# Gem Stones

By J. W. Pressler[1]

The value of gem stones and mineral specimens produced in the United States during 1984 was estimated to be $7.5 million, virtually the same as that of 1983. Turquoise and peridot production decreased while tourmaline, sapphire, and opal production increased. Amateur collectors accounted for much of the activity in many States. Small mine operators produced jade, opal, sapphire, tourmaline, and turquoise, which they sold mainly to wholesale and retail outlets, in gem and mineral shops, gem shows, and to jewelry manufacturers.

**Domestic Data Coverage.**—Domestic production data for gem stones are developed by the Bureau of Mines from the "Gem Stones" survey, a voluntary survey of U.S. operations. Of the 52 operations to which a survey request was sent, 44% responded, representing an estimated 60% of the total production indicated in the text. Production for the 29 nonrespondents was estimated using reported prior year production levels adjusted by trends in employment and other guidelines.

## DOMESTIC PRODUCTION

Mines and collectors in 46 States produced gem materials with an estimated value of $1,000 or more in each State. Ten States supplied 88% of the total value as follows: Arizona, $2.7 million; Nevada, $1.3 million; California, $500,000; Montana, $450,000; Maine and Oregon, $400,000 each; Wyoming, $225,000; and Arkansas, New Mexico, and Washington, $200,000 each. Estimated production increased 67% in California, 50% in Idaho and Montana, and 8% in Nevada, but decreased 33% in Oregon, 20% in Maine, 10% in Wyoming, and 4% in Arizona.

Park authorities at the Crater of Diamonds Park in Pike County, AR, reported that 85,000 people visited the park and recovered, by washing, screening, and panning, 1,339 diamonds, an 11% decrease from that of 1983, with a total weight of 202 carats. The largest was a 5.58-carat brown stone of good quality. The total diamonds recovered averaged 15 points (100 points equals 1 carat) compared with 21 points in 1983. More small stones were found because of improvements in panning and screening equipment, especially the hemispherical "suruka" screen. The "dig for fee" operations remained popular.

In Emerald Creek, ID, the U.S. Forest Service issued 753 permits to diggers and panners who found 1,800 kilograms of gem garnet, most of which was asteriated, with the balance faceting grade. The garnet area consisted of three gulches, with one being especially noted for large stones. The 15 largest stones reported during the season varied from 50 to 500 grams. Because of the cold weather, the area was opened for about 100 days from May to September.

Exploration for diamondiferous kimberlite in Wyoming was continued by Cominco American Incorporated and Superior Minerals Co., working independently with the Geological Survey of Wyoming and the University of Wyoming, using remote sensing techniques. The Geological Survey of Wyoming also discovered a new kimberlite district in the Pole Mountain region of the Laramie Range. Bulk sampling and testing of properties in the Colorado-Wyoming State line district indicated grades of 0.01 and 0.2 carat per short ton, with stones as large as 1 carat.

In upper Michigan and northwest Wisconsin, Dow Chemical Co., Exmin Corp., Anaconda Mining Co., and others conducted investigations and sampled kimberlites in Dickinson and Iron Counties, MI, and Florence, Forest, and Pierce Counties, WI. Three small diamonds were found by a prospector in the Antigo area, Langlade County, WI, in glacial deposits.

Alaska's first confirmed find of diamond occurred near Circle, AK, in 1982, while working a gold placer deposit.

Montana continued to be the largest producer of gem-quality corundum in the United States. Intergem Inc. of Denver, CO, produced over 100,000 carats of corundum in 1984 from test operations of its properties on Yogo Gulch, near Lewiston, Fergus County, MT. Some high-quality colored stones were recovered, including blue and alexandrite-like purple. Recoverable corundum content of the ore was less than 10 carats per ton. After cutting, some of the larger sapphires were as much as 4 carats, but average cut stones, done in Bangkok, were only 20 points. Intergem was vertically integrated with its Yogo Mine, cutting and polishing of stones, and marketing of jewelry. In addition to Intergem, three other pay-as-you-dig or fee placer operations were active in Montana: Eldorado Bar and Castle's Sapphire Mine near Helena, and Gem Mountain Sapphire Mine near Philipsburg.

## CONSUMPTION

Domestic gem stone output went to amateur and commercial rock, mineral, and gem stone collections, objects of art, and jewelry. Value of apparent consumption (domestic production plus imports minus exports and reexports) increased 40% to $2,978 million.

The sales value of jewelry containing pearls and diamonds increased 19%, with the Christmas trade being particularly good. Demand for small, lower quality goods was high, and the demand for larger stones of good quality was better than that in 1983.

U.S. consumption of colored stones, led by emerald, ruby, and sapphire, increased significantly. Annual sales of emerald continued to be almost equal to those of ruby and sapphire combined. The value of all imported gem stones, other than diamond, increased 28%, with other cut, set, and unset, principally cultured pearls, increasing 48%, followed by emerald with a 15% increase.

## PRICES

The U.S. price of 1.0-carat, D-flawless, investment-grade diamond fluctuated between $11,000 and $14,000 per carat, and at yearend was $12,750 per carat, a decrease of 6% for the year. However, only a few hundred of these perfect 1-carat stones have been available each year, and their value may have amounted to less than 0.2% of the total market.

Prices for colored stones experienced little change during the year.

The unit value of Colombian and Zambian emeralds continued at a median price of $1,400 to $1,500 per carat.

**Table 1.—Prices of U.S. cut diamonds, by size and quality**

| Carat weight | Description, color[1] | Clarity[2] (GIA terms) | Price range per carat[3] in 1984 | Median price per carat[3] | |
|---|---|---|---|---|---|
| | | | | December 1983 | November 1984 |
| 0.04-0.08 | G-I | $VS_1$ | $400- $613 | $490 | $490 |
| .04- .08 | G-I | $SI_1$ | 400- 520 | 450 | 450 |
| .09- .16 | G-I | $VS_1$ | 450- 770 | 560 | 560 |
| .09- .16 | G-I | $SI_1$ | 410- 610 | 475 | 475 |
| .17- .22 | G-I | $VS_1$ | 700- 1,300 | 835 | 835 |
| .17- .22 | G-I | $SI_1$ | 500- 1,195 | 690 | 690 |
| .23- .28 | G-I | $VS_1$ | 775- 1,470 | 965 | 965 |
| .23- .28 | G-I | $SI_1$ | 650- 1,350 | 770 | 770 |
| .29- .35 | G-I | $VS_1$ | 875- 1,700 | 1,260 | 1,260 |
| .29- .35 | G-I | $SI_1$ | 735- 1,570 | 1,050 | 1,050 |
| .46- .55 | G-I | $VS_1$ | 1,450- 2,350 | 2,000 | 2,000 |
| .46- .55 | G-I | $SI_1$ | 900- 1,845 | 1,545 | 1,545 |
| .69- .79 | G-I | $VS_1$ | 1,800- 3,010 | 2,500 | 2,500 |
| .69- .79 | G-I | $SI_1$ | 1,400- 2,465 | 1,950 | 1,950 |
| 1.00-1.15[4] | D | FL | 11,000-14,000 | 13,500 | 12,750 |
| 1.00-1.15 | E | $VVS_1$ | 6,800- 8,200 | 7,500 | 7,500 |
| 1.00-1.15 | G | $VS_1$ | 3,500- 5,200 | 4,200 | 4,200 |
| 1.00-1.15 | H | $VS_2$ | 2,400- 4,800 | 3,300 | 3,300 |
| 1.00-1.15 | I | $SI_1$ | 2,000- 3,800 | 2,600 | 2,600 |

[1]Gemological Institute of America (GIA) color grades: D—colorless; E—rare white; and G-I—traces of color.
[2]Clarity: FL—no blemishes; $VVS_1$—very, very slightly included; $VS_1$—very slightly included; $VS_2$—very slightly included, but more visible; and $SI_1$—slightly included.
[3]Jewelers' Circular-Keystone. V. 155, No. 2, Feb. 1984, p. 124, and v. 155, No. 12, Dec. 1984, p. 42. These figures represent a sampling of net prices that diamond dealers in various U.S. cities charged their customers during the month.
[4]The Diamond Registry Bulletin. V. 15, No. 1, Jan. 1984.

**Table 2.—Prices of U.S. cut colored gem stones**

| Gem stone | Carat weight | Price range per carat in 1984 | Median price per carat[1 2] | |
|---|---|---|---|---|
| | | | January 1984 | November 1984 |
| Amethyst | 10 | $8- $24 | $17 | $17 |
| Aquamarine | 5 | 75- 210 | 150 | 150 |
| Citrine | 10 | 8- 18 | 10 | 10 |
| Emerald: | | | | |
| Colombian | 1 | 900-1,800 | 1,500 | 1,500 |
| Zambian | 1 | 750-2,200 | 1,400 | 1,400 |
| Commercial, 2d quality[3] | | 550-1,500 | 550 | 550 |
| Garnet, tsavorite | 1 | 350-1,100 | 725 | 725 |
| Ruby: | | | | |
| Medium to better | 1 | 500-2,200 | 1,200 | 1,200 |
| Commercial, 2d quality[3] | 1 | 330- 660 | 330 | 330 |
| Sapphire: | | | | |
| Medium to better | 1 | 150-1,500 | 700 | 700 |
| Commercial, 2d quality[3] | 1 | 220- 440 | 220 | 220 |
| Tanzanite | 5 | 500- 950 | 762 | 762 |
| Topaz | 5 | 80- 400 | 210 | 210 |
| Tourmaline, green | 5 | 60- 200 | 132 | 132 |
| Tourmaline, pink | 5 | 50- 225 | 137 | 137 |

[1]Medium to better quality.
[2]Jewelers' Circular-Keystone. V. 154, No. 2, Feb. 1983, p. 87, and v. 155, No. 12, Dec. 1984, p. 44. These figures represent a sampling of net prices that colored stone dealers in various U.S. cities charged their cash customers during the month.
[3]The Gemstone Registry Bulletin. V. 2, No. 2, Jan. 1984, and v. 3, No. 1, Jan. 1985, p. 8.

## FOREIGN TRADE

The declared customs value of U.S. imports of rough and polished natural diamond, excluding industrial diamond, increased 28% to $2.9 billion. Total polished diamond imports, principally from Belgium, 32%; Israel, 26%; and India, 22%; were valued at $2.6 billion. Imports in the over-0.5-carat category, mostly from Belgium, 36%; Israel, 24%; and Switzerland, 13%; increased 43% in value to $1.1 billion. Imports in the less-than-0.5-carat group, mostly from India, 36%; Belgium, 29%; and

Israel, 26%; increased 22% in value to $1.5 billion. Imports of rough natural diamond, 79% from the Republic of South Africa, increased 6% in caratage and 11% in value. A 3% decrease in South African carat value, from $336 to $325, was indicated.

The total value of emerald imports increased 15% to $155 million. The total value of ruby imports increased 19% to $80 million, and sapphire imports decreased 3% to $83 million. Average carat value decreased 45% for emerald to $35, influenced by large imports of cheap cut emeralds from India. Average carat values decreased 31% for ruby to $16 and 8% for sapphire to $23, both impacted principally by imports of cheap goods from Thailand.

Export value of all gem materials other than diamond decreased 20% to $53.6 million. Of this total, other precious and semiprecious stones, cut but unset, were valued at $27.7 million; other natural precious and semiprecious stones, not set or cut, $12.8 million; synthetic gem stones and materials for jewelry, cut, $4.7 million; pearls, natural, cultured, and imitation, not strung or set, $2.6 million; and other, $5.8 million. Reexports of all gem materials, other than diamond, increased 25% to $52.8 million. Reexport categories were precious and semiprecious stones, cut but unset, $33.3 million, and other, $19.5 million.

**Table 3.—U.S. exports and reexports of diamond (exclusive of industrial diamond), by country**

| Country | 1983 | | 1984 | |
|---|---|---|---|---|
| | Quantity (carats) | Value (millions) | Quantity (carats) | Value (millions) |
| Exports: | | | | |
| Belgium-Luxembourg | 103,106 | $50.5 | 128,521 | $65.0 |
| Canada | 16,134 | 10.0 | 19,043 | 11.0 |
| France | 4,094 | 9.9 | 2,153 | 7.1 |
| Germany, Federal Republic of | 3,626 | 5.0 | 3,677 | 3.7 |
| Hong Kong | 58,851 | 87.0 | 63,320 | 64.8 |
| Israel | 75,092 | 39.2 | 101,532 | 53.0 |
| Japan | 30,911 | 62.3 | 29,043 | 54.2 |
| Singapore | 5,996 | 11.5 | 3,734 | 9.2 |
| Sweden | 1,198 | 1.1 | 9 | [1] |
| Switzerland | 12,473 | 76.8 | 20,113 | 73.9 |
| Thailand | 3,504 | 3.3 | 3,813 | 2.4 |
| United Arab Emirates | 1,035 | .7 | 29 | [1] |
| United Kingdom | 5,441 | 9.5 | 5,707 | 14.2 |
| Other | 2,912 | 6.0 | 4,468 | 4.4 |
| Total | 324,373 | 372.8 | 385,162 | 362.9 |
| Reexports: | | | | |
| Belgium-Luxembourg | [2]1,317,578 | 84.6 | [2]1,072,640 | 57.4 |
| Canada | 10,145 | 1.7 | 7,834 | .6 |
| China | 10,613 | .1 | 17,784 | .7 |
| Germany, Federal Republic of | 25,919 | 2.2 | 32,530 | 1.5 |
| Hong Kong | 83,800 | 28.0 | 27,244 | 17.6 |
| India | 226,987 | 6.1 | 228,205 | 6.5 |
| Israel | 212,557 | 34.7 | 126,400 | 26.3 |
| Japan | 92,934 | 11.0 | 98,398 | 8.5 |
| Netherlands | 54,407 | 4.7 | 21,793 | 3.4 |
| Switzerland | 31,667 | 43.7 | 110,486 | 46.3 |
| United Kingdom | 73,474 | 26.9 | 93,442 | 32.6 |
| Other | 24,095 | 5.9 | 50,592 | 10.3 |
| Total | 2,164,176 | 249.6 | 1,887,348 | 211.7 |

[1]Less than 1/10 unit.

[2]Artificially inflated in 1983 by auction of approximately 1 million carats of U.S. Government stockpile diamond stones with subsequent reexports as gem stones to Belgium-Luxembourg. In 1984, 1 million carats was similarly auctioned and reexported to Belgium-Luxembourg and India.

## Table 4.—U.S. imports for consumption of diamond, by kind and country

| Kind and country | 1983 | | 1984 | |
|---|---|---|---|---|
| | Quantity (carats) | Value (millions) | Quantity (carats) | Value (millions) |
| Rough or uncut, natural:[1] | | | | |
| Belgium-Luxembourg | 111,211 | $14.7 | 160,100 | $32.8 |
| Brazil | 2,290 | .7 | 1,431 | .3 |
| Cape Verde | 3,400 | .1 | -- | -- |
| Colombia | 21,413 | .1 | 216 | .2 |
| Congo | 8,690 | 2.7 | 12,977 | 4.4 |
| Dominican Republic | 2,331 | .1 | -- | -- |
| Guyana | 4,989 | .3 | 2,475 | .1 |
| Israel | 9,651 | 1.6 | 14,880 | 4.7 |
| Netherlands | 1,585 | 2.1 | 4,675 | 4.1 |
| South Africa, Republic of | 729,547 | 245.3 | 794,912 | 258.3 |
| Switzerland | 13,035 | 2.6 | 7,748 | 7.2 |
| United Kingdom | 41,234 | 13.4 | 22,125 | 4.6 |
| Venezuela | 65,908 | 3.2 | 34,811 | 2.3 |
| Other | 10,366 | 5.8 | 28,163 | 6.9 |
| Total | 1,025,650 | 292.7 | 1,084,513 | 325.9 |
| Cut but unset, not over 0.5 carat: | | | | |
| Belgium-Luxembourg | 1,126,400 | 358.7 | 1,424,655 | 433.6 |
| Brazil | 5,530 | .8 | 20,567 | 6.0 |
| Canada | 9,832 | 2.5 | 38,567 | 5.2 |
| Hong Kong | 29,957 | 8.9 | 100,017 | 20.3 |
| India | 2,153,148 | 440.8 | 3,107,794 | 544.8 |
| Israel | 1,047,471 | 342.4 | 1,113,127 | 399.5 |
| Malaysia | 5,215 | 1.8 | 21,949 | 7.8 |
| Netherlands | 19,802 | 8.6 | 56,924 | 23.5 |
| South Africa, Republic of | 45,187 | 24.3 | 38,301 | 23.8 |
| Switzerland | 44,864 | 18.0 | 56,670 | 23.8 |
| United Kingdom | 31,417 | 17.2 | 33,332 | 15.3 |
| Other | r70,059 | r17.4 | 44,030 | 16.0 |
| Total | 4,588,882 | 1,241.4 | 6,055,933 | 1,519.6 |
| Cut but unset, over 0.5 carat: | | | | |
| Belgium-Luxembourg | 281,064 | 284.2 | 410,638 | 379.8 |
| Hong Kong | 9,135 | 23.8 | 13,697 | 22.5 |
| India | 58,871 | 18.1 | 83,415 | 23.2 |
| Israel | 165,641 | 132.1 | 342,221 | 259.5 |
| Netherlands | 10,841 | 18.8 | 32,846 | 33.6 |
| South Africa, Republic of | 33,936 | 47.4 | 61,595 | 89.8 |
| Switzerland | 27,364 | 111.1 | 56,618 | 134.0 |
| United Kingdom | 29,544 | 58.8 | 34,643 | 68.9 |
| Other | 33,501 | 47.0 | 51,200 | 48.6 |
| Total | 649,897 | 741.3 | 1,086,873 | 1,059.9 |

rRevised.
[1]Includes some natural advanced diamond.

## Table 5.—U.S. imports for consumption of natural precious and semiprecious gem stones, other than diamond, by kind and country

| Kind and country | 1983 | | 1984 | |
|---|---|---|---|---|
| | Quantity (carats) | Value (millions) | Quantity (carats) | Value (millions) |
| Emerald: | | | | |
| Argentina | 550 | (1) | 12,474 | $1.3 |
| Belgium-Luxembourg | 34,027 | $1.6 | 10,092 | 2.8 |
| Brazil | 174,314 | 8.0 | 197,367 | 13.8 |
| Colombia | 203,485 | 44.1 | 271,559 | 48.9 |
| France | 7,806 | 2.2 | 11,456 | 2.5 |
| Germany, Federal Republic of | 28,293 | 3.7 | 52,883 | 2.4 |
| Hong Kong | 44,289 | 6.1 | 114,630 | 11.3 |
| India | 1,274,765 | 12.8 | 3,220,565 | 16.7 |
| Israel | 87,145 | 17.9 | 162,559 | 19.6 |
| Japan | 8,415 | 2.0 | 28,516 | 1.4 |
| Paraguay | -- | -- | 25,790 | (1) |
| South Africa, Republic of | 7,979 | .3 | 3,118 | .1 |
| Switzerland | 41,518 | 17.4 | 103,859 | 20.8 |
| Taiwan | 78,853 | (1) | 2,758 | (1) |
| Thailand | 64,590 | 2.2 | 116,812 | 4.5 |
| United Kingdom | 36,273 | 11.0 | 20,008 | 4.6 |
| Other | r24,697 | r4.8 | 55,709 | 3.9 |
| Total | 2,116,999 | 134.1 | 4,410,155 | 154.6 |

See footnotes at end of table.

**Table 5.—U.S. imports for consumption of natural precious and semiprecious gem stones, other than diamond, by kind and country —Continued**

| Kind and country | 1983 Quantity (carats) | 1983 Value (millions) | 1984 Quantity (carats) | 1984 Value (millions) |
|---|---|---|---|---|
| Ruby: | | | | |
| Austria | 163,361 | $.2 | 75,977 | $.1 |
| Belgium-Luxembourg | 6,930 | .9 | 14,246 | 1.9 |
| Brazil | 6,594 | .2 | 10,712 | .1 |
| Colombia | 37,070 | .2 | 948 | .2 |
| France | 4,393 | 1.6 | 11,277 | 1.4 |
| Germany, Federal Republic of | 53,343 | 1.5 | 65,703 | 1.6 |
| Hong Kong | 125,447 | 4.9 | 71,857 | 5.5 |
| India | 230,186 | 3.3 | 226,782 | 1.8 |
| Israel | 28,376 | 1.2 | 99,663 | 2.1 |
| Japan | 4,168 | .1 | 33,146 | .6 |
| Switzerland | 221,416 | 8.8 | 81,943 | 12.6 |
| Thailand | 1,840,758 | 36.0 | 4,107,406 | 43.0 |
| United Kingdom | 19,472 | 4.1 | 21,208 | 6.1 |
| Other | r45,158 | r3.8 | 32,977 | 2.7 |
| Total | 2,786,672 | 66.8 | 4,853,845 | 79.7 |
| Sapphire: | | | | |
| Australia | 43,493 | .6 | 13,415 | .4 |
| Austria | 44,945 | .1 | 1,186 | (1) |
| Belgium-Luxembourg | 28,462 | 1.0 | 20,436 | 1.8 |
| Brazil | 11,080 | (1) | 13,209 | .1 |
| Canada | 15,146 | .6 | 9,260 | .6 |
| Colombia | 14,656 | .1 | 1,647 | (1) |
| France | 11,026 | 2.5 | 11,185 | 2.5 |
| Germany, Federal Republic of | 121,800 | 2.5 | 67,298 | 1.8 |
| Hong Kong | 167,305 | 9.9 | 98,180 | 3.8 |
| India | 130,481 | 2.7 | 175,855 | 1.7 |
| Israel | 48,966 | .8 | 71,286 | 1.6 |
| Japan | 8,317 | .3 | 45,737 | 1.3 |
| Korea, Republic of | 5,245 | .1 | 22,478 | .1 |
| Singapore | 12,106 | .1 | 22,955 | .8 |
| Sri Lanka | 48,377 | 4.3 | 28,999 | 2.7 |
| Switzerland | 244,025 | 11.8 | 87,879 | 15.7 |
| Thailand | 2,456,096 | 32.7 | 2,917,584 | 39.2 |
| United Kingdom | 33,959 | 8.3 | 36,973 | 6.6 |
| Other | r25,068 | r6.8 | 32,816 | 2.3 |
| Total | 3,470,553 | 85.2 | 3,678,378 | 83.0 |
| Other: | | | | |
| Rough, uncut: | | | | |
| Australia | NA | 1.0 | NA | 1.9 |
| Belgium-Luxembourg | | .4 | | .4 |
| Brazil | | 11.1 | | 14.0 |
| Canada | | 1.4 | | .1 |
| Colombia | | 7.3 | | 10.3 |
| Hong Kong | | .9 | | .6 |
| Nigeria | | -- | | 2.6 |
| Pakistan | | .5 | | .5 |
| South Africa, Republic of | | .3 | | 1.6 |
| Switzerland | | .7 | | .5 |
| United Kingdom | | .2 | | .6 |
| Zambia | | .9 | | .4 |
| Other | | r2.0 | | 2.3 |
| Total | NA | 26.7 | NA | 35.8 |
| Cut, set and unset: | | | | |
| Australia | NA | 2.1 | NA | 2.8 |
| Brazil | | 12.5 | | 32.7 |
| Canada | | .1 | | 1.3 |
| China | | 2.5 | | 5.0 |
| Germany, Federal Republic of | | 11.8 | | 12.0 |
| Hong Kong | | 22.6 | | 20.4 |
| India | | 4.5 | | 6.1 |
| Japan | | 152.8 | | 240.7 |
| Switzerland | | 4.5 | | .7 |
| Taiwan | | 4.8 | | 5.4 |
| Thailand | | 2.6 | | 2.8 |
| United Kingdom | | .8 | | 1.5 |
| Other | | r5.9 | | 5.6 |
| Total | NA | 227.5 | NA | 337.0 |

rRevised. NA Not available.
1Less than 1/10 unit.

**Table 6.—Value of U.S. imports of synthetic and imitation gem stones, including pearls, by country**

(Million dollars)

| Country | 1983 | 1984 |
|---|---|---|
| Synthetic, cut but unset: | | |
| Austria | 1.3 | 0.8 |
| France | 1.0 | 1.4 |
| Germany, Federal Republic of | 6.1 | 5.5 |
| Japan | 1.0 | 1.4 |
| Korea, Republic of | 6.7 | 9.4 |
| Switzerland | 3.2 | 3.6 |
| Other | 1.2 | 1.7 |
| Total | 20.5 | 23.8 |
| Imitation: | | |
| Austria | 10.9 | 17.4 |
| Czechoslovakia | 1.2 | 1.8 |
| Germany, Federal Republic of | 4.4 | 6.0 |
| Japan | 2.4 | 4.5 |
| Other | 1.4 | 2.7 |
| Total | 20.3 | 32.4 |

**Table 7.—U.S. imports for consumption of precious and semiprecious gem stones**

(Thousand carats and thousand dollars)

| Stones | 1983 | | 1984 | |
|---|---|---|---|---|
| | Quantity | Value | Quantity | Value |
| Diamonds: | | | | |
| Rough or uncut[1] | 1,026 | 292,687 | 1,085 | 325,851 |
| Cut but unset | 5,239 | 1,982,686 | 7,143 | 2,579,466 |
| Emeralds: Cut but unset | 2,117 | 134,130 | 4,410 | 154,644 |
| Coral: Cut but unset, and cameos suitable for use in jewelry | NA | 2,584 | NA | 3,120 |
| Rubies and sapphires: Cut but unset | 6,257 | 151,931 | 8,532 | 162,677 |
| Marcasites | NA | 121 | NA | 152 |
| Pearls: | | | | |
| Natural | NA | 3,019 | NA | 2,823 |
| Cultured | NA | 162,833 | NA | 240,439 |
| Imitation | NA | 3,015 | NA | 6,171 |
| Other precious and semiprecious stones: | | | | |
| Rough, uncut | NA | 26,700 | NA | 35,792 |
| Cut, set and unset | NA | 58,983 | NA | 90,421 |
| Synthetic: | | | | |
| Cut but unset[2] | 36,787 | 18,948 | 52,484 | 21,368 |
| Other | NA | 1,536 | NA | 2,410 |
| Imitation gem stones | NA | 17,281 | NA | 26,182 |
| Total | XX | 2,856,454 | XX | 3,651,516 |

NA Not available. XX Not applicable.

[1]Includes 16,799 carats of other natural diamond, advanced, valued at $759,200 in 1983, and 2,084 carats valued at $700,100 in 1984.

[2]Quantity in thousands of stones.

## WORLD REVIEW

De Beers Consolidated Mines Ltd.'s sales of rough diamond through the Central Selling Organization was $1.6 billion, virtually the same as that of 1983. The value of De Beers' stocks of rough diamond has increased from $936 million in 1980 to $2.0 billion in 1984, even though world retail jewelry sales had set new records every year. The 1983 retail value of world diamond jewelry sales increased 9% to $21.6 billion, representing 45 million pieces containing 9.2 million carats of gem diamond. The largest consuming markets were the United States, 36%, and Japan, 19%, with 50% of their diamond needs imported from India, the world's largest processor of small diamonds.

**Angola.**—Angola, whose diamonds are considered by the market to be "nice goods," is ranked among the top three countries in the world in terms of quality.

Although diamonds have been found over much of Angola in alluvial and eluvial deposits, Companhia de Diamantes de Angola (DIAMANG), 77% owned by the Angolan Government, has concentrated its prospecting and exploitation in a 50,000-square-kilometer concession in Lunda Norte Province in northeast Angola near the Zairian border. A labor force of 17,000 workers and dozens of mining and treatment sites, complicated by smuggling and illicit operations, continued to present major problems at the mining headquarters at Dundo. Diamond production was estimated at over 1 million carats in 1984, 97% of which was gem or near-gem quality. In 1983, the three mining divisions' production was Lucapa, 443,000 carats; Andrada, 295,000 carats; and Cuango, 296,000 carats. In late 1984, the Angolan Press Agency said that 124 people were on trial for smuggling, which caused the loss of about $140 million to DIAMANG. Of these, 1 person was sentenced to death, and 122 others were jailed. The trials were a major attempt by the Angolan Government to curb the smuggling.[2]

**Australia.**—Argyle Diamond Mines Joint Venture produced 5.7 million carats of diamond in its second year of alluvial mining operations, an 8% decline compared with 1983 production, reflecting the expected depletion of the higher grade alluvial material. The 1985 production was projected by Argyle to decline as the remaining alluvial material is mined out. Although much of the Argyle infrastructure was already in, construction was initiated at the beginning of 1984 for the $400 million mine and treatment plant on the AK-1 kimberlite project. The primary crushing plant was delivered in September with planned test operations of the mine and concentrator in mid-1986. Design capacity called for the treatment of 3 million metric tons of ore annually to produce over 20 million carats of diamond, 45% of which will be gem and near-gem quality, with the balance industrial quality. The AK-1 pipe is estimated to contain 150 million tons of kimberlite with a grade of 6.5 carats per ton.[3]

CRA Ltd. and Ashton Mining Ltd. established a diamond marketing organization in Antwerp, Belgium. It was to be run by Argyle Diamond Sales Ltd. (ADS), and was owned 60% by CRA and 40% by Ashton. The organization will eventually handle some 6 million carats of diamond per year. From June 1984, ADS was responsible for marketing 25% of the cheap-gem and industrial diamonds, which will increase to a level of 6 million carats per year when the AK-1 project comes on-stream in 1986. Northern Mining Corp. NL, the other partner in Argyle, had been previously purchased by the Western Australian government and in 1984 was selling its 5% share of production through a Belgian agent. A $65 million public offering of the Western Australian government share was made through the Western Australian Development Corp.[4]

The Bow River joint venture, 20 kilometers from the Argyle project, composed of Freeport of Australia Pty. Inc. and Gem Exploration and Minerals Ltd., recovered 0.35 carat per ton and 0.56 carat per ton from two of the four terraces sampled during 1983-84.[5]

Three equal joint venture members, Ashton, AOG Minerals Ltd., and Aberfoyle Ltd. have delineated a potentially major new diamond province in the Coanjula area of the Northern Territory of Australia near the border of Queensland. Diamonds were discovered in 15 of the 22 first priority geophysical targets.[6]

Stockdale Prospecting Ltd. and United Nickel Ltd. were drilling the Jubilee diamond prospect near Kalgoorlie, Western Australia.[7]

Australia produced over 80% of the world's opal, and over 70% of the world's uncut sapphire. In the last 15 years, production has increased to a total value in 1984 of over $50 million. Small syndicates and individuals operated opal mines at Coober Pedy and Andamooka in South Australia, at Lightning Ridge and White Cliffs in New South Wales, and in Queensland. Sapphire production in 1984 was from the alluvial gravels of the Glen Innes-Inverell district in New South Wales and from the Anakie district in Queensland. The heat treatment of the steel-blue stones, as a method of enhancement, has greatly improved the quality in the international market.[8]

**Belgium.**—The World Diamond Congress held in Antwerp reported through the Diamond High Council that diamond prices were stronger, and that exports to the principal consuming countries, the United States, Switzerland, and Japan, were up substantially compared with those of 1983. Sales of Belgian, Israeli, and Soviet diamonds have benefitted from the movement in demand toward higher priced stones at the expense of the cheaper Indian goods.[9]

**Botswana.**—Botswana was the world's second largest producer of diamonds with a total of 12.9 million carats, a 20% increase compared with that of 1983. This included 5.8 million carats of gem diamond. The richness of the Jwaneng Mine, with over 149 carats recovered from 100 metric tons of ore, far surpassed any of De Beers' operations or joint ventures. In Botswana, 15.2 million tons of diamondiferous kimberlite was processed to produce 12.9 million carats of diamonds. The Jwaneng Mine produced 7.5 million carats, Orapa produced 4.7 million carats, and the Letlhakane, 0.7 million carats.[10]

**Brazil.**—Extratifera de Diamantes Brasil S.A. Exportacao de Comercio was investing $6.9 million in an alluvial diamond deposit in Romaria, Minas Gerais. Capacity was to be 240 cubic meters per hour of gravel with a recoverable content of 200 carats of diamond per day. When fully operational in 1985, the mine will produce 72,000 carats of diamond per year, 76% gem quality and 24% industrial.[11]

According to the Brazilian Department of Trade and Industry, Brazilian production of diamond almost doubled in 1983 to more than 1 million carats. About 60% of the diamond came from mines in the States of Minas Gerais, Matto Grosso, Para, Bahia, and the territory of Roraima.[12]

Minerção Tejucana S.A. was expanding its operations in Minas Gerais in 1984, with a fifth dredge on an alluvial diamond deposit with a capacity of 84,000 carats of diamond per year. Morro Vermelho Ltda. was developing its reserves and had a pilot plant in operation on its alluvial diamond deposit in Cuiaba, Matta Grosso. Design production was 60,000 carats per year.[13]

Brazil is a major world producer of gem stones, other than diamond. Exports in 1982 included over 1.1 million kilograms of crude and worked agate, 197,000 kilograms of crude and worked amethyst, 42,000 kilograms of crude and worked emerald, 32,000 kilograms of citrine, 26,000 kilograms of crude and worked aquamarine, and 400,000 kilograms of other crude and worked gem stones.[14]

**Canada.**—Two companies, Monopros Ltd. and BP Resources (Canada) Ltd., were actively prospecting for diamond in northeastern Ontario. Kimberlite has been found, not only as boulders in gravel, but as outcrops in the Kirkland Lake area of Ontario. In British Columbia, kimberlite has been found on two properties, and one gem-quality diamond measuring 0.43 millimeter was identified.[15]

**Central African Republic.**—Diamond production, the principal mining industry of the Central African Republic, improved in 1984. Although smuggling and illicit mining continued to be a problem, the High Commissioner of Mines and Geology announced a plan of stricter controls of the 40,000 workers, 200 collectors, and 12 purchasing offices. Production increased 19% to 350,000 carats, and it was planned to reach 530,000 carats in 1985.[16]

**China.**—The China Nonmetallic Minerals Industry Corp. estimated that China's annual production of diamond was less than 1 million carats, of which 17% was of gem quality. Mines were located in three Provinces: Liaoning, Hunan, and Shandong. Liaoning's Binhai Mines in Fu County was the best source of larger high-quality gem stones. Shandong has one principal placer mine, Chengjiafu near Tancheng, where stones of 96, 124, and 159 carats have been found since 1979. A number of smaller placer mines also were operated. The Changde Mine in Changde County, Hunan, began production in the early 1970's of principally industrial stones, with a recovery of 0.25 carat per metric ton. Kimberlite deposits were also identified in Guangxi and Guizhou.[17]

**Colombia.**—Empresa Colombiana de Minas and the United Nations Development Fund announced in 1983 a $2.5 million, 30-month exploration program for emeralds and improvement of mining techniques. Improved reserves at the Muzo Mine, 90 miles northwest of Bogota, and at the Coscuez and Peeas Blancas Mines, was to be attempted.[18]

**Ghana.**—Ghana Consolidated Diamonds Ltd. produced 340,000 carats of diamond in 1983, of which 10% was gem quality and the balance industrial quality. Reserves at Akwatia are nearing exhaustion, and production has declined progressively. The company will initiate production at its $12 million Birim River placer project in early 1985, in which diamond reserves were estimated at 20 million carats. Design capacity was based on an annual extraction rate of 800,000 cubic meters of gravel, with a recovery of 1 million carats of diamond.[19]

**Guinea.**—The $86.6 million Société Mixte Aredor-Guinea alluvial diamond mine initiated operations in April 1984. The mine is at Banankoro near Kissidougou in southeast Guinea near the Sierra Leone border.

Proven diamond reserves are 2.5 million carats, 90% of which is of gem quality having an average size of 0.53 carat. The average net selling price for the first production consignment was higher than expected, $248 per carat compared with an estimated price of $225 per carat. Diamond production was less than expected in the first 8 months of operation through December 1984, with 70,000 carats produced. Dragline operation encountered large boulders, clay beds, and undulating bedrock, which impeded operations. The latter problem required an increase in washing plant capacity from 400,000 cubic meters per year to 750,000 cubic meters per year. The target production level of 200,000 carats per year was to be achieved by July 1985.[20]

In 1984, diamond prospecting rights were awarded to several other companies in Guinea as follows: Brady Nixon, 10,000 square kilometers in Kindia-Telemele; ADG, 39,000 square kilometers in Faranah-Kouroussa; and Gulf African Enterprises, 9,000 square kilometers in Nzerekore-Yomou.[21]

**India.**—India has the world's leading diamond cutting and polishing industry. Centered in Surat, Navsari, and Bombay, approximately 300,000 workers operate in the cottage industry. Low wages enabled India to compete very favorably on the world market. In 1984, 28 million carats of rough cheap-gem material, commonly called "Indian goods," was processed as cuttables. India apparently is consuming more than the estimated 26 million carats in the world supply, and is using a substantial portion of the natural industrial stones; 38 million carats in 1984. The Indian Ministry of Commerce and the Hindustan Diamond Co., Ltd. have agreed to develop a sawn-goods industry to provide more cutting material for the cottage industry. Sawn goods are being processed mainly by Belgium and Israel, and their excess supply could be made available to India, especially for the cheaper and small sizes. India's exports of cut and polished diamonds were 5 million carats with a value of $584 million.[22]

**Israel.**—Imports of rough diamond were $881 million, a 13% increase compared with that of 1983. Exports of cut and polished diamonds were $1,035 million, a 3.5% decrease compared with that of 1983. Israel produced more small stones and larger stones than in the recent past, and its traditional medium range was less in demand. It also had firmly established itself as the main source of fancy cuts, especially marquises. The trend toward movement of manufacturing activities to smaller plants continued. Sales to the United States represented about one-half of Tel Aviv's diamond exports.[23]

**Ivory Coast.**—The Ivory Coast Syndicate (ICS) recently completed a second field program on its 1,800-square-kilometer concession in the Sanwi region in the southwest. ICS consisted of three Canadian companies, Eden Roc Mineral Corp., Golden Rule Resources Inc., and Dibi Resources Inc., which together held a 49% interest, with the state-owned Société pour le Développement Minière de La Cote d'Ivoire holding the balance. Eden Roc recommended diamond drilling in the Afema sector, pilot plant processing of Asupiri River alluvials, and bulk sampling of alluvials where a diamond occurrence was located. Further ground work over the anomalies also was recommended.[24]

**Liberia.**—Liberia's diamond production declined 27% to 240,000 carats, 45% of which was gem quality, and the balance industrial quality. Total value was $11 million, a 36% decrease compared with the $17.2 million in 1983.[25]

More than one-half of the diamonds exported from Liberia were believed to have originated in Sierra Leone and Guinea, because of the availability of hard currency in Liberia. Exporters must have a Government license.[26]

**Namibia.**—DeBeers' CDM (Pty.) Ltd. continued mining operations at a reduced rate and produced 930,200 carats of diamond from the beach placers, a 3% decrease compared with that of 1983. However, overburden stripped increased to 19.3 million tons, a 12% increase compared with that of 1983. A bedrock vacuum cleaning unit was commissioned with encouraging results. Seawall construction had advanced the high-water mark to 260 meters seaward, and mining was taking place 200 meters beyond the original high-water mark. The Namibian Government increased the tax on diamond mining to 55%, and CDM pointed out that its tax burden in 1984 will climb to 75% of profits.[27]

**Sierra Leone.**—British Petroleum Co. Ltd. sold its 49% interest in Sierra Leone's National Diamond Mining Co. (DIMINCO) for $8.5 million. DIMINCO is now virtually state-owned. Negotiations for the financing of the $100 million Kono kimberlite project collapsed at yearend. An estimated 70% of Sierra Leone's diamond production is gem

quality, and smuggling and illicit mining has intensified.[28]

**South Africa, Republic of.**—De Beers' Consolidated Mines represented 94% of South African diamond production, and mined 22.1 million tons of ore with a recovery of 9.5 million carats of diamond. The Finsch diamond mine, the Republic of South Africa's largest and richest source of diamond, treated 5.1 million metric tons of ore and produced 4.9 million carats, 65% gem quality, and the balance industrial quality. The Finsch ore grade of 95 carats of diamond per 100 metric tons of ore was the highest of all other South African diamond mines. Finsch underground mine development has progressed to the 680-meter level. As the mine shifted from open pit to underground mining, the last phases of open pit mining produced a lower grade material, and resulted in an ore grade of 95 carats per 100 metric tons in 1984, compared with 100 carats per 100 metric tons in 1983.[29]

De Beers' Namaqualand Div. recovered high-quality gem diamonds from marine alluvial deposits along the Namaqualand coast similar to those produced by CDM north of the Orange River in Namibia. Production was from farm concessions Tweepad, Karreedoornvlei, Koingnass, and Langhoogte. The Annex Kleinzee plant has been temporarily suspended since 1982. De Beers was awarded several prospecting leases off the Namaqualand coast, totaling over 9,000 square kilometers in 1984.

Ocean Diamond Mining Ltd. initiated a beach mining project off the coast of Namibia near CDM operations. An air-lift suction dredge will excavate diamondiferous gravels to a washing plant. The company expected to produce about 3,000 carats per month of over 95% gem-quality stones.[30]

**Tanzania.**—The famous Mwadui diamondiferous kimberlite mine in Tanzania is one of the largest kimberlites ever found in the world. Production of diamond, 70% gem quality, decreased to 262,000 carats in 1984. Results from a completed $30 million mineralogical survey performed by Geosurvey Ltd. of Nairobi, Kenya, indicated the presence of new diamond-bearing deposits. The Dar Madine al-Umma Ltd., a private Egyptian-Arab mineral resource development company, was considering the development of the newly found diamond resources.[31]

**U.S.S.R.**—Soviet annual diamond production in recent years has been constant at a level of 10.7 million carats, 40% of which was gem quality and cheap Indian goods, with the balance industrial stones. A major diamond mining complex on the Lena River had been temporarily closed for modernization for some time and was reopened in 1984. The new Anabar diamond placer mine on the Ebelyakh River, long delayed because of the severe weather conditions and permafrost, was commissioned in 1983.[32]

A large diamond weighing 291.6 carats was found at the Udachnaya Mine in the Yakutsk A.S.S.R. This was the second largest stone ever found in the U.S.S.R., and it was likely to remain in the country.[33]

The U.S.S.R. heavily sold cut diamonds, especially good-quality rounds in medium sizes, mainly in the Antwerp market, during two periods in May and October 1984. This caused considerable disruption in the cutting industries of Belgium and Israel, which produced comparable goods, because Soviet prices were 10% to 15% below market levels. A conservatively estimated $300 million in cut stones entered Europe, $200 million of which came through Antwerp, and generated badly needed foreign exchange for the U.S.S.R.[34]

**Zaire.**—Zaire became the world's largest producer of diamonds with a total of 18.5 million carats, a 54% increase compared with that of 1983. This included 5.2 million carats of gem and cheap gem quality. Artisanal mining almost doubled its production from 5.9 to 10.7 million carats. Production from the Bakwanga deposits has enabled Zaire to be the world's largest producer of industrial diamond (Congo boart) since the alluvial deposits were discovered in 1918. Société Minière de Bakwanga's (MIBA) new 100,000-cubic-meter-per-month bucket dredge was in production, and had the capacity to produce 1 million carats of diamond per year. MIBA's 1983 production was 5.5 million carats and was sold to Britmond-Zaire, a De Beers' affiliate, for $48 million. Only 3.5% of this production was classified as gem quality, but it sold for $21 million, 44% of MIBA's revenue.

## Table 8.—Diamond (natural): World production, by country[1]

(Thousand carats)

| Country | 1980 | | | 1981 | | | 1982 | | | 1983[p] | | | 1984[e] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gem | Industrial | Total | Gem | Industrial | Total | Gem | Industrial | Total | Gem[2] | Industrial | Total | Gem[2] | Industrial | Total |
| Angola | 1,110 | 370 | 1,480 | 1,050 | 350 | 1,400 | 915 | 310 | 1,225 | 1,003 | 31 | 1,034 | 970 | 30 | 1,000 |
| Australia | -- | 48 | 48 | 21 | 184 | 205 | 251 | 306 | 557 | 2,770 | 3,385 | 6,155 | 2,560 | 3,130 | [3]5,690 |
| Botswana | 765 | 4,336 | 5,101 | 744 | 4,217 | 4,961 | 1,165 | 6,604 | 7,769 | 4,829 | 5,902 | 10,731 | 5,810 | 7,104 | [3]12,914 |
| Brazil[4] | 253 | 414 | 667 | 163 | 926 | 1,089 | 80 | 450 | 530 | 200 | 800 | 1,000 | 220 | 880 | 1,100 |
| Central African Republic | 227 | 115 | 342 | 209 | 103 | 312 | 186 | 91 | 277 | 230 | 65 | 295 | [3]270 | [3]80 | [3]350 |
| China[e] | [r]180 | [r]720 | [r]900 | [r]190 | [r]760 | [r]950 | [r]200 | [r]800 | [r]1,000 | [r]200 | [r]800 | [r]1,000 | 200 | 800 | 1,000 |
| Ghana | 126 | 1,132 | 1,258 | 85 | 751 | 836 | 68 | 616 | 684 | 34 | 306 | 340 | 35 | 315 | 350 |
| Guinea[e] | 12 | 26 | 38 | 12 | 26 | 38 | 13 | 27 | 40 | [r]23 | [r]17 | [r]40 | [3]34 | [3]14 | [3]48 |
| Guyana | 4 | 6 | 10 | 4 | 6 | 10 | [e]5 | [e]6 | [e]11 | 5 | 7 | 12 | 5 | 5 | 10 |
| India | 12 | 2 | 14 | 14 | 2 | 16 | 11 | 2 | 13 | 12 | 2 | 14 | 12 | 2 | 14 |
| Indonesia[e] | 3 | 12 | 15 | 3 | 12 | 15 | 3 | 12 | 15 | 5 | 22 | 27 | 5 | 22 | 27 |
| Lesotho | 50 | 4 | 54 | 49 | 4 | 53 | 39 | 3 | 42 | -- | -- | -- | -- | -- | -- |
| Liberia | 123 | 175 | 298 | 132 | 204 | 336 | 170 | 263 | 433 | 132 | 198 | 330 | [3]108 | [3]132 | [3]240 |
| Namibia | 1,482 | 78 | 1,560 | 1,186 | 62 | 1,248 | 963 | 51 | 1,014 | 915 | 48 | 963 | 884 | 46 | [3]930 |
| Sierra Leone | 317 | 275 | 592 | 208 | 97 | 305 | 203 | 87 | 290 | 242 | 103 | 345 | 240 | 105 | 345 |
| South Africa, Republic of: | | | | | | | | | | | | | | | |
| Finsch Mine | 465 | 2,442 | 2,907 | 1,002 | 3,463 | 4,465 | 847 | 3,003 | 3,850 | 1,765 | 3,278 | 5,043 | 1,714 | 3,184 | [3]4,898 |
| Premier Mine | 407 | 1,632 | 2,039 | 510 | 1,530 | 2,040 | 615 | 1,845 | 2,460 | 800 | 1,844 | 2,644 | 765 | 1,785 | [3]2,550 |
| Other De Beers' properties[5] | 1,550 | 1,489 | 3,039 | 1,603 | 1,069 | 2,672 | 1,359 | 906 | 2,265 | 1,400 | 569 | 1,969 | 1,452 | 593 | [3]2,045 |
| Other | 390 | 145 | 535 | 314 | 35 | 349 | 521 | 58 | 579 | 589 | 66 | 655 | 585 | 65 | 650 |
| Total | 2,812 | 5,708 | 8,520 | 3,429 | 6,097 | 9,526 | 3,342 | 5,812 | 9,154 | 4,554 | 5,757 | 10,311 | 4,516 | 5,627 | 10,143 |
| Tanzania | 137 | 137 | 274 | 110 | 107 | 217 | [e]100 | [e]120 | [e]220 | 183 | 78 | 261 | 182 | 78 | 260 |
| U.S.S.R.[e] | 2,250 | 8,600 | 10,850 | 2,100 | 8,500 | 10,600 | 2,100 | 8,500 | 10,600 | 3,700 | 7,000 | 10,700 | 4,300 | 6,400 | 10,700 |
| Venezuela | 238 | 483 | 721 | 102 | 388 | 490 | [e]99 | [e]394 | [e]493 | 45 | 234 | 279 | 75 | 175 | 250 |
| Zaire | 345 | 9,890 | 10,235 | 450 | 8,550 | 9,000 | [e]450 | [e]8,550 | [e]9,000 | 3,355 | 8,627 | 11,982 | 5,169 | 13,290 | [3]18,459 |
| World total | [r]10,446 | [r]32,531 | [r]42,977 | [r]10,261 | [r]31,346 | [r]41,607 | 10,363 | 33,004 | 43,367 | 22,437 | 33,382 | 55,819 | 25,595 | 38,235 | 63,830 |

[e]Estimated. [p]Preliminary. [r]Revised.

[1]Table includes data available through July 8, 1985. Total diamond output (gem plus industrial) for each country is actually reported except where indicated by a footnote to be estimated. In contrast, the detailed separate production data for gem and industrial diamond are Bureau of Mines estimates in the case of every country except Australia (1980-84), Central African Republic (1980-84), Guinea (1984), Liberia (1980, 1981, 1984), Sierra Leone (1980-81), and Venezuela (1980-81), for which source publications give details on grade as well as totals. The estimated distribution of total output between gem and industrial diamond is conjectural, and for most countries, is based on the best available data at time of publication.

[2]Includes near-gem and cheap-gem qualities.

[3]Reported figure.

[4]Series changed from estimated data to reported data to conform with official Brazilian Government published data.

[5]Other De Beers Group output from the Republic of South Africa includes Kimberley Pool, Koffiefontein Mine, and the Namaqualand Mines.

The Zairian Government's 1982 decree liberalizing diamond production and marketing by private Zairians, resulted in some abatement of illegal mining and smuggling. Total diamond exports increased from $72 million in 1982 to $139 million in 1983. The Société Zairoise de Commercialisation de Minerais was abolished by Presidential decree in 1984, and as a result, both MIBA and La Générale des Carrières et des Mines du Zaire were to be responsible for their own marketing. Britmond is the sole buyer of MIBA diamonds with a floor price of $8.55 per carat. Britmond stated that in the first half of 1984 the market value of the diamonds was below the floor price, attributing the decline to the theft of the more valuable stones, a continuing problem.[35]

## TECHNOLOGY

Geological research of the West Kimberley Province in Western Australia indicated that diamonds are found in lamproites as well as kimberlites. Seventy new discoveries of lamproite on the southwest border of the Kimberley craton have been made. This was the first recognition of a primary terrestrial source of diamond other than kimberlite. Different properties and tectonic settings for these two diamond-bearing rocks has given a new and expanding geologic horizon, with different major elements, trace elements, indicator minerals, and geophysical responses.[36]

A research team at Cornell University has used a Q-switched YAG laser beam to melt a diamond surface at high pressure. This experiment was the first phase in investigations to determine whether molten carbon can exist in the earth's interior.[37]

Microscopic diamonds, the largest of which was about 30 micrometers, have been formed during the gas-phase decomposition of a mixture of methane and hydrogen in a microwave plasma, by the Hitachi Research Laboratory, Ibaraki, Japan. Diamond, a very good electrical insulator and heat conductor, could be a very important substrate for integrated circuits.[38]

The General Electric Research and Development Center in Schenectady, New York, produced gem-quality synthetic jadeite with a diamond-making press in samples large enough to be cut into gems.[39]

Soviet scientists at Kharkov University, developed a geobotannical prospecting method for location of diamondiferous kimberlites. Some well-known deposits in the Yakut A.S.S.R. were tested and showed excellent geological delineation.[40]

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