

GEM STONES

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SUMMARY OUTLINE

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JEWELRY INDUSTRY IN 1942

Retail sales by jewelry stores in the United States totaled \$699,000,000 in 1942—an all-time record and a 32.9 percent increase over 1941. Gains were particularly large in Washington and Oregon and in other areas where there are big war plants. As in the past 2 years, the increase was due to a large turn-over of relatively inexpensive items, although a few high-priced items were sold. Even the New York Fifth Avenue shops are showing more reasonably priced articles. The Christmas trade reached an all-time record, many believing it to be the last Christmas until the war is over when one could buy what one liked.

Increased sales were due to the marked rise in income of a large number of Americans (national income: 1939, 70 billion dollars; 1942, 119.8 billion dollars—thanks, unfortunately, to the war), to some investment buying, and to an all-time high in number of weddings (about 1,800,000 marriages, an 11-percent increase over 1941). Women war workers form a new class of jewelry-store customers, and some new fortunes are being made which will mean new purchasers of gems.

National income in 1943 will be even greater than that in 1942; and, notwithstanding the markedly higher taxes, the public will be ready to buy jewelry, particularly that moderately priced. Retailers will have difficulty in keeping their showcases filled, even though their business, as is likely, may average less than that of 1942. However, they can get diamond-set palladium jewelry and other gem stones, probably set in gold, and will find dealing in old jewelry profitable. As retailers face a shortage in help and higher operating costs and taxes, as well as ceiling prices on their wares, their 1943 profits are not likely to be as large as those of 1942.

Sales by wholesalers showed smaller gains (9 percent), and yet their stocks decreased (10 percent). Retailers' stocks decreased during the

year, and certain lines (watches, alarm clocks, etc.) were sold out during the Christmas season; they are begging wholesalers for goods, and of course, owing to Government regulations, the situation will become more acute. Late in 1942 the War Production Board limited the size of inventories that might be carried by the large and financially more stable companies in the hope that stocks might be distributed more evenly among retailers. Inventories in 1942 shrank only slightly.

As far as selective service is concerned, the jewelry trade is to receive few favors; jewelry artisans, lapidaries, and salesmen (both retail and wholesale) are nondeferrable.

Canadian retail sales were excellent before the new 25-percent excise tax was effective, June 23, 1942.

FASHIONS IN JEWELS

The rather severe modern gown requires the gaiety of jewels. Utilitarian, though smart, jewelry characterized the mode in 1942, and hence multiple-use clips and other double-duty jewelry were popular. The vogue for gold continued to grow at the expense of platinum, which cannot be used hereafter for jewelry. Regimental jewelry, "V for Victory," and floral designs were popular, although geometric, Hindu, and Latin American motifs also were used. Ensembles set with similar stones were much worn. Clips and brooches were especially popular; bracelets (identification and charm bracelets largely), earrings, and rings were also in demand.

Owing to the shortage of melee, pavé mountings are becoming rare. Topaz, amber, and aquamarine barbaric in size were used in bracelets and rings. Diamond (including some yellow stones), ruby, and sapphire (largely blue, but also yellow and pink) were the most popular gems, followed by topaz, aquamarine, amethyst, and amber. The insistent demand for diamonds and the patriotic motif in jewelry caused colorless stones to be dominant, followed by blue and red stones, then yellow and brown, and then green, purple, and black. The wide knowledge of gem stones, because of lectures by jewelers and courses in some colleges, is causing the American public to use a wider range of gem stones than ever before. Fine examples of certain of these stones are not too expensive, and some of them may be as beautiful as some of the noble gems.

DOMESTIC PRODUCTION

The production of gem stones in the United States in 1942 did not escape the blight of war, because producers sought minerals of greater strategic importance. Further, gas rationing in 1942 reduced not only collecting by amateurs but cut down the number of tourist customers who passed the lapidary's door. On the other hand, the shortage of foreign-cut stones improved the market for stones of American origin and cut. Intensified mining of pegmatitic ore bodies for block mica, beryl, and tantalite should have increased the production of aquamarine and other pegmatitic gem stones; but, if so, the miners appear to have high-graded the gem byproduct. Government-aided crystal mining (for radio plates) in Arkansas and California also probably increased the production of crystal suitable only for objets d'art. Makers of meerschaum pipes were short of the Turkish raw material, and satin spar was not available to the cutters of beads at Niagara

Falls. Restrictions on the use of silver in jewelry are said to have reduced the manufacture of turquoise-set jewelry by the Navajos.

It is believed that the net result of these various factors was a markedly smaller production of gem stones in 1942. A rough estimate of the value of uncut stones used in jewelry and related industries is \$150,000 with a total value after cutting of \$400,000; corresponding estimates in 1941 were, respectively, \$240,000 and \$770,000. Of the total value in 1942, sapphires (largely used industrially) represented 31 percent, turquoise 21 percent, and the quartz minerals 20 percent. The chief producing States in approximate order of output were Montana, Nevada, Oregon, and Wyoming.

Two corporations in Montana in 1942 produced sapphires weighing about 50,000 ounces (1.71 short tons) worth \$47,000; most of these stones were stock-piled for possible use as instrument jewels, although a few were cut for gems. American Gem Mines (Charles H. Carpp, manager) at Philipsburg was the principal producer; this company sold its product to the Government. The Perry-Schroeder Mining Co., a gold-dredging company operating near Helena, was permitted, after the orders closing gold mines were issued, to continue dredging because of its sapphire byproduct. The New Mine Sapphire Co. at Utica and the Simon property near Butte did not operate.

The Smith mine near Beowawe, Nev. (product sold in California); was the principal turquoise producer; it yielded 13,033 pounds valued at \$32,000. B. F. Couch reports that other Nevada turquoise miners produced about 350 pounds worth \$4,000. The King property, at Manassa, Colo., also produced considerable turquoise, and a small quantity is said to have been mined near Kingman, Ariz. The Los Cerrillos mine, near Santa Fe, N. Mex., was not operated.

Dr. H. C. Dake reports that in 1942 gem mining in the Pacific Northwest (Washington, Oregon, Idaho, Montana, and Wyoming) was only about half as active as in 1941, although cutting of agate cabochons increased. Part of the lapidary industry was converted to the cutting of radio quartz plates. Fine moss agate was discovered about 8 miles southeast of Willowdale, central Oregon; the agate is reported to occur as a thick vein in rhyolite, and about 4,000 pounds worth \$4,000 is said to have been mined.

Fine moss agates continue to be recovered from the gravels of Yellowstone River in southeastern Montana, but in diminishing quantities. R. L. Harris, of Miles City, Mont., a jeweler and moss-agate enthusiast, found on the banks of the Yellowstone a moss agate with a natural "V" for Victory on it. He had it cut and mounted in a ring of Montana silver and requested a national news weekly to present it to Winston Churchill; this was done, and the last leg of the journey was made in a ferry bomber. The Prime Minister was pleased to accept it. A little agatized wood, "rainbow" agate, and other forms of quartz are produced in Wyoming.

New occurrences of both green and black jade (nephrite) have been discovered in the general vicinity of Lander, Wyo. (personal communications of Fred Abernathy, Lloyd B. Curtis, H. C. Dake, and O. W. Plaga). Some of the green is of fine quality and worth \$5 a pound. Boulders of jade, one of which is said to weigh almost 2,000 pounds, occur in an area 20 miles long and 3 miles wide paralleling Sweetwater River. Black nephrite is reported to occur in place in granite, but

the lighter green is known only as boulders. It is by no means impossible that after the war American jade will be exported to China.

A. M. Buranek reports that several hundred pounds of variscite were mined from the Clay Canyon deposit near Fairfield, Utah, and collectors obtained some variscite from Grantsville (Tooele County) and Lucin (Box Elder County). Fine agates and jaspers were obtained in eastern Utah. Considerable jet was collected from the Henry Mountains in southeastern Utah. Black obsidian with white chistobalite inclusions, attractive when polished, has been found in Millard County, and some has been sold. Good topaz crystals were collected on Topaz Mountain, and pyrope garnet was obtained near Mexican Hat, San Juan County.

P. C. Leggett reports that several hundred carats of fine amethyst were produced in 1942 from two New Hampshire localities—Stark and Milan. The Stark locality, on Lone Mountain, is almost exhausted, but smoky quartz crystals occur rather abundantly in other "pockets" on the mountain. After heat treatment, the gem turns pale yellow. The Milan amethyst from Greens Ledge is not as fine as that from Stark, but the crystals are larger and less flawed. Gems of almost 30 carats have been obtained. Yellow, wine, blue, and colorless topazes also are found on Greens Ledge. Several good aquamarine crystals were found during the year in two mines in North Groton. Deeply colored, asteriated rose quartz was produced near the French mine in Gilsum.

Hugh D. Miser (see Bibliography) considers the veins from which the Hot Springs (Ark.) quartz crystals are obtained to be hydrothermal deposits of probable magmatic origin of mid-Pennsylvanian age. Although some of the finer crystals are sold for jewelry under the trade name "Hot Springs diamonds," most are sold to collectors or to constructors of water fountains and religious and memorial shrines. He estimates the value of crystals sold in 1941 at \$12,000. Some are cut into radio oscillators. Crystals weigh from a small fraction of an ounce to 330 pounds. Certain localities furnish beautiful crystals of smoky quartz.

Other gems produced in the United States in 1942 included alabaster (South Dakota); albite (Maine); amazonstone (near Bar Harbor, Maine); amethyst (Maine); aquamarine (Amelia, Va.; Avon, Idaho); asteriated quartz (Wyoming); caesium beryl (Maine); lepidolite (Maine); moss agate (Siskiyou and San Bernardino Counties, Calif.); pipestone (Minnesota); rock crystal (Arkansas); rose quartz (Maine and South Dakota); greenish spodumene (Maine); topaz (Maine); tourmaline (Maine); and californite, a variety of vesuvianite, (Siskiyou County, Calif.).

CANADA GEM STONES

Dr. A. L. Parsons reports that a little rock crystal was discovered in 1942 in Leeds County, Ontario; otherwise, the industry, never important, was dead.

The Royal Ontario Museum at Toronto has a fine collection of Canadian gem and decorative stones, notably agate (Bay of Fundy and Thunder Bay district, Ontario); amethyst (Nova Scotia and Thunder Bay district, Ontario); and rose quartz (Lyndock Township, Ontario, and Manitoba). The rose quartz is deep in color and has

been used commercially to some extent. Included, also, are peristerite, an iridescent feldspar (Monteagle Township, Ontario); sodalite (Bancroft, Ontario, and Ice River, British Columbia); aquamarine (rare, Lyndock Township, Ontario, and southeastern Manitoba); golden beryl (rare, Manitoba); yellow scapolite (Grenville Township, Quebec); and amber (Cedar Lake, Manitoba).

IMPORTS¹

Imports of precious and semiprecious (real and imitation) stones (exclusive of industrial diamonds) totaled \$28,449,422 in 1942, a 16-percent decrease from 1941. Details are as follows:

Precious and semiprecious stones (exclusive of industrial diamonds) imported for consumption in the United States, 1941-42

Commodity	1941		1942	
	Carats	Value	Carats	Value
Diamonds:				
Rough or uncut (suitable for cutting into gem stones), duty-free.....	215,026	\$10,301,371	277,826	\$11,518,085
Cut but unset, suitable for jewelry, dutiable.....	229,582	18,346,415	125,806	14,599,770
Emeralds:				
Rough or uncut, free.....	10,295	25,739	6,506	676
Cut but not set, dutiable.....	22,160	313,185	21,209	205,717
Pearls and parts, not strung or set, dutiable:				
Natural.....		387,053		179,169
Cultured or cultivated.....		469,676		
Other precious and semiprecious stones:				
Rough or uncut, free.....		107,610		72,387
Cut but not set, dutiable.....		2,968,129		1,580,705
Imitation, except opaque, dutiable:				
Not cut or faceted.....		10,962		195
Cut or faceted:				
Synthetic.....		244,264		86,829
Other.....		534,070		97,573
Imitation, opaque, including imitation pearls, dutiable.....		33,377		2,622
Marcasites, dutiable:				
Real.....		28,228		104,150
Imitation.....		7,136		1,544
		33,777,215		28,449,422

METAL SHORTAGES IN AMERICAN JEWELRY TRADE

Most of the common metals normally utilized in costume jewelry were diverted to national defense in 1941; and in 1942 use of most of the other metals in jewelry was prohibited. Limited amounts of domestic silver are still available, as, of course, is gold. Small amounts of the copper necessary to harden these metals can be used until June 30, 1943. The use of platinum, iridium, and rhodium in jewelry is forbidden. However, palladium alloyed with ruthenium is an acceptable substitute for platinum. Incidentally, should the need for it arise, the diamond-set platinum jewelry of United States citizens constitutes a considerable reserve of two critical materials for war purposes—platinum and diamonds. The Canadian manufacturer of jewelry is restricted even further, because the use of palladium is forbidden.

PRICE CEILINGS

Jewelry prices were frozen in June 1942 to the level effective during March 1942, although this did not affect "precious stones" as defined

¹ Figures on imports compiled by M. B. Price, of the Bureau of Mines, from records of the Departments, Commerce.

by the Office of Price Administration. A precious stone, according to the OPA, is "any ruby, sapphire, emerald, natural pearl or any diamond weighing more than 1 carat or any semiprecious stone, after sale by the cutter, when the cutter has received more than \$100 for sale of the stone." In addition, when "two or more diamonds with an aggregate weight of 1.5 carats are set in one mounting," the diamonds shall be deemed precious. According to this definition a faded ruby, a watery sapphire, or a badly flawed emerald weighing a carat is precious, but a half-carat, flawless, well-cut diamond is not.

CONVERSION OF THE JEWELRY INDUSTRY

The jewelry industry—as it produces in part articles of no value to the war effort and as it has been shorn of many of its raw materials—has been converted to war work to the greatest possible extent. Some of the larger units are wholly converted, the smaller less completely so, although some of the smaller shops, by pooling, have obtained valuable subcontracts. Silverware plants are making munitions; a firm formerly manufacturing expensive jewelry is now cutting quartz plates for radio work; and watch factories are turning out instrument jewels.

GOVERNMENT REGULATIONS

Every government, from the smallest to the largest, since the war began has had to formulate a host of regulations for the jewelry trade. The principal objects were to divert funds normally spent on jewelry to government securities, to discourage exportation of easily converted wealth, and to prevent critical material and needed skilled labor from being used to produce unessential merchandise.

EFFECT OF WAR ON THE GEM-STONE TRADE

In 1942, the United Nations lost Burma and thereby an important source of ruby, sapphire, spinel, jade, and tourmaline. On the other hand, when Dakar sided with the Fighting French, the Axis Powers lost the most important source of industrial diamonds remaining to them.

There is no shortage of gem diamond, ruby, emerald, and sapphire in America, nor of most of the less expensive precious stones, with the possible exception of zircon. The "good-neighbor policy" is making Americans more familiar with the lovely tourmaline, aquamarine, and topaz of South America. The lapidaries of the Northwestern States are cutting many agate and jasper cabochons for mountings of inexpensive jewelry. Supplies of synthetic stones and imitations are inadequate.

Owing to the war, Indian and Ceylonese stones (especially sapphire and star sapphire) arrive in New York direct instead of via Paris and London, as formerly. By air mail, elapsed time is 3 or 4 weeks.

Nazi puppets in the Netherlands, Croatia, and other dependencies continue to rob Jews of their jewelry, in instances having the effrontery to pretend that the funds which the jewels represent will be administered in favor of the victims.

Americans in India are buying jewels for souvenirs on an extensive scale. Jaipur, the principal Indian cutting center, has never been busier. As the business ethics of the average Hindu jeweler are low,

some American soldiers will find themselves possessing fine bits of glass; others will acquire jewels that will serve as heirlooms for generations to come. Algerian goldsmiths look upon the arrival of Americans as a reasonable excuse to quadruple prices.

DIAMOND

The diamond industry had its most prosperous year in over a decade, owing to unprecedented sales of industrial diamonds. Rough, suitable for gem cutting, also was sold in considerable quantity.

Production continued in 1942 at about the 1941 rate, although it was only 69 percent of that in 1940. A large part of the product of the mines of central and northwest central Africa—only African mines now operating—is of industrial grades, but the gem stones recovered are sufficiently valuable to keep industrial prices reasonable. Prices of rough and fine large cut continued to advance; those of small cut declined somewhat. In fear of inflation, "investment" buying increased in the black markets of Europe and the free market here.

Share dealings.—The shares of diamond-mining companies, virtually all of which are listed on the London Stock Exchange, gained over one-third in value in 1942. Their record was much better than that of the British industrials or American stocks in general. Frequently they were market leaders.

Stocks were hesitant for the first quarter, then advanced sharply; fell, owing to the British set-back in Libya, but from mid-July to the year end gained markedly. At the close of the year stocks stood at 560 percent of the all-time low (1932) and at 52 percent of the all-time high (1927). Nearly all the companies paid dividends in 1942, several at increased rates.

Market.—In 1942, the Diamond Trading Co., which in normal times controls the sale of about 95 percent of the world output, sold rough to the value of well over £10,500,000. "American qualities" (large fine rough) and fine small goods enjoyed a satisfactory market, but probably over 40 percent of the sales were of industrials. In mid 1942 the British Government appointed C. H. Rodwell diamond controller. The Trading Co. branch office at Hamilton, Bermuda, is said to have been closed recently, all stocks on hand having been sold.

In 1942 America bought large quantities of medium-size cut, particularly in the second half of the year. The other warring nations bought what they could, usually in "black" markets at fantastic prices. In time of war diamonds are natural "investments" to the enslaved people of a conquered country and to citizens of a belligerent country whose war future is dismal.

Prices of rough diamonds early in the year advanced 5 to 20 percent, according to qualities. Fine cut advanced 10 to 15 percent; melee slumped 30 percent in the first half of the year but rallied and was off but 10 percent at the year end.

Stocks of rough decreased markedly in 1942, as consumption exceeded production. Stocks in the hands of American cutters are probably adequate, as are those of fine large cut; the supply of small cut is abnormally low.

Imports.—As the following table shows, 1942 imports of gem diamonds were 91 percent of those of 1941, a small gain in rough imported being offset by a larger loss in cut. The quality of cut imported was excellent; that of rough was mediocre.

Diamonds imported into the United States, 1941-42, by countries

[Exclusive of industrial diamonds]

Country	Rough or uncut			Cut but unset		
	Carats	Value		Carats	Value	
		Total	Average		Total	Average
1941						
Argentina.....				146	\$3,607	\$58.95
Belgium.....				145,504	8,293,551	57.03
Brazil.....	63,710	\$2,280,623	\$35.80	7,434	673,099	91.22
British Malaya.....				236	19,873	69.50
Cuba.....				205	17,808	86.87
France.....				4,950	726,665	146.80
Germany.....				539	42,337	78.55
Hong Kong.....				9	596	66.22
Mexico.....				443	35,930	81.11
Netherlands.....				1,521	76,565	50.34
Netherlands Indies.....				104	5,339	51.34
Palestine.....				5,523	703,293	127.34
Switzerland.....				630	103,796	172.69
Union of South Africa.....	150,324	7,986,039	53.13	42,326	5,450,923	128.78
U. S. S. R.....				30	2,250	75.00
United Kingdom.....				19,932	2,170,778	108.91
Venezuela.....	992	34,704	34.98			
	215,026	40,301,371	47.91	229,582	18,346,415	79.91
1942						
Argentina.....				36	32,013	889.25
Belgian Congo.....	205	4,573	22.31			
Belgium and Luxembourg.....				26,755	2,042,757	76.35
Brazil.....	6,320	477,812	75.60	23,842	2,686,071	112.66
British Guiana.....	591	19,775	33.46	55	5,810	105.64
British Malaya.....				278	19,628	70.60
Canada.....				1	395	395.00
Colombia.....				18	2,666	143.11
Cuba.....				2,746	321,863	117.21
France.....				1,327	184,250	138.85
Germany.....				162	7,520	46.42
India and Dependencies (British India).....				1	50	50.00
Mexico.....				365	41,211	112.91
Netherlands.....				960	83,341	86.81
Netherlands Indies.....				117	13,579	116.06
Palestine and Trans-Jordan (Palestine).....				20,502	2,989,910	145.84
Switzerland.....				175	19,346	110.55
Union of South Africa.....	252,580	10,524,425	41.67	35,153	4,738,062	134.78
United Kingdom ¹	1,683	102,154	60.70	13,307	1,410,598	106.00
Venezuela.....	16,447	389,346	23.67	6	700	116.67
	277,826	11,518,085	41.46	125,806	14,599,770	116.05

¹ United Kingdom of Great Britain and Northern Ireland.

Cutting.—In 1942 diamond cutting ceased its recent rapid growth, due partly to a slightly smaller demand for large cut but mostly to the diversion of artisans from gem to industrial cutting.

Now that the Low Countries are no longer factors in the cutting industry, the United States (750 cutters and 750 apprentices) and Palestine (reported as 2,500 cutters) are the largest cutting centers, followed by South Africa (400 cutters), Great Britain (300), Puerto Rico (75), and Cuba (66). Java, Borneo, and Brazil cut some diamonds for their local trade, but the cutting is not done well enough to satisfy the American trade.

Several of the belligerents propose to train their wounded as cutters, notwithstanding the unfortunate outcome of similar experiments after the First World War.

World production.—For the third year, due to the war, accurate diamond-production statistics are not available, but the estimates in

the following table are believed to be fairly accurate. World production (gems and industrials) in 1942 is estimated to have been 9,254,200 carats (1.851 metric tons) valued at \$28,000,000. Compared with 1941, the weight increased somewhat more than 1 percent, and the value did not change. The quality was similar to that of 1941, bort representing about 79 percent of the total and gem stones 21 percent. Belgian Congo was the leading producing country, both in weight (65 percent of the total) and in value (29 percent). The British Empire produced 22 percent of the total by weight and 33 percent by value. As the South African pipe mines were not operated, all production was from alluvial mines.

The following table shows, as accurately as available statistics permit, world production for the past 5 years.

World production of diamonds, 1938-42, by countries, in metric carats

[Including industrial diamonds]

Country	1938	1939	1940	1941	1942
Africa:					
Angola.....	651,265	690,353	784,270	787,000	1,791,850
Belgian Congo.....	7,205,620	8,360,000	9,603,000	5,866,000	6,018,000
French Equatorial Africa.....	16,013	118,000	176,000	20,000	20,000
French West Africa.....	61,928	56,314	175,000	35,000	36,000
Gold Coast ²	1,296,763	1,087,652	1,825,000	1,000,000	1,000,000
Sierra Leone.....	689,621	1,600,000	750,000	850,000	1,850,000
South-West Africa.....	154,856	35,470	30,017	46,578	60,000
Tanganyika (exports).....	3,576	3,445	2,250	1,750	1,000
Union of South Africa:					
Mines.....	979,460	1,089,144	1,371,447	-----	-----
Alluvial.....	259,147	160,684	1,172,027	112,300	106,000
Total Union of South Africa.....	1,238,607	1,249,828	1,543,474	112,300	106,000
Brazil.....	235,000	1,350,000	1,325,000	325,000	300,000
British Guiana.....	32,522	32,491	126,764	27,000	27,000
Other countries ⁴	84,200	19,000	31,750	34,350	44,350
Grand total.....	11,619,971	12,500,553	13,012,525	9,104,978	9,254,200

¹ Estimated.

² 1938-40: Exports; 1941-42: Production.

³ South African production without Namaqualand was about 76,505 carats.

⁴ 1938: U. S. S. R., India, Borneo, New South Wales, and Venezuela; 1939: Venezuela, India, Borneo, New South Wales, and U. S. S. R.; 1940 and 1941: Borneo, India, New South Wales, U. S. S. R., and Venezuela (Venezuela produced 29,399 carats); 1942: Borneo, India, New South Wales, Rhodesia, U. S. S. R., and Venezuela (Venezuela produced 34,084 carats).

Both Angola and Belgian Congo showed slightly greater production; but the decrease in South Africa was rather marked, indicating near exhaustion of its alluvial diggings.

In 1942 some of the companies attempted to increase production of the industrial stones so necessary today and succeeded in a small way. If the war continues, however, the long-term outlook is for a drying up of production, as certain essential supplies will be lacking owing to the isolation of the mines now producing.

Industrial diamonds.—In these days industrial diamonds steal the limelight from the gem variety, not only as to sales but as to romance. Concerning the latter, we may cite the recovery of several shipments snatched by the Allies from under the eyes of the Axis Powers.

The use of industrial diamonds, particularly of crushing bort, continues to increase beyond the expectations of anyone in the industry. Part of this expansion, of course, is due to the war program; but after the war is over, industrial diamonds will retain much of their gain in use. Consumption greatly exceeds production. The

finer grades continue to be scarce, but users are schooling themselves to utilize advantageously the grades that are available.

Germany and Italy are already feeling a shortage of industrial diamonds. Germany's shortage is dramatically indicated by the fantastic prices charged in the Swiss "black" market. Japan is in an even less enviable position, as it has not a store of gem stones to which it can resort.

Wholesale prices of industrials in 1942 remained firm; retail prices strengthened. During the year the War Production Board tightened its regulations as to transactions in industrial diamonds.

In pre-war days the percentages, by value, of the chief uses for industrial diamonds were as follows:

	Percent
Diamond drilling.....	45-40
Diamond-set tools.....	30-35
Diamond dies.....	10- 7
Crushing bort (bonded wheels and tools).....	10- 7
Miscellaneous.....	5-11

Today the use of crushing bort is much greater, and the use of diamond-set tools and of dies is relatively greater, largely at the expense of diamond consumption in drilling.

Imports of industrial diamonds into the United States during the past 5 years were as follows:

Industrial diamonds (glaziers', engravers', and miners') imported into the United States, 1938-42

Year	Carats	Value		Year	Carats	Value	
		Total	Average			Total	Average
1938.....	1,396,247	\$4,213,412	\$3.02	1941.....	6,882,248	\$14,908,809	\$2.17
1939.....	3,568,730	9,725,683	2.73	1942.....	11,208,704	22,154,076	1.98
1940.....	3,809,071	11,026,563	2.89				

RUBY, SAPPHIRE, EMERALD

In Indian Precious Stones, by L. A. N. Iyer (Bull. 6, Records of the Geological Survey of India, Calcutta, New Delhi, 1942, pp. 17-23), the Indian sapphire localities of Afghanistan, Burma, and Ceylon are described. In its 40-year life (1885-1925), the average annual gross of the Burma Ruby Mines Co. was only about \$300,000, sufficient reason why the company expired some years ago. The local natives carry on mining in a crude way, either by shallow shafts from which the "byon" is removed and robbed laterally as far as safety permits; by terracing the sides of a hill, somewhat after the Colombian mining practice; or by collecting gravels from limestone caves. The gravels are treated in an open, slightly sloping pond, in which the valuable gems sink and the valueless sands are washed away.

Edward Gübelin (see Bibliography) described the rather distinctly differing microscopic and other characteristics of sapphires from the major fields (Kashmir, Burma, Thailand, and Ceylon).

LESSER GEMS

Jade (nephrite) occurs in Burma in place in a dike, in a Tertiary conglomerate derived from it, and in modern stream gravels (Indian Precious Stones, by L. A. N. Iyer, pp. 38-41). Mining is confined to the dry months, March to May. Although the finer cutting is done in China (75 percent of the product is exported to that country), some stones are cut in Mandalay. The market depends on the prosperity of China; hence, at present it is depressed.

In 1940, Madagascar produced 4,400 pounds of agate, 1,004 pounds of rock crystal, and 28,508 troy ounces of precious stones of various classes. Its beryl, amethyst, and particularly its amber are fine.

Brazil is rich in precious stones. Its diamond and quartz crystal are mentioned elsewhere; one report states that in the first 9 months of 1941 Brazil exported the following additional gem stones to the United States:

<i>Kind</i>	<i>Quantity</i>	<i>Value, milreis</i>
Aquamarine.....	grams... 26,080	1,912,092
Amethyst.....	do... 45,286	666,336
Tourmaline.....	do... 3,412	238,027
Topaz.....	do... 16,561	175,821
Agate.....	kilos... 5,410	83,076
Other gem stones.....	grams... 371,129	1,431,107

About 63 percent of these exports reached the United States. Total exports of aquamarine in 1940 were reported to have been 1,169,034 grams, worth about \$667,000, and in 1941, 524,651 grams, worth about \$550,000. Brazil's cutting industry employs about 2,500 artisans.

An aquamarine weighing 109 kilos was found early in the summer of 1942 at Ariranho in the State of Minas Gerais. The owners were at once offered 800 contos for the stone, or about \$40,000. A short time before, a fine block of rock crystal weighing 480 kilos had been found in the same region.

South-West Africa formerly sold its precious stones to the Germans; in consequence, since the war began very little if any mining has been done. In 1939, however, 4,075,031 grams of precious stones were produced, and 9,226,269 grams, worth £1,132, were exported to Germany. The principal stones were aquamarine, heliodor (golden yellow beryl), tourmaline (blue, through green, to a pale yellow-green), rose quartz, and chalcedony. A few colorless or light-blue topazes are also produced around Leideritz Bay in the diamondiferous gravels, and some agate. Apparently, so far as aquamarine, tourmaline, and topaz are concerned, the pegmatite druses at the surface are more or less exhausted. The unweathered rock is hard, requiring the use of dynamite in mining, and any gem stones recovered from such rock are likely to be flawed.

INSTRUMENT AND CHRONOMETER JEWELS

Before the war, the United States imported virtually all its instrument and watch jewels from Europe, particularly from Switzerland. Without such jewel bearings, high-grade instruments and chronometers to guide our aviators and to assist our bombardiers and Navy officers cannot be made. When war came, plants were created in this country to produce synthetic sapphire, and stocks of Montana sapphire were set aside as a reserve. Simultaneously, mechanical means of

fabrication were introduced. The program is apparently approaching successful completion. In addition, certain hard-glass bearings are being made, which will alleviate the situation. Imports for consumption of jewels for any movement, mechanism, device, or instrument or for any meter or compass numbered 92,547,236, valued at \$2,007,012, in 1941 and 36,649,359, valued at \$1,015,788, in 1942. In November 1942 the use of instrument jewels was confined to essential war work (WPB. M-50, amended Nov. 2, effective Nov. 2, 1942).

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