poultry grit, filler in paper, and mineral feed for animals. The increased tonnages of road material quarried from sandstone and miscellaneous stone deposits offset to some extent the lower quantity of granitic rock produced for the same use. Marble quarry operators experienced a year of high demand for blocks and slabs for interior use and crushed marble for roofing, terrazzo, and exposed aggregate in precast panels. Dimension granite quarried for architectural stone and industrial purposes increased by nearly 10,000 cubic feet compared with 1959. Output gains also were noted in the volume of dimension limestone prepared for building, and of limestone and slate for flagging. The tonnage of natural and artificially colored roofing granules prepared from crushed stone and gravel during the year rose from 328,000 tons in 1959 to about 404,000 tons.

TABLE 15.—Stone sold or used by producers, by kinds

[Thousand short tons and thousand dollars]

Year	Granite		Basalt and related rocks (traprock)		Limestone [1]	
	Quantity	Value	Quantity	Value	Quantity	Value
1956	3,899	$5,155	1,967	$2,339	14,115	$22,118
1957	12,744	10,565	1,953	2,432	14,102	22,512
1958	3,649	5,348	1,499	1,738	14,409	22,584
1959	4,343	5,433	1,772	2,728	16,137	24,384
1960	4,208	5,409	1,941	2,748	15,054	23,311

Year	Sandstone		Other stone [2]		Total	
	Quantity	Value	Quantity	Value	Quantity	Value
1956	2,918	$4,834	9,684	$11,662	32,583	$46,108
1957	4,222	6,680	8,330	11,402	41,351	53,591
1958	3,933	5,688	8,933	12,987	32,423	48,345
1959	2,758	4,506	7,124	12,039	32,134	49,090
1960	3,541	5,626	8,331	12,748	33,075	49,842

[1] Includes limestone and oystershell used in cement and lime as follows (in thousand short tons and thousand dollars): 1956, 12,260 tons, $17,355; 1957, 11,861 tons, $16,439; 1958, 12,352 tons, $16,422; 1959, 13,663 tons, $16,623; 1960, 12,605 tons, $16,645.

[2] Includes light-colored volcanics, schist, serpentine, river boulders, and such other stone as cannot properly be classed in any main group; also marble (1956–60) and slate (1958–60).

Sulfur.—Recovery of elemental sulfur as a byproduct of oil refining increased 7 percent over 1959. Total production from all major California refineries reached 88,936 long tons. The Modified Claus or Simon-Carves method generally was used for elemental sulfur recovery at refineries concerned, most of which were in the Los Angeles area. Refineries producing hydrogen sulfide reported a 16 percent increase in output. Recovery from stack exhaust gases at the Selby smelter in Contra Costa County was 31 percent greater than in 1959.

Production and shipments of sulfur ore increased 15 and 19 percent, respectively, compared with 1959. A high percentage of the total output was mined at the Leviathan sulfur deposit, Alpine County, by The Anaconda Company. Four other mines, New Elgin, Colusa County; Crater Sulphur, Inyo County; and the S Bar S and Sulphur Bank, Lake County, yielded sulfur ores used to treat soils. Output

from the Leviathan mine was consumed in the producer's sulfuric acid plant in Nevada.

Talc, Soapstone, and Pyrophyllite.—Production and shipments of these minerals dropped 10 and 12 percent, respectively, below 1959 figures, and direct sales to consumers declined 7 percent. Approximately 87 percent of the combined outputs were mined from deposits in Inyo and San Bernardino Counties. These two counties were the source of all the talc produced. The soapstone production came principally from one deposit each in Amador, El Dorado, and Los Angeles Counties. Pyrophyllite was shipped mainly from one property each in Mono and San Bernardino Counties, and three in San Diego County. The ceramic industry consumed 50 percent of the total shipments. In descending order of quantity consumed, insecticides, paint, paper, rubber, toilet preparations, rice polishing, asphalt, and textiles used the remainder. Only talc was reported to have been exported.

Vermiculite.—California Zonolite Co. exfoliated crude vermiculite received from company mines in Montana at plants in Sacramento and Los Angeles Counties. In Orange County, Lahabralite Co. exfoliated crude vermiculite imported from Africa. The plant products were used principally for thermal and acoustical insulation, and as lightweight aggregate in plaster and concrete; however, some of the plant output was sold for use by nurseries for rooting cuttings and tubers, sprouting seedlings, and as a soil conditioner. The quantity of vermiculite exfoliated was virtually unchanged from 1959, but unit values rose appreciably owing to increased sales for specialized uses.

Water.—Pacific Gas and Electric Co. constructed and placed in service the first geothermal-electric power generating station in North America. The Geysers Tower Plant, Sonoma County, had a capacity of 12,500 kilowatts. Source of its power is natural steam recovered through a series of wells that provide the plant with 348° F. steam at the rate of 265,000 pounds an hour. Adequate steam has been developed to permit constructing a second plant of similar capacity.

Possible sources of geothermal power for generating electricity were investigated by the Magma Power Co. at Casa Diablo Hot Springs, Mono County, northwest of Bishop, and in the Sulphur Bank area, Lake County. A geothermal area in Napa County was explored by the Calistoga Power Co.

Westinghouse Electric Corp. was awarded the contract for constructing a 1 million gallon-per-day sea water conversion demonstration plant at Point Loma, San Diego County. The plant represented a cooperative effort of the Office of Saline Water, U.S. Department of the Interior, and the State of California Department of Water Resources, and was expected to produce fresh water for about $1 per thousand gallons. It will use a multistage flash distillation process incorporating several features designed to permit flexibility for testing and for further improvements in economy.

The Southern California Edison Co. completed an experimental seawater conversion plant near Oxnard, Ventura County. The pilot plant consisted of a 26-stage flash evaporation unit that used nearly spent steam from the generating station turbines. It will supply technical and cost data for use in designing larger scale commercial units.

Crude salt was harvested from several thousand acres of ponds by solar evaporation, and washed and refined at four plants in the county. Leslie Salt Co. operated two plants at Newark, and one at Mt. Eden, and sold crude salt to another Newark refinery. Oliver Bros. Salt Co. also operated a plant at Mt. Eden. Salt-works bitterns from the Newark plants were piped to the nearby chemical plant of Mineral Products Division, Food Machinery Corp., and processed to yield magnesia, synthetic gypsum, and byproduct ethylene dibromide. Dolomite from the company quarry in San Benito County was burned and used to precipitate the magnesium hydroxide. Fibreboard Paper Products Corp. in Emeryville used purchased magnesium hydroxide for manufacturing insulation. The company also calcined crude gypsum from Nevada at Newark for use in wallboard and other gypsum products. At Berkeley, Philadelphia Quartz Co. used purchased magnesite and brucite in producing hydrous magnesium sulfate.

Judson Steel Corp. in Emeryville and Pacific States Steel Corp. in Union City operated open-hearth furnaces, using iron and steel scrap as the source of metal. The latter company's planned completion of a blast furnace was delayed until mid-1962, but new fabricating facilities were completed in July. Brush Beryllium Co. placed its new fabrication plant in operation at Hayward, using eastern beryllium metal to produce machined components for atmospheric and space vehicles and nuclear applications.

Custom grinding plants (nonmetallic minerals) were operated in Berkeley by Industrial Minerals & Chemical Co. and Yuba Milling Co., Division of Metals Disintegrating Co., Inc. The Chemical & Pigment Co. ground purchased metallic and nonmetallic minerals in Oakland. In Emeryville, C. K. Williams Co. produced synthetic and natural iron oxide pigments. Raw materials for the natural pigments were obtained from out-of-State sources.

Alpine.—A high percentage of the sulfur ore produced in California during 1960 was obtained from the Leviathan mine near Markleeville by The Anaconda Co. The crude ore was trucked to the producer's copper-leaching plant in Nevada and was used in making sulfuric acid. Virtually the entire sand and gravel and decomposed granite output was used by contractors for the U.S. Forest Service on agency roads or in constructing new sections of State Highway 89 near Picketts.

Claude B. Lovestedt worked the Zaca mine, 6 miles southeast of Markleeville, near Highway 89. The silver ore was shipped to the Selby smelter, Contra Costa County, for recovery of silver, gold, and lead. Some recoverable zinc was contained in the ore. About 485 feet of tunnel was rehabilitated during the year, yielding 100 tons of development work.

Amador.—Sand produced near Ione by Owens-Illinois and Ione Clay & Sand Co. was used in glass, firebrick, and flue lining. Paving sand and gravel was produced by crews of the Amador County Road Department and by a contractor for the State on Highway 88. Harbison-Walker Refractories Co. worked the Custer quarry south of Ione for quartzite used in silica brick. More than 1,000 tons of dimension building stone and roofing granules was produced by Sierra