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OF THE  
UNITED STATES GEOLOGICAL SURVEY

TO THE  
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1894-95

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DIRECTOR

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IN FOUR PARTS

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PART IV.—MINERAL RESOURCES OF THE UNITED STATES, 1894  
NONMETALLIC PRODUCTS

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# PRECIOUS STONES

BY GEORGE FREDERICK KUNZ.

Among the principal items of importance to the precious stone industry in 1894 is (1) an article by Prof. William H. Hobbs calling attention to the fact that the Wisconsin diamonds are probably distributed through the Kettle moraine, on the Green Bay Lobe of the Glacial Ice sheet; (2) the finding of a  $10\frac{7}{8}$ -carat diamond at Dowagiac, Mich.; (3) the developing of a new ruby mine near Franklin, Macon County, N. C.; (4) the finding of emeralds at Mitchell's Peak and near Earl Station, N. C.; (5) the memorial to Congress to preserve the world-renowned agatized forest in Arizona; (6) the finding of a remarkable compact variscite, giving a new ornamental stone, utahlite; (7) the smaller output of turquoise mines due to the depressed financial condition; and (8) the skillful financiering by which the output of diamonds has been regulated and sold for \$17,500,000 for 1895, due to the efforts of Cecil Rhodes, organizer and life governor of the De Beers Diamond Mining Company.

## DIAMONDS.

### LOCALITIES.

*Wisconsin.*—A very interesting relation is coming to view among the occurrences of the diamonds occasionally announced from the drift region of the Northwest. In previous reports, reference has been made to several of these, particularly to the large one ( $15\frac{1}{3}\frac{2}{2}$  carats) found in 1876 in digging a well at Eagle, Waukesha County, Wis., and to the several small ones, none of a carat's weight, found in prospecting for gold along Plum Creek, Pierce County, Wis., from 1887 to 1889. In 1893 a diamond crystal of 3.83 carats was found in a clay bank at Oregon, Dane County, Wis., on the farm of Mr. Judson Devine; it is a rhombic dodecahedron, somewhat modified and distorted and much rounded. This is also the form of the Eagle stone, though the latter is yellowish in color, while the Oregon crystal is white. It now appears that another diamond of the same form, weighing  $24\frac{1}{4}$  carats, wine-yellow in color, and strongly resembling the Eagle crystal, was found in 1884 at Kohlsville, Washington County, Wis., on the farm of Henry Endlich. It is

now in the possession of his widow, who retains it as a memento of her husband. It measures three-fourths by one-half by three-eighths inches.

On comparing these several occurrences, it has been shown by Prof. William H. Hobbs, of Madison, in a paper read before the Wisconsin Academy of Sciences, December 30, 1893 (*Amer. Geol.*, vol. 14; July, 1894; pp. 31 to 37), that the three larger and remarkably similar crystals from Eagle, Oregon, and Kohlsville, all occur in the Kettle moraine of the Green Bay Lobe of the Ice sheet. Those from Plum Creek, which are smaller and of different form, were from a stream bed some 20 miles from another lobe of the Kettle moraine, but within the area of the older drift. The source, or more probably the sources, of these drift-borne diamonds must of course lie to the northward, and may be to some extent indicated by the glacial striae. Professor Hobbs points out that there are two regions where basic intrusive rocks have cut through carbonaceous shales, as in South Africa; one of these is in northwestern Wisconsin, in the Menominee district, and the other northwest of Lake Superior, in the vicinity of Pigeon River. The courses of the striae from the Menominee region extend southward to the Green Bay moraine, and those from Pigeon River come down not far from the locality of Plum Creek. Somewhere in those regions it may be that diamond mines will yet be discovered, under conditions resembling the African; and occasional specimens will be encountered in the drift to the south.

*Michigan.*—An additional discovery bearing marked relations to these has lately been made on the other side of Lake Michigan. This is a diamond crystal of  $10\frac{7}{8}$  carats, measuring 13 by 9 by 11 mm., a hex-octahedron, found in Glacial Drift at Dowagiac, Mich., and the finder, Mr. Fred. B. Blackmond, states that he made an extensive search, but that no other stone was found. Dowagiac is in southwestern Michigan, between Niles and Kalamazoo.

*California.*—Mr. W. P. Carpenter, of Placerville, Cal., who has from time to time reported the finding of diamonds in auriferous gravel, under the usual conditions of their occurrence on the Pacific Coast, has lately obtained two crystals, one weighing over 7 grains troy and the other 6, of rounded form and rough surface, each nearly one-fourth of an inch in diameter and faintly tinted, the larger with a greenish shade and the smaller with pale yellowish. As many as forty or fifty small diamonds have been taken from the gravel at this place from time to time in the past; but since stamp mills have been employed little is found but the crushed fragments encountered in "panning up" the amalgam taken from the batteries. Mr. Carpenter proposes to work his section of the channel by other means, and avoid the possible loss of diamonds of more value than the gold. The occurrence is similar to that of other California diamonds—in the hard compacted gold-bearing gravel occupying ancient river channels now filled and overlain by igneous rocks.

*Montana.*—At Deer Lodge, Mont., Mr. Owen Emerson obtained in 1894 a brilliant white diamond weighing  $3\frac{7}{8}$  carats. Unfortunately it is flawed and would not cut a stone of much more than one carat.

The rumor that appeared in the press early in 1895 as to the discovery of brilliant diamonds at Mount Edgecombe, near Sitka, Alaska, was entirely without foundation. It was fully denied by Mr. John G. Brady, of Sitka, who informed this office that the report arose from his remarking that diamonds might possibly be found on Mount Edgecombe, where, he thought, the geological formation presented some resemblances to that of the South African diamond fields.

In the chapter in this report by Mr. George F. Becker on a Reconnaissance of the gold fields of the Southern Appalachians, he states (p. 272, Part III):

The direct association of gold and diamond anywhere in the world is known in only one instance, and this has never before been described in print. Professor Arzruni showed me the specimen, exhibiting it some years ago, and now gives me permission to make it known. In 1887 the Royal Polytechnic High School at Aachen acquired from Mr. Ernst Winter, a diamond dealer in Hamburg-Eimsbittel, a gray, opaque, flawed, Kimberly diamond, which shows at two points inclusions of native gold in grains. It seems that this native gold must be considered as a constituent of the basic eruptive rock in which the Kimberly diamonds occur.

*British Guiana.*—In the gold fields of British Guiana Mr. E. P. Wood, commissioner of mines, reports the occasional finding of diamonds in panning gold, and hence judges that they may occur in some abundance in the auriferous gravels, and that search for them might be worth while, as only a few would be noticed in the ordinary washing for gold.

*Australia.*—A good deal has been said and hoped for as to the occurrence of diamonds in South Australia, and Mr. Calvert has published an article in a London mining journal on the prospect and probability of such discoveries, comparing the volcanic intrusions and the conglomerates of several South Australian localities with those of South Africa and Brazil. Recently the statement has appeared that a diamond has been forwarded to the government geologist of the province from Mount Kingston, where it was found by the sender in panning for gold. It is a perfect crystal, a little over one carat in weight, with curved faces and slightly tinted with yellow.

*India.*—It is announced that Dr. King, director-general of the geological survey of India, has been sent by the Indian Government to examine diamond mines in the native state of Panna, in Bundelkand, and report upon the best mode of operating them.

*South Africa.*—From the report of Gardner F. Williams, the manager of the De Beers diamond mine, we ascertain that from June, 1893, to June, 1894, the De Beers diamond mines produced \$14,000,000 from 2,500,000 loads washed; 0.89 carat to a load, at a value of \$6.10 a carat. The average yield per load, 16 cubic feet, was 1,600 pounds. The mining was done with a profit of \$5,645,000, and a dividend was paid of

\$4,935,000. The 2,606,362 loads of earth on the floor was valued at 84 cents a load. This was formerly counted at \$1.26 a load; the lower cost is due to improved facilities and to changing the hours of labor from twelve to eight hours a day. For the past few years the entire output has been sold in rough to English dealers; that is, the rough diamonds have been sold in London.

In January of the present year the Antwerp and Amsterdam dealers formed a syndicate and endeavored to break the English control of the rough-diamond market by offering a higher figure than the English syndicate had bid for a three months' option on the entire output. The English syndicate then made a higher offer for the whole product of 1895, and a sale to them took place of over \$17,500,000, the limit fixed for the output this year, thus by clever financiering adding stability to the price of diamonds in the face of the greatest panic of modern times. With increased American demand, the price may advance.

#### IMPORTS.

The following table shows the diamonds and other precious stones imported into the United States from 1867 to 1894:

*Diamonds and other precious stones imported and entered for consumption in the United States, 1867 to 1894, inclusive.*

Years ending—	Diamonds.			Diamonds and other stones not set.	Set in gold or other metal.	Total.
	Glaziers'.	Dust.	Rough or uncut.			
June 30, 1867.....	\$906			\$1, 317, 420	\$291	\$1, 318, 617
1868.....	484			1, 060, 544	1, 465	1, 062, 493
1869.....	445	\$140		1, 997, 282	23	1, 997, 890
1870.....	9, 372	71		1, 768, 324	1, 504	1, 779, 271
1871.....	976	17		2, 349, 482	256	2, 350, 731
1872.....	2, 386	89, 707		2, 939, 155	2, 400	3, 033, 648
1873.....		40, 424	\$176, 426	2, 917, 216	326	3, 134, 392
1874.....		68, 621	144, 629	2, 158, 172	114	2, 371, 536
1875.....		32, 518	211, 920	3, 234, 319		3, 478, 757
1876.....		20, 678	186, 404	2, 409, 516	45	2, 616, 643
1877.....		45, 264	78, 033	2, 110, 215	1, 734	2, 235, 246
1878.....		36, 409	63, 270	2, 970, 469	1, 025	3, 071, 173
1879.....		18, 889	104, 158	3, 841, 335	538	3, 964, 920
1880.....		49, 360	129, 207	6, 690, 912	765	6, 870, 244
1881.....		51, 409	233, 596	8, 320, 315	1, 307	8, 606, 627
1882.....		92, 853	449, 513	8, 377, 200	3, 205	8, 922, 571
1883.....		82, 628	443, 996	7, 598, 176	a 2, 081	8, 126, 881
1884.....	22, 208	37, 121	367, 816	8, 712, 315		9, 139, 460
1885.....	11, 526	30, 426	371, 679	5, 628, 916		6, 042, 547
Dec. 31, 1886.....	8, 949	32, 316	302, 822	7, 915, 660		8, 259, 747
1887.....	9, 027	33, 498	262, 357	10, 526, 998		10, 831, 880
1888.....	10, 025	29, 127	244, 876	10, 223, 630		10, 557, 658
1889.....	8, 156	68, 746	196, 294	11, 704, 808		11, 978, 004
1890.....	147, 227	179, 154	349, 915	b12, 429, 395		13, 105, 691
1891.....	565, 623	125, 688	408, 198	11, 657, 079		12, 757, 079
1892.....	532, 246	144, 487	516, 153	13, 328, 965		14, 521, 851
1893.....	357, 939	74, 255	444, 137	9, 321, 174		10, 197, 505
1894.....	82, 081	53, 691	764, 554	5, 868, 067		6, 768, 393

a Not specified since 1883.

b Includes stones set and not specially provided for since 1890.

The greatest diamond of any time, surpassing even Tavernier's original Great Mogul, was found at the Jagersfontein mine in June, 1893. It weighs 971 carats, exceeding any diamond ever known; it is a fine

blue-white in color, except one slight spot in the center. It is valued at \$2,000,000, and it was believed would cut a drop stone of 600 carats or a brilliant of over 400. The Emperor William was looked upon as a probable buyer, but in February, 1895, it was said to have been presented by the President of the Orange Free State to Pope Leo XIII.

A very novel and interesting experiment was lately reported from London, viz, the burning of diamonds in liquefied oxygen, by Professor Dewar. He heated diamonds red-hot and dropped them in the liquid oxygen, but the intensely low temperature cooled them, and they sank without igniting. He then tried again, heating a diamond extremely with a blowpipe; this one caught fire on touching the liquefied gas, and burned steadily on the surface of the oxygen, the diamond became opaque from the carbon dioxide produced. Professor Dewar also performed the same experiment with graphite.

### RUBY.

*North Carolina.*—The occurrence of rubies was noted in Mineral Resources, 1893 (page 693). In regard to the locality the following information is furnished by responsible parties: They are found in a valley some 3 miles long and one-half to five-eighths of a mile wide, traversed by a stream. The valley is occupied by the débris of calcareous rock, which occurs at its upper end. Rubies are found in the gravel, which forms a stratum from 2 to 10 feet thick, lying from 3 to 20 feet below the surface, and have also been traced into the limestone as their natural matrix. The latter rests upon granite.

Exploration and prospecting show the gravel to exist and to contain rubies throughout the entire valley, but not beyond it. The ruby crystals are of fine color, often of large size, and frequently transparent.

Material has been found that has yielded fine transparent cut rubies of three-fourths of a carat. If stones can be found of large size that combine color, transparency, and perfection this will prove a very important discovery, and it is thought that systematic search may bring larger material to light.

### SAPPHIRE.

*Montana.*—Sapphires have recently been obtained in the alluvial gold washings near Judith River, Choteau County, Mont. These differ from those found near Helena and other localities, inasmuch as they are decidedly bluer—frequently as blue as a fair-colored Ceylonese stone—sometimes with a purplish tint.

Mr. T. E. Crutcher, of Helena, Mont., reports sapphire deposits existing 25 miles west of Phillipsburg, Mont., on the west fork of the Rock Creek, on the east slope of the Bitter Root range, comprising 1,500 acres in extent. Here 75 pounds of crystals were obtained; the gems were light shades—light blue, pink, yellow, and purple. The matrix is identical with that of the Missouri River deposits near Helena, a vesicular mica-augite andesite. Another mine is situated 5 miles

east of the mining camp of Champion, in Deer Lodge County, on Dry Cottonwood Creek, on the western slope of the mountain range; but its 2,500 acres have never been worked except in a very small way.

A valuable contribution to science is the preliminary report on the corundum deposits of Georgia, by Mr. Francis P. King, published under the auspices of Prof. W. S. Yeates, State geologist of Georgia, by the State of Georgia, in 1894. This gives a fairly complete compilation of the history of corundum and its associated minerals, and will be followed by the corrected report at a later day.

#### EMERALD.

*North Carolina.*—In July, 1894, a new locality of true emeralds was discovered by Mr. J. L. Rorison, miner of mica, and Mr. D. A. Bowman, on the Rorison property, 14 miles from Bakersville and 14 miles from Mitchells Peak, Mitchell County, N. C. Here, at an elevation of 5,000 feet, on the Big Crabtree Mountain, occurs a vein of pegmatite some 5 feet wide, with well-defined walls, in mica schist. This vein carries a variety of minerals besides its component quartz and feldspar, among these being garnets; translucent reddish and black tourmaline, the latter abundant in slender crystals; beryls, white, yellow, and pale green; and the emeralds. These latter are chiefly small, 1 to 10 mm. wide by 5 to 25 mm. long, but some have been found two or three times greater than the larger sizes named. They are perfectly hexagonal, generally well terminated with basal planes, and are clear and of good color, with some promise for gems. They very strikingly resemble the Norwegian emeralds from Arendal. The vein outcrops for perhaps a hundred yards, with a north and south strike. The results thus far obtained are only from about 5 feet depth of working, so that much more may be looked for as the vein is developed.

*South Carolina.*—A little north of the crest of the Blue Ridge, and some 50 miles south of the emerald locality at Stony Point, Alexander County, N. C., a second new occurrence of emerald is reported by Mr. J. Meyer, of Charlotte, N. C., who had found near Earle Station, N. C., between Blacksburg, S. C., and Shelby, N. C., a broken fragment of emerald of good color, better than anything observed from North Carolina. Though somewhat flawed, it was cut into a faceted stone, of trapeziform or subtriangular shape, weighing  $4\frac{1}{8}$  carats, that quite closely resembles the material from the Muzo mines of New Grenada.

#### BERYL.

*Maine.*—During the past year the Trenton Flint and Spar Company, of Topsham, Me., in mining for feldspar, came upon a number of pockets filled with remarkable crystals of beryl—green, yellow, and white. Some of these were doubly terminated crystals 5 inches long and an inch in diameter. Nearly all possessed more or less transparency, and

would cut into gems, some of them being quite equal to those from the Ural Mountains. Their cutting is, in some cases, marred by what is nevertheless a very interesting mineralogical feature, viz, what appears to be a highly developed rhombohedral cleavage indicated by shadowy planes visible within the crystal. Their forms are also interesting; some are perfect quartzoids, with extremely regular hexagonal pyramids; others were slightly tapering, showing very acute scalenohedral planes.

#### QUARTZ GEMS.

The amethysts of the metamorphic belt of the Eastern United States appear to be of richer and deeper color than those found in igneous rocks, although the crystals are apt to be not uniform in color. They have been found at many localities from Maine to Alabama, in some cases quite as fine in color as those from Ceylon or the Urals. Such are those formerly found at Deer Hill and Stowe, Me. Other localities are in Pennsylvania, in Upper Providence Township, and elsewhere in Delaware County; in North Carolina, near Statesville, Iredell County, and in Burke and Lincoln counties, and in Rabun County, Ga.

*Maine.*—During 1894 Mr. George R. Howe, of Denmark, Me., has obtained many fine amethyst crystals, and has had a number of gems cut from them that were of a remarkably deep purple color.

*Pennsylvania.*—During the past year a quantity of amethyst was obtained at Upper Providence Township, Delaware County, Pa., and a number of fine gems were cut, one weighing 33 carats; a superb deep purple stone exceeding that weight now forms a part of the Lea collection in the United States National Museum.

*North Carolina.*—Prof. T. K. Brunner reports the following quartz gems as being found in North Carolina: Amethyst in Catawba, Macon, Wake, Lincoln, and other counties; smoky and citrine variety of quartz abundant in Iredell, Mitchell, and Alexander counties; rose quartz and asteriated quartz in Iredell and Cabarrus counties; hornblende in quartz in Iredell, Alexander, and Burke counties; rutilated quartz principally in Iredell and Alexander counties.

*California.*—Mr. Henry S. Durden, curator of the State mining bureau at San Francisco, reports hornblende in quartz from Tyler's ranch, Oleta, Amador County, Cal., and also from Fairplay, Eldorado County, and dumortierite 25 miles from Ogilby, San Diego County.

*Wyoming.*—Mr. H. E. Crane has opened a ledge of moss agate 6 inches thick in a limestone 5 feet wide and running half a mile, at Hartville, about 100 miles north of Cheyenne, Wyo., and but 9 miles from the railway. The agate as quarried is quoted at \$200 a ton. The owner is J. M. Grogan, who was prospecting for copper.

*Arizona.*—A memorial<sup>1</sup> from the legislative assembly of Arizona has been presented to Congress, requesting that the lands covered by the

<sup>1</sup>An Appeal to Congress for the Preservation of a Forest Tract. Washington, February 19, 1895.



petrified forest be withdrawn from entry until the advisability of making a public park of it can be decided. The lands are in Apache County, are 10 miles square, and, according to the memorial, are covered by trunks of trees some of which measure over 200 feet in length and from 7 to 10 feet in diameter. The legislature represents that "ruthless curiosity-seekers are destroying these huge trees and logs by blasting them in pieces in search of crystals, which are found in the center of many of them, while car loads of the limbs and smaller pieces are being shipped away to be ground up for various purposes." The park, or "chalcedony forest," is annually visited by hundreds of scientific men and travelers from every State. To make it a public park would preserve the tract from vandalism and injure no one, as there are no settlers upon it. A cowboy rode over the agatized bridge with his horse, endeavoring to break down the tree crossing the chasm, and was disappointed at not succeeding.

#### TURQUOISE.

Owing to the stringency of the times and the condition of one of the companies the output of turquoise, of which so large a quantity was mined during 1891 and 1892, was limited to not more than \$30,000 for the year 1894. Turquoise has been found at several localities in Arizona, New Mexico, and more recently in Texas, north of El Paso, but no new mines of value have been opened.

A large amount of a remarkably beautiful sky-blue turquoise-like substance was found in an extensive vein near Phoenix, Ariz. This was at first supposed to be turquoise, but being too soft, it was chemically examined in the Geological Survey laboratory by Prof. F. W. Clarke, and proved to be a hard compact chrysocolla.

#### UTAHLITE.

*Utah.*—An interesting discovery has been made of compact nodular variscite in Cedar Valley, near old Camp Floyd, Utah, by Mr. Don Maguire. The rock is a crystalline limestone, with layers of black pyritiferous siliceous slate. In the latter occur the nodules, varying from the size of a walnut to that of a cocoanut. They are covered with a thin, lamellar, ferruginous crust, beneath which lies the compact variscite of various shades of rich green. This is a new form of occurrence for this species and has attracted considerable attention abroad, both as a novel mineral and an ornamental stone of quaint beauty. The locality, which is a spur of the Oquirrh Mountains, has been visited and examined by Mr. Maguire. He finds that it is somewhat abundant, but that only careful hand work can be used to extract the pieces from the rock. The writer suggests that the name utahlite would not be inappropriate for it. Mr. Maguire searched for traces of ancient working, but without success, though some stone articles and a rock with picture inscriptions were found in the vicinity.

## GARNETS, ETC.

During the past few years the Indians on the Navajo Reservation have found a greater quantity of garnets and peridots than there has been demand for, and the result is that there is a large surplus stock on hand at the various agencies.

Tourmaline from a new locality was discovered by Albert C. Bates 1 mile from Moosup, Conn., of a light-green color and of transparent gem quality, one crystal being 9 inches long, three-fourths at the largest end and tapering gradually. About thirty smaller crystals were found, but all with poor terminations. The largest perfect gem was  $9\frac{1}{2}$  carats. From Eustis, Frontier County, Nebr., small pebbles from the Platte River were sent for examination. Among them were observed some grains of labradorite showing a beautiful chatoyancy quite equal to that from Labrador.

Lieut. Constant Williams, of the Navajo Agency at Fort Defiance, Ariz., obtained a quantity of dark, almost emerald-green, specimens of diopside that would cut into gems of from one to two carats each.

Cyanite, in rich blue and green blades, weathered out of the rock, has been found near Red Bluff, Madison County, Mont., by J. L. Ulerg.

## OPAL AND HYALITE.

*Utah.*—Hyalite and banded opal are described by Mr. T. Beck, of Provo, Utah, as occurring in Beaver Valley, Utah, some 3 miles from Granite Peak. The locality is a low hill, covered by a laminated deposit of silica, partly opal and partly hyalite, of no great thickness, but covering several acres in extent. It is much disintegrated and decomposed, but with care the material can be taken out in slabs or plates sometimes a foot square, varying in color. What appear to be disintegrated and broken-down geyser-cones occur with this material, which is conformable to the slopes of the hill, and probably represents a deposit from ancient geysers. A few miles away are boiling springs and an extinct crater.

## AMBER.

*Texas.*—Amber in small nodules was found near Pendennis, Lane County, Tex., by L. W. Hasting, mining expert, of San Antonio, Tex. The color of the amber is a rich brown, more closely resembling burmite.

## JET.

*New Mexico.*—Mr. A. Monier reports from the vicinity of Santa Fe, N. Mex., a fine black jet, evidently found in some quantity.

## PRODUCTION.

The product of precious stones in recent years is shown by the following table:

*Estimated production of precious stones in the United States from 1883 to 1893.*

Species.	1883.	1884.	1885.	1886.	1887.	1888.
	Value.	Value.	Value.	Value.	Value.	Value.
Diamond .....		\$800		\$60		
Sapphire .....	\$2,200	1,750	\$500	750	\$500	\$500
Chrysoberyl .....	100	25				
Topaz .....	1,000	500	1,250	1,000	2,000	600
Beryl (aquamarine, etc.) .....	500	700	750	5,500	3,500	800
Phenacite .....						650
Emerald .....	500		3,200	3,200		100
Hiddenite (lithia emerald) .....	600		2,500	4,500		
Tourmaline .....		2,000	600	5,500	500	
Smoky quartz .....	10,000	12,000	7,000	7,000	4,500	4,000
Quartz .....	11,500	11,500	11,500	11,500	11,500	11,150
Silicified wood .....	5,000	10,500	6,500	1,500	36,000	16,000
Garnet .....	6,000	4,000	2,700	3,250	3,500	3,500
Anthracite .....	2,500	2,500	2,500	2,500	2,000	1,500
Pyrite .....	2,000	3,000	2,000	2,000	2,500	2,500
Amazon stone .....	3,750	2,750	2,750	2,250	1,700	1,700
Catlinite (pipestone) .....	10,000	10,000	10,000	10,000	5,000	5,000
Arrow points .....	1,000	1,000	2,500	2,500	1,500	1,500
Trilobites .....	500	500	1,000	1,000	500	500
Hornblende in quartz .....	600	600	300	200	100	
Thomsonite .....	750	750	750	400	750	500
Diopside .....	300		100		50	
Agate .....	1,500	4,500	2,000	2,000	4,000	4,000
Chlorastrolite .....	1,500	1,500		1,000	800	800
Turquoise .....	2,000	2,000	3,500	3,000	2,500	3,000
Moss agate .....	21,000	3,000	2,500	2,000	950	950
Amethyst .....	2,250	2,250	2,100	2,100	2,100	2,500
Jasper .....	2,500	2,500				100
Sunstone .....	450	450	350	300	150	
Fossil coral .....	750	750		1,000	2,000	3,000
Rutile .....			750	750		
Gold quartz .....	115,000	140,000	140,000	40,000	75,000	75,000
Rutilated quartz .....			250	1,750		
Peridot .....	300	150				
Total .....	206,050	221,975	209,850	118,519	163,600	139,850

*Estimated production of precious stones in the United States from 1883 to 1893—Cont'd.*

Species.	1889.	1890.	1891.	1892.	1893.
	Value.	Value.	Value.	Value.	Value.
Diamond .....					\$125
Sapphire .....	\$6,725	\$6,725	\$10,000	\$20,000	10,000
Ruby .....					150
Topaz .....	400		100	1,000	100
Beryl (aquamarine, etc.) .....	747		1,000	1,000	500
Phenacite .....	200				
Emerald .....	450		1,000		
Tourmaline .....	2,250	2,250	3,000	3,000	5,000
Opal .....			5,000	10,000	5,000
Peridot .....			1,000	1,000	500
Smoky quartz .....	4,232	2,225	5,000	5,000	5,000
Quartz, rock crystal .....	14,000	14,000	10,000	10,000	10,000
Silicified wood .....				1,000	1,250
Garnet (pyrope, almandite, and essonite) .....	2,308	2,308	3,000	5,250	2,000
Anthracite .....				3,000	3,000
Pyrite .....	2,000	2,000	1,500	1,500	1,500
Amazon stone .....	500	500		1,000	1,000
Catlinite (pipestone) .....	5,000	5,000	5,000	5,000	5,000
Arrow points .....				1,000	
Thomsonite .....	400	400	200	500	500
Diopside .....				500	105
Agate .....				2,000	1,000
Chlorastrolite .....	500	400	500	500	500
Turquoise .....	23,675	28,675	150,000	175,000	143,136
Moss agate .....				1,500	2,000
Amethyst .....	98			200	75
Fossil coral .....	700	700	1,000	1,000	1,000
Rose quartz .....	600	200		200	100
Gold quartz .....	9,000	9,000	6,000	15,000	10,000
Rutilated quartz .....	30				
Dumortierite in quartz .....	250	250			

Estimated production of precious stones in the United States from 1883 to 1893—Cont'd.

Species.	1889.	1890.	1891.	1892.	1893.
	Value.	Value.	Value.	Value.	Value.
Quartz coating chrysocolla.....	\$4,000	\$2,000	.....	\$500	.....
Chrysoprase.....	200	200	.....	100	.....
Agatized and jasperized wood....	53,175	6,000	\$2,000	10,000	\$20,000
Banded and moss jasper.....	630	.....	.....	.....	.....
Obsidian.....	.....	.....	.....	100	.....
Fluorite.....	500	500	.....	.....	.....
Azurite and malachite.....	2,037	.....	.....	1,000	.....
Prehnite.....	.....	.....	.....	200	.....
Zircon (a).....	16,000	.....	.....	.....	.....
Gadolinite, fergusonite, etc. (a)...	1,500	.....	.....	.....	.....
Monazite (a).....	1,000	.....	.....	.....	.....
Spodumene (a).....	200	.....	.....	.....	.....
Wooden ornaments decorated with minerals (b).....	15,500	15,500	15,000	15,000	15,000
Staurolite crystals.....	.....	.....	.....	.....	500
Miscellaneous minerals (c).....	20,000	20,000	15,000	20,000	20,000
Total.....	188,807	118,833	235,300	312,050	264,041

a Used to extract the rarer elements for chemical purposes.  
 b Such as clocks, horseshoes, boxes, etc.  
 c Collection and souvenir minerals.

Estimated production of precious stones in the United States in 1894.

Species.	Value.	Species.	Value.
Diamond.....	\$200	Dumortierite.....	\$100
Corundum:		Diaspore.....	200
Ruby.....	2,500	Olivine (chrysolite, peridot).....	500
Sapphire.....	10,000	Pyrite.....	1,800
Topaz.....	1,000	Opal, noble (precious).....	500
Beryl:		Feldspar:	
Aquamarine.....	1,000	Microcline (amazon stone).....	1,200
Emerald.....	250	Oligoclase (sunstone).....	100
Golden-colored.....	50	Orthoclase (moonstone).....	100
Garnet:		Obsidian (volcanic glass).....	100
Almandine (precious).....	2,300	Marekanite (mountain mahog- any).....	100
Pyrope (Bohemian).....	2,000	Chondrodite.....	400
Tourmaline:		Turquoise.....	30,000
Green and blue.....	1,800	Diopside.....	150
Rubellite.....	500	Willemite.....	100
Iolite staurolite.....	500	Chlorastrolite.....	500
Quartz:		Prehnite.....	300
Rock crystal, "pebble".....	1,300	Thomsonite.....	500
Amethyst.....	500	Titanite (sphene).....	100
Smoky quartz, cairngorm stone, Scotch topaz, Spanish topaz..	5,000	Rhodonite.....	100
Rose quartz.....	200	Malachite.....	500
Gold quartz.....	10,000	Chrysocolla.....	1,000
Onegite.....	500	Catlinite (pipestone).....	3,000
Rutilated quartz.....	100	Fossil coral.....	1,000
Agate:		Arrowheads.....	1,000
Carnelian.....	2,000	Anthracite.....	3,000
Moss agate.....	500	Mineral ornaments.....	10,000
Chrysoprase.....	100		
Agatized wood.....	10,000	Total.....	120,250