The foregoing samples represent types of use that may be expected in the different sizes of material from minus 200 mesh, pulverized, up to the ordinary sizes required for terrazzo, stucco-chips and manufacture of marble products.

MARKET

The statistics showing the condition of the market zone in Southern California are shown herein, and the merchantable products of marble are represented by the foregoing samples. There are other colored marbles not shown in the foregoing samples, that may be reduced to the form and sizes shown and make a complete showing of all of the different variety of colors in the marble deposit.

MARBLE COLOR

We draw your attention especially to the different colored marbles as one of the elements notable in this deposit and an element that should be emphasized in merchandising the product.

MERCHANDISING

Based upon our survey of the conditions in the field and our laboratory test of the marble, we are of the opinion that the problem of the use of the marble is mainly one of the merchandising certain sizes and colors of marble that may be sold on merit and irrespective of price competition.

At the present time, due to the high freight rate, we eliminate the use of the marble in manufactured units and for lime and white cement.

This phase of the development should be taken up at a later date when a reasonable competitive freight rate is obtained.

SPECIAL USES

Based upon our survey we are of the opinion that the possibility of using the marble profitably will be confined to its use as agricultural marble, spraying solution, stucco-chips, terrazzo, marble cubes, "Marb-L-Cote" preparation, chemical and paint industries and other special uses where the chemical character, size and color are the guiding factors and not the competitive price.

PLANT CONDITIONS

To prepare the above special use marble you will require a crushing plant in addition to the equipment inspected. This should consist of one ordinary rock crusher, one set of rolls, one pulverizing machine, one single or double jacketed screen and the necessary equipment to connect with the present motive power.

We estimate that there has been developed and quarried approximately 10,000 tons of marble, that is adjacent to the tracks near the quarries and on the ground at the plant. This quantity of marble could be used up before there would be any necessity for quarry operations, unless there is a marked call for a color of marble not in the present quarried marble piles.

After the present piles of marble are used up you will need a compressor and rock drill, pipe and a very small amount of other quarry equipment in order to quarry the marble that is now exposed and under the piles or to enter the present faces in the quarry that are free and ready to respond without further development.

We estimate that the proposed crushing unit will cost about $8,000 connected up to the present equipment in one of the present buildings.

In view of the idle mines in the neighborhood you might be able to obtain from some of these properties some of their rock crushing equipment which would be suitable for marble. This is a matter that the Custodian, who is familiar with the area can advise you more accurately than we can, as we made no survey of the other mines in the neighborhood.

When the crushing unit is installed the shipments can begin as the railroad track is at the plant and the crushing unit would probably be installed not more than 20 to 30 feet from the railroad tracks.

In the shipment of the crushed marble you will find that the major portion will have to be shipped in sacks. Sacks of different sizes are standard in the market and can be purchased as needed.

The crushing operation will consist of two phases, first crushing the present quarried marble, second quarrying the marble from the present deposit and crushing.

On a basis of 150 to 250 tons per day crushing and loading the marble from the present piles, we estimate the plant operating cost at $1.25 to $1.75 per ton, exclusive of sacks.

When the quarried marble has been cleaned up we estimate that the plant operating cost for quarrying, crushing and loading will be $2.25 to $3.00 per ton, exclusive of sacks. With an efficient plant management and a steady tonnage these costs could be materially reduced. The above estimate of plant costs does not include administ ation and selling expenses or rent on the present development.

We estimate that you should have a tonnage of at least 150 tons per day in order to warrant operating the property.

OPERATING FLOW SHEET

An operating flow sheet will require two major elements, first plant operation, material delivered f.o.b. cars; second, sales and administration. The plant can be operated by day labor under the management to be employed or the operation can be contracted on a basis of a fixed price per ton, including the quarrying, crushing and delivery of the marble f.o.b. cars. In this

event you would furnish the necessary equipment and pay the tonnage charge as and when the marble is delivered f.o.b. cars.

The second phase, the administration and selling, may be on the basis of regular employees of the company or may be the basis of contract for all of the output with responsible distributers in California and other places.

In view of the fact that the company has no organization we advise that you contract the output and the plant production. By this method you would be able to handle the development with the minimum preliminary and organization expense and with a reasonable degree of certainty as to the expected net profit.

In considering the necessary net profit per ton to warrant a satisfactory operation, we are of the opinion that this should be on a basis of $2.00, and up, per ton, net. On this basis the plant selling price f.o.b. cars, exclusive of sacks, would be from $4.50 to $5.50 and up per ton. You may expect a marked difference in the market price for the different colors and sizes of marble.

The condition of the terrazzo and stucco-chip market is subject to wide variation in price. The quotation of April 14, 1928, in Rock Products, is as follows.

"Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or Shipping Point	Terrazzo	Stucco-chips
Brandon, Vt. English pink, English cream and coral pink	$*12.50	$*12.50
Brandon grey	*12.50	*12.50
Brighton, Tenn. Pink marble chips	B 3.00	B 3.00
Harrisonburg, Va. Bulk marble (crushed, in bags)	‡12.50	‡12.50
Ingomar, Ohio. Concrete facings and stucco dash		11.00 @ 18.00
Middlebury, Vt. Middlebury white	C 9.00	C 9.00
Middlebury and Brandon, Vt. Caststone, per ton including bags		4.00 @ 5.50
Randville, Mich. Crystalite crushed white marble, bulk	4.00	4.00 @ 7.00
Tuckahoe, N. Y. Tuckahoe white	10.00	

* Carloads, including bags: L.C. L. 14.50
‡ C. L. L.C.L. 16.00
C Carloads, including bags, L.C.L. 10.00
B Bulk, car lots, minimum 30 tons.

You will note in studying this list the relation between color, size and price.

Today's quotation at Chicago, on plain white terrazzo, in ton lots, delivered on the job, is quoted to us as $9.23 per ton, without sacks, and $11.23 per ton, with sacks.

CONCLUSION

1. Based upon our survey we are of the opinion that the conditions are not favorable for a development of the property with the view of selling manufactured marble facing stone, marble blocks, lime and white cement, in the Southern California area. These products should await future development when the freight tariff is more favorable.

2. Based upon our survey, laboratory samples made, and chemical and physical tests, we are of the opinion that there is a reasonable business opportunity in developing the property with the view of selling special use marble, commercially classified as agricultural stone, terrazzo, stucco-chips, marble cubes, chicken grits, and for use in spraying solutions, whiting, paint industry, chemical industry, "Marb-L-Cote" preparation and other special uses where size and color are the guiding factors and not competitive price.

3. We advise that you contract the output of marble products with responsible distributers in California elsewhere, having in view a distribution by rail inland from Carrara and to the Pacific and Atlantic tidewater ports through the Port of Los Angeles. We advise that before any expense is incurred at Carrara that you have contracts for at least 150 tons per day on a basis showing a satisfactory net profit and when these contracts are in hand we advise the installation of a modest efficient crushing unit near the track at the present marble mill at Carrara.

4. The tariff on these new marble products must be authorized before you make the expenditure at Carrara, so that you will be protected against an advance after you are in operation.

5. In the event that sales contracts cannot be obtained showing a satisfactory net profit, for a minimum of 150 tons per day, we advise that nothing further be expended on the property with the view of development, under the existing freight tariff and the present condition of the market.

Our obligation in making this investigation and furnishing this report extends only to our client. It represents our opinion upon the date of the report only, based entirely upon the report of our engineers, all of whom we endeavor to select with due care. We believe their reports are accurate, but the conclusions reached by them are matters of opinion, the accuracy of which we dot not guarantee, and we shall not be responsible for damages or loss of any kind which may be connected in any way with this investigation or report.

Respectfully submitted,
ROBERT W. HUNT COMPANY.
By C. C. WHITTIER,
Consulting Engineer.

CCW:MB

INDUSTRIAL SURVEY ON MARBLE

.. AT ..

CARRARA NEVADA

MR. P. V. PERKINS
29 SO. LA SALLE ST.
CHICAGO
APRIL 28, 1928

ROBERT W. HUNT COMPANY
ENGINEERS
CHICAGO, ILLINOIS

Chicago, Illinois,
April 28, 1928.

Mr. P. V. Perkins,
29 South LaSalle Street,
Chicago, Illinois.

Dear Sir:

Complying with your instructions, we have made an industrial survey of your marble property at Carrara, Nevada, and the market zone in Southern California.

LOCATION

The marble property inspected on January 27th and 28th, 1928, is located in Bare Mountain, about 8 miles southeasterly from Beatty, Nevada. The marble quarry is in the mountain near the northeast side of the Amargosa Desert. The manufacturing plant is at the foot of the mountain on the valley floor near the Tonopah & Tidewater Railroad. The automobile road from Beatty to Las Vegas runs near the mill.

The description of the property is shown by the Trust Deed, dated March 1, 1921.

Exhibit I attached to this report shows the general location of the property in relation to Southern California, and the railroad connections.

Exhibit III is the United States Geological Survey Topography sheet marked "California-Nevada Furnace Creek Quadrangle."

The approximate location of the quarry and plant is shown on this sheet marked in red. The Las Vegas and Tonopah Railroad shown on this sheet has been removed. The road bed on the date of our inspection was being used as a public highway from Beatty to Las Vegas.

CONDITION OF MARBLE PROPERTY

The property was idle on the date of our inspection.

The marble deposit has been opened in three places known as—

1—White Quarry,
2—Black and White Quarry,
3—Green Quarry.

These quarries appear to be in the same condition as when the operation ceased and are in good condition. The hoisting engine, tracks, derricks and other machinery and equipment appeared to be in place as last used and in good second-hand condition, with the exception of showing the usual wear and tear incident to their use in quarrying block marble.

We inspected the track from the marble quarries to the mill and found it in good condition.

The dry atmosphere has prevented the corrosion of the machinery and equipment.

We inspected the visible portions of the marble finishing mill, power machinery and other machinery and equipment.

This plant appeared to be in good second-hand condition, showing the usual wear and tear.

We observed some renewals or repairs that were in progress on the vertical engine at the time the operation stopped. We found the property in charge of a custodian who advised us that none of the plant had been

removed since the operation ceased. The quarry and plant was operated as a marble block, quarrying, sawing and finishing plant.

The physical condition of the marble in its natural state caused too much plant waste to meet the requirements of a commercial marble sawing and finishing plant.

The quarry and the needed equipment could be used to produce crushed marble by the addition of the necessary crushing machinery and equipment, and the necessary rock drills and compressed air equipment and machinery. The two cars used for lowering the block marble down the incline would need to be adapted to crushed marble instead of block marble.

The crushed marble could be shipped as broken quarry run marble. The proposed use is for crushed marble shipped to the point of consumption.

Our inspection shows that the plant was supplied by a pipe line delivering water for the plant needs. This pipe line showed leaks here and there and will need to be repaired. The line was opened and discharged water through a valve located in front of the custodian's house near the mill.

COMMERCIAL PRODUCTS

The commercial product will consist of crushed marble and could be quarried to maintain the different colors and produce a variety of different colored crushed marble. The marble could be reduced to commercial sizes for concrete products and on down to pulverized marble for industrial and agricultural use.

We made a check on the quality of the white marble and the report of our chemical laboratory shows the following analysis on the sample of white marble:

Per cent Silica	None
Per cent Iron Oxide	.43
Per cent Aluminum Oxide	.57
Per cent Calcium Oxide	55.11
Per cent Magnesium Oxide	None
Per cent Carbon Dioxide	43.26
Per cent Loss on Ignition	.24
Per cent Available Lime (for agricultural purposes)	98.37

These tests show the marble to be suitable in quality for the usual commercial uses of crushed marble products in construction. or industrial and agricultural use.

MARKET AREA PRODUCTS

The nearest market area to this property of considerable extent is in Southern California. Shipments may be made by rail to more distant areas as far as the tariff and market prices will permit.

The following list shows a considerable number of probable uses for this crushed and pulverized marble:

1—Agricultural use.
2—Spraying solutions.
3—Commercial lime.
4—Beet sugar.
5—Glass.
6—Flux.
7—Carbon Dioxide.
8—Chicken grits.
9—Substitute for sand in concrete.
10—Asphalt filler.
11—Paint industry.
12—Marble gunnite.
13—Marble tile cubes.
14—Composition roof tiles.
15—Marb-L-Cote "marble applied with a brush."
16—Concrete.
17—Stucco.
18—Marble bricks, face and common.
19—Inside plaster.
20—In place of sand in lime mortar.
21—Marble hollow building blocks.
22—Marble facing stone.
23—Cast art marble stone.
24—White cement.
25—Sidewalk tops.
26—Pulverized marble dust.
27—Terrazzo.

TRANSPORTATION CONDITIONS

Exhibit II, attached to this report, shows the Tonopah & Tidewater Railroad, and the connection of this line with the Atchison, Topeka & Santa Fe Railway (Coast Line) at Ludlow, California, and at Crucero, California, with the Union Pacific System (Los Angeles & Salt Lake Railroad). The Official Guide of Railways, March, 1928, shows the Tonopah & Tidewater Railway ending at Beatty, about 8 miles northwest of the quarry. This line has ceased operation from Beatty to Gold Field.

The Railway Official Guide shows Carrara to be 339 miles from Los Angeles via Crucero and 355 miles via Ludlow. The Union Pacific Freight Department, Chicago, advised us that the present published tariff J-7, 1927, shows a rate on marble refuse from Carrara to Los Angeles at 22c per 100 pounds. This is a rate of $4.40 per ton.

We are advised by the same office that the published tariff rate I. C. C. 552, on gypsum, raw, ground and pulverized, from Arden to Los Angeles, is 9½c per 100 pounds. This is a rate of $1.90 per ton.

Arden, Nevada, is a shipping point on the Union Pacific, southeast of Carrara, and is shown by the official guide as 323 miles from Los Angeles.

We attach a copy of a letter of April 6, 1928, from the Traffic Manager, of the Tonopah & Tidewater Railway Company, on the subject of the tariff on movements of marble, lime or lime rock.

It will be observed that via Crucero, Carrara is 16 miles, and via Ludlow 32 miles further from Los Angeles than Arden, Nevada. This distance is not in our opinion sufficient to warrant the difference in rate.

Raw marble and raw gypsum are both natural products quarried from near the surface and of low commercial value at the quarry. Gypsum and marble are used in the prepared state for building construction and agricultural purposes, and in a considerable number of uses would be in competition in the market zone under consideration. It is thus necessary for you to have the same rate from Carrara to Los Angeles on marble, raw, ground and pulverized, as prevails from Arden on gypsum, raw, ground and pulverized.

We especially draw your attention to the necessity of a freight tariff structure that will permit the Carrara product to compete in the Los Angeles market on an equal basis with the Arden product. At the present time this would give you a rate of $1.90 per ton, the same as the Arden gypsum rate instead of $4.40 per ton, present rate on marble refuse.

We were advised that the Tonopah & Tidewater Railroad recently ceased operation from Beatty to Gold Field and we draw your attention to the possibility that this Company might abandon railroad service to Carrara and Beatty. In that case there would be no rail shipment facilities and the property would have no commercial value. If this event is going to happen it might be better to remove the marble plant and the other machinery and equipment to a safe point in the Los Angeles area where this equipment could be put into use on block marble coming into Southern California through the Los Angeles Port or otherwise.

BUSINESS ELEMENTS

The report of the Industrial Department, Los Angeles Chamber of Commerce, shows:

"Population 1927, Los Angeles City 1,300,328
Population 1927, Los Angeles County 2,206,864
Los Angeles Building Permits 1926 37,478
Los Angeles Building Permits Valuation ..... $123,006,215"

The above figures reflect the market for building materials. Other conditions in Los Angeles are set out in greater detail by General Industrial Report, Los Angeles County, California, copyrighted, 1927.

The report of the Department of Commerce, Bureau of the Census, Census of Manufacture, 1925, title Cement and Cement Products, shows in detail the statistics as compiled by this bureau and reference should be made to this publication. Pages 12, 13, 14, and 15 show for California under the heading—Concrete Products by Kind, Quantity, and Value, by States: 1925—as follows:

CALIFORNIA

Kind	No. of Establishments	Tons	Value
Block and Tile	40	64,847	$ 548,589
Brick	12	1,230	27,120
Cast stone	27	30,770	1,327,555
Roofing Tile	11	13,469	194,541
Art Marble Floor Tile	6	1,345	173,535
Garden Furniture	11	375	59,401
Laundry Trade	8	6,221	195,868
Septic Tanks and Sanitary Fittings	9	1,038	12,682
Vaults and Caskets	7	587	31,320
Large Sewer Pipe	7	94,376	1,514,703
Machine Made Pipe	17	71,114	1,041,285
Irrigation Pipe	52	121,659	1,551,272
Drain Tile	6	1,568	22,087
Meter Boxes	3	3,737	107,664
All other concrete or cement products	26	15,049	394,570

AGRICULTURAL USES

The use of lime for agricultural purposes is covered under "The California Agricultural Minerals Act of 1923" (Approved June 14, 1923: Stats. 1923, Chap. 349).

The state of California, Department of Agriculture, Special Publication No. 80, Commercial Fertilizers Agricultural Minerals (1927), page 49, reads as follows:

"Segregated Tonnage Reports.

"The following tabulation shows the tonnage of the various kinds of agricultural minerals sold in the state during the years 1924 to 1927 as segregated by the companies reporting:

Material	TONS 1924	1925	1926	1927
Limestone and shells	6,839.16	9,261.81	9,261.03	10,101
Marl	12,791.22	7,381.53	7,338.66	9,614
Hydrated lime	117.00	929.59	407.30	481
By-product lime	11,204.24	12,954.00	7,468.81	8,595
Gypsum	4,085.85	6,504.00	11,048.90	10,185
Phosphate rock	.....	.....	97.50	97
Sulfur	809.76	1,918.50	492.88	400
Miscellaneous	1,847.78	3,712.59	4,820.84	5,893
Mixed goods	2,187.87	8,050.93	8,906.25	9,553
Segregated	39,882.88	50,712.95	49,842.17	54,919
Unsegregated	4,358.43	22.00	2,274.91	5,295
Totals	44,241.31	50,734.95	52,117.08	60,214

"The private business of the companies has been safeguarded by showing in the tabulation those items only which have been reported upon by three or more companies."

CONCRETE PRODUCTS

The Census report shows on page 11, table 4, in the United States:

"Concrete Products Total	Tons 6,628,367	Value $78,546,515"
In making up the above total the following large items appear:		
Block and tile	4,183,945	$31,193,535
Brick	263,858	2,532,246
Cast stone	354,164	12,843,418
Roofing tile	116,555	3,538,601
Art marble floor tile	5,157	801,279

Other details are shown in this same table.

It will be noted from the above table that the large items are used in building construction.

In our opinion your marble is suitable for use in manufacturing a marble concrete.

PHYSICAL TESTS

Samples of the white marble were submitted to our laboratory for crushing tests, and shows as follows:

Test No.	1	2
Original height	2.00"	2.03"
Dimensions	2.07"x2.10"	2.00"x2.04"
Area in compression, Sq. In.	4.35	4.08
Maximum load	45,690 lbs.	40,100 lbs.
Crushing strength per Sq. In.	10,503 lbs.	9,829 lbs.
Failure	Vertical	Vertical

The chemical analysis and physical tests show the character of the white marble and in our opinion indicate that this marble is suitable for agricultural, industrial and building uses.

LABORATORY SAMPLES

Samples of the white and other colored marble were shipped to our laboratory and crushed into various sizes, and a considerable number of different sample products were made, using white cement, standard Portland Cement and Oxy-Chloride cement.

We hand you herewith the following samples crushed and made up in our laboratory:

LIST OF MATERIAL EXHIBITS

A—Pulverized white marble minus 200 mesh.
B—Sized white marble minus 10 to plus 40 mesh.
C—Broken white marble minus ¾" to plus ¼" mesh.
D—Gray marble, broken as shown.
E—Dark marble, broken as shown.
F—Buff marble, broken as shown.
G—Briquette—White marble, dash surface.
H—Briquette—White marble dash surface, coarse.
I—Briquette—White marble dust, rough surface.
J—Briquette—White marble aggregate.
K—Briquette—White marble sand surface.
L—Briquette—White marble sand surface.
M—Slab 2¾"x5½", Portland Cement, White marble aggregate.
N—Slab 2¾"x5½", Oxy-Chloride Cement, White marble dash surface.
O—Slab 2¾"x5½", Oxy-Chloride Cement, White marble dash surface.
P—Slab 2¾"x5½", Oxy-Chloride Cement, White marble dust, grooved.
Q—Slab 2¾"x5½", Oxy-Chloride Cement, White marble ground surface.
R—Slab 2¾"x5½", Oxy-Chloride Cement, White marble ground surface.
S—Slab 2¾"x5½", Oxy-Chloride Cement, White marble cast on glass.
T—Brisquette-White Cement, White Marble, ground surface.
U—Brisquette-White Cement, White Marble, rough surface.
V—Cubes—White marble fine aggregate.