

GEM STONES

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SUMMARY OUTLINE

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Retail sales of jewelry in 1938 totaled about \$276,000,000, or 11.5 percent below the 1937 sales (\$312,000,000) and slightly below those of 1936 (\$280,000,000). Diamond rings, watches, and gold jewelry were the principal sales items. January was a fair month, February and March were poor, and May and June were better; July witnessed a slump from which a slight improvement was noted each month until the usual marked increase in December (sales in that month usually make up 25 percent of the year's sales). Although the Christmas sales of 1938 were almost as good as those of 1937, it was disappointing that no one of the later months of 1938 exceeded those of 1937 when, it will be remembered, trade was poor. The wholesalers' jewelry sales, in comparison, were 27 to 29 percent lower than those of 1937; consequently retailers' stocks at the end of 1938 were smaller than at the end of 1937. The demand for popular-price articles was better than for items in the higher price brackets, and the sales of costume jewelry were remarkably large.

Fashions in jewels.—Jewels continue to be worn in almost barbaric profusion, with large stones prominent. Gold, often in two colors, is even being worn in the evening and continues its gain at the expense of platinum. Silver jewelry also became popular in 1938. The motifs range from Hindu and Persian to French of the times of Louis XIV and of the late Directoire, as well as Victorian types and those of the nineties of the last century. Massive gold chains with pendant watches, crosses, or cameos, imposing necklaces and dog collars, and jeweled flowers and leaves are popular; jeweled hair ornaments and earrings, either long pendants or set close to the lobe of the ear, are imperative with the present coiffures. Tiaras are again worn, particularly in England. Much of the jewelry is flexible, permitting the stones to move with the wearer's movements. The ensemble is as much in vogue in jewels as in dress accessories. Costume jewelry ("junk" jewelry in the trade) is sold in quantity and may foster a love

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for the real article. The demand for colored stones grows, such jewelry requiring the use of countless small diamonds set pavé for contrast. The finer gems—diamonds, including “fancies,” ruby, emerald, and sapphire—hold the center of the stage, but topaz and aquamarine are extremely popular, and the use of turquoise, moonstone, and amethyst and a host of other colored stones is increasing. Men are wearing more jewelry, featuring particularly star sapphire and ruby, cat’s-eye, and the quartz gems.

Domestic production.—From the peak of American gem-stone production of \$534,280 in 1909 the industry dwindled until 1934, when the value of the production was only about \$3,000. Since then it has increased appreciably, and in 1938 the total output was perhaps \$127,000; as the production is largely by individuals or partnerships and there is no canvass, exact figures are not available. The revival of the industry is due to two factors—the desire of tourists to purchase souvenirs and the increasing use of a variety of colored stones in jewelry. The demand by jewelers for American tourmaline, kunzite, and turquoise is insistent; the sales of Navajo turquoise-silver jewelry, for example, probably exceeded those of 1937 by some 15 percent.

In the Northwest and especially in Oregon, according to correspondence with H. C. Dake, are a large number of collectors of agate and other quartz minerals, many of whom are amateur lapidaries, while others send their “finds” to professional lapidaries, some 50 in number. It is estimated that in 1938 in Oregon material valued at \$210,000 was collected; in Washington, \$85,000; in Idaho, \$35,000; and in Wyoming (largely moss agate) \$8,000—a total of \$338,000. Most of these agates remain in private collections, although it is believed that about one-fourth of the amount is sold to tourists. Turquoise valued at almost \$30,000 was produced in 1938, and the United States is again the most important producer of this gem. Nevada produced over 80 percent of the total, Colorado 15 percent, and Arizona a small quantity. Southeastern Montana, as usual, produced a large amount of moss agate from the Yellowstone Valley which found a ready market among tourists. Scott’s Rose Quartz Co., Custer, S. Dak., produced about 1,000 pounds of rose quartz. Considerable kunzite and a little tourmaline was produced by one firm in San Diego County, Calif.

William O. Vanderburg lists 39 turquoise mines in Nevada; in part he says:

The production of turquoise and turquoise matrix in Nevada for 1938 was approximately 8,000 pounds, varying in value from \$0.50 per pound for off-color and inferior grade material to \$40 per pound for the finest quality. Due to the fact that the bulk of the production is made by individuals and firms who do their own cutting and polishing it is difficult to arrive at the value of the crude turquoise. Probably an average value for the crude material would be about \$3.00 per pound. After the gems are cut and polished, sorted, and graded according to quality the value increases considerably.

As a result of the increased demand for turquoise a number of deposits have been discovered in Nevada within the last 2 or 3 years. One of the notable features of turquoise mining in Nevada during the year was the shift in the bulk of the production from the deposits in Nye and Esmeralda Counties, centering around Tonopah, to the recently discovered deposits in Lander County with Battle Mountain and Austin as the producing centers. The principal producers of turquoise in Nevada in 1938 were the Burnham Bros., Guy Grannis, W. F. Godber (Western Gem & Jewel Co., Los Angeles), and Geo. McGinnis and associates, all of whom operated properties near Hickerson Summit, Lander County;

Lee F. Hand and C. T. Johnson, owners of turquoise properties in the Royston and Crow Springs districts, Nye and Esmeralda Counties; Ed. C. Smith, who operated the Smith mine, Cortez district, Lander County; D. J. Wilson (American Gem Co., Los Angeles), who worked a deposit in Copper Basin, northern Lander County, under a lease agreement with the Copper Canyon Mining Co.; and W. F. Godber, owner of the Reik mine in the Candelaria district, Mineral County.

The turquoise mined in Nevada varies considerably in color, ranging from green, blue-green, and various shades of blue to nearly white. The best quality is a rich blue color. Off-color material is hard to dispose of in the United States, although small lots of the inferior grades of turquoise have in recent years been sold to Germany. Turquoise matrix has an established popularity with the tourist trade, and some of its numerous varieties are characteristic of certain properties such as "black", "spider web", "gold", "brown", or "pinto matrix".

The turquoise mines in Nevada are not operated continuously; activity is restricted to the summer months, and the degree of activity is dependent on the demands of the jewelry trade. One of the most pronounced trends in Nevada turquoise mining in recent years is the tendency of the cutting establishments to acquire their own mines. Only a few years ago the principal outlets for crude turquoise were traders who made annual trips through the State, bartering articles of Indian craftsmanship for the crude turquoise, and in turn trading it to the Indians of the southwest.

The mining of turquoise is popular with miners of limited means because a minimum of equipment is necessary.

The discovery of emerald at Rye Patch, Pershing County, Nev., was widely heralded early in 1939 as the first deposit of emerald found in the United States, although deposits of the gem have long been known in North Carolina and other Eastern States. The Nevada emerald occurs as unusually deep-color marginal parts of beryl crystals in a pegmatite that intrudes limestone. The deep-color material makes up a relatively small part of the beryl, and most of it is flawed and not transparent; in consequence, the commercial importance of the find is doubtful. An abandoned emerald mine 15 miles south of Spruce Pine, N. C., was reopened early in 1938. North Carolina produced a little emerald matrix.

Near Hot Springs, Ark., there are at least seven producers of rock crystal, and these and others sell the product.

Among the other gem stones produced in the United States in 1938 were agatized wood (private lands surrounding Petrified National Monument, Ariz.); amazon stone (Teller County, Colo.); amethyst (North Carolina; and Larimer County, Colo.); aquamarine (North Carolina and Chaffee and Park Counties, Colo.); chrysoberyl (Jefferson County, Colo.); garnet (North Carolina; Custer, Chaffee, and Jefferson Counties, Colo.; and Emerald Creek, Idaho); fire opal (Owyhee County, Idaho); phenacite (Chaffee County, Colo.); ruby (North Carolina and Georgia); smoky quartz (North Carolina); and topaz (El Dorado County, Calif.; Thomas Range, Utah; and Teller and Park Counties, Colo.).

Charles H. Carpp and J. W. Kaiser operated the property of the American Gem Mining Syndicate, near Phillipsburg, Mont., in 1938. They produced 9,480 ounces of industrial sapphire valued at about \$11,000. The Rocky Mountain Alabaster Co., Fort Collins, Colo., quarried about 50 tons of alabaster in 1938. Some Iceland spar of optical grade was produced in California.

Imports.—According to the Bureau of Foreign and Domestic Commerce, imports of precious and imitation stones (exclusive of industrial diamonds) into the United States in 1938 totaled \$28,304,956, a

decrease of 36 percent from 1937. Details are shown in the following table.

	Carats	Value
Diamonds:		
Rough, uncut, duty free.....	91, 515	\$7, 077, 159
Cut, but not set, dutiable.....	330, 925	17, 016, 842
Pearls, not strung or set, dutiable		470, 304
Other precious stones:		
Rough, uncut, free.....		116, 924
Cut, but not set, dutiable.....		1, 698, 916
Imitation, except opaque, dutiable.....		1, 762, 458
Imitation, opaque, including imitation pearls, dutiable		18, 896
Marcasites, dutiable.....		143, 457

Tariffs.—There were few important changes in tariffs during the year. In the United States, under the provisions of the Czechoslovak Trade Agreement negotiated last spring, the duties on Czechoslovak imitation stones in the various brackets were reduced as much as 50 percent. Czechoslovakia was by far the chief source of such imitation stones, particularly rhinestones. The effect of the agreement was nullified when Germany occupied Czechoslovakia. Germany made barter agreements with some of the diamond-producing countries, without impressive results, however. A trade agreement with Brazil was canceled, and some of the others are stated to be inoperative.

Trade terms and judicial proceedings.—The Federal Trade Commission on March 18, 1938, issued its Trade Practice Rules for the Wholesale Jewelry Industry, a recodification of unfair methods of competition and other illegal practices in the trade. The use of the word "perfect" in describing a gem that under a 10-power loupe shows any imperfection is unfair practice; "perfectly cut" is not to be used to deceive the purchaser; the use of "diamond," "ruby," or other names is to be confined to these mineral species alone; "real," "genuine," and "natural" cannot be applied to synthetic or imitation stones; "blue white" cannot be applied to a diamond if at all off-color; articles must be as advertised; the adjective "synthetic" must be confined to synthetic stones. The Federal Trade Commission during the year issued a number of cease and desist orders against firms not living up to its trade rules.

In the fall, the Department of Commerce released texts of two commercial standards, covering gold and platinum.

The Jewelers Vigilance Committee continued its good work against shortcomings of the less ethical members of the trade; as for example, against a store that sold 0.72-carat diamonds as 1-carat solitaires. But even they are unable to do away wholly with the occasional switching of pieces of glass for diamonds, a case of this kind having occurred in Baltimore a few months ago.

Exhibits.—At the New York World's Fair jewels will be among the most attractive exhibits. In the House of Jewels, five of the leading New York jewelers will show their most beautiful jewelry, and De Beers & Associated Producing Cos. and the Diamond Corporation will exhibit rough and cut diamonds, an exhibit valued at over \$5,000,000. In the Belgian pavilion, besides cut diamonds worth several millions, the art of diamond cutting will be shown. In Iraq's exhibit, goldsmiths from Baghdad will ply their ancient art. The Crown of the Andes, set with innumerable Colombian emeralds, is to be on exhibition. Boart Products, Ltd., is to have in the Hall of Mining and Metallurgy

an instructive exhibit showing the industrial uses of diamonds. These exhibits should strengthen the gem consciousness of the American people and promote jewelry sales.

DIAMOND

The improvement in the diamond industry, which had continued for over 5 years, ended in September 1937; and 1938—with its wars, changes in the political map of Europe, and financial depression—was a poor year, as was to be expected with an industry that feeds on prosperity. The small demand and a large mine output increased stocks of rough diamonds for the first time in 6 years, although stocks of cut stones in the hands of cutters and retailers are not large. Prices of rough were firm, and those of cut diamonds tended to advance.

Share dealings.—The shares of diamond-mining companies listed on the London Stock Exchange had a relatively narrow market in 1938. Off to a good start, by January 15 quotations began to slip, and, except for a short rally in April, the decline continued until mid-July, after which prices strengthened for 2 months. The Czechoslovak crisis affected the market adversely, but this was followed by a sharp rise in October. For the rest of the year the market was inclined to be weak. The loss for the year was about 25 percent, the quotations of five representative stocks at the year end being 37 percent of their high (1927) and 370 percent of their low (1932). Of the more important stocks, 12 paid dividends.

Market.—The Diamond Trading Co. sold rough diamonds valued at about £4,000,000, only 44 percent of the sales of 1937. Sales in the third quarter were quite satisfactory, those of the first and fourth quarters fair, and those of the second quarter small. Good-quality large stones are still scarce.

Sales of polished stones were only about one-half those of 1937, the principal demand being for small goods and most of them of mediocre quality. June and July were the best months, as the Czechoslovak crisis interfered with the usual purchases for the Christmas trade. The United States, Argentina, India, and (early in the year) south-eastern Europe were large purchasers.

As is usual in years of political crises, investment buying increased the sale of large stones, while the mode for pavé jewelry promoted the demand for small stones. Sales of industrial stones were large.

Growth of diamond-cutting industry.—Diamond cutting originated in India, where diamonds first were discovered, certainly well over a thousand years ago, and to Hindu lapidaries we owe the two basic principles of the art—the wheel and the use of diamond dust. Indeed, it was not until early in the seventeenth century that Europe wrested the cutting supremacy from India and its ally, Borneo, now for the past 2 centuries the most important of the eastern cutting countries. The Hindu cut too crudely for European taste, in part prompting the growth of the European industry. By the sixteenth century European artisans surpassed their eastern confreres in skill and were in demand at eastern courts.

The art was transmitted from India to Constantinople and later to Venice. Cut stones appeared in Europe between the eighth and thirteenth centuries. The art reached northern Europe at the turn of the fourteenth century, first at Nuremberg and Paris, and probably

Bruges only slightly later. Religious persecution drove the cutters from Bruges to Antwerp and soon thereafter to Amsterdam, later the asylum of persecuted Jews from Portugal, Spain, and Poland. Excluded from the guilds, they sought the free professions, among them diamond cutting. Diamond cutting appeared on the Western Continent in Brazil in 1802, and in the late sixties of the last century a cutting industry sprang up in the United States, small in roster but renowned for its superior product. The Government-subsidized South African industry, started in 1928, thrived for only 5 or 6 years.

The art of cutting has made steady improvement, slow at first but thereafter marked, particularly in our generation. Hindus, Venetians,

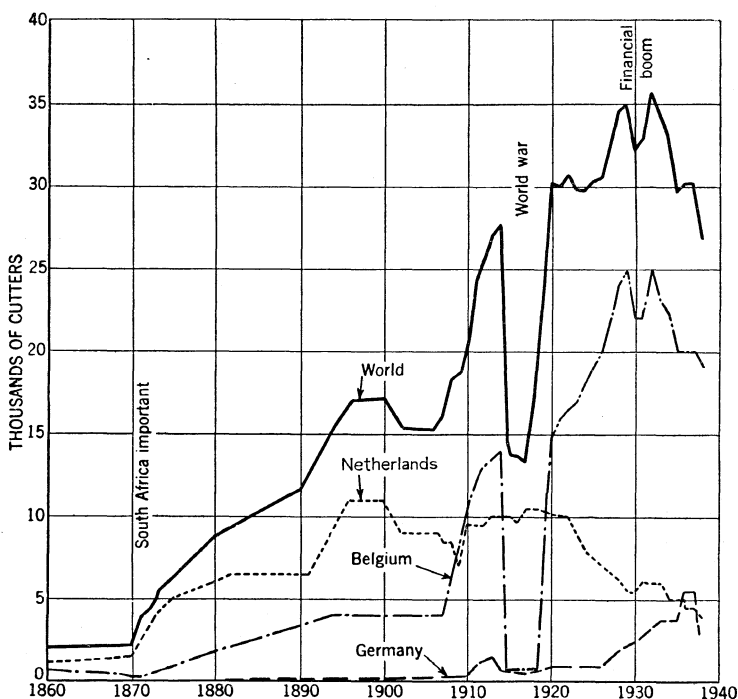


FIGURE 1.—Approximate number of diamond cutters in Belgium, Germany, Netherlands, and the world, 1860-1938.

Flemish people, both Catholic and Protestant, Netherlanders, Jews, and Americans have all made notable contributions to the craft.

An adequate supply of rough diamonds is necessary to the growth of the art. The Indian mines created the ancient industry of India and with their decline the industry died. Cutting in Borneo was fed first from the local mines, but now is supplemented by imported South African rough. Lisbon was an important cutting center while Portugal controlled the India trade, and the dominant position of the Netherlands as a cutting center was due first to her Indian trade and later to her monopoly of Brazilian rough. On the other hand, the French industry established by Cardinal Mazarin about 1650 starved to death owing to the lack of an adequate supply of rough diamonds. With the rough market centered in London, rough is now available to all cutters.

Bruges was the dominant center during most of the fifteenth century, Antwerp from 1483 to 1585, and then Amsterdam for over 3 centuries. In 1909 Antwerp regained the lead and has held it since, except for the World War period. During the past decade the growth of the craft in Germany has been phenomenal. That country, like Belgium, cuts small rough, while the Netherlands specializes in large.

During the financial boom of a decade ago, the industry became geared to prosperous times and since 1929 has been markedly overstaffed.

An ancient industry, the secrets of which were carefully guarded till 60 years ago; once a home industry, taught by father to son, it is now carried on in large factories. Started as a family trade, it has become big business. Sixty-five years ago the prince of artisans, the diamond cutter today, due to the unjustified growth of his craft, receives an indifferent and desultory wage. Unless great prosperity awaits in the near future, many a diamond cutter must seek employment in more profitable industries.

In 1500 A. D. there were some 600 cutters (India, 500; Europe, 100): 1660, 1,400 (India-Borneo, 400; Europe, 1,000); 1700, 950 (India-Borneo, 350; Europe, 600); 1770, 1,400 (India-Borneo, 300; Europe, 1,100); and in 1810 but 700, owing to the Napoleonic wars (India-Borneo, 300; Europe, 400). The growth of the industry since 1860 is shown in figure 1.

Cutting in 1938.—The diamond-cutting industry had a poor year, marked by little profit for the "masters" and increased unemployment among the men. Many of the latter were absorbed by other industries. Although the Belgian and Netherland centers lost ground, the German industry, which during the past decade has had such a phenomenal growth, suffered most severely.

Imports.—Diamond imports into the United States in 1938, by countries, were as follows:

*Diamonds imported into the United States in 1938, 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
Austria ?				11	\$589	\$53.55
Belgium	419	\$23,311	\$55.63	278,144	13,869,072	49.86
Egypt				1	135	135.00
France				767	67,608	88.15
India, British				87	20,456	235.13
Mexico				11	1,346	122.36
Netherlands				50,376	2,902,155	57.61
Switzerland				232	15,904	68.55
Trinidad and Tobago				8	439	54.88
Union of South Africa	91,096	7,053,848	77.43	691	65,990	111.66
U. S. S. R.				32	5,106	159.56
United Kingdom				665	68,042	102.32
	91,515	7,077,159	77.33	330,925	17,016,842	51.42

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

² Figures cover period January 1 to May 5.

World production.—World production of diamonds (gem and industrial) in 1938 approximated 11,755,200 carats (2.351 tons) worth about \$43,000,000. Compared with 1937 this is an increase of 22.5 percent by weight, without much variation in value, as the increase was largely in low-price industrials. As only Dutoitspan and Bulfontein of the South African pipe mines were operated, the alluvial mines produced 91.5 percent by weight and 70 percent of the value. The British Empire produced 31 percent by weight and 69 percent of the value. Of the total production, less than one-fourth by weight were gem stones.

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

World production of diamonds, 1934-38, by countries, in carats

[Including industrial diamonds]

Country	1934	1935	1936	1937	1938
Africa:					
Angola.....	452,963	481,615	577,531	626,424	1 651,000
Belgian Congo.....	3,331,360	3,812,023	4,634,266	4,925,228	1 7,205,300
French Equatorial Africa.....		138	1,550	6,197	1 23,000
French West Africa.....			5,500	52,933	59,548
Gold Coast.....	2,391,609	1,349,847	1,414,677	1,577,661	1 315,000
Sierra Leone.....	68,633	295,483	616,200	913,401	1 900,000
South West Africa.....	4,126	128,464	184,917	196,803	1 140,000
Tanganyika.....	1,155	1,446	2,704	3,234	1 3,590
Union of South Africa:					
Mines.....	9,414	274,317	339,719	820,284	979,460
Alluvial.....	430,899	402,405	284,204	207,359	259,145
Total Union of South Africa.....	440,313	676,722	623,923	1 1,030,434	1 238,605
Brazil.....	142,500	39,100	136,462	238,606	1 150,000
British Guiana.....	44,821	47,785	41,067	35,958	1 35,000
Other countries ¹	4,000	5,500	6,000	6,000	34,200
	6,781,500	6,838,100	8,244,800	9,612,900	11,755,200

¹ Estimated.

² Exports.

³ Includes a small quantity of diamonds recovered from retreatment of tailings.

⁴ 1934: Netherland India (Borneo), India, Australia (New South Wales), Rhodesia, Nigeria, United States (California), and Venezuela; 1935: Netherland India (Borneo), India, 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; 1938: U. S. S. R., India, Borneo, New South Wales, Venezuela.

The increased production in 1938 compared to that of 1937 was due largely to an unusually large production of industrial stones by the Belgian Congo. South Africa increased its production about 20 percent, and the small outputs of French Africa and of miscellaneous sources increased markedly. The production of South-West Africa decreased about 26 percent and that of Gold Coast 17 percent.

Industrial diamonds.—More diamonds were used industrially in 1938 than ever before, although, as the proportion of crushing bort used increased, the dollar sales value probably was somewhat less than in 1937. The increase was due largely to the world-wide armament race and the need of a superabrasive to cut and shape hard alloy steels, as well as to the diversified use of diamond grains bonded in plastics and powdered metals. Over two-thirds, by weight, of the world diamond output is used in industry, mainly in the United States, Great Britain, Canada, Germany, and the U. S. S. R.

The demand for industrial stones was strong throughout 1938. As the finer stones are scarce, industry was forced to use the smaller stones and those of mediocre quality more and more. Carbonado (the Brazilian "black diamond") is now selling at a price that for certain purposes renders its use attractive. Prices were firm, with an upward tendency.

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, 1934-38*¹

Year	Carats	Value		Year	Carats	Value	
		Total	Per carat			Total	Per carat
1934.....	526, 007	\$2, 852, 349	\$5. 44	1937.....	1, 885, 970	\$6, 542, 365	\$3. 47
1935.....	954, 589	4, 293, 611	4. 50	1938.....	1, 396, 247	4, 213, 412	3. 02
1936.....	1, 166, 094	4, 328, 603	3. 71				

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

EMERALD, RUBY, AND SAPPHIRE

For the third successive year the lavish use of colored stones in jewelry depleted the store obtainable from old jewelry and brought nearer the time when the colored-gem mines will have to increase their scale of operation or a shortage will result. Barring a world war or a financial cataclysm prices must rise.

The Government-owned Muzo emerald mine, Colombia, was closed at least most of the year and early in 1939 was to be leased to private parties. The Government gives, rather naively, the theft of the better stones by the miners as the reason for the proposed change in management. The Chivor Emerald Mines, Colombia, operated on a restricted scale in 1938. The Bank of the Republic is said to have 24,000 carats of uncut emeralds stored in its vaults. The Cobra Emerald Mine, South Africa, in 1937 was operated by the African & European Investment Co. at a small profit. The official figures of the value of emerald produced in South Africa were £6,082 in 1936 and £10,838 in 1937. Victor Leinz and O. H. Leonardos report the occurrence of emeralds in detrital deposits in the State of Goyaz, Brazil, 20 miles southeast of the city of Goyaz. The stones are of good color but are badly flawed and lack transparency. The geological occurrence suggests affiliation with occurrences in the U. S. S. R., Egypt, and North Carolina—mica schists cut by pegmatites. The emerald mine at Habachtal (former Austria) is now in German territory.

In 1937 Burma produced 157,308 carats of rubies valued at £6,841 (20 cents a carat). Its rubies and byproduct sapphires were valued at £7,069 as opposed to £7,319 in 1936. Burmese miners in Cambodia produced a few rubies, sapphires, and zircons at the alluvial mines at Pailin and at Bo-Keo. The 1936 value was 1,880 piasters, three-fourths from the first locality and one-fourth from the second. Production, in carats, has been as follows: 1934, 450; 1935, 312; and 1936, 104.

India in 1937 produced 22,736 carats of sapphire, largely from Kashmir. The value as officially given is £1,682 in 1936 and £41 in

1937. The larger part of the Kashmir production is understood to be only usable industrially.

Sapphires valued at £1,410 were sold in the Anakie (Queensland) field in 1937 (£2,030 in 1936). Twenty-five men were engaged in mining, largely around Ruby and Sapphire, although some of them were attempting to locate new leads in the surrounding country. First blues, only a small percentage of the production, were in demand, but yellows and greens were difficult to sell. The Miners' Association sold largely in France, although a few fine stones were disposed of in America. Queensland produced gems, largely sapphires, from 1860 to 1937, inclusive, worth £643,156, the years of important production being 1907 to 1925.

The special committee appointed by the Government of Ceylon to investigate the gem-mining industry at first decided to establish a Government cutting works and a sales room at Colombo but finally recommended that the miners bring their stones to small depots where they could obtain the best current prices. The committee recommended further that an up-to-date map of the gemmiferous area be made, as it believes much illicit mining is being carried on and that there are several unexplored areas in Ceylon where gems may be found. Whether the central depots will be advantageous to the trade, time alone can tell. The Government could perhaps spend its efforts more advantageously in preventing unscrupulous merchants from selling synthetics and imitations as genuine stones.

LESSER GEMS

The all-time opal production of New South Wales is valued at £1,622,795, although for the 10 years, 1928-37, the average yearly production has been but £4,803. The 1936 production was valued at £6,110 and that of 1937 at £3,357. In the latter year over 97 percent came from Lightning Ridge, Grawin and White Cliffs supplying the remainder. The total opal production of Queensland from 1860 to 1937 is valued at £187,745, the big production being in the last 8 years of the nineties. In 1936 the production was only worth £150 and in 1937 had shrunk to £16. This came from Sheep Station Creek in the Quilpie district, where four men prospected part of the year. South Australia had sold opal to the value of £160,158. from 1916 to 1937. In 1937, £11,887 worth of opal was marketed, the most satisfactory year since 1920. The demand was better than usual, and hence mining was more active. Coober Pedy was the principal source; but two smaller fields, Mintabic and Andamooka, also produced. Opal artifacts and jade and crystal beads were found in a cave near Nakuru, Kenya, by Dr. L. S. B. Leakey, the distinguished archaeologist. The objects are believed to date from about 4,000 B. C. Dr. Leakey believes there were important opal mines in the vicinity.

In 1937 about 40 men gophered turquoise stringers at Nishapur, Iran. The owners, an Iranian mining company in Meshed, plan to drive a large tunnel 200 to 300 feet beneath the deepest old workings, which in turn are several hundred feet beneath the surface. The company cuts and mounts the turquoise in a small shop at Meshed. The same company also mines and sells salt; according to a letter from Lester S. Thompson, to increase the sale of the latter, a cheap

turquoise ring is concealed in every five-hundredth 1-kilo package of table salt sold. A little turquoise (20 oz. worth £8 in 1936, none in 1937) is produced from time to time in the Brisbane district, Queensland.

The Afghanistan lapis lazuli contact-metamorphic deposits are worked by long tunnels whose sides are badly smoked, the rock having been broken by fire setting. It is believed there has been no mining for 10 years, the lapis lazuli sold coming from stocks on hand. Ernest F. Fox states that the best goes to Kabul, where it is cut.

In 1937, 2,952 cwt. of jadeite were produced in Burma, nearly double the previous year's production, although the value (£13,030) was lower (£13,412).

Burma also produced amber valued at £668 (£409 in 1936). Recent production of amber in Germany was, 1935, 112 metric tons; 1936, 332 metric tons; and 1937, 328 metric tons.

Vesuvianite of fine gem quality is produced to a limited extent at Laurel, Quebec.

Considerable amounts of jet are produced in the Province of Kompong-Thom, Cambodia (1934, 13,000 kilos; 1935, 24,000 kilos; and 1936, 24,270 kilos).

The United States annually imports from Brazil 5 to 6 tons of unusually fine quartz crystals absolutely essential in radios and in telephonic, telegraphic, and optical apparatus. Even if the finest crystals are used, the finished plates represent but a twentieth of the original. Minas Geraes exports its rock crystal to the United States, Germany, and Japan. Mining is primitive and rarely is carried to any considerable depth. Recently a fine rock crystal from Minas Geraes, Brazil, was sent to this country. It weighed 63 pounds and was sold for over \$1,100, or about \$18 per pound.

Amethysts occur in seams in trap rock near Scott's Bay, Nova Scotia, on the Bay of Fundy. The winter's frost each year forms new outcrops. Some of the amethysts are cut in Europe, returned to Nova Scotia, set in lockets or rings, and, together with rough crystals, sold to tourists. The trade has increased greatly in the last 6 or 7 years.

Several tons of rose quartz from pegmatic dikes in Minas Geraes, Brazil, are sold annually. Japan, China, and Germany are the principal markets, the best grades bringing \$500 to \$600 per metric ton. The State of Hyderabad, India, has widely distributed deposits of agate, plasma, and bloodstone.

The Iceland spar deposit at Hegustader, Iceland, is still operated as a Government monopoly.

As a result of 1938 political changes, the well-known Bohemian garnet localities and the Czerwenitza opal locality became German territory. It is understood that further working of the Jordansmühl (Silesia) nephrite deposits is to be regulated by the German Government.

In 1936, 13 companies were mining precious stones in Madagascar, although the production only was worth some \$21,000. In 1936, 6.6 kilos of beryl, tourmaline, and kunzite were exported (4.5 kilos in 1935 and 9 kilos in 1934) and 31 kilos of feldspar and quartz gems, garnets, and similar stones (16 kilos in 1935, 23 in 1934). In addition much greater weights of industrial stones were exported. The demand is, however, so irregular that exports for a single year mean little.

The mines are small units, and the use of explosives is avoided lest the gems be ruined.

South-West Africa in 1937 produced 46.765 kilos of precious stones, largely tourmaline. Sales, largely to Germany, were, however, 688.987 kilos. In the first 9 months of 1938, 110.563 kilos were sold for £1,182. The stones included aquamarine, tourmaline, topaz, rose quartz, and chalcedony.

Brazil is the most important producer of the lesser gems, but figures on its 1938 production are not at hand.

SYNTHETICS

The Gemmological Institute of America in a study of synthetic emeralds finds the best method of distinguishing synthetics from real is the presence of irregular cracklike or wisplike markings in the synthetics, imperfections markedly different from the blemishes of emeralds.²

The Russian Precious Stone Trust is now making synthetics in its Leningrad laboratory, several of which, a sapphire of 292 carats and a ruby of 250 carats, are sizable.

The I. G. Farben-Industrie has a large synthetic-gem plant at Bitterfeld, Germany, which produces several thousand carats of synthetics a day. Some are sent to Oberstein for cutting, and others are used as jewels for watches and bearings for precision instruments.

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² *Gems and Gemmology*, Summer, 1938, p. 163-167.