California Stone & Building 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. 35.

(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

(Please Note: Only a few of the California county excerpts will be presented below at this time.)

Section IV. Tuolumne County (circa 1867)

(pp. 35-36)

"Tuolumne county extends from the Stanislaus river on the north to the divide between the Tuolumne and Mercede on the south, and from the summit of the Sierra to the low foot hills near the plains. Nearly all the mines and population are in the western half of the county, below the level of 2,000 feet above the sea.

"The placer mines have nearly all been quite shallow, and they are now exhausted in many places. There never have been any large and profitable hydraulic claims in the county, although there are some gravel ridges above Big Oak Flat, and others near Cherokee that may prove valuable for hydraulic mining. One of the chief mining features is table mountain, which follows the Stanislaus river from Columbia to Knight's Ferry, and covers a rich auriferous channel that is worked through tunnels."

"This mountain has yielded about $2,000,000, but at a cost of $3,000,000. Another remarkable feature of the county is the limestone belt, which crosses the country, through Garrote No. 2, Kincaid Flat, Shaw's Flat, Springfield, and Columbia. This limestone, instead of having a smooth solid surface, appears to be broken into water-worn boulders, and rich auriferous gravel is found down to a great depth in the narrow crevices between them. In this county, too, the mother lode is more strongly marked; more distinctly traceable for a considerable distance, and worked in more mines than in any other county. Columbia is notable for having produced more large nuggets than any other district in the State, and also for the high fineness of its dust. Bald mountain, near Sonora, has had a unsurpassed cluster of rich pocket lodes, and the Soulsby

district has some of the richest granite mines of the State. The county has further extensive and valuable beds of plumbago and some fine white marble suitable for statuary, but its extent is not yet proved...."

Section VI. Amador County (circa 1867)

(pp. 71)

"Amador, one of the smallest mining counties of the State, and also one of the most prosperous, lies between the Mokelumne and Cosumnes rivers, extending from the summit of the Sierra to near the plain, with a length of 50 miles and an average width of 14. It owes its prosperity chiefly to the mother lode, which crosses the county about 12 miles from the western boundary, and has within three miles three miles, which have all been worked continuously for 15 years, have probably produced not less than $8,000,000, and form the most remarkable cluster of quartz mines on one vein in the State. Twelve miles further east near Volcano, there is another rich quartz mining district, which has some peculiar features. Otherwise, the county has not much wealth. It has no great thoroughfare leading across the mountains, no place of fashionable summer resort, no productive mines of copper, no extensive hydraulic claims, few rich surface placers, and no quarries of marble or deposits of plumbago."

Section VII. El Dorado County (circa 1867)

(pp. 81-85)

"El Dorado county lies between the Cosumnes and the Middle fork of the American river, and extends from the eastern boundary of the State to near the Sacramento plain. It was in this county that Marshall made his discovery of the gold on the 19th January, 1848; and El Dorado was previous to 1853 called the Empire county, because it was for a time the most populous in the State, but it is now surpassed by many others.

"In this county we observe various features not found in Mariposa, Tuolumne, Calaveras, or Amador.

"Granite appears as the bedrock on the western border of the mining region. No rich quartz veins are found in the granite at an elevation of 2,500 feet or more above the sea.

"The lime belt, which is distinctly traceable across Tuolumne, Calaveras, and Amador, appears at Indian Diggings in El Dorado, and then seems to be lost.

"A new lime belt appears very distinctly twelve miles west of the main belt. In this new belt is the beautiful Alabaster cave, near Centreville.

"El Dorado has 25 ditches, with a total length of 821 miles, constructed at a cost of $1,500,000. Of these the principal are the South Fork, the Pilot Hill, and the Michigan Flat ditches...."

Miscellaneous Resources in California (Tombstones, etc.) (circa 1867)

(pp. 82)

"A considerable part of the marble used for tombstones in California is obtained from a marble quarry at Indian Diggings. Steatite, or soapstone, of very good quality is obtained from a quarry near Placerville, and numerous places in the county supply a chalk-like silicate of lime that is used in San Francisco for polishing metals, especially silver-ware. The county has 85,000 acres of enclosed land, 22,000 acres under cultivation, 1,164,000 grape-vines, 91,000 apple trees, 52,000 peach trees, saws 10,000,000 feet of lumber annually, has taxable property assessed at $3,500,000, and casts 5,000 votes....The Alabaster cave in the northwestern corner, and Lake Tahoe at the northeastern, are both places of fashionable resort."

"**The Blue Channel**. – There are several old channels in El Dorado county, and they appear to belong to two different systems of drainage and periods of existence. They may be distinguished as the blue and the gray, according to the color of the cement or gravel found in their beds. The blue is prior in time, and only one blue channel has been distinctly traced in the county. It runs from the northwest to the southeast, nearly with the course of the slates, and has been found at White Rock, Smith's Flat, and Try again tunnel. The channel is 220 feet wide, and 250 feet above the level of Weaver creek. The rim rock is never less than eight feet higher than the bottom of the channel. The cement is harder and more brittle, and contains more quartz, and quartz of a bluer color, and pebbles smaller and more uniform in size than the gray cement. This channel with its well-defined banks and a deep covering of lava, formed a bed in which ran a subterranean stream of water that broke out in springs on the hillside...."

"The Granite company are running a tunnel to strike the Blue channel, and are in several hundred feet.

"The Deep Channel Company has been at work seven or eight years. The dirt is hoisted through an incline by horse power, and pays $4 to the car load. Most of their cement is crushed in the 10-stamp custom mill of P. M. Taft.

"The Blue Lead Company employ 10 or 15 men in their claim, and crush their cement, which yields about $8 per ton, in a 10-stamp mill, driven by 30 inches of water over a wheel 45 feet in diameter.

"The Buchanan, Fremont, Henry Clay, and Hook and Ladder Companies, facing Smith's Flat on the east, have had some very rich claims.

"Redd & Co. have a five-stamp custom mill, and crush cement for the Hook and Ladder Company...."

Indian Diggings, El Dorado County (circa 1867)

(pp. 85)

"Indian Diggings, 25 miles southeastward from Placerville, is on the limestone belt, and is the furthest north of all the large mining camps on that belt. No solid bed rock is found here. It is supposed that pay gravel is found 200 feet from the surface, and to drain the diggings to that depth would require a tunnel a mile long. At Slug gulch a shaft was sunk down through what appeared to be solid limestone bed rock into a stratum of limestone boulders. A ditch of water was accidentally turned into this shaft, and the water ran there for several days without any accumulation of water in the shaft. No outlet was ever discovered. Brownsville, at the side of the Indian Diggings, may be considered part of the same place, and the two together have about 20 acres of deep diggings, which will not be exhausted for many years. Indian Diggings and Brownsville, unlike Columbia and Volcano, do not wash with a pipe in a dump box...."

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:

Indian Diggings Marble Quarry, El Dorado County (circa 1867)

(pp. 243)

"Indian Diggings. – This quarry is located on the limestone belt, above referred to, in El Dorado county. It was opened in 1857. A considerable quantity of marble has been taken from it, darkly and coarsely marked with gray and black. It is very beautiful in large masses, but has a smeary appearance in small pieces; it is susceptible of a high polish, but it retains well. Monuments, after exposure for 10 years to the heat and cold peculiar to the foot hills of California, are as bright and glossy on the surface and edges as when erected.*

(Many of the old cemetery stones in California cemeteries constructed from the Indian Diggings marble show considerable disintegration along the gray veins in the stone today. Peggy B. Perazzo.)

The Columbia Marble Quarry, Tuolumne County (circa 1867)

(pp. 243)

"The Columbia is located on the same limestone belt, on the Tuolumne county side of south fork of Stanislaus river, near Abbey's Ferry, 70 miles from Stockton, the head of navigation on the San Joaquin river. This quarry was opened in 1860, and has been well developed. The quality of the marble is fine in grain and nearly white, with pale gray pencillings, and has improved with the depth of the workings. Blocks of 20 feet square, without flaw or blemish, may be obtained from this quarry. Machinery was erected for working it, and a mill built for cutting the blocks into slabs and polishing them. The works consisted of a revolving derrick with a boom 60 feet in length, by means of which two men could take blocks weighing 10 to 15 tons from any part of the quarry and place them on cars which ran on a track laid around it and connected with the mill. This mill had 100 saws and four polishing machines, moved by water power. Many thousands of tons of marble were cut here between 1862 and1866. The increase of importations, erection of similar machinery at San Francisco, and the impossibility of sending the product to market during the winter, owing to the want of good roads, has caused the proprietors to cease operations, except during the summer. Some of the handsomest monuments in the state are

made of this marble; that erected to the memory of the late Senator Broderick, in the Lone Mountain cemetery, at San Francisco, is a beautiful specimen.

The Colfax Marble Quarries, Placer County (circa 1867)

(pp. 243)

"The Colfax Quarries. – The most noted of these was discovered in 1866, in the mountains bordering the Bear river, about two miles to the east of the town of Colfax, Placer county, near the line of the Central Pacific railroad. The marble differs from all others found on the coast, being a dark gray, with jet black venation. When polished it is very beautiful. The mantels in the new Bank of California are made from this marble, which contributes to the beauty of the interior of that structure.

"The proprietors of the quarry are among the first to derive direct benefit from the Central Pacific railroad, and their case illustrates how great an advantage that road will be in developing the resources of the State. Without such a means of transportation the marble could not be delivered at San Francisco for less than $20 per ton; with it freight is only $8 per ton. The owners of the quarry at Columbia pay $10 per ton for hauling their marble to Stockton when the roads are good, but from $12 to $15 per ton during the winter, with an addition of $2 per ton from that place to San Francisco by water. The expenses for transportation are still higher from the Indian Diggings quarry. Expense of transportation alone has thus far prevented the development of this valuable resource, and cost the State as much for imported marble as would have nearly paid for a railroad to the quarries.

"There is a quarry of nearly white marble recently discovered on the Appleton ranch, about seven miles from Colfax and two miles from the railroad. Some fine blocks have been sent from it to San Francisco.

"Both these quarries are in the limestone belt.

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.

Other Localities in California Where Marble Has Been Found (circa 1867)

(pp. 244)

"Other localities where marble has been found. – A quarry of marble has been opened recently on Butte creek, about 40 miles from Oroville, Butte county, near the lately-discovered iron mines. The quality is good, the color gray and white, and the deposit extensive, being on the limestone belt.

"There are other localities in the State where marble has been found, but the explorations have been too limited to determine their value.

"In May, 1867, Mr. J. R. Brown discovered and located a quarry of marble a few miles north of Auburn, Placer county, of a nearly white color. Samples sent to San Francisco are considered fine. The quantity is abundant.

"A marble quarry has been found to the south of the Bay of Monterey, in the Coast range."

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:

	Barrels
1864	73,553
1865	90,037
1866	89,786
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.

Dolomite or Magnesian Limestone in California (circa 1867)

(pp. 245)

"Dolomite or Magnesian Limestone. – This mineral has been found during the present year, on the Merced river, between Horseshoe Bend and Don Pedro's bar. It is fine grained, of a yellowish gray color, having much the appearance of 'Turkey stone,' and is prized for hones for sharpening razors, penknives, &c. It has been mistaken for lithographic limestone. The deposits are abundant, and it may ultimately be found an important resource.

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.	
1st 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.

Granite in California (circa 1867)

"Granite. – Quarries of this rock are in nearly every county, including portions of the foot-hills or sierras. But as none of them are convenient to railroads or rivers, except the following, only these will be referred to:

"The oldest and best known is located near Folsom, Placer county; another quarry worked to some extent exists at Natoma, in the cañon of the American river, a few miles from the first; another at Rocklin, 22 miles from Sacramento; and a fourth at Penryn, 28 miles from that city. The last two are on the line of the Central Pacific railroad.

"There is a marked difference in the appearance of the rock from these several quarries. That from Folsom is hard and dark, containing feathery crystals of black hornblende in patches, on a dark bluish-gray ground of quartz and feldspar. Very little mica exists in any of the California granite. That from Natoma is as dark as that from Folsom, but the components being more evenly distributed gives it a lighter appearance. The stone-cutters consider this the best rock for smooth blocks. It has a clean and fresh appearance, never changing color. The granite from Rocklin is of a nearly snowy whiteness, remarkably fine grained, and free from stains and blotches, and is susceptible of a fine finish. The upper portion of the State capitol at Sacramento is being built of this stone. The mouldings and other architectural ornaments are cut with sharpness and elegance. The lower portion of the structure is built of the Folsom stone, which has a dark and dingy appearance in comparison with the lighter and marble-like stone above.

"The fortifications in course of construction near San Francisco are being built of Penryn granite, which is somewhat darker than that from Rocklin, but lighter than the others described above. The basements of nearly all the large stores and warehouses in San Francisco are built of Folsom rock. The quarries at Rocklin are very extensive. It is possible to break off blocks of large dimensions – masses 100 feet long by 100 feet deep, and 10 feet thick, have been quarried out and afterwards split into smaller blocks, of any required thickness, across the grain, by means of

gads and sledges. The rock splits evenly. There is a body of this rock several miles in length and breadth and of unknown depth.

"In San Francisco are 10 stone-yards, at which about 350 men are employed dressing and trimming granite for building and paving purposes. These yards use about 400 tons of stone per month. The curbs and crossings of the principal streets are made of this rock. There are 20 miles of such curbing and crosswalks. The Central Pacific railroad carries about 5,000 tons of granite from Rocklin to Penryn to Sacramento, the greater portion of which is brought to San Francisco by schooners. About 1,000 tons per month are brought from the quarries at Folsom and Natoma.

"The price of granite at San Francisco is $1.50 per cubic foot, or $21 per ton in blocks delivered at the wharf. The cost of trimming it is high; stone-cutters being paid $4 per day in gold for nine hours work.

Sandstones, &c. in California (circa 1867)

"Sandstones, &c. – Brown stone of good quality for building purposes is quarried near Hayward's (sic), Alameda county. Some of this stone is used in the city cemeteries as bases for monuments and for building vaults. Its somber appearance is considered an advantage.

"Greenish-gray sandstone is obtained from Angel island, in the Bay of San Francisco. Of this beautiful stone the new building of the Bank of California has been built. The scroll-work and sculpture on the front are fine and smooth in outline as if cut in marble, while the color is soft and pleasant to the eye. Each pillar, lintel, and post of the doors and windows is formed of a single block, some of them 10 feet in length. The wheels used in the linseed oil factory at Steamboat Point are also made of Angel Island stone. These wheels are seven feet in diameter and 18 inches thick, each weighing five tons.

"In several of the interior counties are deposits of a variety of trachytes, forming portions of table mountain, which make good materials for buildings. It is generally a pinkish or gray color, fine in grain, and when first taken from the quarry is sufficiently soft to be trimmed with a common hatchet, but a few months' exposure to the air renders it quite hard. A valuable deposit is found near Mokelumne Hill, Calaveras county. Wells & Fargo's office, several hotels, and other buildings in that town are made of it. Some of these buildings are 14 years old, and the stones in them retain the marks and edges as when first made.

"A quarry of freestone, of a pale drab color and fine texture, is found near Marsh's creek, six miles from the Mount Diablo coal mines.

"Near the Merced river, in Mariposa county, on the road between Bear Valley and Stockton, there are beds of freestone well adapted to building purposes. The stone is of a pleasant pinkish tint, with wavy lines of brown and purple, and is compact and stands exposure well. With cheap transportation it would become a favorite for many purposes, as it can be cut cheaper than granite, and is better adapted to building than marble, and is more elegant and durable than brick.

Bricks in California (circa 1867)

"Bricks. – The manufacture of bricks is carried on extensively in nearly every county in the State. The tough clay of the Sacramento valley probably makes the best. Some of the earth used in one or two localities along the coast in early times, contained a per centum of soda and potash. Such bricks are ill-suited for a climate as humid as that of San Francisco. The moisture causes the alkali to exude, injuring the paint or plaster with what the bricks are covered.

"The consumption of bricks at San Francisco amounts to about 100,000,000 annually. The average price is $12 per 1,000. About 20,000,000 are used annually in the interior of the State, at an average cost of $16 per 1,000. Until recently the bricks made were the product of hand labor. A brick-making machine was introduced in July, 1867. The increase of building consumes all that are made. The city corporation uses many millions annually in the construction of sewers, of which there are 10 miles within the city limits.

Roofing Slates in California (circa 1867)

"Roofing Slates. – Notwithstanding the abundance of slate on this coast, but little of it fit for roofing purposes has thus far been found. The use of shingles, asphaltum, and tin for roofing, which are so much cheater and lighter than slate, is almost general, so that but little inducement is held out to furnish slate. In 1865 a company was organized in Amador county for the purpose of working a slate quarry found in that county. Experienced Welsh slaters were interested in the enterprise. They say the Amador slate is quite equal to any found in Wales. The causes above stated, together with the cost of labor and transportation, rendered the enterprise unprofitable, and it was abandoned. No doubt a proper search would result in the discovery of an abundant supply of roofing slates on this coast.

Steatite, or Soapstone, in California (circa 1867)

"Steatite, or Soapstone, though not strictly a building material, is classed under this head because it is valuable in various departments of arts and manufactures. There are localities in all the States and Territories on this coast, except Arizona, where this mineral is known to exist in great abundance, but its consumption is limited at present. Only one or two deposits are found profitable to work, and these only to an inconsiderable extent. There is but one establishment on the coast for the manufacture of articles from soapstone. This is at San Francisco, where it was commenced in 1866. As marble can be obtained cheaper than this stone, its use is confined to blocks for lining furnaces, slabs for the chemical works, linings for stoves, beds for ovens, &c. Its peculiar property of standing a high temperature, and retaining the heat a long time, makes it valuable for such purposes. About 200 tons are used at San Francisco annually; part of it in the form of powder by soap-makers, chemists, boot-makers, and others. Twenty tons of this powder are sold annually at $3 per 100 pounds. The price of the stone, in blocks, is $4.80 per cubic foot, or $40 per ton. In slabs of one inch thick, 75 cents per superficial foot.

"Most of that used at San Francisco is brought from near Placerville, El Dorado county, where the company owning the factory have a claim containing 3,000 feet in length on a bed of this material 363 feet wide, and there are 'extensions' on the same 'lead' for miles on both sides of the original claim. Other quarries are worked to some extent – one near Sonora, Tuolumne county; another on Santa Catalina island, off the southern coast, near Santa Barbara; another on the south of the San José valley, near the city of San José, in Santa Clara county; another at Copperopolis, in Calaveras county, &c.

"The cost of transportation from Placerville amounts to $12 per ton for freight alone, divided as follows: For hauling by team from quarry to railroad, nine and a half miles, $6 per ton; by railroad to Sacramento, 40 miles, $4 per ton; to San Francisco by steamer, $2 per ton.

"The California steatite is superior to that obtained in the Atlantic States or Europe for many important purposes. It contains neither mica nor iron. The Golden City Chemical Works, an extensive establishment, uses steatite to line the retorts for distillation of nitric and sulphuric acids. When commencing operations this company imported steatite from New York, which, owing to its containing mica and iron, was soon destroyed by the fumes of the acids. Induced to try some of the California stone, it was found to last for a long time, the acids having but little effect on it.

"Don Abel Stearns states that when he came to California, in 1825, the common people cooked their food in vessels made of this stone, which is abundant in all southern counties, and almost as soft as wood. These 'crocks' were made of various sizes, usually about an inch thick on the sides and two inches on the bottom. Such vessels are occasionally found by the surface miners in various parts of the State. Parcels of California steatite have been exported to China, where it is used for various purposes.

"The furnaces at the copper-smelting works at Aubrey City, Arizona, are lined with steatite taken from Santa Catalina island."