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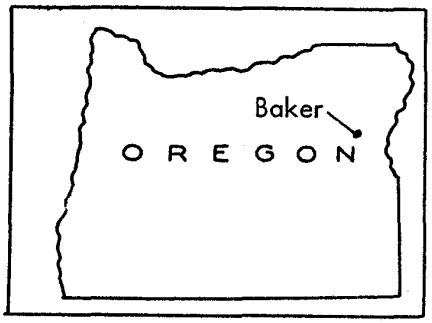
THE CHEMICAL LIME COMPANY OPERATION AT BAKER, OREGON

By
R. G. Vervaeke*

A new industry for eastern Oregon began producing in October 1957. This industry is the lime plant of the Chemical Lime Company at Baker, Oregon. The operation is owned by Mr. Anthony Brandenthaler and Mr. Thomas W. Dant, prominent Oregon lumbermen. Mr. Robert G. Vervaeke, General Manager, is responsible for the basic design and development of the flow sheet at the quarry and the plant. Engineering details were handled by Stoyanov and Johnson of Portland, Oregon. General Superintendent is Mr. Walter Taschek and the chemist is Mr. Raymond Fenn. Exclusive sales agent for the finished product is the Great Western Chemical Company of Seattle and Portland.



Lime is the second oldest material known to man, preceded only by burnt clay or brick. Evidence of lime's lasting quality as a building material is found in the pyramids of Egypt where it was used as the cementing material for the limestone blocks. Today there are some 7,000 uses for lime and it is a primary base for the chemical industry. Lime from the Baker plant will be used in the manufacture of acetylene gas, in the steel industry, nickel smelting, paper industry, water treatment, adhesives, insecticides, and building material.

The new plant which is of 75,000-ton yearly capacity is located at Wing Siding on the Union Pacific Railroad 5 miles north of Baker. Limestone for the plant is obtained from a quarry located 10 miles east of the plant at an elevation of 5400 feet on Marble Creek in the Blue Mountains. The plant's first $7\frac{1}{2}$ by 150-foot Vulcan rotary kiln is now in operation and the installation of a second similar kiln alongside the first will be completed some time in January of 1958. The output from the plant includes chemical grade lime, pulverized quicklime, regular and superfine hydrate, and various other lesser products.

Outcroppings and extensive exploratory diamond drilling of the company's limestone deposit has indicated a proved reserve of 3 million tons of excellent quality high-calcium stone with an additional 3 million tons indicated in the same area. A second limestone deposit of equal quality is located $1\frac{1}{2}$ miles east of the deposit being mined. The quarry face, which will eventually reach a height of 260 feet, is being developed on 20-foot benches with Worthington wagon drills and millisecond-delay blasting procedures. As the deposit consists largely of outcroppings, very little stripping is required.

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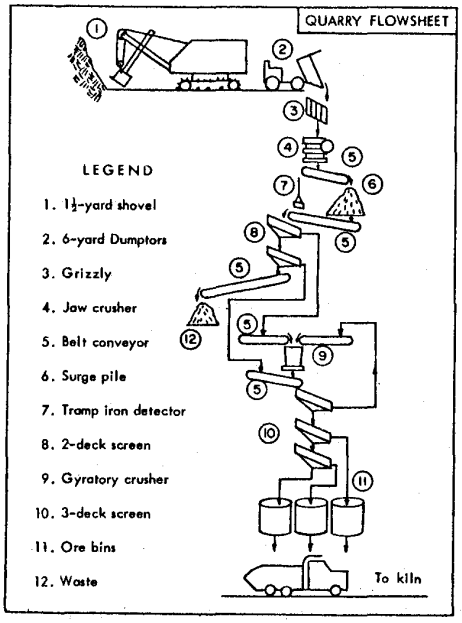
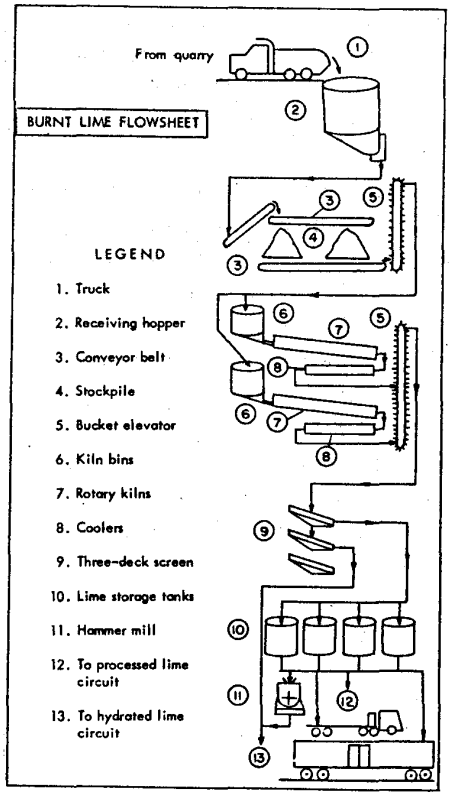
*General Manager, Chemical Lime Company.

After blasting, the stone is loaded by a Bucyrus Eyrie 1½-cubic yard shovel into Koehring Dumptors which haul an average of 350 feet to a hopper located on the mountainside. A Lippmann 42-inch by 15-foot apron feeder beneath the hopper passes the stone over a grizzly to a Pioneer 30 by 42-inch jaw crusher powered by a Westinghouse 150-hp V-Belt drive motor. The primary crusher is set to break everything down to minus 5 inches, a 30-inch by 70-foot belt conveyor building up a 2,000-ton surge pile. Recovery from a pioneer apron feeder located in the tunnel beneath the surge pile feeds a 30-inch by 70-foot belt conveyor which carries the stone to the screen house and secondary crusher.



First pass of the stone is over a Tyrock 5 by 10-foot double-deck screen, the top deck scalping off plus 3-inch oversize which goes to a Traylor 3-foot TY reduction crusher. This crusher is closed circuited with the sizing screen, an El-Jay 4 by 10-foot triple-deck unit. The finished product is conveyed by 3 belt conveyors for storage in three 360-ton steel truck loading bins; the kiln feed is being produced in two sizes -- minus 1½ plus 3/4-inch, and minus 3/4 plus 3/8-inch stone. The minus 3/8-inch limestone will be sold commercially either as produced or subject to further processing as required by the demand of the market.

Delivery to the plant at Wing Siding is by contract haul using International truck trailers carrying 26 tons per trip. David Galle and Jack Brach have the contract for the haul. The quarrying and crushing plant operate on an 8-hour shift while the trucks run on two shifts. Winters are severe so the quarry will shut down three months in mid-winter. A 30,000-ton capacity stockpile of stone will be established at the plant in order to permit year-around operation. The stockpile is built up by the trucks dumping their loads into a 40-ton live-bottom receiving hopper which feeds a 24-inch by 250-foot conveyor inclined upward to the 42-foot high by 700-foot long trestle. At the top of the trestle, transfer is made to an 18-inch by 700-foot horizontal conveyor. A Rex tripper discharges the stone as desired at any point along the 700-foot span. The kiln stone sizes are separated for uniformity in burning, one kiln utilizing the 1½-inch feed and the other the 3/4-inch in accordance with accepted calcining practice. The stone is piled as received to effect a rough blend, the 700-foot reclaim tunnel being equipped with 16 draw points for loading out onto the 18-inch by 800-foot belt operating in the tunnel and carrying to a 50-foot bucket elevator. This elevator, in turn, supplies the two 50-ton kiln feed bins.



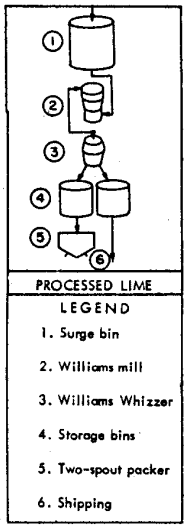
Feed to the kiln is regulated to close limits by a Syntron vibratory feeder and the kiln is fired by Coen combination gas and oil burners. Natural gas became available in the past year in the Baker area and oil firing is expected to be resorted to only in the winter

months. Each kiln is turned by a 40-hp motor, one of the drives being a Louis Allis motor transmitting power through a Western gear reducer; the other is a U. S. Motors Vari-Drive unit, believed to be the first adaptation of this variable-speed combination to kiln-drive service. In the event of public utility power failure, a 75-kva gasoline engine generator can supply standby power to the kiln directly through the drive motors.

The kilns are lined with Gladding-McBean Company refractories. Diablo Brand brick is used in the intermediate zone of the kiln, J-M 70-percent alumina brick in the hot zone, and Columbia brick in the preheat zone. Products from combustion from the kiln go through the dust chamber to four American blower dust collectors of the cyclone type and then to American blower induced-draft fans.

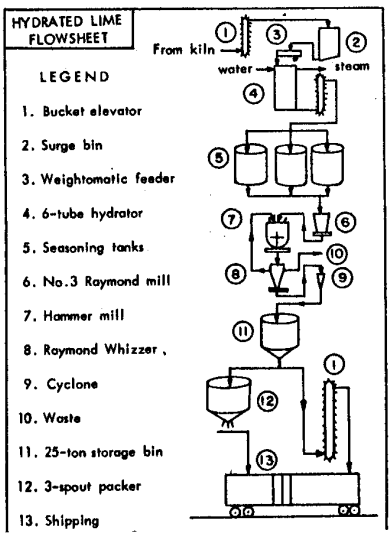
The kiln control panel is located inside a pressurized cubicle and instrumentation largely provided by Honeywell is quite complete. The panel mounts ammeters indicating current draw on the kiln and fan motors, gauges measuring and regulating draft within the dust chamber and at the fans themselves, automatic oxygen analyzers, optical pyrometers, and recording and control devices which measure exit and discharge end gas temperatures.

After cooling to 300° F. or less in a 7- by 60-foot rotary cooler, the lime is conveyed and elevated to an El-Jay screen for sizing over 3/4- and 3/8-inch mesh decks. A third deck is in reserve for any special requirement of customers. The pebble lime is stored in six 70-ton steel bins, the transfer to the elevator and from the screen being made by Link-Belt Coil-Mount natural-frequency conveyors. Lime may be withdrawn from any of the bins for loading into railroad cars or trucks or may be elevated to a 50-ton surge bin ahead of a Williams suspended four-roller mill equipped with air separation for pulverizing. Pulverized quicklime goes to a cyclone and thence to a 20-ton bin which feeds a St. Regis two-spout packer, or to a screw conveyor and elevator for bulk loading into cars.



Base for hydrate may be drawn from any of the four storage bins and is elevated by a screw conveyor to the hydrate feed bin. The feed bin is equipped with high- and low-level Bindicators which automatically control the operation of the elevator and screw conveyors. Lime to be hydrated may be transferred directly or, depending on size, may first be ground in a Sturtevant swing-hammer mill. Hydrate is prepared continuously in a 6-tube Kritzer hydrator which is fed from the 15-ton surge bin by a Hardinge constant-weight feeder.

The finished hydrate is elevated to the top of the building and can either go to a surge bin ahead of a No.3 mill or to 60-ton seasoning tanks prior to milling. The mill is equipped with a double whizzer that has integral air separation. Prior to bagging or bulk loading, the hydrate is stored in 20-ton bins. Bagging is done on a three-spout St. Regis Packer or the Hydrate can go into railroad cars or bulk storage.



Since the water table at the plant site is only 4 feet below the surface all structures are on floating foundations except for the kiln supports. For the same reason, the 700-foot reclaiming tunnel beneath the stone-storage pile is above ground. A double-spur track parallels the mill building and provides ample car capacity and loading facilities. Conveyors are made of Rex rollers and idlers and Goodyear belting. Future plans call for the installations of carbon dioxide recovery equipment.

A large service building has a completely equipped laboratory, change room, shop, store room and mill office. The new plant provides the State of Oregon with commercial lime production for the first time in more than a decade.

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AND NOW URANIUM

Mr. Jesse C. Johnson, Raw Materials Director for the Atomic Energy Commission, recently announced that the United States has arrived at the point "where it is no longer in the interest of the Government to expand (domestic) production of uranium concentrate." Johnson continued by saying that an "intensive" world-wide search for new uranium supplies must continue and a plea was made for continuation of domestic uranium exploration. How domestic miners can continue exploration and not be able to market their product, which can only be sold to the AEC, was not explained.

Uranium miners should take warning from the present predicament of their fellow strategic miners who opened up properties in response to urgent demands from Government when emergency supplies were essential. These miners and processors of copper, cobalt, lead, zinc, mercury, chrome, tungsten, antimony, aluminum, columbium and tantalum are now suffering a recession, see the end in sight, or are shut down altogether.

In almost every instance the pattern which has caused the plight of the domestic miner has been the same - solicitation by the Government for expanded production (by loans, incentive price, bonus, and price guarantees); procurement by the Government of world production (through price increase and barter) until it became so large as to inhibit absorption of total supplies; and finally stopping purchases, curtailing or eliminating loans, incentive prices and the like. The result has been excess of world production over world consumption, forcing the domestic miners into the untenable position of being unable to compete with foreign production because of much higher costs in this country.

Uranium miners have received loans and incentive prices and have been assured of a market for their product. Now it develops that Government participation in exploration loans is being reduced and a ceiling is to be placed on production. At the same time foreign production is being encouraged. The pattern appears to be the same as that followed by the Government on other strategic minerals, and the uranium miners should now expect that they will get the same treatment from Government as other metal producers.

The Government's vacillating policy of first encouraging and then discouraging mineral production is putting a blight on western mining. Requests to obtain a consistent long-range minerals policy which would strengthen the industry have been met with a hodgepodge of shortsighted plans on each individual metal. The net result has been to gradually discourage western mining and prospecting. If this is not corrected, most of the nonferrous mines in the West will be forced into closing.

H.M.D.

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STATE WATER RESOURCES BOARD SETS HEARINGS

The State Water Resources Board has announced a series of hearings to assist the Board in formulation of an "integrated, coordinated program for the use and control of the water" in the McKenzie and Rogue River basins. Hearings on the upper portion of the McKenzie River Basin will be in Springfield, December 2; on the Rogue River Basin in Medford, December 11; and in Gold Beach, December 13. The Board announces that any person, including public agencies and civic associations, desiring to be heard may present his views at that time. Mining is included among the beneficial uses of the water.

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LAKEVIEW URANIUM MILL APPROVED BY AEC

A new industry for Oregon was created on November 18 when the State's first uranium mill was assured by the Atomic Energy Commission in a contract signed with the Lakeview Mining Company of Lakeview, Oregon, for the sale of uranium concentrates (U_3O_8). The contract allows the Lakeview Company to proceed at once with plans for construction of a processing mill having a capacity of about 210 tons of uranium ore per day.

Dr. Garth Thornburg, president of the Company, told the Lakeview Examiner that the first step would be to retain an engineering firm to handle the engineering and designing of the mill. The Company hopes to negotiate for a construction contract in April with completion in 12 months. The mill will cost approximately $2,600,000 and will be located at the northern outskirts of Lakeview. It is estimated that about 60 men will be employed to operate it.

The new mill will process uranium ores from the Lakeview Mining Company's properties, the White King and Lucky Lass claims, on Augur Creek about 14 miles northwest of Lakeview. The Company will also purchase amenable ores from independent producers in the area including northern California and Nevada.

At the present time the Lakeview Mining Company is conducting an exploration and development program at the White King mine where 40 men are employed. About 1800 feet of underground development has been done and this work will soon be accelerated. Exploratory drilling, on latest report, totals 86,000 feet in 265 holes, and the follow-up underground development work is verifying the indications gained through the drilling program. A large Mayhew rotary core drill is now in operation.

The uranium deposits in the Lakeview area have been under study by the Department ever since discovery of the ore in 1955, and progress reports describing the geology and mineralogy of the Lakeview deposits, as well as other uranium deposits in the State, were published in the December 1955 and December 1956 issues of The Ore.-Bin.

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GAMMA-RAY LOGGING UNIT ACQUIRED BY DEPARTMENT

The State of Oregon Department of Geology and Mineral Industries now has available for use within the State a gamma-ray logging unit. This instrument is on loan from the Atomic Energy Commission, Division of Raw Materials, and will be used for logging drill holes for indications of radioactivity. The equipment consists of a Universal Counters Geiger counter, a probe containing a gamma-sensitive 900-volt 1B85 Geiger tube, and a stand and reel assembly for lowering the tube slowly down the hole.

The Department expects to check holes drilled for water wells and other drill holes where there is a possibility of discovering radioactive ores. Any person interested in having a drill hole logged should contact the Department, 1069 State Office Building, Portland 1, Oregon, for further information.

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MINING NEWS

The Circle Star Mining Company, a partnership of Loren Stanciu, Roy Pickler, Clyde Smart, and Dave Aeder, P.O. Box 1055, Haines, Oregon, has leased the Chloride Mine in the Rock Creek District of Baker County. A 35-ton flotation mill has been erected. The ore is reported to contain values in gold, silver, lead, zinc, and copper.

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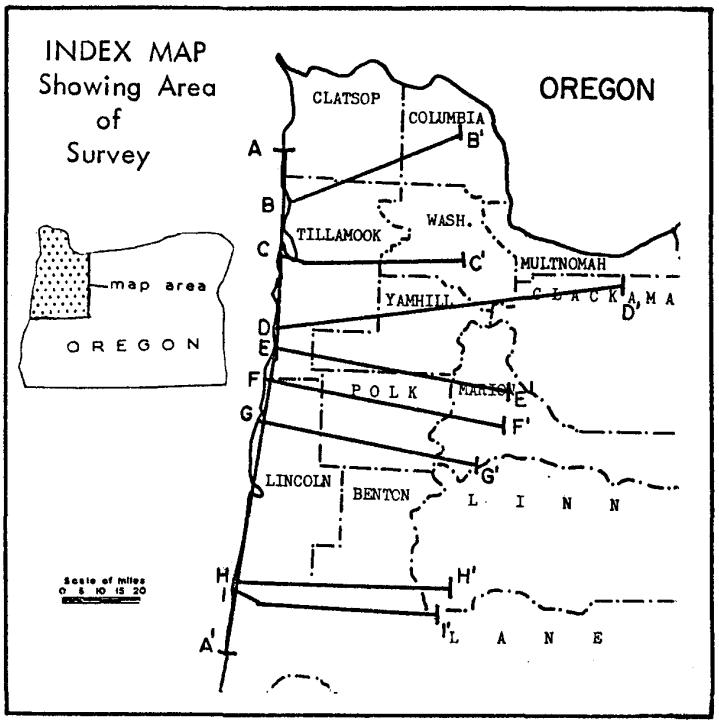
AEROMAGNETIC PROFILES OF WESTERN OREGON AVAILABLE

The U.S. Geological Survey has just released nine aeromagnetic profiles of Western Oregon by R. W. Bromery. The nine profiles cover one north-south section along the coast from Florence to Seaside and eight east-west sections from the coast to the Cascade foothills (see index map).



The magnetic profiles were made from a total intensity aeromagnetic survey. Measurements were made by a continuously recording AN/ASQ-3A airborne magnetometer mounted in a Douglas DC-3 airplane. The pilot used sectional aeronautical charts for navigation, and the flight path of the aircraft was simultaneously checked by an observer using a vertical sighting device. The distance from the plane to the ground was measured with a continually recording radio altimeter.

The profiles, released without correction for regional gradient or editorial or technical review, are on file at the State of Oregon Department of Geology and Mineral Industries, 1069 State Office Bldg., Portland 1, Oregon, and they may be examined here. Copies are on file for inspection also at the Geological Survey Libraries, Federal Center, Denver, Colorado, and at the Survey offices at 4 Homewood Place, Menlo Park, California; 1031 Bartlett Building, Los Angeles, California; and 724 Appraisers Building, San Francisco, Calif.

Information on how to purchase copies of the aeromagnetic profiles may be obtained from this Department or from the Survey at Menlo Park, California.

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NEW DRILLING PERMITS

Permit No. 29 was issued to the Miriam Oil Company, McMinnville, Oregon, on October 29, 1957. This is to be a shallow test hole. The site is located 1089 feet north and 270 feet west from the SE corner sec. 10, T. 8 S., R. 5 W., Polk County. Ground elevation is approximately 280 feet above sea level. The lessors are Walter and Arthur Bliven, Dallas, Oregon. This test is to be called the Bliven No. 3.

Permit No. 30 was issued to the Sunnyvale Oil Company the last of this month. The tentative location of the drilling site is approximately 600 feet N. and 660 feet W. from the SE$\frac{1}{4}$ sec. 14, T. 16 S., R. 29 E., Grant County. Ground elevation is about 5000 feet above sea level. This is a Federal lease. The test is to be called the Mitchell No. 1. Headquarters of Sunnyvale Oil Company are at 520 South Murphy Avenue, Sunnyvale, California. Company officers are Mitchell Pusateri, president, and Burr Matthews, secretary.

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DMEA REDUCES PARTICIPATION

The Defense Minerals Exploration Administration has recently announced a reduction in the Government's portion of allowable costs of exploration for certain commodities. The lowered participation percentages become effective on October 22, 1957, and will apply to all applications filed on or after that date. The following mineral commodities have been changed from 75 percent to 50 percent Government participation: asbestos (chrysotile only), columbium, corundum, diamonds (industrial), kyanite (strategic), mercury, monazite and rare earths, platinum group metals, quartz crystals (piezo-electric), tantalum, thorium, tin, tungsten, and uranium.

Other commodities which are eligible for 50 percent Government participation are: bauxite, cadmium, chromium, copper, fluorspar, graphite (crucible flake), lead, molybdenum, and zinc.

Under the DMEA order, the following commodities remain eligible for 75 percent Government participation: antimony, beryl, cobalt, manganese, mica (strategic), nickel, rutile-brookite, selenium, and talc (block steatite).

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TITANIUM PUBLICATION AVAILABLE

The U.S. Bureau of Mines has recently published "Titanium, a materials survey," by Jesse A. Miller. The report centers on the increasing importance of titanium in the United States due to the rapid upward trend in output and use of the metal. The 202-page illustrated publication covers all phases of the titanium picture. It discusses mineralogy and geology of titanium deposits, sources, uses, methods of mining and beneficiation, metallurgy, marketing, research and development, and government policies. There is a short discussion of the occurrence of titaniferous minerals in Oregon in beach sands and bauxite deposits, and a brief summary of the electrometallurgical work at the Bureau of Mines laboratory in Albany, Oregon.

The report is designated as Bureau of Mines Information Circular 7791. It may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D.C., for $1.00.

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JOSEPH ROBERT McCUSKER

Notice has just been received of the death on November 25, 1957, of Mr. Joseph Robert McCusker.

Mr. McCusker was born November 16, 1900, in San Francisco, California, but lived most of the past 50 years in Portland, where he was for a time in the oil well supply business through ownership and operation of the United Supply Company. For many years his primary interest has centered in the search for petroleum and natural gas in the Pacific Northwest, and it is probably safe to say that he was the country's best informed authority on the history of oil and gas prospecting in this area. He owned and operated the Northwest Scouting Service, a firm whose purpose is the gathering and dissemination of information on all phases of local petroleum prospecting. The bi-monthly bulletins issued in connection with this service go by subscription to leading oil and gas companies in all parts of the United States. A file of these bulletins merits an important place among documents of Pacific Northwest history.

Joseph McCusker will be missed by many as a loyal friend, and by the petroleum industry as a man dedicated to the objective of developing commercial oil and gas production in the Pacific Northwest.

R.E.S.

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WORLD PRODUCTION OF CHROMITE,* BY COUNTRIES 1/
1947-51 (average) and 1952-56, in short tons 2/

(Compiled by Pearl J. Thompson)

Country 1/	1947-51 (average)	1952	1953	1954	1955	1956
North America:						
Canada	848	-	-	-	-	-
Cuba	114,218	68,132	77,205	80,011	85,107	3/59,248
Guatemala	592	116	441	146	320	4/650
United States	2,492	21,304	58,817	163,365	153,253	5/207,662
Total	118,150	89,552	136,463	243,522	238,680	267,560
South America: Brazil	1,603	2,920	3,942	2,108	4,546	4/4,000
Europe:						
Albania 4/	34,000	57,000	61,000	107,000	135,000	147,000
Greece	10,104	35,452	40,520	29,508	27,902	52,900
Portugal	122	119	6	23	-	-
U.S.S.R. 4 6/	560,000	600,000	600,000	600,000	600,000	600,000
Yugoslavia	101,823	118,192	139,950	137,216	139,119	130,913
Total 1 4/	715,000	800,000	900,000	900,000	900,000	1,000,000
Asia:						
Afghanistan	7/597	-	-	-	-	-
Cyprus (exports)	12,820	14,867	9,115	10,080	9,599	6,526
India	24,666	8/40,530	72,543	50,968	100,071	59,009
Iran 9/	1,946	22,046	23,657	23,406	38,504	29,700
Japan	24,903	51,975	41,418	36,138	29,269	43,984
Pakistan	20,711	19,518	26,255	24,487	31,808	25,487
Philippines	283,043	599,121	614,086	442,230	655,882	781,598
Turkey	426,780	889,466	1,005,883	619,001	710,253	783,697
Total 6/	795,466	1,637,523	1,792,957	1,206,310	1,575,386	1,730,001
Africa:						
Egypt	120	-	231	584	926	281
Sierra Leone	15,593	26,312	27,277	21,011	23,231	3/21,027
Rhodesia and Nyasaland, Federation of:						
Southern Rhodesia	269,217	355,679	463,028	442,506	449,202	448,965
Union of South Africa	491,973	639,366	798,562	706,935	597,368	690,851
Total	776,903	1,021,357	1,289,098	1,171,036	1,070,727	1,161,124
Oceania:						
Australia	775	1,565	3,070	5,536	-	6,828
New Caledonia	85,571	118,728	134,032	93,645	50,790	53,932
Total	86,346	120,293	137,102	99,181	50,790	60,760
World total (estimate) 1/	2,500,000	3,700,000	4,300,000	3,600,000	3,800,000	4,200,000

1/ In addition to countries listed, Bulgaria and Rumania produce chromite, but data on output are not available; estimates by senior author of chapter which will appear in Minerals Yearbook, 1956, included in total.
2/ This table incorporates a number of revisions of data published in previous chromite chapters. Data do not add to totals shown due to rounding where estimated figures are included in the detail.
3/ Exports.
4/ Estimate.
5/ Includes 45,710 short tons of concentrates produced in 1955-56 from low-grade ores and concentrates stockpiled near Coquille, Oregon during World War II.
6/ Output from U.S.S.R. in Asia included with U.S.S.R. in Europe.
7/ Average for 1949-51.
8/ Does not include 21,603 tons of low-grade ore accumulated from production from 1943 through 1948.
9/ Year ended March 20 of year following that stated.

* Prepared in the Division of Foreign Activities, Bureau of Mines, for publication in Minerals Yearbook, 1956. From U.S. Bureau of Mines Mineral Trade Notes, v. 45, no. 1, p. 10.

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