Gem Stones

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GENERAL

DOMESTIC PRODUCTION

THE United States continues to be an unimportant factor in world gem production. Although a wide variety of gems is produced in small amount, gem mining probably will continue to be a minor mining industry.

There are no large gem-mining companies in the United States. A few small companies have been organized from time to time to work certain deposits, such as jade, turquoise, sapphire, and tourmaline. Some professional lapidary shops employ a few miners. Most gemstone production results from the efforts of thousands of amateur lapidaries ("rockhounds"), who spend their vacations and week ends searching for materials suitable for cutting and polishing. Chief objects of their search are such varieties of quartz as agate, jasper, and petrified wood. Much of what they collect is sold or exchanged to mineral dealers, local jewelers, or roadside curio shops, particularly in the Southwestern, Western, and Northwestern States. The hobby of lapidary work and gem and mineral collecting has grown phenomenally in the past 15 years. No reliable figures are available as to the number of persons engaged in this hobby, but the best estimates range from at least 200,000 to a million or more.

Since only a small percentage is mined by companies on a commercial scale, no statistics have been compiled as to the value of the domestic output of gem stones. In the rough, it may approximate $400,000 to $500,000.

The many forms of quartz, chiefly the cryptocrystalline varieties, led the field, with kunzite (pink spodumene) second, jade third, and turquoise fourth. Of the producing States, California, Texas, Oregon, Washington, and Wyoming were the leaders.

Agate.—Agate production, including all other varieties of chalcedony, continues to increase as interest grows in the lapidary hobby.

Greatest production in 1950 appears to have been from the Alpine-Big Bend area, Texas, where agates were recovered having a value variously estimated at $10,000 to $50,000.

Another relatively large producing area was Deming, N. Mex., with an estimated production of 30 tons, of which not more than 3 tons was of good quality.

Large quantities of agate were also found in California, Oregon, and Washington, with smaller amounts in Arizona, Montana, and Wyoming. Small quantities of various varieties of chalcedonic quartz, such as petrified wood and jasper, were collected in almost every other State.

[1] Smithsonian Institution; consulting mineralogist to Bureau of Mines.

Kunzite.—Kunzite, the pink gem variety of spodumene, figured in the gem-production picture owing to the discovery of a pocket containing 280 pounds of rough kunzite crystals in the San Pedro mine, Pala district, San Diego County, Calif. This is the first discovery of a large quantity of this gem in many years. The value of the find was estimated at $20,000 to $30,000. The largest crystal fragment, containing a large proportion of gem material, weighed 5 pounds. The material is reported to be of good quality but rather pale.

Jade.—The Wyoming jade (nephrite) industry is reported to be decreasing rapidly. The deposits of good green jade are nearly exhausted, with a 1950 production of not over 200 pounds. Prices for good-quality green have increased to as high as $30 per pound. Black jade is still plentiful at $2.00 to $5.00 per pound. Approximately 1,500 pounds of the black variety were sold in 1950, but a market is hard to find. Some black jade has been used as a substitute for black onyx; but, because it is harder to saw and polish, lapidaries prefer the onyx.

In California about 700 pounds of nephrite jade, valued at $700, was produced at Porterville. Smaller amounts were picked up by collectors at other localities, chiefly in Monterey County.

The jadeite jade deposit discovered in San Benito County, Calif., in 1949 has been visited by many collectors but has not been exploited commercially because of its poor color. Other finds of jadeite have been reported in Mendocino County, but so far no good gem material has been reported.

No production of nephrite jade was reported for the year from the Kobuk area, northwestern Alaska.

Turquoise.—Turquoise production in the Southwest continues to diminish. No output was reported from the Cerrillos mine in New Mexico. Some turquoise was mined by the Nevada Turquoise Co. near Battle Mountain, Nev., and the open-pit Castle Dome (copper) mine near Miami, Ariz., produced a small amount of turquoise of good quality.

Other Gem Stones.—No diamonds were produced from the Arkansas diamond mines in 1950, although the newly organized American Diamond Mining Co. indicated the possibility of renewing operations there.

The South Dakota inspector of mines reports 68.5 tons of rose quartz produced in that State in 1950 for ornamental and monumental purposes. Scott's Rose Quartz Co., Custer, S. Dak., mined no gem rose quartz in 1950, but produced 7⅓ tons, valued at $506.50, for ornamental purposes.

A small quantity of rock-crystal quartz from Arkansas and about 500 pounds of asteriated quartz from the Springfield, N. H. area were sold for gem use.

Some quartz colored blue by chrysocolla was produced from various localities in the Southwest, especially at the Inspiration (copper) mine near Miami, Ariz.

No sapphires were produced at the Yogo Sapphire mine, Montana.

An estimated $5,000 worth of colorless to pale-blue topaz was produced in Mason County, Tex., mostly by local collectors for private collections.

A small amount of peridot from near Deming, N. Mex., was sold. This material is reported to be abundant but will only cut 4- to 8-point stones. Peridot in small quantity was also found on the San Carlos Indian Reservation and sold by the Indians in small lots.

Some pyrope garnet was produced near Fort Defiance, Ariz., and sold by the Indians.

CONSUMPTION AND USES

For the first 6 months of the year jewelry sales were slow. The general attitude among retailers was one of depression but not panicky concern, for the early months of every year are traditionally dull in the jewelry stores. Diamonds were particularly slow, principally in higher-valued pieces, because of the anticipated reduction of the jewelry excise tax from 20 percent to 10 percent. The outbreak of the Korean War, however, killed any possibility of a tax reduction and had a strong effect on the sale of diamonds, for there was now nothing to be gained by further postponement of purchases. Actually, consumers saw higher prices in the immediate future because of inflationary influences, higher wages among diamond cutters, and greater demand. These factors, plus an increase in the marriage rate, caused a strong diamond market during the last 6 months of the year.

As usual, the United States again in 1950 was the principal world market for diamonds. There was substantial purchasing of diamonds as investments in several troubled areas of the world and considerable evidence of such type of purchasing of fine-quality diamonds in America during 1950.

The jewelers' Christmas business was good. It gained over 1949 and sufficed to raise the year's volume for the jewelry industry to $1,140,000,000 compared with $1,055,000,000 in 1949, a gain of 8 percent.

Fashions in Jewels.—Fashions in gems showed relatively little basic change during 1950. Jewelry was light, flexible, and mobile. Designed on the theory that diamonds in motion look bigger than diamonds in repose, mountings were made to move loosely.

In mountings, curved lines were the most popular, but with fewer naturalistic flowers and abstract objects. In forms of diamond jewelry, the necklace remained the most important single piece. Earrings changed from the long pendant type to large button clusters on the lobe. Diamond wrist watches became increasingly popular.

The cluster, a large center stone surrounded by one or more rows of stones of matched sizes, was the outstanding motif in 1950, especially in diamonds. The cluster mountings might be marquise, square, oval, or round. Most popular usage of these clusters was in dinner rings.

Toward the end of the year the metal restrictions imposed or on the horizon made new designs uncertain. Gold was being used extensively owing to the shortage of platinum.

More fancy-cut diamonds were used than since the 1920's. Such shapes as pentagon, kite, trapeze, triangle, and half-moon were used extensively. The bulk of the diamond jewelry sold in America, however, is mounted with the standard brilliant, the emerald cut, and occasionally the marquise and baguette.

IMPORTS[2]

Imports of gem stones, exclusive of industrial diamonds, in 1950, as reported by the United States Department of Commerce, totaled $119,641,457, an increase of 42 percent over 1949.

TABLE I.—Precious and semiprecious stones (exclusive of industrial diamonds) imported for consumption in the United States, 1949–50

[U. S. Department of Commerce]

Commodity	1949		1950	
	Carats	Value	Carats	Value
Diamonds:				
Rough or uncut (suitable for cutting into gem stones), duty-free	[1] 633,731	[1] $28,246,634	819,083	$44,775,769
Cut but unset, suitable for jewelry, dutiable	335,487	41,427,718	492,671	58,524,902
Emeralds:				
Rough or uncut, duty-free	80,231	226,233	12,142	7,991
Cut but not set, dutiable	13,723	284,578	9,706	237,446
Pearls and parts, not strung or set, dutiable:				
Natural		532,310		410,970
Cultured or cultivated		1,733,698		3,192,334
Other precious and semiprecious stones:				
Rough or uncut, duty-free		208,124		324,089
Cut but not set, dutiable		2,045,476		2,429,992
Imitation, except opaque, dutiable:				
Not cut or faceted		36,090		19,088
Cut or faceted:				
Synthetic		680,428		811,372
Other		8,495,151		8,752,863
Imitation, opaque, including imitation pearls, dutiable		37,819		14,854
Marcasites, dutiable:				
Real		170,405		136,768
Imitation		7,802		3,019
Total		[1] 84,132,466		119,641,457

[1] Revised figure.

TECHNOLOGY

Additional experiments in the artificial coloration of diamonds in a cyclotron were carried out during the year.[3] Color changes noted were usually from pale brown to green, white to bluish green, and yellow to yellow green. Occasional changes from yellow to golden brown were observed. The induced color appears to be permanent but is only present as a surface skin. No permanent induced radioactivity was observed. Diamonds subjected to neutron bombardment in an atomic pile were said to have been quickly blackened after first passing through an intermediate green color.

Research on diamonds was carried out by the Diamond Research Laboratory of Johannesburg, Union of South Africa, sponsored and supported by the Industial Distributors (1946), Ltd.

[2] Figures on imports and exports compiled by M. B. Price and E. D. Page, of the Bureau of Mines, from records of the U. S. Department of Commerce.

[3] Gems and Gemology, Summer 1950, p. 295, and Spring 1951, p. 3.

DIAMONDS

The year 1950 was a record-breaking one in the diamond industry. Sales of diamonds effected through the Central Selling Organization on behalf of South African and other producers set a new record, as follows: Gem diamonds £38,357,698, industrial diamonds £12,609,343, total £50,967,041. The previous record was a total of £38,000,000 established in 1948. Whereas the quantity of diamonds sold in 1950 was approximately the same as the quantity sold in 1948, the proceeds realized in sterling in 1950 exceeded by nearly £13,000,000 (34 percent) the sterling proceeds in 1948. This increase was due to devaluation of the pound sterling in terms of the dollar in September 1949.

A new record was also set for world production of diamonds in 1950, with a total of 15,300,000 carats, compared with 14,175,000 carats in 1949.

Cutting.—The strong demand for gem diamonds in 1950 tended to alleviate somewhat the unemployment situation in the cutting centers. Both the Diamond Manufacturers Association and the World Federation of Diamond Workers passed resolutions at their annual conventions in Amsterdam urging uniform working conditions and hours throughout the industry.

Belgium continues to be the largest cutting center, followed by Germany, Netherlands, Israel, and the United States. Smaller cutting centers are well-established in South Africa, England, and Puerto Rico. Efforts to revive the Cuban diamond-cutting industry failed. In the United States there are about 300 diamond-cutting establishments, employing approximately 1,500 workers. High cutting costs in the United States, compared to other cutting centers, foreign currency manipulation, and other difficulties were only partly offset by greater efficiency and finer categories of cutting in the American industry.

Imports.—Imports of gem-grade diamonds into the United States amounted to $103,300,671 in 1950 compared to $69,674,352 in 1949, an increase of 48 percent. Percentagewise, rough or uncut stones showed the greatest increase in total value. Belgium furnished 50 percent (value) of the cut in 1950.

TABLE 2.—Diamonds (exclusive of industrial diamonds) imported for consumption in the United States, 1949–50, by countries

[U. S. Department of Commerce]

Country	Rough or uncut			Cut but unset		
	Carats	Value		Carats	Value	
		Total	Average		Total	Average
1949						
Argentina				3	$1,009	$336.33
Belgian Congo	3,100	$6,096	$1.97			
Belgium-Luxembourg				159,189	19,581,847	123.01
Brazil	[1] 12,315	[1] 411,799	[1] 33.44	4,679	615,265	131.49
British Guiana	241	6,464	26.82	30	3,011	100.37
Canada				38	5,303	139.55
Chile				13	3,990	306.92
China				4	700	175.00
Cuba				580	71,099	122.58

[1] Revised figure.

TABLE 2.—Diamonds (exclusive of industrial diamonds) imported for consumption in the United States, 1949–50, by countries—Continued

[U. S. Department of Commerce]

Country	Rough or uncut			Cut but unset		
	Carats	Value		Carats	Value	
		Total	Average		Total	Average
1949—Continued						
Czechoslovakia				44	$4,357	$99.02
Denmark				139	11,300	81.29
France				2,843	355,899	125.18
French Morocco				63	15,091	239.54
Germany				3,528	283,903	80.47
Gold Coast	6,947	$81,936	$11.79			
Hong Kong				75	41,172	548.96
Iran				996	82,039	82.37
Israel				70,485	5,402,074	76.64
Italy				27	134,933	4,997.52
Lebanon				103	13,829	134.26
Liberia	60	2,500	41.67			
Netherlands				24,789	3,202,227	129.18
Netherlands Antilles	11	3,534	321.27	15	3,689	245.93
Switzerland				14,465	1,932,944	133.63
Thailand				1,142	251,155	219.93
Union of South Africa	[1] 580,376	[1] 26,911,452	[1] 46.37	39,644	8,404,959	212.01
U. S. S. R.				8,663	539,412	62.27
United Kingdom	1,708	118,838	69.58	3,771	449,356	119.16
Venezuela	[1] 28,973	[1] 704,015	[1] 24.30	159	17,155	107.89
Total 1949	[1] 633,731	[1] 28,246,634	[1] 44.57	335,487	41,427,718	123.49
1950						
Argentina				109	11,847	108.69
Australia				12	6,500	541.67
Belgian Congo	400	11,059	27.65			
Belgium-Luxembourg	1,631	85,283	52.29	257,942	29,115,318	112.88
Brazil	43,043	955,922	22.21	2,125	190,562	89.68
British Guiana	821	25,078	30.55	1	148	148.00
British West Africa, n. e. s.	15,274	349,455	22.88			
Canada	1,415	6,413	4.53	657	98,343	149.68
China				90	12,738	141.53
Cuba				261	34,893	133.69
Denmark				104	7,118	68.44
France				4,497	517,574	115.09
French Equatorial Africa	215	14,009	65.16			
French Morocco				156	14,779	94.74
Germany	3	41	13.67	7,317	603,797	82.52
Hong Kong				321	64,126	199.77
Hungary				5	120	24.00
India				8	1,277	159.63
Iran				16	1,551	96.94
Israel	98	5,938	60.59	86,192	6,834,363	79.29
Italy				5	900	180.00
Kuwait				2	542	271.00
Lebanon				217	37,770	174.06
Netherlands	480	13,932	[1] 29.03	44,978	4,845,140	107.72
Philippines				30	8,500	283.33
Portuguese Asia				39	11,329	290.49
Southern-Southeastern Asia, n. e. s.				75	4,621	61.61
Switzerland				3,251	740,125	227.66
Thailand				418	81,596	195.21
Union of South Africa	703,520	41,956,932	59.64	74,476	14,313,316	192.19
U. S. S. R.				3,919	190,000	48.48
United Kingdom	9,349	380,338	40.68	5,448	776,009	142.44
Venezuela	42,834	971,369	22.68			
Total 1950	819,083	44,775,769	54.67	492,671	58,524,902	118.79

[1] Revised figure.

World Production.—Official figures on diamond production are not available for all countries, but the figures in the accompanying table are believed to be reasonably accurate, as they have been compiled from Government reports, information supplied by officials of producing companies, and other authoritative sources. World production (gems and industrials) is estimated to have been 15,300,000 metric carats, which compares with 14,175,000 (revised figure) carats for 1949, an increase of 8 percent.

Belgian Congo is the leading producer by weight, but only about 5 percent of the Belgian Congo production is of gem quality. South Africa, although producing much less by weight, leads in value owing to the high percentage of gem stones.

TABLE 3.—World production of diamonds, 1947–50, by countries, in metric carats

[Including Industrial Diamonds]

Country	1947	1948	1949	1950
Africa:				
Angola	799,210	795,509	769,981	538 867
Belgian Congo	5,474,469	5,824,567	9,649,896	10,147,471
French Equatorial Africa	107,076	[1] 118,300	[1] 122,928	111,460
French West Africa	53,749	77,970	94,996	126,346
Gold Coast	[2] 852,493	[3] 850,000	[1 2] 972,976	[3] 950,000
Sierra Leone	605,554	465,518	494,119	655,474
South-West Africa	179,554	200,691	280,134	488,422
Tanganyika	92,229	148,169	191,787	195,274
Union of South Africa:				
Lode	918,042	[3] 930,000	964,266	1,516,194
Alluvial	[4] 286,692	[3 4] 270,000	[4] 289,756	[4] 231,674
Total Union of South Africa	1,204,734	[3] 1,200,000	1,254,022	1,747,868
Brazil [3]	275,000	250,000	250,000	200,000
British Guiana	24,669	36,562	34,790	37,462
Venezuela	61,634	75,513	56,362	60,389
Other countries [3]	3,500	3,500	3,000	3,000
Grand total (round figures)	9,750,000	10,050,000	[1] 14,175,000	15,300,000

[1] Revised figure.
[2] Exports.
[3] Estimated.
[4] Includes an estimated 100,000 carats for State mines of Namaqualand.

Industrial Diamonds.—Details regarding imports, production, sales, and uses of industrial diamonds will be found in the Abrasive Materials chapter of this volume.

OTHER GEM STONES

The price of most gem stones other than diamonds continued to increase owing to short supply of newly mined stones of fine quality.

Again in 1950 Canada produced very little in the way of gem stones. A few tons each of sodalite, peristerite, and labradorite are produced each year, but the total value probably does not exceed a few hundred dollars.

Ceylon maintained its output of important quantities of a variety of gems, chiefly ruby, sapphire, chrysoberyl (including alexandrite), topaz, spinel, garnet, zircon, and tourmaline. The Ceylon gems come from the alluvial gravels of the Ratnapura district. The gem-mining industry is chiefly handled by villagers and minor concerns. Value of the annual production is believed to be about $500,000.

Emeralds were mined at the Chivor-Somondoco mines in Colombia. Production for 1949 was reported to be 91,656 carats. According to latest reports, the famous Muzo, Colombia, mines are still closed. Some good-quality emeralds were mined at Kaliguman, India, a small village in the Udaipur district, State of Rajasthan. South Africa and Brazil continued to produce a few emeralds.

Australian gem-sapphire production for 1948 had a reported value of £A 6,000.[4] In September 1948 a 1,958-carat (uncut weight) blue sapphire was discovered at Anakie, central Queensland.

Gem-stone production of Burma for 1949 was as follows: Ruby 100 carats, sapphire 2,500 carats, spinel 12,500 carats, jadeite 2,393 pounds, total value approximately $88,500.[5]

The Australian opal-mining industry continues at a low ebb. South Australia is now the largest producer, with the main fields lying in the Stuart Range north of Tarcoola. Only about 100 miners are now active, and the value of the annual production averages about $200,000.[6]

Madagascar gem-stone production for the first half of 1950, chiefly tourmaline, beryl, and garnet, was 9,004 grams.[7]

In Mozambique the pegmatites in the Alto Ligonho district produced some fine-quality rubellite, morganite, and aquamarine, some of which came into the United States.

The zircon mining and cutting industry of Thailand, which experienced a sudden boom immediately after World War II, is now in a depressed condition. Bangkok cutters predict that, if the present export volume is not increased soon, it may be impossible to keep the industry alive. The zircons are mined in the Provinces of Chantaburi and Ubonrajathani, in southeast Thailand along the Thai-Indochina border.

Brazil continued to produce a large caratage of amethyst, aquamarine, citrine, topaz, and tourmaline and smaller amounts of euclase, chrysoberyl, andalusite, and other stones.

SYNTHETIC GEM STONES

Corundum and Spinel.—The year 1950 witnessed further recapture of the American market by European producers of synthetic corundum and spinel. Chief production is in Germany, followed by France. India and Japan are other foreign producers.

The Idar-Oberstein district, in the French zone of West Germany, resumed its former position of importance as the chief cutting center for synthetics. Favored by low labor rates and devaluation of currency, most synthetic gems used in the American market are now cut in Idar-Oberstein. Toward the end of the year, as large orders piled up and European deliveries became slower, more business was placed in the United States.

[4] Bureau of Mines, Mineral Trade Notes: Vol. 30, No. 6, June 1950, p. 36.
[5] Bureau of Mines, Mineral Trade Notes: Vol. 31, No. 6, December 1950, p. 31.
[6] Australian News and Information Bureau, New York: Vol. 8, No. 4.
[7] Bureau of Mines, Mineral Trade Notes: Vol. 31, No. 6, December 1950, p. 31.

Domestic synthetic corundum and spinel production for the year amounted to several million carats. Of this, approximately 70 percent was ruby-color synthetic corundum, 20 percent blue spinel, and the remainder corundum and spinel of other colors. Most of this material was used in educational ring stones, the buff-top, flat-back stones being the most popular style.

Synthetic Rutile (Titania).—During the year public acceptance of this relatively new synthetic gem material increased. When first introduced, the jewelry trade did not respond, but as a result of interest by the amateur lapidaries and direct-mail sales, public interest has been created to a point where the jewelry trade is now beginning to accept and promote titania.

Production has been largely on an experimental basis by the Linde Air Products Co. and the National Lead Co. Prices for boules are about 50 cents per carat for colorless and 75 cents per carat for colored (blue and red).

Synthetic Emerald.—This synthetic gem stone continues to be produced only by the Chatham Research Laboratories in San Francisco, Calif. Production in 1950 amounted to 50,000 carats of rough crystals, of which less than 10 percent was gem quality. No flawless stones of over 2 carats were produced. The retail price for top-quality synthetic emerald is $120 per carat.