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OF THE

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1919

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PART II—NONMETALS

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GEMS AND PRECIOUS STONES.

By B. H. Stoddard.

PRODUCTION.

The value of gems and precious stones produced in the United States in 1919 was $111,763, as against $106,523 in 1918—an increase of about 5 per cent.

For three years preceding 1917 the production of precious stones in the United States steadily increased, but in 1917 and 1918 it decreased. The scarcity and high price of labor seem to have been the chief causes of the decline in operations. Recent information of renewed activity in gem mining, however, indicates that within a few years the industry in this country will regain its pre-war status.

Increases in the production of tourmaline, turquoise, quartz, garnet, spinel, variscite, jet, and fossil coral were reported. Tourmaline showed the greatest increase in value, from $6,206 in 1918 to $17,700 in 1919; quartz ranked second, with an increase of $2,421; and turquoise was third, with an increase of $2,083. Variscite, jet, fossil coral, garnet, and spinel showed increases of less than $1,000 each.

The production of jet in Utah was renewed after many years of inaction.

Arkansas is credited with all the diamonds reported as produced in the United States in 1919; Michigan with all the chlorastrolite, datolite, fossil coral, and gem hematite; and Texas with all the meerschaum.

Decreased production was reported for several minerals, especially opal, which showed the largest decrease in value. Topaz showed a decline, due to the fact that none of this mineral was reported from Maine or California, as in 1918; and among other minerals of which a decrease in production was reported were beryl, corundum, diamond, chlorastrolite, copper-ore gems, datolite, feldspar, hematite, lapis lazuli, rhodonite, spodumene, and thomsonite.

Value of precious stones produced in the United States, 1913–1919.

	1913	1914	1915	1916	1917	1918	1919
Beryl	$1,615	$2,395	$1,675	$2,031	$2,178	$1,906	(a)
Copper-ore gems	2,350	1,280	1,120	1,713	2,857	2,299	(a)
Corundum	238,835	61,032	88,214	99,180	54,204	42,414	$40,304
Diamond	6,315	765	608	2,680	4,175	1,910	(a)
Feldspar	1,285	449	368	305	(b)	(b)	(b)
Garnet	4,285	1,760	4,523	1,542	624	1,277	1,630
Hematite			126	(b)	(b)	138	(b)
Jade		300					
Opal	15,130	1,114	1,850	1,838	805	6,304	(a)

a Less than 3 producers; figures combined with others to avoid disclosing confidential information.
b Small production included under "miscellaneous gems."

Value of precious stones produced in the United States, 1913–1919—Continued.

	1913	1914	1915	1916	1917	1918	1919
Peridot	$375	$100	(a)	$455	(a)	$1,018	.....
Pyrite	50	.....	$1,042	2,075	(a)	(a)	.....
Quartz	16,861	18,838	35,724	25,707	$28,273	15,211	$17,632
Rhodonite	165	1,050	85	(a)	(a)	515	160
Smithsonite	50	50	(a)	.....	(a)	.....	.....
Spodumene	6,520	4,000	(a)	(a)	(a)	281	(a)
Thomsonite	.....	21	(a)	47	(a)	(a)	(a)
Topaz	736	1,380	862	1,005	230	907	210
Tourmaline	7,630	7,980	10,969	50,807	12,452	6,206	17,700
Turquoise	8,075	13,370	11,691	21,811	14,171	20,667	22,750
Variscite	6,105	5,055	3,867	3,140	2,350	753	925
Vesuvianite	152	1,425	1,535	(b)	2,765	320	.....
Beryl, copper-ore gems, diamond, opal	(b)	(b)	(b)	(b)	(b)	(b)	8,832
Miscellaneous gems	2,920	2,287	c 6,172	d 3,457	e 5,928	f 4,397	g 1,620
	319,454	124,651	170,431	217,793	131,012	106,523	111,763

a Small production included under "Miscellaneous gems."
b For value of production in this year, see p. 165.
c Includes apatite, calamine, chlorastrolite, crocidolite, datolite, fossil coral, Iceland spar, kyanite, lapis lazuli, obsidian, peridot, phenacite, rutile, smithsonite, spodumene (kunzite), staurolite, thomsonite, titanite, and zircon.
d Includes chlorastrolite, datolite, epidote, fossil coral, hematite, Iceland spar, kyanite, lazulite, obsidian, rhodonite, rutile, sepiolite, serpentine, spodumene, staurolite, and vesuvianite.
e Includes andalusite, chlorastrolite, datolite, epidote, feldspar, fossil coral, hematite, Iceland spar, lapis lazuli, obsidian, peridot, phenacite, pyrite, rhodonite, rutile, sepiolite, smithsonite, spodumene, staurolite, thomsonite, willemite, and zoisite.
f Includes andalusite, calamine, chlorastrolite, datolite, epidote, feldspar, fluorite, Iceland spar, lapis lazuli, mariposite, meerschaum, obsidian, phenacite, pyrite, satin spar (gypsum), staurolite, thomsonite, willemite, and zoisite.
g Includes chlorastrolite, datolite, feldspar, fossil coral, hematite, jet, lapis lazuli, meerschaum, spinel, spodumene (kunzite), thomsonite, and Iceland spar.

The value given in the table represents as nearly as possible the value of the rough material; the value of the cut and polished gems is several times greater. The completeness and accuracy of the statistics of production depend on the assistance rendered by the gem miners and dealers, and their help is greatly appreciated.

Persons and firms that have reported to the Geological Survey production of gems and precious stones in the United States, 1917–1919.

Name and address.	Mineral.
American Gem Mining Syndicate, 509 Merchants Laclede Building, St. Louis, Mo.	Corundum.
Arkansas Diamond Co., 201 West Second Street, Little Rock, Ark.	Diamond.
Frank C. Bailey, Big Arm, Mont.	Topaz.
Barber Jewelry Manufacturing Co., D. H. Kingsland, secretary, 36 Gold Street, New York City, N. Y.	Quartz.
Robert F. Bickford, Norway, Maine.	Tourmaline.
Carl Blatt, 800 Olive Street, St. Louis, Mo.	Quartz.
Otto Borreson, Hancock, Mich.	Thomsonite.
W. J. Brown, Happy Camp, Calif.	Rhodonite.
H. T. Buie, Murfreesboro, Ark.	Diamond.
F. F. Burr, Wayne, Maine	Amazon stone. Beryl. Quartz. Topaz.
J. S. Callen, Lawyers' Block, San Diego, Calif.	Tourmaline. Do.
R. H. Cartwright, Greycliff, Mont.	Iceland spar.
Dr. Homer Collins, 417 New Jersey Building, Duluth, Minn.	Chlorastrolite. Pyrite.
Eugene N. Crossett, South Acworth, N. H.	Hornblende in quartz.
Crystal Peak Gem Co., Florissant, Colo.	Amazon stone. Feldspar. Fluorite. Hematite. Opal. Phenacite. Quartz. Topaz.
F. S. Davis, 406 Charleston Building, San Francisco, Calif.	Quartz. Turquoise.
Elgin National Watch Co., Elgin, Ill.	Garnet. Sapphire.
J. D. Endicott, Canon City, Colo.	Beryl. Garnet. Miscellaneous gems. Opal. Quartz. Spodumene.
William Fliedner, R. D. 4, Box 42, Oroville, Calif.	Diamond.
F. H. L. Gutierrez, 1 Salinas Street North, Santa Barbara, Calif.	Opal.
W. C. Hart, 111 Narcissus Street, West Palm Beach, Fla.	Amazon stone. Calamine. Pyrite. Quartz. Topaz.
Francis Holstein, De Roche, Ark.	Quartz.

Persons and firms that have reported to the Geological Survey production of gems and precious stones in the United States, 1917–1919—Continued.

Name and address.	Mineral.
John F. Heeney, Reno, Nev.	Dumortierite in quartz.
	Vesuvianite.
T. J. & Thomas Homer, Lemon Cove, Calif.	Rhodonite.
J. B. Horne & Mrs. G. Jordan, Searchlight, Nev.	Turquoise.
E. A. Howard, Cave Creek, Ariz.	Quartz.
H. Johnson, 565 South Ionia Avenue, Grand Rapids, Mich.	Chlorastrolite.
	Thomsonite.
Ben Jutz, Cherokee, via Oroville, Calif.	Diamond.
	Quartz.
M. L. Keith, 65 Court Street, Auburn, Maine.	Beryl.
	Quartz.
	Tourmaline.
J. B. Kiernan, Beatty, Nev.	Opal.
Kimberlite Diamond Mining & Washing Co., St. Louis, Mo.	Diamond.
C. G. King, Manassa, Colo.	Turquoise.
J. J. Kinrade, 628 Montgomery Street, San Francisco, Calif.	Copper ore gems.
	Lapis lazuli.
	Olivine.
	Opal.
	Quartz.
	Rhodonite.
	Topaz.
	Turquoise.
	Variscite.
	Vesuvianite.
William Kley, 1608 Tremont Street, Denver, Colo.	Turquoise.
Henry Lindemann, 1520 Champa Street, Denver, Colo.	Beach pebbles.
	Copper ore gems.
	Garnet.
	Quartz.
	Turquoise.
Luminous Compass Co., E. N. Kramer, 617 Washington Street, Cedarburg, Wis.	Garnet.
	Quartz.
Don Maguire, 549 Twenty-fifth Street, Ogden, Utah.	Garnet.
	Jet.
	Quartz.
	Variscite.
G. H. Marcher, 411 Douglas Building, Los Angeles, Calif.	Hematite.
	Lapis lazuli.
	Quartz.
	Spodumene.
	Tourmaline.
	Turquoise.
	Variscite.
W. R. McGaw, La Jolla, Calif.	Turquoise.
J. C. Melcher, La Grange, Tex.	Meerschaum.
	Opal.
	Quartz.
	Spinel.
	Topaz.
W. W. Mildrum Jewel Co., East Berlin, Conn.	Garnet.
	Quartz.
Montana Gem Shop, 109 South Sixth Street, Miles City, Mont.	Do.
E. G. Morrison, Shelby, N. C.	Beryl.
	Garnet.
	Quartz.
J. H. Mosher, Glendive, Mont.	Do.
F. M. Myrick, Johannesburg, Calif.	Do.
W. D. Nevel, Andover, Maine.	Do.
New Jersey Zinc Co., Franklin, N. J.	Willemite.
New Mine Sapphire Syndicate, Morley House, Holburn Viaduct, London, E. C., England.	Corundum (sapphire).
Occidental Gem Corporation, 343 Main Street, Salt Lake City, Utah.	Variscite.
Pearce Novelty Co., 405 Fidalgo Street, Seattle, Wash.	Quartz.
William B. Penniston, Ashland, Oreg.	Do.
Petoskey Steam Agate Works, I. A. Ponfield, Petoskey, Mich.	Fossil coral.
William Petry, 424 South Broadway, Los Angeles, Calif.	Turquoise.
Dr. J. P. Rowe, Missoula, Mont.	Iceland spar.
A. J. Rudinger, Trevilians, Va.	Quartz (amethyst).
F. J. Rynerson, 4088 First Street, San Diego, Calif.	Tourmaline.
George E. Schulze, 400 Elm Street, Calumet, Mich.	Chlorastrolite.
	Datolite.
	Hematite.
	Opal.
	Quartz.
	Thomsonite.
	Tourmaline.
Mrs. Samuel Scott, Custer, S. Dak.	Quartz.
Louis Sigmund, 819 North Main Street, Goldfield, Nev.	Turquoise.
Ambrose Smedley, Lima, Pa.	Andalusite.
	Beryl.
	Feldspar.
	Garnet.
	Quartz.
	Rutile.
Southwest Turqouise Co., 426 Metropolitan Building, Los Angeles, Calif.	Turquoise.
H. C. Stevens, 603 Sixth Street, Oregon City, Oreg.	Quartz.
L. W. Stilwell, Deadwood, S. Dak.	Do.
Sunset Gem Co., 313 Hinckley Building, Seattle, Wash.	Do.
A. L. Thomas, Newport, Oreg.	Do.
Virginia Fairy or Lucky Stone Co., Roanoke, Va.	Staurolite.
Ward's Natural Science Establishment, 84–102 College Avenue, Rochester, N. Y.	Opal.
	Pyrite.
	Quartz.
	Spodumene.
	Tourmaline.
	Vesuvianite.
S. L. Watkins, Pleasant Valley, Calif.	Beryl.
	Copper ore gems.
	Corundum.
	Epidote.
	Garnet.
	Mariposite.
	Obsidian.
	Pyrite.
	Quartz.
	Rhodonite.
	Spodumene.
	Tourmaline.
	Turquoise.
	Vesuvianite.
	Zoisite.
A. C. Weeks, P. O. Box 233, Santa Fe, N. Mex.	Turquoise.
Edw. R. Zalinski, Salt Lake City, Utah.	Variscite.

RANK OF STATES.

Montana led all other States in the value of precious stones produced in 1919, a position she has held since 1911. The output consisted of sapphire, quartz of several varieties, and Iceland spar. Montana was the only producer of corundum (sapphire) and Iceland spar in the United States in 1919.

Maine rose to second place in 1919, her increase being due chiefly to a larger production of tourmaline, which is spoken of at greater length in another part of the report. Beryl, of which she was the sole producer, and quartz, of the rock crystal and smoky varieties, were also reported.

Arizona ranked third, and her output was chiefly turquoise. Small quantities of copper-ore gems, garnet, and quartz were also reported.

Nevada dropped from second to fourth rank in 1919, and the total production decreased from $21,674 to $13,679.

California, which dropped from third to fifth place in 1919, produced chiefly quartz of several varieties, tourmaline, and turquoise. She also produced small quantities of lapis lazuli, rhodonite, spodumene, and variscite, of all of which, except variscite, she was the only producer.

Value of precious stones produced in 1919, by States.

Montana	$48,391
Maine	16,225
Arizona	13,745
Nevada	13,679
California	9,221
Oregon	3,025
Arkansas, Colorado, New Mexico, Utah[1]	5,762
Other States [2]	1,715
	111,763

IMPORTS.[2a]

The precious stones (excluding pearls) imported into the United States in 1919, as reported by the Bureau of Foreign and Domestic Commerce, Department of Commerce, were valued at $91,958,830, the highest value reported for the last 10 years. The value of the pearls produced is omitted from the total, for pearls are not a mineral but an animal product, being deposited in the shells of mollusks. They are lustrous calcareous concretions with animal membrane between successive layers, and they owe their beauty and value to their organic part: but as they are among the most desired of gems, their value is given in a separate column in the table of imports.

General imports and imports for consumption for any period will differ to the extent that the value of entries for warehouse for the period differs from the value of withdrawals from warehouse for consumption. The term "entry for consumption" is the technical name of the import entry made at the customhouse and implies that the goods have been delivered into the custody of the importer and that the duties have been paid on the dutiable portion. Some of them may be afterward exported.

[1] Production of each State more than $1,000 and less than $2,000.
[2] Michigan, New Hampshire, South Dakota, Texas, Washington, and Wyoming. Production of each State less than $1,000.
[2a] Statistics compiled by J. A. Dorsey, of the United States Geological Survey, from records of the Bureau of Foreign and Domestic Commerce.

Diamonds and other precious stones imported and entered for consumption in the United States, 1910–1919.

Year.	Diamonds.				Other stones not set.	Total, excluding pearls.	Pearls.
	Glazier's.	Dust and bort.	Rough or uncut.	Cut but not set.			
1910	$213,701	$54,701	$8,991,890	$25,593,641	$4,237,232	$39,091,165	$1,626,083
1911	199,930	110,434	9,654,219	25,676,302	3,820,703	39,461,588	1,384,376
1912	452,810	94,396	9,414,514	22,865,686	3,433,163	36,260,569	5,130,376
1913	471,712	100,704	12,268,543	24,812,604	2,805,963	40,459,526	5,092,624
1914	579,332	77,408	2,851,933	11,976,871	1,649,875	17,135,419	2,090,018
1915	366,793	75,944	7,020,646	13,177,919	1,078,391	21,719,693	4,513,909
1916	836,018	67,290	11,441,328	24,282,140	2,303,351	38,930,127	11,336,971
1917	1,098,102	349,746	13,092,855	18,421,838	1,883,810	34,846,351	4,947,509
1918	718,397	475,870	12,636,024	7,734,150	1,102,398	22,666,839	765,929
1919	984,381	1,420,442	20,306,758	64,085,610	5,161,639	91,958,830	11,008,973

Value of diamonds imported into the United States in the calendar years 1918 and 1919.

[General imports.]

Country.	1918		1919			
	Uncut.	Cut but not set.	Uncut.		Cut but not set.	
			Carats.	Value.	Carats.	Value.
Argentina					17	$2,933
Belgium			46	$2,913	13,133	1,793,815
Bolivia					5	1,745
Brazil	$444,465		13,940	529,272	298	27,969
British Guiana			588	29,613		
British South Africa	197,777		8,263	469,999	62	16,572
Canada	94	$852	1	22	681	59,600
Cuba	802				40	3,361
Denmark					991	23,627
England	11,924,482	1,308,941	245,207	17,921,148	66,758	6,664,911
France	163	170,441	857	22,818	8,995	2,033,268
Italy	14,618	1,749				
Mexico		1,100				
Netherlands	23,125	6,266,319	20,998	1,337,775	434,340	53,561,019
Panama					6	1,275
Siam			897	2,198		
Spain		2,454				
Switzerland		9,954			230	32,064
Turkey in Europe					3	788
	12,605,526	7,761,810	290,797	20,315,758	525,559	64,222,947

The very notable increase of about 200 per cent in the imports of dust and bort into the United States would seem to indicate a revival of exploratory drilling in the mining industry in this country, most of the bort being used for the cutting edges of diamond drills.

The diamond market in the United States had a profitable year in 1919, as is shown by the unprecedented increases in the imports of uncut and cut diamonds. Never before has the price of diamonds risen so high, and never before has the demand been so great. One partial explanation of the vast expenditures on luxuries is that the great wave of economy that spread over the whole country during the

war was followed by a reaction, and that high wages have enabled the American people to spend large sums of money for jewelry and other luxuries.

The imports of pearls into this country in 1919 amounted to $11,008,973, the highest record for the last 10 years except that of 1916, when it reached $11,336,971.

CORUNDUM (SAPPHIRE).

The mine of the New Mine Sapphire Syndicate, in Fergus County, Mont., was handicapped in its operations in 1919 by the scarcity of miners and other laborers, and by a shortage of water, the supply of which gave out early in August, bringing operations to a close. The mine was active only about 10 weeks. During the year there was taken from the mine an exceptionally fine stone, which was cut and sold in Hatton Garden, London, for £400. It weighed 10 carats in the rough and cut a gem weighing 5 carats.

DIAMOND.

UNITED STATES.

ARKANSAS.

According to a report received from the Arkansas Diamond Co., Little Rock, Ark., which owns the Arkansas diamond mine, work was done there in 1919 only by the watchman, who took out casually a very few stones. Mr. Reyburn, president of the Arkansas Diamond Corporation, which now has control of the property, states[3] that the diamonds that have been recovered from the mine average in weight a little less than half a carat. Many of the stones are of the finest quality, and the few that have been cut are said to have made beautiful gems. The company, under the supervision of its chief engineer, S. H. Zimmerman, was in April, 1920, installing on the site a mill for testing the value of the property. The actual diamond area covers about 60 acres. The diamonds occur in peridotite, which is similar in its geologic characteristics to the diamond-bearing rock in South Africa.

The Kimberlite Diamond Mining & Washing Co., which holds a lease on the Mauney mine and owns the Ozark and Kimberlite mines, did not operate the mines in 1919, owing to the loss of its two plants by fire on January 13, 1919.

The American mine, which is owned by T. E. Fluornoy, was not operated.

No work was done at the Black Lick prospect, which is owned by the Grayson-McLeod Lumber Co.

According to the best information available, about 5,000 diamonds, mostly from the Arkansas, Ozark, and Mauney mines, have been found in Arkansas between the discovery in August, 1906, and the end of 1919. These included white, brown, and yellow stones, and their average weight was between 0.3 and 0.4 carat. The largest

[3] Reyburn, S. W., Diamonds in Arkansas: Eng. and Min. Jour., Apr. 24, 1920.

diamond yet discovered in the State was found in the Arkansas mine in May, 1917, and was a canary-colored octahedron weighing 17.85 carats.

CONDITION OF DIAMOND INDUSTRY.

Up to May, 1919, the United States was buying more precious stones than all the rest of the world put together. The demand for all grades of diamonds, from "chips" to stones of the finest quality, continues in excess of the offerings. The shortage of diamonds, which is general, is most marked in small stones. The output from the South African mines has not attained the level it reached in recent pre-war years, and as the diamond market is now under the control of a diamond-mining syndicate, the diamonds have been distributed on the rationing principle, which is varied by the syndicate according to circumstances. America, however, still probably absorbs her pre-war proportion of these diamonds, which was three-fourths of the total output.

According to the American Jeweler the price of diamonds has increased almost 100 per cent in the last year. A stone weighing 1 carat now brings $500 to $650, whereas last year plenty were to be had at $250. A perfect white stone is now worth at least $700 a carat, but it formerly sold at half that price. Diamonds have become so scarce that cutters consider themselves fortunate if they can get supplies enough to keep them going from day to day.

DIAMOND CUTTING IN THE UNITED STATES.

America is becoming more and more a diamond-cutting country, according to statements made by authorities in the diamond trade. In 1918 as many as 600 cutters were employed in the vicinity of New York, and they are said to be as efficient as their foreign competitors. Antwerp has heretofore been the center of the industry.

AFRICA.

UNION OF SOUTH AFRICA.

Diamonds sold in the Union of South Africa, 1918–19.

Province.	1918		1919	
	Carats sold.	Value.	Carats sold.	Value.
Transvaal	896,021.34	£1,603,449	873,680.71	£3,244,239
Cape Colony	1,526,487.25	4,870,980	1,553,652.75	8,639,580
Orange Free State	219,424.02	758,315	221,597.55	1,495,843
	2,641,932.61	7,232,744	2,648,931.01	13,379,662

There are no diamond mines or diggings in Natal.

It will be noted that the quantity of African diamonds sold in 1919 was practically the same as in 1918, and that the increased price per carat is therefore the sole reason for the very considerable increase in the total value.

Average price per carat of diamonds sold in Union of South Africa, 1911–1919.

Year.	Mine stones.	Alluvial stones.	All stones.
	s. d.	s. d.	s. d.
1911	32 11	111 1	35 1
1912	37 4	107 9	40 1
1913	41 2	108 9	43 8
1914	38 5	80 2	40 2
1915	47 0	80 4	52 11
1916	40 3	113 2	45 7
1917	45 11	113 10	51 1
1918	50 2	134 6	54 9
1919	87 3	261 6	101 0

The following table [4] shows the production of the five mines owned by the De Beers Consolidated Mines (Ltd.) for the three years ending June 30, 1919:

Diamonds produced by De Beers Consolidated Mines (Ltd.), 1916–1919.

De Beers mine.

Year.	Blue ground hoisted (loads).	Blue ground washed (loads).	Diamonds found (carats).	Price per carat.
1916–17	0	0	41	(a)
1917–18	0	0	206	(a)
1918–19	0	0	94½	(a)

Kimberley mine.

1916–17	0	0	b 76	(a)
1917–18	0	0	109¾	(a)
1918–19	0	0	147½	(a)

Wesselton mine.

				s. d.
1916–17	1,814,393	1,669,104	455,665¾	53/ 9.27
1917–18	2,065,620	1,805,436	487,828¼	54/ 9.76
1918–19	1,035,311	1,657,146	403,039¾	69/11.79

Bultfontein mine.

1916–17	2,092,267	1,761,756	675,401¾	46/ 11
1917–18	2,328,615	1,859,531	646,927½	49/ 9.62
1918–19	1,262,942	1,629,198	507,858¾	63/ 5.38

Dutoitspan mine.

1916–17	135,650	1,957,335	c 377,571¼	106/11.93
1917–18	2,200,843	2,178,132	422,657¾	108/ 6.22
1918–19	1,389,883	1,066,465	180,983	139/ 9.77

[a] Value not given in company's report. [b] Includes 9½ carats of débris. [c] Includes 9 carats of débris.

[4] Taken from the report of the De Beers Co.

It is reported by the Premier Diamond Mining Co. (Ltd.) that the scarcity of native labor necessitated a curtailment of development work during the greater part of 1919. As the development of the mine was well advanced, however, at the end of the preceding financial year, this curtailment will not react unfavorably upon operations in the future, as there is still 32,500,000 loads of blue ground available above the present lowest working level.

Diamonds produced at the Premier mine for two years ending October 31, 1919.

Year.	Quantity (carats).	Value.
		£ s. d.
1917–18	851,573	1,203,903 15 2
1918–19	814,577	1,961,259 8 1

According to information received in this country[5] a flawless blue-white diamond, weighing 1,400 carats and valued at $500,000, was discovered on the property of this company near the point where the famous Cullinan diamond was found. It was later reported that this stone had been split into about a dozen fragments by the crushing machinery, whether by accident or not is not stated. The largest piece recovered is said to weigh 300 carats and is valued at approximately $220,000.

According to the Financial Times the report of the New Jagersfontein Mining & Exploration Co. for the year ending March 31, 1919, is of more than ordinary interest, for although there was a falling off in the quantity of ground washed and in the number of carats of diamonds found, the total value of the stones produced was higher than that for 1918. No details are given of the value per carat of the various classes of stones. At a meeting at Kimberley the chairman stated that the fine blue-white stone weighing 388¼ carats found on the dump in January, 1919, was taken in the books at the end of March at the average cost of production, but has since been sold at a very high price.

NEW DIAMOND-MINING DISTRICT NORTH OF KIMBERLEY.

A new diamond-mining district[6] is said to have been discovered at Tlaring, near Taungs, in Bechuanaland, about 100 miles north of Kimberley. So great is the rush of prospective diggers from the Cape to the Zambesi and Mozambique, and even into the Kongo, that the Government has decided to lay out a township to receive the new community.

OPERATIONS ON VAAL RIVER.

A company called Deep Water Diamonds has been formed to recover diamonds from the bed of Vaal River, South Africa,[7] by means of an air-lock caisson or diving bell. According to a descrip-

[5] Jewelers' Circular, Dec. 24, 1919.
[6] Manufacturing Jeweler, vol. 66, No. 5, Jan. 29, 1920.
[7] Min. and Sci. Press, Dec. 6, 1919.

tion published by the South African Mining and Engineering Journal, Johannesburg, the bell of the caisson has a diameter of 15 feet, giving ample space for several men to work. The bell is specially designed for working in deep pools and can easily be shifted from one pool to another, as the whole structure is attached to pontoons that can float in shallow water from 12 to 18 inches deep. The bell is lowered into the water by means of water ballast, and the water is displaced by air pumped into the bell by compressed-air pumps. The interior is lighted by electricity and has a telephone and signals for communication. The gravel is hauled up by a compressed-air hoist and is handled by purely mechanical means once it enters the skip. The apparatus is designed to work in any depth of water less than 65 feet; the deepest pool in the Vaal in the dry season is only about 30 to 40 feet deep. On the deck there are boilers and a steam turbine for driving the machinery and an air-compressor for supplying air to the bell. There is a bin to accommodate the gravel brought up, a trommel for cleaning and classifying the soil, gravitators for separating the diamonds, and a sorting table. Previous attempts to obtain diamonds from the bed of Vaal River have been made by means of breakwaters and suction or bucket dredges, but the latter method is said to have proved unsuccessful because the bed of the river is a natural concrete of bowlders and clay. Recent advices indicate that the idea of recovering diamonds from Vaal River by means of a caisson is not new.

CONTROL OF SOUTH AFRICAN DIAMONDS.

The diamond-mining industry of South Africa has undergone a complete change of control, as is shown by the following notes extracted from the annual report of the De Beers Consolidated Mines (Ltd.) for 1919:

A conference of the four largest producers of diamonds, consisting of the German Southwest Africa, De Beers, Jagersfontein, and Premier companies, met in London in July, 1914, with the object of regulating the value of diamonds to be placed on the market and determining the quota of each participant in the total annual sales. After long and protracted negotiations lasting many days an agreement was arrived at among the producers and terms made with the syndicate for the marketing of the diamonds. Owing to the war all negotiations came to an end, but during 1916 the diamond market began to show signs of a return to life, and while the trade was slowly recovering the Union Government decided to place a large quantity of German Southwest Africa (Southwest Protectorate) diamonds on the market, for which it called for tenders in London and on the Continent. The syndicate, feeling that if those goods were forced on the dealers there would be a collapse, approached the De Beers Co. and suggested tendering on joint account. The proposition was accepted, and an arrangement was made on a profit-sharing basis for the purchase of the German Southwest diamonds until the conclusion of peace. In October, 1916, the syndicate came to terms with the Premier Co. for the purchase of its output, so that from February, 1917, the diamonds of the four big producers have been sold through one channel.

The prices are paid to the four producers in South and Southwest Africa every quarter and are based on the net average price realized by the syndicate for the respective quotas during the previous three months, less 5 per cent. The quotas were fixed as follows:

	Per cent.
De Beers Co	51
Southwest Protectorate producers	21
Premier Co	18
Jagersfontein Co	10

NOTES ON DIAMOND MINING IN SOUTH AFRICA.

The following is an extract from the annual report of the Department of Mines and Industries of the Union of South Africa in 1919:

The continued increase in the price of diamonds, which has been most striking, has naturally resulted in renewed activity in prospecting and in the working of alluvial fields.

Although the strict control now exercised over production and sale by agreement between the principal producers steadies the market and allows of a continual enhancement of price, it may be pointed out that high prices have their disadvantages. In most commodities, in which supply and demand balance each other, the sale value of the commodity can not get away very far from the cost of production, which thus acts as a stabilizer and insures a certain reasonable minimum below which prices can not readily fall. In the case of diamonds the sale value of the big producers is at present far above the cost of production. This large margin enables a number of smaller producers whose costs are considerably higher to work also at a profit. A slight contraction of the market then becomes disastrous to these producers; and at all times the knowledge that the large producers can, if need be, place diamonds on the market at a much lower price is an element of danger. The security rests, of course, in the monopoly of control, and as long as this is maintained the position is safe. A further danger lies, however, in the possibility of the discovery of important new mines. With such great activity in prospecting as is now prevalent, such a discovery is by no means to be looked upon as impossible. It is unlikely that all the large diamond pipes already known are the only ones that exist. If other large and valuable pipes are discovered, they will be a disturbing element in the market until they also come within the monopoly of control.

GOLD COAST COLONY.

The discovery of a new diamond field in the Gold Coast Colony by the director of the Gold Coast Geological Survey, Mr. Kitson, is reported in Commerce Reports for December 15, 1919, which quotes a report published in the Gold Coast Government Gazette. The diamonds vary greatly in size. The largest found are about the size of a split pea; large numbers of them range in size from a large pinhead to a grain of millet; and many are still smaller. Of one lot of 175 stones the weight of the largest is about a carat; of the average stones of medium size 28 weigh one carat; and of the next grade there are 36 to the carat. The whole 175 stones weigh $4\frac{13}{32}$ carats. Many of the diamonds are beautifully perfect crystals, colorless and transparent. The commonest forms are the octahedron and the rhombic dodecahedron. A few are of pale-yellow, blue, green, gray, and brown tints; others are colorless, but with small dark inclusions. Cleavage plates of octahedra occur in fair numbers, indicating that the original crystals were much larger than any of those found. The Board of Trade Journal states that their value

is from $2.50 to $3 a carat for the smaller grades, $4.25 a carat for the medium grade, and $7.25 to $8 a carat for the larger grade. These prices are for mixed samples, including stones of all qualities. Some of the largest stones, however, are worth $17 to $19.50 a carat.

More than 600 diamonds were found merely by panning during the time the surrounding locality was being tested with regard to the origin and distribution of the diamond-bearing gravels. Sufficient work has not yet been done to prove the economic value of the discovery.

ENGLAND.

Prior to the war the industry of cutting diamonds was confined almost exclusively to Holland and Belgium, but endeavors were made some years before the war to add diamond cutting to the other industries of Birmingham, England. In face of great difficulties the effort was continued, and when Antwerp fell numbers of refugees from among the diamond cutters of that city were provided with means of pursuing their craft in Birmingham.[8]

Centers for the employment of disabled soldiers in the diamond-cutting industry have also been established at Brighton, Cambridge, and Wrexham (Wales).

SCOTLAND.

It was recently reported[9] that a diamond-cutting industry was about to be established at Fort William, in the northwestern part of Scotland. The director of training, Ministry of Pensions, at Fort William, is reported to have said that there were about 20,000 disabled soldiers who required to be retrained. Preparations for the establishment of the diamond-cutting industry are under way, and the plant was expected to be in operation early in the spring of 1920.

BRAZIL.

A corporation was recently organized in Rio de Janeiro[10] to develop the diamond mines at Moribeca and Boa Vista, in the region of Diamantina, State of Minas Geraes, Brazil.

EMERALD.

COLOMBIA.

The rediscovery of one of the lost emerald mines in Colombia, about 10 miles northeast of Bogota, has been reported. The rediscovered mine is called the Chivor. Flawless gems of a rich and vivid color, valued as high as $1,000 a carat, are said to have been found.

The following notes on the rediscovery of certain lost emerald mines in Colombia are taken from the Survey's report on gems and precious stones in 1910 by Douglas B. Sterrett:

Emeralds were highly prized by the Indians of South America and were mined by them for centuries prior to the coming of the Spaniards in three districts of the present Republic of Colombia. These districts—Muzo, Cosquez,

[8] Commerce Repts., July 17, 1919.
[9] Idem, Apr. 3, 1919.
[10] Idem, Apr. 5, 1919.

and Somondoco—were widely separated. When the Spanish took possession of the country about 1555, the emerald mines also were taken up. Excessive cruelties were practiced by the Spanish mine workers on the Indians employed in the mines. The trouble was not averted by the importation of African negroes, and in the war of independence of 1816 the country was so desolated that the mines of Cosquez and Somondoco were entirely lost. From that time until recently the Colombian emeralds have been obtained only from Muzo.

A Colombian named Francisco Restrepo, guided by a few hints given in ancient Spanish parchment maps and with little or no knowledge of geology or emeralds, undertook the search for the lost emerald mines. In 1896 he found traces of ancient workings and later the large workings of the lost mines. The mines are situated on a sectional ridge of the great eastern range of the Andes Mountains, at an elevation of about 9,000 feet above sea level. An old ditch 12 to 15 miles long, with reservoirs above the mines, was found. The great open cuts and tunnels were scattered over an area 6 miles long east and west and 3 miles wide north and south. Some of the working faces of these mines measure 700 to 300 meters on steep slopes; of this about 100 meters is emerald-bearing and the rest nonproductive. The emerald region is covered by forest and jungle, which doubtless conceal other workings in the region.

JET.

UTAH.

The production of jet in Utah in 1919, though small, is somewhat significant for the reason that no other production of this mineral has been reported to the Geological Survey for several years. The demand for jet had decreased considerably up to 1918, but the mortality caused by the recent war revived the demand for jet ornaments, and it may gain some vogue after years of disuse. The locality in which the mineral was found is described by Don Maguire, of Ogden, Utah, as lying south of Dirty Devil River, in a spur of the north base of the Henry Mountains, Wayne County, and also just across the line in Garfield County. The jet occurs in masses from 4 to 15 inches long and as much as 6 inches wide and from 1 to 4 inches thick. The material takes a durable blue-black polish, is not liable to crack or check after mounting, and is said to be suitable for cutting into scarf pins or cuff-button settings or necklaces.

OPAL.

UNITED STATES.

During 1919 a large flawless black opal, $3\frac{15}{16}$ inches long, $3\frac{1}{8}$ inches wide, and $1\frac{3}{16}$ inches thick, free from matrix, weighing 16.95 troy ounces, was exhibited to the Secretary of the Interior. This new gem, which is remarkable for its iridescence, was pronounced by G. P. Merrill, curator of precious stones in the United States National Museum, the finest and most beautiful he had ever seen. This very remarkable opal was found more than two years ago and is held by its owners to be worth $250,000. They have not made public the locality where it was found.

NEVADA.

In Humboldt County, Nev., writes H. P. Whitlock,[11] there have recently been brought to light some wonderful fossil remains of trees. These are remarkable not merely because they are trees, but because

[11] Jewelers' Circular, Feb. 4, 1920, p. 189.

the stone by which the wood has been replaced is the much-sought opal. A series of these Nevada wood-opal replacements has been put on view in the Morgan Hall of Minerals, in the American Museum of Natural History, New York, where all steps in the process of the transformation of wood to opal may be seen. A unique specimen is of dark smoky color which, when it catches the light at a certain angle, reflects a dull glow of red and orange, almost as if there still burned in it some of the fires of the extinct volcano which was perhaps the first factor in its metamorphosis.

MEXICO.

Opal mining in the vicinity of Queretaro, Mexico, in a district that has for many years furnished nearly all the opals sold in the Republic, showed renewed activity in 1919. Most of the gems are sent to dealers in Mexico City, who in turn ship them to the United States.

NEW SOUTH WALES.

The discovery of black opal at Tintenbar, about 7 miles from Ballina, New South Wales,[12] caused much local excitement and a rush of applicants for miners' rights and permission to enter private lands. The Melbourne Age states that nearly a hundred claims have already been pegged. The geologic formations in the locality are slates and sandstones capped by basaltic lava flows, of which there are at least three. The opal consists of loose pieces, ranging in size from that of a pea up to that of a good-sized walnut, which are found in the soil and in highly decomposed volcanic rock at depths ranging from 3 to 6 feet. It is evident that the opal occurs as the filling of cavities in the volcanic rock and that it can probably be worked at a profit only where the containing rock has been softened by weathering.

Up to September, 1919, most of the opal found was of the transparent variety, but black opal of a very different type from the Lightning Ridge stone is also obtained.

QUARTZ.

CALIFORNIA.

Rose quartz has been found in mining feldspar,[13] 5 miles from Hale Station, on the line of the Lemon Cove & Visalia Electric Railroad (Southern Pacific), shipping point Exeter, Tulare County, Calif. The operators are Lawton & Cone, 503 Market Street, San Francisco.

MAINE.

Large quantities of pure, colorless quartz, gems from which are very brilliant and flawless, are reported by Mr. Robert F. Bickford, Norway, Me., to have been obtained from the Mount Apatite feldspar quarry owned by the Greenlaw Corporation. One large piece of smoky quartz cut a $2\frac{1}{2}$ or 3 inch ball, and another specimen, without flaws, measured 6 inches in length and $2\frac{1}{2}$ inches in diameter.

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[12] Commerce Repts., Jan. 29, 1920.
[13] Information furnished by C. G. Yale, of the U. S. Geological Survey.

TOPAZ.

IDAHO.

White topaz is reported to have been discovered by Mrs. Emma Mikesell at City of Rocks, about 5 miles northeast of Moulton, Cassia County, Idaho. The mineral is said to resemble diamond closely and has been cut into stones of 1 to 3 carats. Some stones that have been exhibited by the owner of the claims are exceptionally clear and will cut glass like a high-priced diamond. Miles E. North and C. C. Young, of Reno, Nev., propose to operate the properties.

TOURMALINE.

MAINE.

Mr. Robert F. Bickford, Norway, Maine, reports that new pockets of tourmaline were opened at the feldspar property on Mount Apatite owned by the Greenlaw Corporation. One oblong emerald stone weighing 10½ carats and several weighing more than 6 carats each were cut from the material taken out. Some of the material is perfect and of fine color.

Other minerals that have been found on this property are dark-pink lepidolite, talclike altered pink and blue tourmaline, cookeite, and other alteration products of original lithia minerals. A pink beryl crystal was also discovered.

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