.

The products from this test were, -

Fine wet ground limestone 139 lbs.
Cleanup of classifier 462 lbs.

The fines are 99.95 % - 325 mesh and are a very slight amount off color, this being due to the small amount of material used and the number of times it was handled in removing it from the classifier. Large lots of calcite have been ground wet using the same process without having any discoloration. The classifier cleanup contains a high percentage of -325 which would have been in the overflow had the classifier been working correctly.

Conclusions. ~~The calcite submitted is an~~ limestone
excellent one for wet grinding.
It can be ground either dry or wet.
Wet grinding would give a slightly finer and more uniform product.
The color of the ground product in both methods of grinding would be pure white.

↓ The limestone submitted is of very good grade and adaptable to fine grinding for the production of commercial product.