GEMSTONES

By Ronald F. Balazik

According to Webster's dictionary, a gem is "any jewel, whether stone, pearl or the like, having value and beauty that are intrinsic and not derived from its setting; a precious or, sometimes, a semiprecious stone cut and polished for ornament. A semiprecious stone of value because it is carved or engraved, as a cameo or intaglio." Additionally, the dictionary states that gemstone is "any mineral or petrified material which can, when cut and polished, be used in jewelry."

For this report, therefore, "gemstone" is defined as any organic or inorganic mineral used for personal adornment, display, or object of art because the mineral possesses beauty, rarity, and durability. Note that shell and cultured pearl are treated as gemstones in this report. Also, synthetic gems are covered in this report but are treated separately from natural gemstones. (See tables 1 and 2.)

Production

It is estimated that the value of natural gemstones produced in the United States from indigenous sources during 1996 was at least \$44 million. (See table 3.) This output was significantly less than production in the preceding year because foreign markets for shell declined, particularly in Japan where the operations of cultured pearl producers who use shell material for pearl nuclei were adversely affected by massive pearl oyster deaths.

The estimate of 1996 gemstones production is based on a survey of more than 250 domestic gemstone operations conducted by the U.S. Geological Survey (USGS). The survey provides a foundation for projecting the scope and level of domestic gemstone production. However, the survey does not represent all gemstone activity in the United States, which includes thousands of professional and amateur collectors. Consequently, the USGS attempts to supplement its survey with estimates of domestic gemstones production from related published data, contacts with gem dealers and collectors, and analyses of gem and mineral shows.

Natural gem materials indigenous to the United States are collected, produced, or marketed in every State. However, six States accounted for more than 75% of the total value of production reported by survey respondents. These States (in declining order of reported production value) were Tennessee, Oregon, Kentucky, Arkansas, Arizona, and Alabama. Certain States are known best for the production of a single gem material (e.g., Tennessee for freshwater shell). Other States, however, have a wide array of gemstones. For example, Arizona gemstone deposits include agate, amethyst, azurite, chrysocolla, fire agate, garnets, jade, malachite, obsidian, onyx, petrified wood, precious opal, smithsonite, and turquoise. A

great variety of gemstones also can be found in California, Idaho, Montana, and North Carolina.

Progress continued in 1996 toward opening the first commercial diamond mine in North America in almost a century. Colorado Diamond Co., a subsidiary of Redaurum Red Lakes Mines Ltd. (Toronto), announced a two-year trial mining program at its Kelsey Lake kimberlite prospect near Fort Collins, CO (U.S. Geological Survey 1997b). Open pit mining at Kelsey Lake commenced in 1995, and a diamond processing plant at the site began operating in May 1996. Production is expected to reach 100,000 to 150,000 carats at its peak.

Evaluation of a large lamproite intrusion located in Crater of Diamonds State Park near Murfreesboro, AR, also continued in 1996 (U.S. Geological Survey, 1997a). The intrusion has long been known to contain diamonds that range greatly in size and quantity. During 1996, the U.S. National Park Service permitted Arkansas to proceed with bulk sampling and testing operations.

In addition to natural gemstones, laboratory-grown synthetic gems and gem simulants are produced in the United States and elsewhere. Synthetic gemstones essentially have the same appearance and the same optical, physical, and chemical properties as the natural materials that they represent. Simulants have an appearance similar to that of a natural gem material but have different optical, physical, and chemical properties. Synthetic gemstones produced in the United States include alexandrite, emerald, ruby, sapphire, turquoise, and zirconia. Simulants produced in the United States include coral, cubic zirconia, lapis lazuli, malachite, and turquoise. Additionally, certain colors of synthetic sapphire and spinel, used to represent other gemstones, are classed as simulants. Colored and colorless varieties of cubic zirconia are the major simulants produced.

Synthetic gem production in the United States reached \$24 million in 1996; simulant gemstone output was even greater (estimated to exceed \$100 million). Five firms in four states, representing virtually all of the U.S. synthetic gem industry, reported production to the USGS in 1996. In descending order of production value, the States with reported output were California, New York, Michigan, and Arizona.

Consumption

The U.S. market in 1996 for natural, unset colored gemstones (excluding pearl and coral) was estimated to be more than \$370 million. The domestic market for unset gem diamonds in 1996 was estimated to be more than \$4.3 billion, the largest in the world.

Gemstones are used in the United States and elsewhere for

jewelry, collections/exhibits, decorative art objects, and certain industrial applications. According to a poll conducted in 1996 by a U.S. jewelry retailers association, 61% of domestic consumers who were surveyed preferred diamond as their favorite gemstone; others preferred emeralds (10%), sapphires (9%), and rubies (7%) (International Colored Gemstone Association, 1996).

Prices

Gemstone prices are governed by many factors, including beauty, clarity, defects, demand, and rarity. Values and prices of gemstones produced and/or sold in the United States are shown in tables 3 through 5. In addition, customs values for diamonds and other gemstones imported and exported or reexported are shown in tables 6 through 10.

The Central Selling Organization (CSO), controlled by De Beers Centenary AG (Switzerland), is a significant force affecting gem diamond prices worldwide. The average price of all rough uncut diamonds sold worldwide was estimated to be about \$70 per carat in 1996; by country, the average value reported per carat ranged from \$9 for Australian production to \$315 for Namibian output (Financial Times, 1997).

Foreign Trade

By several standards, the United States is the world leader in gemstone trade. In 1996, U.S. gemstone imports came from 106 countries and domestic exports/reexports of gemstones went to 56 countries. (See tables 6 through 10.)

The United States remained the world's largest importer of colored gemstones in 1996; imports of natural colored gemstones, excluding coral and pearl, reached \$572 million. During the year, U.S. imports of all gemstones, including synthetics and simulants, increased 8% to a record high of \$7.24 billion. Gem diamonds accounted for about 90% of the total.

Domestic exports and reexports of all gemstones in 1996 totaled about \$2.7 billion; diamonds, including \$2.2 billion for cut diamonds, accounted for 81% of the total. The value of U.S. exports plus reexports of natural, rough, colored gemstones was about \$29.1 million, while the value of U.S. exports plus reexports of natural, cut, colored gemstones was about \$175 million. Synthetic gemstone exports and reexports during the year were valued at \$12.4 million and \$17.1 million, respectively. Exports and reexports of pearl were valued at \$1.9 million and \$6.6 million, respectively. Approximately \$38.6 million of coral and shell was exported and reexported by the United States in 1996.

World Review

In 1996, world diamond production reached 117 million carats with an estimated value of approximately \$7 billion. (See table 11.) Although there are many diamond mines throughout the world, much production is concentrated in a few regions. Most world diamond production occurs in Africa (Angola,

Botswana, Namibia, South Africa, and Zaire); Asia (northeastern Siberia and Yakutia in Russia); Australia; and South America (Brazil and Venezuela).

In addition to the new U.S. diamond mine, noted on page 1, substantial progress was made in 1996 on plans for Canada's first gem-quality diamond mine (Wilkinson, 1997). Final approvals for construction of the mine, located in the Northwest Territories, were granted during the year by the Canadian government. The mine is expected to employ 800 workers and generate approximately \$350 million annually over a 25-year lifespan. Production is scheduled to begin in 1998.

De Beers Centenary AG, through its CSO, controlled most of the rough, uncut diamonds sales worldwide during 1996. De Beers reported record sales of \$4.83 billion during the year. The record was 7% greater than De Beers rough diamond sales in 1995. Moreover, the sales in 1996, unlike the preceding 2 years, surpassed the value of diamond stocks (\$4.7 billion) held by De Beers (Cockle, 1997b). Nevertheless, world diamond retail sales decreased slightly to \$52 billion, partly due to a weaker Japanese market (Cockle, 1997a).

De Beers also encountered significant events in the world diamond market during 1996. For example, Australia's Argyle Diamond Mines Joint Venture (which accounts for more than one-third of global diamond output) withdrew from the CSO to sell its production independently. In addition, Russia's marketing accord with the CSO was not renewed when agreement on the terms of a new contract could not be reached; negotiations between the two parties were continuing at yearend.

It is estimated that annual world production of cut natural gemstones other than diamond and pearl exceeded \$2 billion in the mid-1990's. Foreign countries with major gemstone deposits other than diamond are Afghanistan (beryl, ruby, and tourmaline); Australia (beryl, opal, and sapphire); Brazil (agate, amethyst, beryl, ruby, sapphire, topaz, and tourmaline); Burma (beryl, jade, ruby, sapphire, and topaz); Colombia (beryl, emerald, and sapphire); Kenya (beryl, garnet, and sapphire); Madagascar (beryl, rose quartz, sapphire, and tourmaline); Mexico (agate, opal, and topaz); Sri Lanka (beryl, ruby, sapphire, and topaz); Tanzania (garnet, ruby, sapphire, tanzanite, and tourmaline); and Zambia (amethyst and beryl). The world's largest blue sapphire (90,000 carats) reportedly was discovered in Madagascar during 1996 (Unpub. data accessed June 18, 1997, on the World Wide Web at URL http://www.gemstone.org/source.html).

Outlook

Trends toward the growth of personal disposable income, particularly in industrialized and developing nations, will continue to be the principal influence on world demand for precious gems. In addition, the independence displayed by major diamond producers in 1996 vis-a-vis the De Beers CSO may prove to be an important new trend in world diamond markets; however, its significance cannot be assessed at present.

Asian nations such as Japan and others with growing personal wealth are expected to be the most rapidly expanding

markets for precious gems, particularly diamond. One indicator of this trend is that China will open its first diamond exchange and recently liberalized its investment policy for foreign jewelry manufacturers to allow more sales within the country (Henricus, 1997; Schlussel, 1997).

Demand for colored gemstones will continue to rise as diamonds become more expensive and promotional efforts by retailers promote the popularity of alternatives. The retail jewelry trade will further consolidate toward fewer companies while more dealers focus on niche markets and target specific demographic groups. Greater demand for synthetic and simulant gemstones also is anticipated.

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¹Prior to January 1996, published by the U.S. Bureau of Mines.

TABLE 1
GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

			Practical			Specific		Refractive	May be	Recognition
Name	Composition	Color	size 1/	Cost 2/	Mohs	gravity	Refraction	index	confused with-	characters
Amber	Hydrocarbon	Yellow, red, green, blue	Any	Low to medium	2.0-2.5	1.0-1.1	Single	1.54	Synthetic or pressed plastics	Fossil resin, soft.
Beryl:										
Aquamarine	Beryllium aluminum silicate	Blue-green to light blue	do.	Medium to high	7.5-8.0	2.63-2.80	Double	1.58	Synthetic spinel, blue topaz	Double refraction, refractive index.
Bixbite	do.	do.	Small	Very high	7.5-8.0	2.63-2.80	do.	1.58	Pressed plastics, tourmaline	Refractive index.
Emerald	do.	Green	Medium	do.	7.5	2.63-2.80	do.	1.58	Fused emerald, glass, tourmaline, peridot, green garnet doublets	Emerald filter, dichroism, refractive index.
Emerald, synthetic	do.	do.	Small	High	7.5-8.0	2.63-2.80	do.	1.58	Genuine emerald	Flaws, brilliant, fluorescence in ultraviolet light.
Golden (heliodor)	do.	Yellow to golden	Any	Low to medium	7.5-8.0	2.63-2.80	do.	1.58	Citrine, topaz, glass, doublets	
Goshenite	do.	do.	do.	Low	7.5-8.0	2.63-2.80	do.	1.58	Quartz, glass, white sapphire, white topaz.	Refractive index.
Morganite	do.	Pink to rose	do.	do.	7.5-8.0	2.63-2.80	do.	1.58	Kunzite, tourmaline, pink sapphire	Do.
Calcite:										
Marble	Calcium carbonate	White, pink, red, blue, green, or brown	do.	do.	3.0	2.72	Double (strong)	1.49-1.66	Silicates, banded agate, alabaster gypsum	Translucent.
Mexican onyx	do.	do.	do.	do.	3.0	2.72	do.	1.6	do.	Banded, translucent.
Chrysoberyl:										
Alexandrite	Beryllium aluminate	Green by day, red by artificial light	Former U.S.S.R. (small), Sri Lanka (medium)	High	8.5	3.50-3.84	Double	1.75	Synthetic	Dichroism, inclusions in synthetic sapphire.
Cats-eye	do.	Greenish to brownish	Small to large	do.	8.5	3.50-3.84	do.	1.75	Synthetic, shell	Gravity and translucence.
Chrysolite	do.	Yellow, green, and/or brown	Medium	Medium	8.5	3.50-3.84	do.	1.75	Tourmaline, peridot	Refractive index, silky.
Coral	Calcium carbonate	Orange, red, white, black, or green	Branching, medium	Low	3.5-4.0	2.6-2.7	do.	1.49-1.66	False coral	Dull translucent.

TABLE 1--Continued
GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

			Practical			Specific		Refractive	May be	Recognition
Name	Composition	Color	size 1/	Cost 2/	Mohs	gravity	Refraction	index	confused with-	characters
Corundum:										
Ruby	Aluminum oxide	Rose to deep purplish red	Small	Very high	9.0	3.95-4.10	Double	1.78	Synthetics, including spinel	Inclusions, fluorescence.
Sapphire	do.	Blue	Medium	High	9.0	3.95-4.10	do.	1.78	do.	Inclusions, double refraction, dichroism.
Sapphire, fancy	do.	Yellow, pink, white, orange, green, or violet	Medium to large	Medium	9.0	3.95-4.10	do.	1.78	Synthetics, glass and doublets	Inclusions, double refraction, refractive index.
Sapphire and ruby stars	do.	Red, pink, violet, blue, or gray	do.	High to low	9.0	3.95-4.10	do.	1.78	Star quartz, synthetic stars	Shows asterism, color side view.
Sapphire or ruby synthetic	do.	Yellow, pink, or blue	Up to 20 carats	Low	9.0	3.95-4.10	do.	1.78	Synthetic spinel, glass	Curved striae, bubble inclusions.
Diamond	Carbon	White, blue-white, yellow, brown, green, pink, blue	Any	Very high	10.0	3.516-3.525	Single	2.42	Zircon, titania, cubic zirconia	High index, dispersion, single refraction hardness, cut, luster.
Feldspar:		-								
Amazonite	Alkali aluminum silicate	Green	Large	Low	6.0-6.5	2.56		1.52	Jade	Cleavage, sheen, vitreous to pearly, opaque, grid.
Labradorite	do.	Gray with blue and bronze sheen color play	do.	do.	6.0-6.5	2.56		1.56	do.	Do.
Moonstone	do.	White	do.	do.	6.0-6.5	2.77		1.52-1.54	Glass or white onyx	Blue sheen, opalescent.
Garnet	Complex silicate	Brown, black, yellow, green, ruby red, or orange	Small to medium	Low to high	6.5-7.5	3.15-4.30	Single strained	1.79-1.98	Synthetics, spinel, glass	Single refraction, anomalous strain.
Jade:										
Jadeite	do.	Green, yellow, black, white, or mauve	Large	Low to very high	6.5-7.0	3.3-3.5	Cryptocry stalline	- 1.65-1.68	Onyx, bowenite, vesuvianite, grossularite	Luster, spectrum, translucent, to opaque.
Nephrite	Complex hydrous silicate	do.	do.	do.	6.0-6.5	2.96-3.10	do.	1.61-1.63	do.	Do.
Opal	Hydrous silica	Colors flash in white gray, black, red, or yellow	Large	Low to high	5.5-6.5	1.9-2.3	Isotropic	1.45	Glass, synthetics, triplets	Play of color.
Pearl	Calcium carbonate	White, pink, or black	Small	do.	2.5-4.0	2.6-2.85			Cultured and imitation	Luster, structure, X-ray.
Peridot	Iron magnesium silicate	Yellow and/or green	Any	Medium	6.5-7.0	3.27-3.37	Double (strong)	1.65-1.69	Tourmaline chrysoberyl	Strong double refraction, low dichroism.

TABLE 1--Continued GUIDE TO SELECTED GEMSTONES AND GEM MATERIALS USED IN JEWELRY

			Practical			Specific		Refractive	May be	Recognition
Name	Composition	Color	size 1/	Cost 2/	Mohs	gravity	Refraction	index	confused with-	characters
Quartz:										
Agate	Silica	Any color	Large	Low	7.0	2.58-2.64			Glass, plastic, Mexican	Cryptocrystalline, irregularly
									onyx	banded, dendritic inclusions.
Amethyst	do.	Purple	do.	Medium	7.0	2.65-2.66	Double	1.55	do.	Refractive index, double refraction,
										transparent.
Cairngorm	do.	Smoky	do.	Low	7.0	2.65-2.66	do.	1.55	do.	Do.
Citrine	do.	Yellow	do.	do.	7.0	2.65-2.66	do.	1.55	do.	Do.
Crystal, rock	do.	Colorless	do.	do.	7.0	2.65-2.66	do.	1.55	do.	Do.
Jasper	do.	Uniform or spotted red,	do.	do.	7.0	2.58-2.66			do.	Opaque, vitreous.
		yellow, or green								
Onyx	do.	Many colors	do.	do.	7.0	2.58-2.64			do.	Uniformly banded.
Rose	do.	Pink, rose red	do.	do.	7.0	2.65-2.66	do.	1.55	do.	Refractive index, double refraction,
										translucent.
Spinel	Magnesium	Any	Small to	Medium	8.0	3.5-3.7	Single	1.72	Synthetic, garnet	Refractive index, single refraction,
	aluminum oxide		medium							inclusions.
Spinel, synthetic	do.	do.	Up to 40	Low	8.0	3.5-3.7	Double	1.73	Spinel, corundum, beryl	, Weak double refraction, curved
			carats						topaz, alexandrite	striae, bubbles.
Spodumene:										
Hiddenite	Lithium aluminum	Yellow to green	Medium	Medium	6.5-7.0	3.13-3.20	do.	1.66	Synthetic spinel	Refractive index.
	silicate									
Kunzite	do.	Pink to lilac	do.	do.	6.5-7.0	3.13-3.20	do.	1.66	Amethyst, morganite	Do.
Tanzanite	Complex silicate	Blue	Small	High	6.0-7.0	3.30	do.	1.69	Sapphire, synthetics	Strong trichroism.
Topaz	do.	White, blue, green	Medium	Low to	8.0	3.4-3.6	do.	1.62	Beryl, quartz	Refractive index.
				medium						
Tourmaline	do.	All, including mixed	do.	do.	7.0-7.5	2.98-3.20	do.	1.63	Peridot, beryl,	Double refraction, refractive index.
									corundum, glass	
Turquoise	Copper aluminum	Blue to green	Large	Low	6.0	2.60-2.83	do.	1.63	Glass, plastics	Difficult if matrix not present,
	phosphate									matrix usually limonitic.
Zircon	Zirconium silicate	White, blue, or brown,	Small to	Low to	6.0-7.5	4.0-4.8	Double	1.79-1.98	Diamond, synthetics,	Double refraction, strongly dichroic
					0.0 7.0			2.77 2.70		, ,
		White, blue, or brown, yellow, or green	medium	Low to medium	6.0-7.5	4.0-4.8	Double (strong)	1.79-1.98	Diamond, synthetics, topaz, aquamarine	Double refraction, strongly wear on facet edges.

^{1/} Small-up to 5 carats; medium-up to 50 carats; large-more than 50 carats.
2/ Low-up to \$25 per carat; medium-up to \$200 per carat; high-more than \$200 per carat.

TABLE 2 SYNTHETIC GEMSTONE PRODUCTION METHODS

	Production		Date of first
Gemstone	methods	Company/producer	production
Alexandrite	Flux	Creative crystals	1970's
Do.	Melt pulling	J.O. Crystal	1990's
Do.	do.	Kyocera	1980's
Do.	Zone melt	Seiko	1980's
Cubic zirconia	Skull melt	Various producers	1970's
Emerald	Flux	Chatham	1930's
Do.	do.	Gilson	1960's
Do.	do.	Kyocera	1970's
Do.	do.	Seiko	1980's
Do.	do.	Lennix	1980's
Do.	do.	Russia	1980's
Do.	Hydrothermal	Lechleitner	1960's
Do.	do.	Regency	1980's
Do.	do.	Biron	1980's
Do.	do.	Russia	1980's
Ruby	Flux	Chatham	1950's
Do.	do.	Kashan	1960's
Do.	do.	J.O. Crystal (Ramaura)	1980's
Do.	do.	Douras	1990's
Do.	Zone melt	Seiko	1980's
Do.	Melt pulling	Kyocera (Inamori)	1970's
Do.	Verneuil	Various producers	1900's
Sapphire	Flux	Chatham	1970's
Do.	Zone melt	Seiko	1980's
Do.	Melt pulling	Kyocera	1980's
Do.	Verneuil	Various producers	1900's
Star ruby	do.	Linde (Div. of Union Carbide)	1940's
Do.	Melt pulling	Kyocera	1980's
Do.	do.	Nakazumi	1980's
Star sapphire	Verneuil	Linde	1940's

 $\label{eq:table 3} \textbf{VALUE OF U.S. GEMSTONE PRODUCTION, BY GEMSTONE } 1/$

(Thousand dollars)

Gem materials	1995	1996
Agate	907	1,110
Beryl	698	960
Coral (all types)	114	152
Diamonds	163	685
Garnet	54 r/	40
Gem feldspar	3,150	4,980
Geode/nodules	206	169
Obsidian	64	64 e/
Opal	475	363
Peridot	225	
Petrified wood	150	54 e/
Quartz	1,440	1,880
Sapphire/ruby	4,910 r/	2,030
Shell		22,800
Topaz	9	14
Tourmaline		25
Turquoise	1,670	1,410
Other		6,900
Total	48,700 r/	43,600

e/ Estimated. r/ Revised.

 $^{1/\,\}mbox{Data}$ are rounded to three significant digits; may not add to totals shown.

 ${\bf TABLE~4}\\ {\bf PRICES~OF~U.S.~CUT~DIAMONDS,~BY~SIZE~AND~QUALITY~1/}$

Carat	Description,	Clarity 3/		Representative price	es
weight	color 2/	(GIA terms)	January 1996 4/	August 1996 5/	December 1996 6/
0.25	G	VS1	\$1,400	\$1,400	\$1,500
.25	G	VS2	1,300	1,280	1,380
.25	G	SI1	975	1,030	1,130
.25	Н	VS1	1,300	1,300	1,400
.25	Н	VS2	1,150	1,150	1,250
.25	Н	SI1	950	950	1,050
.50	G	VS1	3,050	3,200	3,300
.50	G	VS2	2,700	2,800	2,900
.50	G	SI1	2,400	2,300	2,500
.50	Н	VS1	2,800	2,800	2,900
.50	Н	VS2	2,600	2,500	2,600
.50	Н	SI1	2,300	2,200	2,400
.75	G	VS1	3,600	3,600	3,800
.75	G	VS2	3,350	3,400	3,600
.75	G	SI1	3,100	3,100	3,300
.75	Н	VS1	3,400	3,450	3,650
.75	Н	VS2	3,200	3,250	3,450
.75	Н	SI1	2,900	2,900	3,100
1.00	G	VS1	4,900	5,200	5,400
1.00	G	VS2	4,600	4,900	5,200
1.00	G	SI1	4,200	4,400	4,700
1.00	Н	VS1	4,500	4,800	5,000
1.00	Н	VS2	4,400	4,700	4,900
1.00	Н	SI1	4,000	4,200	4,500

^{1/} Data are rounded to three significant digits.

 ${\bf TABLE~5}$ PRICES OF U.S. CUT COLORED GEMSTONES, BY SIZE 1/

	Carat	Price ran	nge per carat
Gemstone	weight	January 1996	2/ December 1996 2/
Amethyst	1	\$8 -\$18	\$7 - \$16
Aquamarine	1	75-90	75 - 190
Emerald	1	1,750 - 3,200	1,575 - 2,900
Garnet, tsavorite	1	600 - 900	600 - 900
Rhodolite	1	20 - 30	20 - 30
Ruby	1	2,450 - 3,900	2,450 - 3,900
Sapphire	1	800 - 1,800	800 - 1,800
Tanzanite	1	125 - 220	125 - 220

^{1/} Fine quality.

^{2/} Gemological Institute of America (GIA) color grades: D--colorless; E--rare white; G - H - I --traces of color.

^{3/} Clarity: $\overline{\text{IF--no}}$ blemishes; VVS1--very, very slightly included; VS1--very slightly included; VS2--very slightly included, but not visible; SI1--slightly included.

^{4/} Jewelers' Circular-Keystone. V. 167, No. 3, Mar. 1996, p. 142.

^{5/} Jewelers' Circular-Keystone. V. 167, No. 9, Sept. 1996, p. 222.

^{6/} Jewelers' Circular-Keystone. V. 168, No. 1, Jan. 1997, p. 290.

^{2/} Jewelers' Circular-Keystone. V. 167, No. 3, Jan. 1996, p. 142; and V. 168, No. 1, Jan. 1997, p. 290. These figures represent a sampling of net prices that wholesale colored stone dealers in various U.S. cities charged its cash customers during the month for fine-quality stones.

 ${\it TABLE~6}\\ {\it U.S.~EXPORTS~AND~REEXPORTS~OF~DIAMOND~(EXCLUSIVE~OF~INDUSTRIAL~DIAMOND),~BY~COUNTRY~1/2}$

	1995		199	6
	Quantity	Value 2/	Quantity	Value 2/
Country	(carats)	(millions)	(carats)	(millions)
Belgium	658,000	\$475	576,000	\$547
Canada	123,000	44	135,000	50
France	23,900	31	24,000	43
Hong Kong	462,000	436	324,000	400
India	146,000	21	137,000	21
Israel	496,000	480	546,000	558
Japan	150,000	159	106,000	139
Russia	9,930	23	569	4
Singapore	26,500	57	18,100	55
Switzerland	54,100	183	50,500	234
Thailand	124,000	32	95,000	42
United Arab Emirates	10,500	5	6,320	7
United Kingdom	10,900	64	31,900	94
Other	35,800 r/	35 r/	40,900	32
Total	2,330,000	2,040	2,090,000	2,230

r/ Revised.

Source: Bureau of the Census.

 ${\bf TABLE~7} \\ {\bf U.S.~IMPORTS~FOR~CONSUMPTION~OF~DIAMOND,~BY~KIND,~WEIGHT,~AND~COUNTRY~1/} \\$

	1995	· · · · · · · · · · · · · · · · · · ·	199	6
	Quantity	Value 2/	Quantity	Value 2/
Kind, range, and country of origin	(carat)	(millions)	(carat)	(millions)
Rough or uncut, natural: 3/				
Australia	34,200	(4/)	74,600	\$1
Belgium	181,000	\$119	277,000	149
Brazil	4,910	1	38,500	5
Ghana	162,000	119	157,000	105
India	61,900	1	11,100	(4/)
Russia	34,900	33	34	(4/)
Israel	36,500	22	33,600	34
South Africa	17,800	26	21,900	33
Switzerland	6,950	10	20,900	44
United Kingdom	969,000	155	658,000	200
Venezuela	19,900	(4/)	11,300	2
Zaire	82,600	82	92,000	84
Other	100,000 r/	65 r/	51,500	75
Total	1,710,000	631	1,450,000	731
Cut but unset, not more than 0.5 carat:				
Belgium	677,000	181	841,000	232
Brazil	6,450	1	9,490	3
Canada	3,990	1	18,000	4
Hong Kong	216,000	39	358,000	68
India	7,240,000	1,190	7,140,000	1,250
Israel	769,000	352	890,000	387
Netherlands			1,000	(4/)
South Africa	8,580	4	5,350	7
Switzerland	8,600	1	7,420	2
Thailand	65,000	10	54,600	8
United Kingdom	8,260	2	1,450	1
Other	47,300 r/	13 r/	62,600	23
Total	9,050,000	1,790	9,390,000	1,980
Cut but unset, over 0.5 carat:			· ·	·
Belgium	873,000	1,110	833,000	1,190
Hong Kong	43,600	64	48,300	60
India	326,000	196	259,000	151
Israel	1,490,000	1,740	1,580,000	2,020
Netherlands	300	1	199	1
Russia	40,500	63	39,400	53

 $^{1/\,}Data$ are rounded to three significant digits; may not add to totals shown.

^{2/} Customs value

 ${\bf TABLE~7-Continued}\\ {\bf U.S.~IMPORTS~FOR~CONSUMPTION~OF~DIAMOND,~BY~KIND,~WEIGHT,~AND~COUNTRY~1/2}$

	1995		199	6
	Quantity	Value 2/	Quantity	Value 2/
Kind, range, and country of origin	(carat)	(millions)	(carat)	(millions)
Cut but unset, over 0.5 caratContinued:				
South Africa	15,100	37	15,800	52
Switzerland	19,600	196	16,100	163
United Kingdom	8,290	38	6,820	53
Other	64,800 r/	80 r/	69,400	111
Total	2,880,000	3,530	2,870,000	3,850

r/ Revised.

Source: Bureau of the Census.

 ${\it TABLE~8} \\ {\it U.S.~IMPORTS~FOR~CONSUMPTION~OF~GEMSTONES,~OTHER~THAN~DIAMOND,~BY~KIND~AND~COUNTRY~1/2} \\$

	1995		199	
	Quantity	Value 2/	Quantity	Value 2/
Kind and country	(carats)	(millions)	(carats)	(millions)
Emerald:				
Belgium	27,000	\$4	13,900	\$2
Brazil	2,620,000	6	4,340,000	7
Canada	9,940	1	15,600	
China	1,610	1	1,550	(3/
Colombia	1,130,000	94	968,000	74
France	1,500	2	3,340	2
Germany	24,600	2	13,900	2
Hong Kong	315,000	17	304,000	17
India	2,570,000	47	3,280,000	39
Italy	10,300	(3/)	7,540	(3/
Israel	116,000	27	401,000	20
Japan	1,300	(3/)	3,020	
South Africa	474	(3/)	1,370	(3/
Switzerland	50,900	26	89,800	18
Taiwan	3,890	(3/)	207	(3/
Thailand	418,000	7	358,000	
United Kingdom	2,630	1	2,330	:
Other		2 r/	138,000	
Total	7,320,000	236	9,930,000	203
Ruby:			.,,	
Belgium	14,600	1	11,000	1
Brazil	233	(3/)	11,300	(3/
Canada	11,700	(3/)	9,540	(3/
China	2,270	(3/)	9,020	(3/
Colombia	438	(3/)	423	(3/
France	482	2	1,260	(3)
Germany	129,000	1	31,000	
Hong Kong	278,000	6	377,000	,
India	1,370,000	6	2,340,000	
Israel	8,360	1	25,400	
Italy	10,200	1	83	(3/
Japan	1,050	(3/)	2,240	(3/
Switzerland	52,400	18	14,900	1′
Thailand	2,270,000	41	3,010,000	4
United Kingdom		2	3,370	4
Other	15,900 r/	3 r/		
			57,100	
Total	4,180,000	84	5,910,000	80
Sapphire:	40.000	1	0.100	(2)
Australia	49,900	1	9,190	(3/
Austria		(3/)	56 25 000	(3/
Belgium	9,280	(3/)	25,900	
Brazil See footnotes at end of table	7,570	(3/)	8,190	(3/

^{1/} Data are rounded to three significant digits; may not add to totals shown.

^{2/} Customs value.

^{3/} Includes some natural advanced diamond.

^{4/} Less than 1/2 unit.

 ${\bf TABLE~8-Continued}\\ {\bf U.S.~IMPORTS~FOR~CONSUMPTION~OF~GEMSTONES,~OTHER~THAN~DIAMOND,~BY~KIND~AND~COUNTRY~1/2}$

	1995	;	199	16
	Quantity	Value 2/	Quantity	Value 2/
Kind and country	(carats)	(millions)	(carats)	(millions)
SapphireContinued:				
Canada	82,200	(3/)	4,840	(3/)
China	1,670	(3/)	506,000	1
Colombia	1,270	(3/)	395	(3/)
France	863	1	738	1
Germany	146,000	2	64,500	2
Hong Kong	505,000	4	298,000	6
India	329,000	1	682,000	2
Israel	17,500	2	67,800	3
Italy	4,400	(3/)	10,500	(3/)
Japan	831	(3/)	1,640	(3/)
Korea, Republic of			1,110	(3/)
Singapore	1,250	(3/)	84	1
Sri Lanka (ceylon)	328,000	9	864,000	10
Switzerland	17,700	13	23,100	10
Tanzania	4,060	(3/)	3,010	(3/)
Thailand	5,240,000	49	5,920,000	55
United Kingdom	7,750	2	8,030	3
Other	20,100 r/	1 r/	26,600	2
Total	6,780,000	84	8,530,000	95
Other:				
Rough, uncut:				
Australia	NA	\$3	NA	\$4
Brazil	NA NA	32	NA	21
Colombia	NA	3	NA	1
Fiji	NA	(3/)	NA	1
Hong Kong	NA	1	NA	1
India	NA	1	NA	1
Kenya	NA	1	NA	2
Nigeria	NA	(3/)	NA	(3/)
Pakistan	NA	1	NA	(3/)
Philippines	NA	1	NA	1
Russia	NA	9	NA	(3/)
South Africa	NA	(3/)	NA	(3/)
Switzerland	NA	(3/)	NA	(3/)
Tanzania	NA	1	NA	1
Thailand	NA	1	NA	1
United Kingdom	NA	(3/)	NA	1
Zambia	NA	1	NA	2
Other	NA	6 r/	NA	12
Total	NA	61	NA	50
Cut, set and unset:				
Australia	NA	6	NA	5
Brazil	NA	8	NA	8
Canada	NA	(3/)	NA	(3/)
China	NA	5	NA	5
French Polynesia	NA	7	NA	4
Germany	NA	14	NA	11
Hong Kong	NA	23	NA	24
India	NA	13	NA	18
Israel	NA	5	NA	5
Japan	NA	11	NA	20
Kenya	NA	1	NA	1
Sri Lanka (ceylon)	NA	3	NA	3
Switzerland	NA NA	1	NA	2
Taiwan	NA NA	2	NA	2
Tanzania	NA	2	NA	2
Thailand	NA	19	NA	25
United Kingdom	NA	1	NA	1
Other	NA	2 r/	NA	4
Total	NA NA	125	NA	138

r/ Revised. NA Not available.

Source: Bureau of the Census.

 $^{1/\,\}mbox{Data}$ are rounded to three significant digits; may not add to totals shown.

^{2/} Customs value.

^{3/} Less than 1/2 unit.

TABLE 9 VALUE OF U.S. IMPORTS OF SYNTHETIC AND IMITATION GEMSTONES, BY COUNTRY 1/

(Thousand dollars) 2/

Country	1995	1996
Synthetic, cut but unset:		
Australia	1,120	768
Austria	6,250	5,320
China	2,830	4,880
France	1,010	1,090
Germany	11,000	12,100
Hong Kong	1,390	2,060
India	938	1,000
Italy	1,120	318
Japan	512	93
Korea, Republic of	1,360	1,440
Sri Lanka (Ceylon)	510	649
Switzerland	4,430	3,780
Thailand	7,910 r/	6,410
Other	840 r/	855
Total	41,200	40,700
Imitation: 3/		
Austria	59,900	46,200
China	575	414
Czech Republic	12,800	17,300
Germany	1,640	2,360
Japan	503	788
Taiwan	448	214
Other	1,240	1,270
Total	77,100	68,500
/D : 1		

r/ Revised.

Source: Bureau of the Census.

 $\label{eq:table 10} TABLE~10$ U.S. IMPORTS FOR CONSUMPTION OF GEMSTONES 1/

(Thousand carats and thousand dollars)

	199	5	1996	
Stones	Quantity	Value 2/	Quantity	Value 2/
Diamonds:				
Rough or uncut	1,710	631,000	1,450	731,000
Cut but unset	11,900	5,320,000	12,300	5,830,000
Emeralds: Cut but unset	7,320	236,000	9,930	203,000
Coral and similar materials, unworked	NA	4,020	NA	6,340
Rubies and sapphires: Cut but unset	11,000	168,000	14,400	181,000
Pearls:				
Natural	NA	3,260	NA	1,100
Cultured	NA	30,400	NA	31,800
Imitation	NA	1,660	NA	1,740
Other precious and semiprecious stones:				
Rough, uncut	1,420,000	48,600	1,610,000	37,400
Cut, set and unset	NA	91,500	NA	105,000
Other	NA	8,800	NA	6,320
Synthetic:				
Cut but unset	160,000	41,200	174,000	40,700
Other	NA	1,830	NA	3,800
Imitation gemstone 3/	NA	75,400	NA	66,800
Total	XX	6,660,000	XX	7,240,000

NA Not available. XX Not applicable.

Source: Bureau of the Census.

^{1/} Data are rounded to three significant digits; may not add to totals shown.

^{2/} Customs value.

^{3/} Includes pearls.

^{1/} Data are rounded to three significant digits; may not add to totals shown.

^{2/} Customs value.

^{3/} Does not include pearls.

TABLE 11 NATURAL DIAMOND: ESTIMATED WORLD PRODUCTION, BY TYPE AND COUNTRY 1/ 2/

(Thousand carats)

Country	1992	1993	1994	1995	1996
Gemstones: 3/					
Angola 4/	1,100	130	270	2,700 r/	3,600
Australia	18,100	18,800	19,500	18,300	18,897 5/
Botswana	11,200	10,300	10,550 5/	11,500	11,000
Brazil	653	1,000 r/	300 r/	700 r/	700
Central African Republic	307 5/	370	400	400	350
China	200	230	230	230	230
Gabon	400	400	400	400	400
Ghana	104 r/ 5/	106 r/ 5/	118 r/	126 r/	125
Nambia	1,520	1,120	1,312 5/	1,382 5/	1,300
Russia	9,000	8,000	8,500	9,000	9,250
Sierra Leone	180	90	155	113 5/	162
South Africa	4,600	4,600	5,050 r/	5,070 r/	5,360
Venezuela	302	145 r/ 5/	203	229 5/	230
Zaire	8,930	2,010	4,000	4,000	3,000
Other	305	277 r/	463 r/	608 r/	813
Total	56,800 r/	47,600 r/	51,400	54,800 r/	55,400
Industrial:					
Angola 4/	80	15	30	300 r/	400
Australia	22,100	23,000	23,800	22,400	23,096 5/
Botswana	4,790	4,420	5,000	5,300	5,000
Brazil	665	600 r/	600 r/	600 r/	600
Central African Republic	107 5/	125	131	130	120
China	800	850	850	900	900
Gabon	100	100	100	100	100
Ghana	590 r/5/	484 r/ 5/	473 r/5/	505 r/	505
Nambia	30	20			
Russia	9,000	8,000	8,500	9,000	9,250
Sierra Leone	116	68	100	101 r/	108
South Africa	5,600	5,700	5,800 r/	5,880 r/	6,000
Venezuela	176	155 5/	214 5/	64 5/	60
Zaire	4,570	13,600	13,000	13,000	15,000
Other	218	210 r/	277 r/	344 r/	464
Total	48,900 r/	57,400	58,900 r/	58,600 r/	61,600
Grand total	106,000	105,000	110,000	113,000 r/	117,000

r/ Revised.

 $^{1/ \} World\ totals\ and\ estimated\ data\ are\ rounded\ to\ three\ significant\ digits;\ may\ not\ add\ to\ totals\ shown.$

^{2/} Table includes data available through May 28, 1997.

^{3/} Includes near-gem and cheap-gem qualities. 4/ Figures do not include smuggled artisanal production.

^{5/} Reported figure.