The larger Diamonds of South Africa.

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THE inquiry that I have recently made into the weight of the 'Cullinan' diamond [1] has led me to clear up, as far as possible, various discrepancies in the published statements respecting the other large diamonds of South Africa. Although a knowledge of the exact weights of these stones is a matter of only trivial scientific importance, yet it is desirable to place on record any definite facts that may still be gathered respecting them. Much valuable information in this direction has been freely given to me by Messrs. Wernher, Beit & Co., through whose hands several of the larger stones have passed; without their help the present notes could not have been written, and I therefore desire to express to them my hearty thanks.

The 'Excelsior' Diamond.

Next to the 'Cullinan', this is the largest of known diamonds. It was found on June 30, 1893, in the Jagersfontein diamond mine in Orange Free State. Pictures of this stone are given in several of the books on precious stones; and a glass model of it has been presented to the British Museum collection by Messrs. Wernher, Beit & Co. The various published statements of its weight range from 969 to 972 carats, that most frequently quoted being 971¾ carats. Messrs. Wernher, Beit & Co., in whose possession the stone, in its uncut form, remained for several years, inform me that the correct weight is 969½ carats. They also kindly allowed me to compare against gram-weights the carat-weights [2] in use at their office, and their unit proved to be the English (Board of Trade) carat of 205·304 milligrams. The weight of the 'Excelsior' in the rough was therefore 199·04 grams.

[1] L. J. Spencer, 'Notes on the weight of the "Cullinan" diamond, and on the value of the carat-weight,' Mineralogical Magazine, 1910, vol. xv, pp. 318–326.

[2] Supplied by Messrs. De Grave, Short & Co., of Hatton Garden, London. Compare Mineralogical Magazine, 1910, vol. xv, p. 321.

The glass model, mentioned above, measures 5·86 by 5·47 cm. with a thickness of 2·4 to 3·1 cm. It is irregular and flattened in form with a curved outline, but at one end it is bounded by a large flat surface (3 by 4·8 cm.) representing a cleavage.

This stone has very often been confused with the 'Jubilee' diamond (p. 142), and most of the books state[1] that it was cut as a brilliant of 239 carats. This error has recently been corrected by Professor Max Bauer,[2] though the weights he mentions differ slightly from those now given.

Failing to find a purchaser, the stone was left intact until the year 1903, when it was cleaved and cut by Messrs. I. J. Asscher & Co., of Amsterdam, into a number of smaller brilliants, which were sold to various persons in London and America. The weights and descriptions of these twenty-one brilliants, as supplied to me by Messrs. Wernher, Beit & Co. and by Messrs. I. J. Asscher & Co., are as follows, together with the calculated weights in metric carats.

Brilliants cut from the 'Excelsior' Diamond.

No.		English carats.	Metric carats.[3]	No.		English carats.	Metric carats.[3]
1	Drop . .	67⅞	69·68	11	Drop . .	9 9/16	9·82
2	,, . .	45 13/16	47·03	12	,, . .	3 21/32	3·75
3	,, . .	45 11/16	46·90	13	Marquise	3¼	3·34
4	Marquise	39 3/16	40·23	14	Drop . .	2 9/32	2·34
5	Drop . .	34	34·91	15	Marquise	2 1/32	2·08
6	Marquise	27⅞	28·61	16	Drop . .	1 11/32	1·37
7	,,	25⅝	26·30	17	,, . .	1	1·03
8	,,	23 1/16	24·31	18	Marquise	¾	0·77
9	Drop . .	16 11/32	16·78	19	3 small brilliants	⅝	0·64
10	,, . .	13½	13·86				

The total weight of the twenty-one brilliants is 364 3/32 English carats or 373·75 metric carats (= 74·75 grams), corresponding to a yield from the rough stone of 37½ per cent.

[1] This statement having been copied either directly or indirectly from Dr. G. F. Kunz's Report on Precious Stones for 1900 (Mineral Resources, United States Geol. Survey, 1901, p. 18 of the preprint, but not in the bound volume as issued).

[2] M. Bauer, 'Edelsteinkunde,' 2nd edit., 1909, pp. 320-321.

[3] To convert the weights in metric carats to weights in grams, divide by 5.

The 'Jubilee' Diamond.

This is another of the large stones from the Jagersfontein diamond mine in Orange Free State. It was found at the end of the year 1895, and was at first known as the 'Reitz' diamond, in honour of the retiring president, F. W. Reitz, of the Orange Free State. After being cut in 1897, the year of the diamond jubilee of Queen Victoria, it was re-named the 'Jubilee'.

A plaster model of the uncut stone was lent by Messrs. Wernher, Beit & Co. for copies to be taken for the British Museum collection. This model has the form of a somewhat irregular and flattened octahedron (fig. 1), measuring 5·5 × 4·8 × 3·1 centimetres; the large triangular face

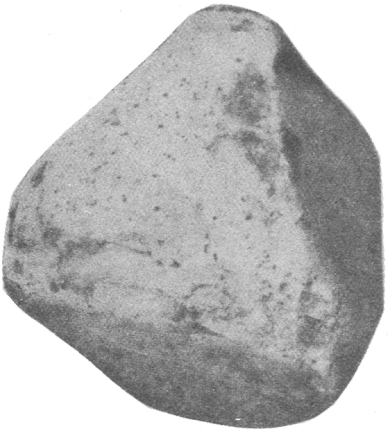

Fig. 1.—The 'Jubilee' diamond in its original form.
(Photograph[1] of plaster model: actual size.)

Fig. 2.—The 'Jubilee' diamond cut as a brilliant.
(Photograph of the actual stone: natural size.)

has an edge of 4 cm. Its volume is about 37 cubic centimetres, which would correspond with a weight of about 130 grams for the original stone.

The weight of the original stone was given to me by Messrs. Wernher, Beit & Co. as 634 carats.[2] As the stone was found subsequently to the

[1] For the photographs for figs. 1, 3, and 4. my thanks are due to Mr. Frank Stevens.

[2] The same weight, 634 carats, is given by L. de Launay, 'Les Diamants du Cap,' Paris, 1897, p. 61. Other accounts give 640 (G. F. Kunz, Annual Report on Precious Stones for 1895, 17th Ann. Rep. United States Geol. Survey, 1896,

date of the Board of Trade definition of the English carat in 1888 and 1889, we may assume that the carat is one of 205·304 milligrams. The weight of the original stone was therefore 130·16 grams or 650·8 metric carats.

According to information supplied by Messrs. Wernher, Beit & Co., this stone was cut in December 1896 to May 1897, producing a brilliant of 239 carats (= 49·07 grams) and a pendeloque brilliant of 13 carats. This brilliant of 239 carats is erroneously stated in many of the books on precious stones to have been cut from the 'Excelsior' diamond (p. 140). Its size[1] is $4·2 \times 3·55 \times 2·6$ cm. It still remains in the possession of Messrs. Wernher, Beit & Co., and a photograph (reproduced in fig. 2) of the actual brilliant was given to me by Mr. Alexander Knaus.

The 'Imperial' Diamond.

This stone, also known as the 'Victoria' or 'Great White' diamond, appeared surreptitiously on the London market in 1884, having presumably been stolen from the mines and smuggled from the Cape. In all probability it came from the Jagersfontein mine in Orange Free State. Its weight was stated to be 457 carats, and it was cleaved and cut by the late Jacques S. Metz at Amsterdam in 1885–6, yielding an oval brilliant of 180 carats and a smaller round brilliant of $19\frac{5}{8}$ carats. The large brilliant was sold to the Nizam of Hyderabad, and gave rise to a well-known lawsuit.

These particulars have been kindly given to me by Mr. James A. Forster, of Holborn Viaduct, London, who was one of the diamond merchants forming the syndicate for the purchase of the rough stone in 1884. He also obligingly lent me leaden models, made by himself at the time, of the uncut and cut stones, from which plaster copies have been taken for the British Museum collection.

The model of the uncut stone (fig. 3) is elongated and rounded, and much like a gherkin in shape. The only indication of any crystalline structure is the presence of a stepped cleavage surface at one end. The dimensions are $5·8 \times 3·35 \times 2·95$ cm., and the volume about 27 c.c. (corresponding to a weight of about 95 grams for the original stone). The model of the cut stone (fig. 4) shows an oval outline rather flattened

part iii, p. 898), and 655 carats (M. Bauer, 'Edelsteinkunde,' 1st edit., 1896, pp. 240, 243, and English translation by L. J. Spencer, 1904, pp. 208, 210, 254).

[1] A glass model of this brilliant, acquired in 1908 from a German dealer, measures $4·29 \times 3·68 \times 2·84$.

along one of the longer sides. It measures[1] 4·04 × 3·24 × 2·4 cm., and has a volume of about 10 c.c. (corresponding to a weight of about 35·2 grams for the original brilliant).

Not knowing the value of the carat-weights against which these stones were weighed, it is impossible now to arrive at their exact weights. They can only be given approximately as 93·8 grams for the uncut and 36·9 grams for the cut stone.

The picture (fig. 3) here given of the uncut stone differs entirely from that given by Dr. G. F. Kunz,[2] and copied by Professor Max Bauer[3] and

FIG. 3.—The 'Imperial' diamond in its original form. (Photograph of plaster model: actual size.)

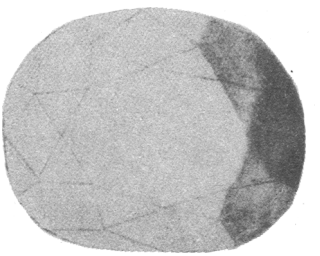

FIG. 4.—The 'Imperial' diamond cut as a brilliant. (Photograph of plaster model: actual size.)

Professor R. Brauns.[4] These represent the stone as a rounded octahedron, the weight of which is given as 457½ carats. Dr. Kunz, after remarking that little is known of the history of this diamond, and quoting various conflicting accounts as to its origin, states that the figure he gives was

[1] G. F. Kunz (Science, New York, 1887, vol. x, p. 69) gives the dimensions as 3·95 × 3·0 × 2·3 cm. A glass model supplied in 1910 by Dr. F. Krantz, of Bonn, measures 3·9 × 3·14 × 2·47 cm.: it incorrectly shows the table facet too small, and the flattened side of the oval outline of the girdle is wanting.

[2] G. F. Kunz, 'Four large diamonds from South Africa,' Science, New York, 1887, vol. x, pp. 69–70.

[3] M. Bauer, 'Edelsteinkunde,' 1st edit., 1896, p. 289; 2nd edit., 1909, p. 319; English translation ('Precious Stones') by L. J. Spencer, 1904, p. 253.

[4] R. Brauns, 'Das Mineralreich,' 1903, p. 202; English translation ('The Mineral Kingdom') by L. J. Spencer, 1910, p. 207.

'drawn from two photos, that, strange to say, had been taken by a Cape photographer'. Now, as this diamond had been smuggled from the Cape, and was first openly offered for sale in London, there can be no evidence to connect Dr. Kunz's photographs with this particular stone. It is possible that they were of another stone, or enlarged photographs of a smaller diamond.

On pp. 146–147 are tabulated the main facts respecting four of the larger diamonds, which, with the expenditure of much time, I have been able to arrive at. In the same table are added particulars of other stones taken from the books on precious stones and other readily accessible sources in mineralogical literature. The latter have not been critically examined, and no doubt contain several inaccuracies. It is likely that in some of the earlier records the stones were weighed against the older English carat of 205·409 milligrams, which was in use at the time that the 'Koh-i-noor' was re-cut in England in 1852, and probably still later (compare foot-note 22, p. 147).

In addition to the diamonds mentioned in the table, many more large stones have within recent years been found in the Premier diamond mine, near Pretoria in the Transvaal. A list of the more valuable stones of over 100 carats, found between March, 1904 and April, 1911, has been kindly supplied to me by Mr. W. Busch, the manager of the London Diamond Office of the Premier (Transvaal) Diamond Mining Company, Ltd. This list of 58 items includes stones of 3,025¾ (the 'Cullinan'), 511, 487¼, 458¾, 391½, 373, 348, and 334 carats, and ten others of over 200 carats each.

Mention may be here made of the fact that the 'Cullinan', although the largest crystal, is not the largest piece of diamond that has hitherto been discovered. A mass of carbonado weighing 3,078 carats (= 631·9 grams) was found in 1895 in Bahia, Brazil.[1]

[1] J. R. Gregory, Mining Journal, 1895, vol. lxv, p. 1536; J. K. Gulland, Journ. Soc. Arts, 1902, vol. li, p. 22, Mining Journal, 1909, vol. lxxxvii, p. 258; G. F. Kunz, Mineral Resources, United States, for 1902, 1904, p. 821, with fig.; J. Baszanger, Mining Journal, 1909, vol. lxxxvii, pp. 7, 333. Models of this piece of carbonado are supplied by Messrs. J. R. Gregory & Co., London.

THE LARGER DIAMONDS

No.	Name of Diamond.	Locality.	Date of find.	Weight in rough.	
				English carats.	Grams.[1]
1	Cullinan . .	Premier mine, Transvaal .	25 January 1905 .	3025$\frac{3}{4}$	621·20
2	Excelsior . .	Jagersfontein, O.F.S. . . .	30 June 1893 . .	969$\frac{1}{2}$	199·04
3	Jubilee . . .	Jagersfontein, O.F.S. . . .	End of 1895 . .	634	130·16
4	—	Jagersfontein, O.F.S. . . .	1883 or 1884 . .	*over* 600	—
5	—	Premier mine, Transvaal .	1905 or later . .	600	123·2
6	—	De Beers mine, Kimberley .	1 June 1896 . .	503$\frac{1}{4}$	103·3
7	—	Kimberley mine, Kimberley	1892	474	97·3
8	Imperial . .	Cape	1884 or earlier .	457	93·8
9	De Beers . .	De Beers mine, Kimberley .	28 March 1888 .	428$\frac{1}{2}$	88·0
10	—	De Beers mine, Kimberley .	Early workings .	409	84·0
11	—	Kimberley	Before 1896 . .	352$\frac{3}{4}$	72·42
12	—	Jagersfontein, O.F.S. . . .	About 1906 . .	335	68·78
13	—	Premier mine, Transvaal .	13 February 1905	334	68·6
14	. —	Vaal River	—	330$\frac{1}{4}$	67·8
15	—	De Beers mine, Kimberley .	27 March 1884 .	302	62·0
16	Tiffany Yellow	Kimberley mine, Kimberley	About 1878 . .	—	—
17	Stewart . . .	Waldeck's Plant, Vaal River	1872	288$\frac{3}{8}$	59·2
18	Du Toit I. . .	Dutoitspan mine, Kimberley	1878	244	50·1
19	Julius Pam. .	Jagersfontein, O.F.S. . . .	1889	241$\frac{1}{2}$	49·6
20	Jagersfontein .	Jagersfontein, O.F.S. . . .	1881	209$\frac{1}{4}$	43·0
21	Porter Rhodes	Kimberley mine, Kimberley	12 February 1880	149·6	30·71
22	Colenso . . .	[Kimberley], Cape	1883 or earlier .	129$\frac{41}{64}$	26·6290
23	Du Toit II. .	Dutoitspan mine, Kimberley	21 July 1871 . .	124	25·5
24	Tennant . .	Cape	1873	112	23·0
25	Pam or Jagersfontein	Jagersfontein, O.F.S. . . .	Before July 1891	*about* 112	23
26	Star of South Africa or Dudley . .	Orange River	March 1869 . .	83$\frac{1}{2}$	17·15

[1] To convert grams to metric carats, multiply by 5.

No. 4. E. W. Streeter, 'Precious Stones and Gems,' 4th edit., 1884, p. 98. (Very impure.)

,, 5. M. Bauer, 'Edelsteinkunde,' 2nd edit., 1909, pp. 258, 322. This is not included in the list of Premier stones supplied to me by Mr. W. Busch (p. 145); so that, either this record is incorrect, or the stone was a low grade bort of little value.

,, 6. Eighth Annual Report for the year ending 30 June 1896, De Beers Consolidated Mines, Ltd., p. 4. (A pale yellowish octahedron marred by a large number of black spots.)

,, 7. M. Bauer, 'Edelsteinkunde,' 1896, p. 242, and later editions. (See note to No. 11.)

,, 9. Second Annual Report for the year ending 31 March 1890, De Beers Consolidated Mines, Ltd., p. 20.

,, 11. Information supplied by Mr. H. Hirsche, of Messrs. Wernher, Beit & Co., who showed me this beautiful yellow brilliant. It was cut in January 1896 as a brilliant of 207$\frac{11}{16}$ carats and afterwards re-cut. Mr. Hirsche suggests that this stone may be identical with No. 7.

OF SOUTH AFRICA.

No.	Number of cut stones.	Weight of cut stones.				Percentage yield of cut material	Reference.
		Weight of largest.		Total weight.			
		English carats.	Grams.[1]	English carats.	Grams.[1]		
1	105	$516\frac{1}{7}$	106·04	$1036\frac{5}{32}$	212·73	$34\frac{1}{4}$	Min. Mag., xv, p. 318.
2	21	$67\frac{7}{8}$	13·94	$364\frac{3}{32}$	74·75	$37\frac{1}{2}$	This vol., p. 140.
3	2	239	49·07	252	51·74	$39\frac{3}{4}$	This vol., p. 142.
4	—	—	—	—	—	—	E. W. Streeter, 1884. (4)
5	—	—	—	—	—	—	M. Bauer, 1909. (5)
6	—	—	—	—	—	—	(6)
7	1	200	41·1	—	—	$42\frac{1}{4}$	M. Bauer, 1896. (7)
8	2	180	36·9	$199\frac{5}{8}$	41·0	$43\frac{3}{4}$	This vol., p. 143.
9	1	$228\frac{1}{2}$	46·9	—	—	$53\frac{1}{3}$	(9)
10	—	—	—	—	—	—	M. Bauer, 1909, p. 250.
11	1	$199\frac{25}{32}$	41·02	—	—	$56\frac{2}{3}$	(11)
12	47	$40\frac{57}{64}$	8·40	$138\frac{3}{64}$	28·34	$41\frac{1}{4}$	(12)
13	—	—	—	—	—	—	M. Bauer, 1909, pp. 258, 322.
14	—	—	—	—	—	—	G. F. Williams, 1902. (14)
15	—	—	—	—	—	—	M. Bauer, 1896, p. 239.
16	—	$125\frac{3}{8}$	25·7	—	—	—	G. F. Kunz, 1887. (16)
17	1	120	24·6	—	—	$41\frac{1}{2}$	—
18	—	—	—	—	—	—	E. W. Streeter, 1882. (18)
19	1	120	24·6	—	—	50	(19)
20	—	—	—	—	—	—	E. W. Streeter, 1882, p. 95.
21	—	—	—	—	—	—	E. W. Streeter, 1882. (21)
22	—	—	—	—	—	—	(22)
23	—	—	—	—	—	—	E. W. Streeter, 1882, p. 190.
24	1	66	13·6	—	—	59	(24)
25	1	55	11·3	—	—	49	(25)
26	1	$46\frac{1}{2}$	9·55	—	—	$55\frac{2}{3}$	—

No. 12. Information supplied by Mr. James A. Forster, who showed me models of the uncut stone and one of the larger drop brilliants. The stone was cut in 1910 in accordance with his instructions.

,, 14. G. F. Williams, 'The Diamond Mines of South Africa,' 1902, p. 158.

,, 16. G. F. Kunz, Science, New York, 1887, vol. x, p. 69.

,, 18. E. W. Streeter, 'The Great Diamonds of the World,' 1882, p. 84.

,, 19. Dana's 'System of Mineralogy', 6th edit., 1892, p. 6; M. Bauer, 1896, p. 242.

,, 21. Sir A. H. Church ('Precious Stones,' 1883, p. 47) gives the weight as 474 troy grains, and the specific gravity 3·523.

,, 22. Presented to the British Museum collection by John Ruskin in 1887. The weight in carats here given is against the older English carat of 205·409 milligrams; if compared with the English (Board of Trade, 1888 and 1889) carat of 205·304 milligrams, the weight is $\frac{1}{15}$ carat more.

,, 24. J. Tennant, Geol. Mag., 1875, dec. 2, vol. ii, p. 546, with 4 figs.; E. W. Streeter, 'The Great Diamonds of the World,' 1882, p. 215.

,, 25. T. Reunert, 'Diamonds and Gold in South Africa,' 1893, p. 67. Possibly identical with the stone of 113 carats from Jagersfontein mentioned by E. Cohen (Neues Jahrb. Min., 1881, vol. i, p. 184).

In conclusion, I must confess that the present notes have been, in part at least, written with the object of pointing out once more, by means of concrete examples,[1] the absurdity of the present system of carat-weights. The use of the metric carat of 200 milligrams, a perfectly definite unit of weight, has recently been legalized in Bulgaria, Denmark, France, Holland, Japan, Norway, Portugal, Roumania, Spain, Sweden, and Switzerland; and the matter is receiving favourable consideration in Belgium, Italy, Mexico, Russia, and Servia.[2] It only remains for England and South Africa, Germany, and the United States to follow suit.

[1] A striking example is given by the case of the 'Florentine' or 'Austrian Yellow' diamond in Vienna, the weight of which had been variously stated to be 139½ and 133⅛ carats. Owing to this discrepancy the gem was weighed by Professor A. Schrauf in 1865 ('Gewichtsbestimmung, ausgeführt an dem grossen Diamanten des kais. österreich. Schatzes, genannt "Florentiner",' Sitzungsber. math.-naturwiss. Classe, Akad. Wiss. Wien, 1866, vol. liv, Abth. i, pp. 479–488) and found to be 27·454 grams, corresponding with 139⅛ Florence carats, 133⅜ Paris carats, and 133⅛ Vienna carats. (The small differences in the fractions suggest that the Florence and Vienna carats have themselves not been always quite constant.)

[2] C. E. Guillaume, 'Les récents progrès du système métrique (deuxième suite),' Procès-verbaux des Séances du Comité international des Poids et Mesures, Paris, 1911, ser. 2, vol. vi, pp. 193–213. (See 'Nature,' 1911, vol. lxxxvii, p. 251.)