

# **Solano County Stone Resources circa 1867-1868**

Excerpts from

## ***Mineral Resources of the States and Territories West of the Rocky Mountains***

By J. Ross Browne

Report to the Committee on Mines and Mining, House of Representatives  
During the Second Session of the Fortieth Congress, 1867-1868

This transcription, which begins on the next page, is presented on the  
Stone Quarries and Beyond web site in the California state section.

<http://quarriesandbeyond.org/states/ca/california.html>

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June 2011

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Ex. Doc. No. 202, 1868, pp. 81-82, 85.

(This book is available on Google Books.)

[http://books.google.com/books?id=DEd0JALLPXQC&dq=Mineral+Resources+of+the+States+and+Territories+West+of+the+Rocky+Mountains+1867-68&source=gbs\\_navlinks\\_s](http://books.google.com/books?id=DEd0JALLPXQC&dq=Mineral+Resources+of+the+States+and+Territories+West+of+the+Rocky+Mountains+1867-68&source=gbs_navlinks_s)

### **Marble, Limestone, &c. in California (circa 1867)**

(pp. 241-246)

“The use of marble for domestic, artistic, and funeral purposes is very general in California, especially in San Francisco. Marble mantels, tables, and slabs are to be found in almost every residence, workshop, and store. The graves of all, save the utterly friendless dead, are adorned with marble tablet or monument of some kind. This taste has created an important branch of productive industry.

“There are fourteen factories engaged in the manufactures of marble in San Francisco, some of which employ 30 or 40 men. One has steam machinery for cutting and polishing the marble, and turns out 3,000 feet of slabs per month, in addition to tombstones, mantels, and other ornamental work. There are marble factories at Sacramento and Marysville, and one at each of the following towns in the interior: Stockton, Sonora, Petaluma, Santa Cruz, San José, Downieville, Folsom, and other places. Probably 1,000 persons are employed in California quarrying, transporting, and working marble.

“The consumption in San Francisco averages 500 cubic feet per month; the factories in the interior use about one-fourth as much; total consumption in the State, say 600 feet per month, or 7,200 feet per annum. The average price of marble at present is \$5 per foot. It thus appears that the value of the raw material used in this business amounts to \$36,000 annually. The value of manufactured marble in the State is estimated at \$2,500,000.

“The most singular suggestive feature in this business is presented in the fact that, although California contains an abundance of marble of great beauty and variety, most of that used in San

Francisco is imported from Italy or New York. This fact may be attributed to the want of good roads and cheap transportation. It is found more economical to bring the raw material from Genoa, Italy, including transshipment at Bordeaux or Marseilles, than from the foot hills in the State, less than 100 miles from Stockton or Sacramento.

“There are two firms in San Francisco engaged in the importation of marble. Brigadelli & Co. are in the Italian branch of the business. They own a vessel of 300 tons register, sailing between San Francisco and Genoa. Large quantities are brought by French vessels from French ports. From June, 1866, to June, 1867, this firm imported 545 tons of Italian marble and had 600 tons more on the way, the whole of which was sold, leaving orders still unfilled. The present price of Italian marble is 50 cents per superficial foot, in slabs of seven-eighths of an inch thick; in blocks of ordinary dimensions, \$5 per cubic foot; blocks weighing several tons, at \$6 per cubic foot. California marble cannot be laid down in San Francisco at these rates. Myers & Co. import Italian marble from New York, where it is brought in vessels from Genoa. This firm also imports white marble from Vermont, which sells at \$15 per cubic foot, being used in the finer kinds of work. Some of the ornamental mantels in the homes of the wealthy cost \$750 to \$1,000 each.

“The marble dust used in the preparation of effervescing beverages is imported from New York. Five hundred tons annually are consumed, at a cost of about \$30 per ton.

“The cost of transportation, which gives the imported marble a monopoly of the markets along the coast, prohibits its introduction in the interior. All the factories in towns above Sacramento, Marysville, and Stockton use the native marble, because it is cheapest at these places. With reference to the quality of the Pacific coast marble, as compared with the imported article, the fact should be taken into consideration that it is excavated from near the surface. None of the quarries have been opened to any considerable depth; consequently the marble is scarcely as fine in color or texture as it will be found at a greater depth. Much of it, nevertheless, when compared with Italian, loses nothing in the contrast. Many samples of the California marble are superior. The block of white marble, from the quarry at Columbia, Tuolumne county, from which the sculptor Devine\* formed the bust of the late Senator Broderick, compares favorably with the Carrara in color, texture, and purity.

(\* *Patrick J. Devine, sculptor, located in Sacramento. Peggy B. Perazzo*)

“The recently-discovered quarries of black and white marbles near Colfax, Placer county, on the line of the Central Pacific railroad, will probably stop the importations from Italy. The beauty of the black marble from this locality, the exquisite polish it retains, and the advantage the owners of the quarry possess in railroad communication, which enables them to deliver it at San Francisco cheaper than the Italian, will probably give it the control of the market.

“There are many localities in California where quarries of marble are known to exist, but, with few exceptions, they remain undeveloped. A belt of limestone traverses the State from north to south, between the foot hills and the Sierras, said to be 20 miles wide, forming a prominent feature of the topography of the counties famous for placer gold, particularly in Tuolumne, Calaveras, Amador, Nevada, El Dorado, and Placer counties. This belt abounds in white or

grayish marble; and it is not improbable marble of variegated colors will be found on more thorough examination, as local causes are known to control the color. In illustration, it may be stated that in the gulch on the south side of the road between Columbia and Gold Springs, Tuolumne county, there are bodies of marble of a jetty blackness, colored by manganese; on Matelôt gulch, about a mile to the east, there is a deposit of marble which, through the action of salts of iron, has been mottled with red, brown, yellow, blue, and green spots; on Mormon gulch, about three miles to the west, are masses of marble of very fine texture veined with pale green by the action of chlorine. This variety of color is not peculiar to that locality, but may be observed throughout the State. The Suisun marble, of Solano county, and the black and white marbles recently found near Colfax, Placer county, are cases in point.

“Little attention has thus far been paid to the marble quarries of the State, because the working of them has not been profitable, except in a few localities. As soon as railroads and cheaper labor shall remove existing impediments, they will probably become a source of profit, both to individuals and to the State.

“The most important quarries at present worked are the following:

### **The Suisun Marble Quarry, Solano County (circa 1867)**

(pp. 243-244)

“The Suisun marble is found in the Peleoo Hills, a short distance north of the city of Suisun, Solano county. It occurs in the form of irregular beds, in a peculiar sandstone formation, and is of various shades of brown and yellow, beautifully blended in bands and threads, Similar to the famous stalagmites of Gibraltar, which it resembles in origin and structure, as well as in appearance.

“It has been formed by water, holding lime and iron in solution, percolating through the sandstone and depositing the mineral in cavities; consequently it is only found in limited quantity, though much of it, of an impure quality, is burned for making lime.

### **Limestone and Lime in California (circa 1867)**

(pp. 244-245)

“Limestone and Lime. – The supply of these materials is abundant in nearly all parts of California. The great belt of limestone so frequently referred to furnishes materials for lime for the towns in the foot hills and among the Sierras; while in the coast range there are other calcareous rocks, which supply the demands for lime in the towns and cities along the coast and on the plains. The consumption of lime at San Francisco averages about 100,000 barrels annually, three-fourths of which is obtained from the vicinity of Santa Cruz, on the ranch of the Cañada del Rincon, where there is a supply of white metamorphic limestone, which makes good lime. Considerable quantities are also brought from Sacramento. Since the completion of the Central Pacific railroad in that vicinity, lime is brought to San Francisco from near Auburn and

Clipper Gap, Placer county. About 5,000 barrels are brought to Sacramento monthly by the railroad, and the supply is increasing with the facilities for its preparation and transportation.

“The imports of lime at San Francisco, since 1864, have been as follows:

	<b>Barrels</b>
1864	73,553
1865	90,037
1866	<u>89,786</u>
1867 (for first six months only)	321,216

“Average price during this time, \$2.25 per barrel. The consumption of lime in San Francisco during the past three and a half years has cost \$722,736. The increase of brick and stone buildings during the latter half of 1867 has greatly augmented the consumption of lime.

“The construction of railroads and increase in buildings in the interior towns has also increased the consumption. The lime used for various purposes in the State annually probably exceeds \$1,000,000 in value.

“The Golden City Chemical Works, at San Francisco, have made a few tons of chloride of lime as an experiment, but the demand for this compound is so small on this coast that its manufacture is unimportant. It was ascertained in making these experiments that the California lime will not absorb as much chlorine as that made in the Atlantic States or Europe. This may be the effect of a variety of causes; but it is of importance, both in practice and to science. Some of the English lime will absorb 50 per cent. chlorine. None obtained in California would take up 30 per cent. The general per cent. of chlorine in imported chloride of lime does not exceed 10. It loses its strength during the voyage.

“Other Calcareous Minerals – Sulphate of Lime. – There are deposits of this mineral in various forms in all the States and Territories on this coast. It is valuable when burned as a fertilizer on heavy clay lands, such as constitute much of ‘tule’ and ‘adobe’ bottoms in California. It is abundant in the coast range. A body of it is found in the form of selenite in the hills near Stockton, within a few miles of the San Joaquin river.

“Considerable quantities of the same mineral are known to exist in most of the mountains which have been examined for silver in Alpine county, among the high Sierras.

“Sulphate of lime, in the form of alabaster, is found in Tuolumne, Los Angeles, Solano, and several other counties.

“Near Silver City, Story county, Nevada, alabaster of great beauty is found, but it soon crumbles on exposure to the atmosphere. In 1862 this deposit was quarried as marble. It was soon discovered that blocks cut from it fell to pieces, and were useless for building and ornamental purposes; but it makes good plaster of Paris.

“Beds of friable sulphate of lime exist in the vicinity of the Sulphur Springs, near Red Bluffs (sic), Tehama county, in the form of loose grains, deposited by the waters of the thermal springs, which cover acres of ground in the vicinity. All the hot springs on this coast deposit sulphate of lime, in some form or other.

“In the Granite mountains, between Chico, in Tehama county, and Idaho, there are numerous deposits of gypsum. Anhydrate, or dry sulphate of lime, is found in Plumas and Sierra counties. Professor Whitney, State geologist of California, has various specimens.

“Excellent materials for the manufacture of plaster of Paris exist on this coast. Considering the simpleness of its preparation it is remarkable that its manufacture has not been attempted. The imports of plaster of Paris amount to 6,000 barrels annually at San Francisco, at an average cost of \$4 per barrel, or nearly \$25,000 per annum. Nearly all imported is from New York.

### **Hydraulic Limestone in California (circa 1867)**

(pp. 245-246)

“Hydraulic Limestone. – California contains deposits of this valuable mineral, of good quality. The best known are found in a range of hills at the back of Benicia, Solano county. Hydraulic, or Benicia cement, as it is called, is made here in considerable quantities, a company having been incorporated in 1860 for the purpose of carrying on its manufacture. The company has good machinery, kilns, and the necessary arrangement for making several thousand barrels per month. An impetus has been given to this business by the action of the State harbor commissioners, who having charge of the construction of the sea-wall, in the harbor of San Francisco, have had experiments made with the various cements. The Benicia cement proving satisfactory, has been selected for use in the wall, which will be several miles in length, and of great depth and thickness, and will consequently require many thousand tons of cement. This action of the commissioners has had a tendency to remove a prejudice that had been cultivated by interested parties against the California cement. The imports of cement have been heavy for several years at San Francisco, the damp nature of the foundations in the business portions of the city requiring the bricks or stones to be laid in cement for several feet in extensive buildings. In 1866, 23,812 barrels were imported, at a cost of \$91,648. During the first six months of 1867, 14,517 barrels were imported, at a cost of \$50,000. These figures show the importance of this business.

“The mineral in the vicinity of Benicia is found in a series of deposits extending for several miles. Though there does not appear to be any regular stratum of it, there is sufficient to last for many years, should the consumption reach 100,000 barrels annually.

“Hydraulic limestone is a sub-carbonate of lime, which owes its value to its property of hardening under water, to a certain proportion of clay in its composition. Too much clay causes it to set too slowly, while too little renders it unfit for use as a cement. It is necessary to make this explanation to render the following statements intelligible:

“There are two varieties of this mineral at Benicia, the one making a cement which hardens very rapidly, the other very slowly. Experience and observation prove that a combination of the two

makes a hard, durable cement, which may be regulated to harden in any required time. Common limestone exists near the cement rock. The workmen first employed in making cement, not being aware of the difference, mixed all together in the kilns; the consequence was to spoil the whole, and give the product a bad character in the market. But the processes for its preparation are now better understood, and the workmen more experienced. Such contaminations are avoided, and a really good cement is prepared.

“This Benicia cement stone is of a dark yellowish color, speckled with black, tolerably soft; breaks with a dull, earthy fracture, without any appearance of crystallization.

“The following table gives the results of some of the experiments made with various kinds of cements, to test the time each requires for ‘setting’ in the air and under water:

Composition	Time setting in air.		Time setting in water.	
1 <sup>st</sup> quality Benicia cement	3	5	8	10
2d quality Benicia cement	25	30	30	50
Mixture of both	50	1.00	1.20	1.25
Roman cement	30	50	45	1.00
Eastern cement	1.00	1.20	1.50	2.20
Mixture of equal parts Benicia cement and sand	1.20	1.50	2.40	3.10
Mixture of one part of Benicia cement and two parts sand	1.50	3.10	4.10	5.25

“This cement is much used in the manufacture of drainage and water pipes. There are several factories of these articles in California. Miles of such pipe are laid down in San Francisco. Other places in the Coast range and foot hills have been found where cement stone is known to exist. On the banks of Hospital creek, a few miles south of Corral Hollow, San Joaquin county, there is a deposit of it similar in appearance and composition to that worked at Benicia.

“Within the past few months a hydraulic limestone has been discovered in Washington territory, on the Columbia river, about seven miles north from Astoria. Works are in course of erection to manufacture cement at this place. There can be but little doubt that this mineral will be found abundantly all along this coast whenever an intelligent search shall be made for it. The metamorphosis of the rocks in the Coast range has been of a nature to form it extensively.”

### **Building Materials in California (circa 1867)** (pp. 247-250)

“Building Materials. – The mountainous nature of the Pacific coast, and the geological formations to which the rocks composing the mountains belong, suggest the existence of a great variety of building materials. Few countries possess greater abundance or variety of these materials than California, and there are few cities in the United States where equal opportunities are afforded for comparing the merits of the materials used in other countries with those obtained



at home, than are presented at San Francisco. In the early days of this city everything was imported, from bread to clothing for its inhabitants to lumber, brick and stone for their houses. The city hall is built of Australian freestone, several of the banks and other large edifices are built of China granite, and there are hundreds of steps, pillars, lintels, and other portions of buildings, of sandstone and granite imported from the Atlantic States and Europe. The foundations of many of the old buildings in the city are laid on imported bricks. None of these materials are found to be as durable or as handsome as those since obtained in California. In this, as in other mineral resources, the cost of labor and transportation has impeded development. It is only under favorable conditions that stone for building will pay to ship to San Francisco from the interior of the State; while the cheapness, excellence, and abundance of the lumber, and the general adaptability of the soil for the manufacture of bricks, cause these materials to be used for building almost everywhere throughout the State. The introduction of iron mouldings for the decorative portions of large structures prevents a demand for stone for such purposes. The Bank of California building, at San Francisco, is the only structure of cut stone of any magnitude, outside of the government fortifications, on the Pacific coast. Under such circumstances little attention is paid to opening quarries to test the quality of the stone. The consumption of stone is confined to granite for curbing and paving the streets, and the basements and steps for a few of the more costly buildings at San Francisco.”