

GEM STONES

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SUMMARY OUTLINE

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The jewelry industry throughout the world improved markedly in 1937 due to relatively large sales in the first 9 months of the year. In the United States retail sales by jewelry stores, estimated by the United States Bureau of Foreign and Domestic Commerce at about \$310,764,000, were approximately 60 percent of those in 1929. Compared with 1936, the increase was 10.2 percent. Diamonds, watches, and silverware led in the recovery. Some stores felt the recession as early as late August, and the Christmas trade was on the whole slightly less than that of 1936. The sale of more expensive items was particularly affected. A bright spot is the relatively small stock held by both wholesalers and retailers.

Fashion in jewels.—Women are again using jewelry lavishly, wearing gold, alone or set with gems, by day and platinum, set with fine stones, by night. Designs are influenced by a legion of periods, places, events, and geometric shapes; the results are usually delicate and a tribute to supercraftsmanship, although in some instances heavy and barbaric with crude, hard color effects. Heirlooms of the sixties and nineties are again being worn. Bracelets, necklaces, and hair ornaments are exceedingly popular, and the last two in many instances can be broken down into clips, bracelets, and brooches. Clips, earrings, rings, and jeweled flowers continue in favor. The jewelry of the present day is marked by variety of color due to the greater use of colored stones and by the widespread use of small diamonds set pavé. This in part explains the remarkably strong market for small cut diamonds. The finer gems—diamond, ruby, sapphire, emerald, and pearl—are of course particularly popular; but topaz is gaining favor, and occasionally aquamarine, amethyst, moonstone, turquoise, and other gem stones are used. Men continue to favor star sapphire, cat's-eye, star ruby, and crystal.

Domestic production.—Domestic production of precious stones reached a peak in 1909, when gem stones valued at \$534,280 were produced; thereafter the industry dwindled until in 1934 the value of the production was probably only about \$3,000. Since then it has gradually increased, and the 1937 output is estimated to have been worth about \$32,000; as the production is by partnerships and individuals exact figures are not available.

Turquoise represents well over half, and Nevada is the principal producer according to a letter from Mr. W. O. Vanderburg. The American Gem Co. leased the property of the Copper Canyon Mining

Co. 8 miles south of Battle Mountain and produced 424 pounds of turquoise. Lee F. Hand and the American Gem Co. produced 300 pounds of turquoise from the Lone Mountain Mine 20 miles west of Tonopah. Part of this was "spider-web matrix." Hand also produced 200 pounds from the Montezuma mine, Royston district. Joseph Norman and Rudolph Rundberg produced 50 pounds from a new prospect 17 miles north of Austin. In Colorado, the Hall mine near Villa Grove employed three to five men and produced considerable turquoise. A little turquoise was also produced in Arizona. The gem stone is cut in Gallup, Santa Fe, Taos, and Albuquerque, N. Mex., and in California cities. A number of tons of moss agate were gathered in the Yellowstone Valley, southeastern Montana, and relatively large quantities of various kinds of agates in central Oregon. Scott's Rose Quartz Co., Custer, S. Dak., produced 377 pounds of rose quartz of gem grade, besides some 35 tons of poorer material. Maine produced tourmaline, agates and jaspers, aquamarine, amethyst, and rose quartz.

Among the other gem stones produced in the United States in 1937 were emerald matrix (Mitchell County, N. C.); rhodolite (Macon County, N. C.) and other garnets (Custer, Chaffee, and Jefferson Counties, Colo.); aquamarine (North Carolina and Park County, Colo.); topaz (Teller and Park Counties, Colo.); amazonstone (Teller County, Colo.); rock crystal (Arkansas); agatized wood (Arizona); and amethyst (Larimer County, Colo.). A new deposit of fine amethyst was discovered in 1937 in Coos County, N. H.

Lapidary work is becoming a relatively popular fad, particularly in the Northwest. Beach pebbles, agates, and various other attractive minerals are eagerly sought as materials to be cut.

Alabaster (fine-grained gypsum) has been produced in some quantity by the Rocky Mountain Alabaster Co., Fort Collins, Colo., and is manufactured into lamps, vases, book ends, and other novelties.

The American Gem Mining Syndicate, Philipsburg, Mont., produced 21,469 ounces of sapphires, valued at about \$35,000 which are used industrially.

Imports.—According to the Bureau of Foreign and Domestic Commerce imports of precious and imitation stones (exclusive of diamond bort and dust) into the United States in 1937 totaled \$50,493,585, an increase of 32 percent over 1936. Details are shown in the following tabulation:

	<i>Carats</i>	<i>Value</i>
Diamonds:		
Rough, uncut, duty free.....	97, 219	\$7, 729, 663
Cut, but not set, dutiable.....	517, 677	29, 860, 396
Glaziers', engravers', and miners', not set, free.....	1, 885, 970	6, 542, 365
Pearls, not strung or set, dutiable.....		1, 104, 580
Other precious stones:		
Rough, uncut, free.....		180, 433
Cut, but not set, dutiable.....		3, 019, 713
Imitation, except opaque, dutiable.....		1, 985, 374
Imitation, opaque, including imitation pearls, dutiable....		25, 400
Marcasites, dutiable.....		45, 661

DIAMOND

Until September 1937 the diamond industry continued the improvement that had been uninterrupted since 1932, and notwithstanding the subsequent recession virtually all indices showed gains of 7 to 49 percent over those for 1936. The improvement was due to better

world financial conditions early in the year, to the increasing demand for industrial stones and for small gem stones in pavé jewelry, and to investment buying. Despite a small increase in production, stocks of rough diamonds decreased, and stocks of polished goods are not high. Prices of both rough and cut diamonds advanced during 1937.

Share dealings.—The shares of diamond-mining companies had a broad and active market during 1937. They had advanced in value about 25 percent by February 24, then slumped, by August 5 reached the year's high, again fell off, and ended the year with a loss of 16 percent. At the end of the year stocks were 53¼ percent of their high (1927) and 541 percent of their low (1932). Of the 15 more important stocks, 13 paid dividends.

Market.—The Diamond Trading Co. sold rough diamonds to the value of £9,151,205, a gain of 7 percent over 1936 sales. Sales totaling £12,000,000 characterize markedly prosperous years. The demand was broad, and good-quality large stones were scarce.

The market for polished stones was broad at higher prices and from January to March was almost of boom proportions. The United States, Argentina, and India were large purchasers, and the trade improved in Great Britain, Austria, Hungary, and Canada.

Investment buying of fine stones was particularly active after September, France being one of the larger buyers.

Cutting.—The diamond-cutting industry improved in 1937, although prosperity in the first half of the year was largely offset by poor business thereafter. Wages increased, as did the yearly average of employment. The International Commission of Commerce of the Diamond Industry, an association of European brokers, cutters, and distributors formed in 1937, is rationalizing the cutting and retail branches of the industry.

Imports.—Diamond imports into the United States in 1937 by countries were as follows:

*Diamonds imported into the United States in 1937, by countries*¹

[Exclusive of industrial diamonds]

Country	Rough, or uncut			Cut, but not set		
	Carats	Value		Carats	Value	
		Total	Per carat		Total	Per carat
Africa, British:						
Union of South.....	14,044	\$966,573	\$68.82	1,510	\$115,992	\$76.82
Other British.....	1,142	74,067	64.86			
Belgium.....	27,321	2,247,871	82.28	391,058	21,846,259	55.86
Brazil.....				2	75	37.50
Canada.....				7	985	140.71
Costa Rica.....				2	455	227.50
Czechoslovakia.....				105	14,062	133.92
France.....	741	43,134	58.21	3,437	305,865	88.99
Germany.....				38	1,715	45.13
Italy.....				6	370	61.67
Japan.....				1,143	55,009	48.13
Mexico.....				30	4,900	163.33
Netherlands.....	22,942	1,718,999	74.93	117,097	7,070,255	60.38
Switzerland.....				320	18,582	58.07
United Kingdom.....	31,029	2,679,019	86.34	2,922	425,872	145.75
	97,219	7,729,663	79.51	517,677	29,860,396	57.68

¹ Compiled from records of the Bureau of Foreign and Domestic Commerce.

Taxes and tariffs.—International tariffs, difficulties of exchange, and taxes continue to restrict the growth of the industry. Italy, British India, and Bahia reduced duties; Peru and Germany increased them, and Japan prohibited the importation of all jewelry.

World production.—World production of diamonds (gem and industrial) in 1937 approximated 9,016,250 carats (1.988 tons), worth about \$43,475,000. Compared with 1936, this is an increase of almost 9 percent by weight and of over 22 percent in value. As only Dutoitspan and Bulfontein of the South African pipe mines operated, the alluvial mines produced 91 percent of the carats but only 68 percent of the value. The British Empire produced 37 percent by weight and 68 percent by value of the output. Of the total production, only about one-third was of gem quality.

The following table gives, as accurately as available statistics permit, world diamond production for the past 5 years:

World production of diamonds, 1933-37, by countries, in carats

[Including industrial diamonds]

Country	1933	1934	1935	1936	1937
Africa:					
Angola.....	373, 624	452, 963	481, 615	577, 531	626, 000
Belgian Congo.....	2, 256, 771	1, 450, 203	3, 758, 620	4, 634, 266	4, 904, 000
French Africa.....	(¹)	-----	(¹)	7, 050	² 25, 600
Gold Coast.....	803, 985	2, 391, 609	1, 145, 828	1, 175, 399	1, 170, 000
Sierra Leone.....	32, 017	68, 633	295, 483	616, 200	² 913, 000
South-West Africa.....	2, 374	4, 126	128, 464	184, 917	² 190, 000
Tanganyika.....	1, 432	1, 155	1, 446	2, 704	³ 3, 230
Union of South Africa:					
Mines.....	14, 149	9, 414	274, 317	339, 719	820, 284
Alluvial.....	492, 404	430, 899	402, 405	284, 204	207, 359
Total, Union of South Africa.....	⁴ 506, 553	440, 313	676, 722	623, 923	⁴ 1, 030, 434
Brazil.....	34, 000	42, 500	39, 100	136, 462	² 100, 000
British Guiana.....	48, 569	44, 821	47, 785	42, 478	35, 038
Other countries ⁵	3, 500	4, 000	5, 500	6, 000	6, 000
	4, 063, 000	4, 900, 000	6, 581, 000	8, 007, 000	9, 003, 000

¹ Included under "Other countries."

² Estimate.

³ Exports.

⁴ Includes a small quantity of diamonds recovered from re-treatment of tailings.

⁵ 1933: Netherland India (Borneo), India, Australia (New South Wales), French Equatorial Africa, and Venezuela; 1934: Netherland India (Borneo), India, Australia (New South Wales), Rhodesia, Nigeria, United States (California), and Venezuela; 1935: Netherland India (Borneo), India, French Equatorial Africa, Nigeria, and Venezuela; 1936: Netherland India (Borneo), India, Rhodesia, United States (California), and Venezuela; 1937: Netherland India (Borneo), India, Australia (New South Wales), Liberia, Venezuela, and Rhodesia.

The increase in production in 1937 came from the pipe mines of South Africa and the alluvial mines of Sierra Leone, offset in part by decreases in output of the alluvial mines of the Gold Coast and of South Africa. The increase was made by mines operated by interests closely allied to the Diamond Corporation. The Central African field (Belgian Congo-Angola) for the past 7 years has been the largest producer by weight but in 1937 lost first place in value to South Africa. The Sierra Leone deposits, discovered in January 1930 by the Colonial Geological Survey officers, Major Junner and J. D. Pollett, are the most important found since those of South-West Africa in 1908. The Sierra Leone production of stones of well-diversified sizes and qualities is growing rapidly. While the mother rock of these diamonds is unknown, the variety in character of the diamonds suggests more than one original source.

Industrial diamonds.—Rapid development of the use of hard alloys in general industry, particularly in the armament trade, made 1937 a record year in the use of industrial diamonds. The United States, Great Britain, Germany, Canada, and Russia are the principal consumers. Over two-thirds of the world diamond output by weight is used by industry. The chief use is truing abrasive wheels, but diamond drills, diamond dies, wheels, and tools impregnated with diamonds or diamond dust (bonded in an artificial plastic or set in powdered metal under heat and pressure), diamond-set tools, and many other uses are also important. The modern automobile factory, the airplane plant, and glass works in particular would be badly crippled were it not for industrial diamonds.

It should be emphasized that, unlike the gem stones, which last for all time, a diamond that enters industry is eventually destroyed.

In 1937, the market for industrial stones was strong and broad with an actual scarcity of the better qualities, forcing use of the poorer grades in certain trades. Prices were firm, with an upward tendency.

The importance of the diamond drill is indicated by the fact that in 1936, 402 miles of holes were drilled in Canada alone. A diamond-drill hole on the Rand has been carried to a depth of almost 2 miles (10,035 feet). Some years ago bort largely supplanted carbonado in most drilling. Experiments continue with the object of supplanting percussion drills with diamond drills in underground mining.

Bahia (Brazil) exports of carbonado or black diamonds in 1936 were 12,867.97 carats (1935, 21,033.65 carats worth about \$630,000).

Imports of industrial diamonds (exclusive of bort and dust) into the United States during the past 5 years were as follows:

*Industrial diamonds (glaziers', engravers', and miners') imported into the United States, 1933-37*¹

Year	Carats	Value		Year	Carats	Value	
		Total	Per carat			Total	Per carat
1933.....	263, 484	\$1, 263, 156	\$4. 79	1936.....	1, 166, 094	\$4, 328, 603	\$3. 71
1934.....	526, 007	2, 862, 349	5. 44	1937.....	1, 885, 970	6, 542, 365	3. 47
1935.....	954, 589	4, 293, 611	4. 50				

¹ Compiled from records of the Bureau of Foreign and Domestic Commerce.

EMERALD, RUBY, AND SAPPHIRE

If fashion continues its present lavish use of colored stones in jewelry, increased production will be necessary to avoid a shortage. At present much of the supply comes from old jewelry. Barring a world financial cataclysm, prices must rise.

The Colombian Government emerald mines were closed in 1937 or at best operated on a very small scale. Leasers started operations at the Chivor Emerald Mines about November 1, 1937. The Russian emerald mines at Murzinka in the Urals were worked on a small scale. One report is that recent production has ranged from \$175,000 to \$300,000 per year. South Africa continues to produce beryl, some little of which is emerald of mediocre quality. Reported values were £10,756 in 1935 and £6,082 in 1936. Emeralds were discovered in

1937 on the farm, Willie No. 481, Leydsdorp district, Transvaal, near an old emerald mine. Most beryl of the pegmatite intrusive in biotite schist is pale-green, but the color is deeper near the contact. Much of the material is badly flawed. A small shipment has been made to India. Late in 1937, the Habachtal emerald mine in the Salzburg Mountains was reopened on a small scale. Emeralds are reported in gravels at Fazenda das Lages, Itaberahy district, Goyaz, Brazil.

In 1936, for the second consecutive year, Burma increased its ruby production (155,381 carats in 1936 compared to 105,484 carats in 1935). Because of restricted exports of jade to China due to the war, Burmese jade miners in the fall of 1937 petitioned the Government to be permitted to reopen the ruby mines of the Nanyaseik stone tract, first opened about 1890 but never extensively operated.

The figures for the 1936 production of sapphires in Kashmir and of sapphires and spinels in Burma is not given. The Anakiefield, Queensland, produced in 1936 corundum gems worth £2,030. The producing areas were Sapphire, Rubyvale, and Willows. Prior to the World War exports, largely to Germany, reached £60,000 to £70,000 annually.

The Ceylon gem industry is prosperous, mining in the Sabaragamuwa Province being particularly active. The Government has appointed a special committee to study the cutting and marketing of the local gems. The price of star sapphires and star rubies (the latter are rare) doubled in the first half of the year, and that of gem sapphires has improved. The demand for cat's-eye is more moderate. Burma buys from Ceylon considerable white sapphire, cat's-eye, and opal. The latter is imported from Australia, cut, and exported widely even to Australia, where cutting facilities are limited.

LESSER GEMS

In 1936, Lightning Ridge and Grawin, New South Wales, produced opals valued at some £6,000, an improvement over 1935. The Queensland opal industry is practically extinct. A little was produced at Sheep Station Creek, and some prospecting was done at Toompine and at Mount Margaret.

Report of the discovery of an important alluvial deposit of zircon at Nizhne Saldinsk comes from Russia.

Burma produced 1,671 hundredweight of jadeite in 1936 against 1,265 hundredweight in the previous year. Export of the stone to China is encountering difficulties, and jade miners are turning to ruby mining. Preparations to work the nephrite deposit near Jordansmuehl, Silesia, are completed, and regular mining has doubtless started.

The United States imported from Bahia, Brazil, 8½ tons of rock crystal in 1936: in the first 8 months of 1937 the exports to America were much less but were offset by larger exports of somewhat poorer material to Europe. Prices range from \$3 a pound for fine large crystals to 4 cents a pound for small water-clear crystals for fusing. The demand for Brazilian citrine is good.

Soviet geologists report the discovery of crystal-lined caves on the upper Maidanal, South Kazakhstan Province.

Prussia produced 332 metric tons of amber in 1936 (112 tons, 1935). Much of this is used industrially. In 1934, Rumania produced 24 kilos of amber; figures for 1935 and 1936 are not yet available.

Thanks to loans by the Eti-Bank, the meerschaum industry at Eskisehir, Turkey, is reviving. Production in 1936 was 621 metric tons.

Madagascar exported 4,804 grams of fine stones in 1936, 220 kilos of amethyst, and almost 100 tons of industrial stones.

In 1936, South-West Africa sold, largely to Germany, aquamarine, tourmaline, and rose quartz valued at £3,993. Sales in 1937 were at about the 1936 rate and also included chalcedony.

BIBLIOGRAPHY

- BALL, SYDNEY H. Precious Stones. American Institute of Mining and Metallurgical Engineers, Industrial Minerals and Rocks, 1937, p. 303-332.
- The Diamond Industry in 1937. Jewelers Circ., May and June, 1938.
- "Investment" Factors of Precious Stones. Jewelers Circ., January and February, 1938. Gemmological News, February and March, 1938.
- CRAWFORD, WM. P., and JOHNSON, FRANK. Turquoise Deposits of Courtland, Ariz. Econ. Geol., June-July, 1937, vol. 32, no. 4, pp. 511-523.
- DAKE, H. C. The Gem Minerals of Oregon. Bull. 7. Oregon Dept. of Geol. and Min. Indust., Portland, Oreg., 1937.
- GOETTE, JOHN. Jade Lore. Shanghai, 1936.
- KNETSCH, GEORG. Geologische Beobachtungen an Diamantlagerstätten der Goldküste, Westafrika. Ztschr. prakt. Geol., vol. 44, no. 11, 1936, pp. 167-174, 2 figs. (incl. g. sk. map).
- MCCALLIEN, W. J. Scottish Gem Stones. Glasgow, 1937.
- POLLETT, J. D. Sierra Leone Diamond Deposits. Bull., Imperial Inst., London, July-September, 1937.
- RAU, WILHELM. Die Edelsteine. Leipzig, 1937.
- SCHLOSSMACHER, K. Praxis der Edelsteinbestimmung w. w. Ed. Klampt Neurode (Eulengebirge), Germany.
- SEGNIT, R. W. Report by the Assistant Government Geologist; Andamooka Opal Field. South Australia Dept. Mines, Min. Rev. 62, 1935, pp. 51-56, 2 figs. (incl. g. sk. map).
- WALCOTT, ALBERT J. Resources Asterism in Garnet, Spinel, Quartz, and Sapphire. Field Mus. Nat. Hist., Chicago, vol. 7, no. 3, 1937, pp. 39-57.
- ZILBERMINTS, V. A., and BONSTEDT, E. M. On the Diamond from the New Deposit in the Syuren River Basin (U. S. S. R.). Acad. Sci. U. R. S. S. (Akad. Nauk), C. R. (Dokl.) n. s., vol. 3, no. 7, 1936, pp. 329-331.

