

tirely from the stop-cock B. Hydrochloric acid rarely gets beyond the condenser, and the downward pitch of the drying tube F G hastens the passage of the carbonic acid gas. The whole apparatus occupies less than two square feet of desk room.

CHEMICAL LABORATORY,

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### THE SPECIFIC GRAVITIES OF SOME GEM STONES.<sup>1</sup>

BY A. LIVERSIDGE, M.A., F.R.S., PROFESSOR OF CHEMISTRY, UNIVERSITY OF SYDNEY.

THE following tables contain the specific gravities of some gem stones which were all in the cut and polished condition except in the cases specified. As the specimens were sufficiently free from flaws and mechanical impurities to be cut and polished for jewelry, the specific gravities can be taken as those of typically pure minerals and the results should be more satisfactory than those obtained from ordinary cabinet specimens, unless it can be shown that the specific gravity is altered by the pressure and other treatment they have received during the process of cutting and polishing.

The specific gravities were taken with special care on an Oertling's best chemical balance by direct weighing, *i. e.*, by suspending the specimen in a very small and light metal stirrup in distilled water. A specific gravity bottle was found, as is well known, to give less accurate results.

The temperature at the time of the determination is given in all cases and the results are corrected to 4° C. according to Rossetti's determinations of the density of water.

In the last column are given the extremes of specific gravity as given by F. W. Clarke in his Constants of Nature.

The numbers refer to those in my catalogue of specimens and added in case of future reference.

<sup>1</sup> Read before the World's Congress of Chemists, August 23, 1893.

No. of Spec.	Name.	Locality.	Temperature.	Weight.	Sp. Gr.	Corrected to 4° C.
63	BERYL Beryllium silico-aluminate.....		20° C.	0.1260	2.6359	2.6312
62	" (five small stones) pale green.....		"	0.5640	2.7865	2.7816
43	" " " ".....		21.5° C.	0.1225	2.7282	2.7228
39	" " " ".....		"	1.0108	2.6826	2.6773
	F. W. Clarke gives a range from 2.650 to 2.725.....					
	CHRYSOBERYL Beryllium aluminate.....					
27	Cymophane or cat's eye (three small stones).....	Ceylon.	19° C.	0.3615	3.4330	3.4277
14	" " " ".....	"	21° C.	1.8065	3.7147	3.7074
15	" " " ".....	"	"	2.1986	2.9299	2.9241
22	" " " ".....	"	19° C.	0.5193	3.6882	3.6825
24	" " " (four small stones).....	"	"	0.6445	3.7040	3.6982
	F. W. Clarke gives a range from 3.597 to 3.860.....					
45	CHRYSOOLITE. Magnesium iron silicate.....		21.5° C.	0.2186	3.3839	3.3772
	CORUNDUM. Alumina.....					
33	Adamantine spar.....	New South Wales.	21.5° C.	1.5550	3.9974	3.9895
	Barklyite (four uncut stones).....	"	18.5° C.	0.5884	3.7382	3.7331
19	Ruby.....	Ceylon.	21° C.	0.3257	4.0160	4.0081
20	" " " ".....	"	"	0.2644	4.0060	3.9981
40	" (six small stones).....	"	21.5° C.	0.3590	3.9977	3.9898
15	" star.....	"	19° C.	0.4230	3.8986	3.8925
13	" " " ".....	"	21° C.	0.1876	4.0960	4.0880
10	" " " ".....	"	20° C.	3.7292	3.9920	3.9850
	F. W. Clarke gives a range from 3.511 to 3.994 for star ruby.....					
7	Sapphire, pale blue.....	New South Wales.	19° C.	0.3130	3.8882	3.8822
10	" royal blue.....	"	18° C.	0.1395	4.1117	4.1061
17	" " " ".....	"	19° C.	0.6486	3.9404	3.9343
38	" " " ".....	"	21.5° C.	0.2330	3.9827	3.9751
42	" " " ".....	"	"	0.4770	4.0219	4.0140
15	" (four) dark colored.....	Ceylon.	18.5° C.	0.5050	4.1124	4.1068
5	" " " ".....	"	20° C.	2.5580	3.9323	3.9254
3	" pale blue.....	"	19° C.	0.8713	3.9730	3.9668
6	" " " ".....	"	20° C.	1.3653	3.9784	3.9714

No. of Spec.	Name.	Locality.	Temperature.	Weight.	Sp. Gr.	Corrected to 4° C.
7	Sapphire .....	Ceylon.	20° C.	1.2060	3.9476	3.9407
8	" .....	"	"	0.8220	4.0039	3.9969
1	" yellow; large "Oriental topaz" .....	"	"	5.0802	4.0089	4.0019
16	" .....	"	19° C.	0.5056	3.9164	3.9103
2	" star .....	"	"	1.1352	3.9943	3.9981
9	" blue grey star .....	"	20° C.	4.4812	3.9914	3.9844
11	" star .....	"	21° C.	2.8314	3.9969	3.9890
12	" .....	"	"	0.2973	4.0284	4.0205
29	" .....	"	19° C.	1.2374	3.9967	3.9905
	F. W. Clarke gives a range from 3.562 to 4.022.....					
23	Green sapphire or oriental emerald.....	New South Wales.				
25	" " (two small stones).....	" "	19° C.	0.2872	4.1146	4.1082
23	" .....	" "	"	0.9674	4.0041	3.9979
25	" .....	Cudjergong, N. S. W.	18.5° C.	0.5996	4.0733	4.0678
2	" " yellow.....	New South Wales.	20° C.	1.5972	3.9738	3.9668
3	" " pale green.....	" "	"	2.9772	4.0000	3.9930
	<b>DIAMOND</b> .....					
61	Diamond, dark uncut octohedron.....	Bingera, N. S. W.	20° C.	0.2920	3.4762	3.4701
	" five dark colored, uncut .....	"	18.5° C.	1.3220	3.5633	3.5585
	" six light " " .....	"	"	2.2790	3.5278	3.5230
	F. W. Clarke gives a range from 3.334 to 3.550.....					
	<b>FELDSPAR.</b> Potassium aluminum silicate .....					
16	Moonstone .....	Ceylon.	21° C.	0.7370	2.5877	2.5826
17	" .....	"	"	0.3534	2.5833	2.5782
18	" .....	"	"	0.2288	2.5823	2.5772
	F. W. Clarke gives a range from 2.5702 to 2.5950.....					
	<b>GARNETS</b> .....					
44	Garnet, almandine. Iron aluminum silicate.....		21.5° C.	0.1510	4.0266	4.0187
49a	" two specimens .....		"	0.1248	4.0519	4.0439
59	" three " " .....		20° C.	1.3708	4.0058	3.9088
37	" two " " .....		21.5° C.	0.3038	4.1389	4.1308
41	" two " very dark.....		"	0.2558	4.0862	4.0792

No. of Spec.	Name.	Locality.	Temperature.	Weight.	Sp. Gr.	Corrected to 4° C.
60	Garnet.....		20° C.	1.3768	4.0637	4.0566
64	" three specimens.....		"	0.3280	4.1000	4.0928
65	" two " very dark.....		"	0.2748	3.9458	3.9389
37a	" two " ".....		21.5° C.	0.5714	4.2515	4.2431
53	" cinnamon stone. Calcium aluminum silicate.....		20° C.	0.4566	3.6448	3.6384
28	" " " ".....		19° C.	0.4039	3.6420	3.6363
54	" " " less full of air bubbles.....		20° C.	0.5157	3.7342	3.7276
	F. W. Clarke gives a range for almandine of from 3.900 to 4.236.....					
	" " " cinnamon stone " 3.252 to 3.609.....					
50	LAPIS LAZULI, four pieces cut and polished for stud links.....		21.5° C.	1.3560	2.7684	2.7629
	PEARLS. Calcium carbonate.....					
46	Pearl, three specimens.....	Ceylon.	21.5° C.	0.2841	2.7291	2.7237
47	" " " very irregular.....	Torres Straits.	"	1.1422	2.6837	2.6784
48	" " " ".....	" "	"	0.4510	2.6845	2.6792
	QUARTZ. Silica.....					
56	Rock crystal.....		20° C.	0.2255	2.6877	2.6830
	F. W. Clarke gives a range from 2.61 to 2.6507 at 0° C.....					
57	Auethyst.....		20° C.	0.4756	2.6481	2.6434
	" purchased at.....	Oberstein	18° C.	5.2408	2.6565	2.6529
	F. W. Clarke gives a range from 2.659 to 2.744.....					
26	Rose Quartz, two specimens.....	Ceylon.	19° C.	1.1598	2.6674	2.6632
	F. W. Clarke gives a range from 2.651 to 2.658.....					
	Cairngorm, purchased at.....	Oberstein.	18° C.	22.4670	2.6555	2.6519
	" " " ".....	"	"	15.6290	2.6553	2.6517
	" " " ".....	"	"	13.3554	2.6567	2.6531
	" brown " ".....	"	"	3.9084	2.6567	2.6531
	F. W. Clarke gives a range from 2.651 to 2.658 (smoky).....					
8	Fibrous Quartz. "Cat's eye".....	N. S. W., West. Dist.	18.5° C.	0.2636	2.6703	2.6667
34	Opal. Hydrous silica, two specimens.....	New South Wales.	19° C.	0.1150	2.0105	2.0074
35	" " " ".....	"	21.5° C.	0.1858	2.0690	2.0649
6	" " " flawed.....	"	19° C.	0.3616	2.0760	2.0746

No. of Spec.	Name.	Locality.	Temperature.	Weight.	Sp. Gr.	Corrected to 4° C.
	<b>SPINELS. Magnesium aluminatē</b> .....					
8	Spinel, dark blue .....	Ceylon.	18° C.	0.3306	3.6392	3.6343
35	" puce.....	"	21.5° C.	0.3468	3.5900	3.5829
36	" dark puce.....	"	"	0.1616	3.5831	3.5761
	F. W. Clarke gives a range from 3.48 to 3.77.....					
	<b>TOPAZ. Aluminum silico-fluoride</b> .....					
1	Topaz, colorless.....	New South Wales.	19° C.	1.5213	3.5602	3.5547
18	" .....	" "	18° C.	11.6010	3.5509	3.5461
58	" .....	" "	20° C.	0.6334	3.5110	3.5048
32	" two white.....	Ceylon.	21.5° C.	2.0280	3.5717	3.5647
51	" .....	"	20° C.	0.4282	3.5330	3.5268
31	" yellow Brazilian.....	Brazil.	21.5° C.	0.3162	3.5728	3.5658
30	" pink " burnt.....	"	19° C.	1.0845	3.5406	3.5372
52	" .....	"	20° C.	0.8920	3.5257	3.5195
13	" .....	"	19° C.	0.4413	3.4676	3.4622
55	" .....	"	20° C.	0.6585	3.5691	3.5628
	F. W. Clarke gives a range from 3.439 to 3.597.....					
12	<b>TOURMALINE. Aluminum boro-silicate</b> .....					
	" brown colored specimen.....	Ceylon.	19° C.	0.4835	3.0087	3.0040
	F. W. Clarke gives a range from 2.997 to 3.243 and from 3.035 to 3.068 for brown tourmalines.....					
5	<b>TURQUOISE. Hydrous aluminum phosphate</b> .....					
	F. W. Clarke gives a range from 2.426 to 2.651.....					
	<b>ZIRCONS. Zirconium silicate</b> .....					
4	Zircon, red .....	New South Wales.	19° C.	0.4026	4.4783	4.4714
9	" .....	" "	18° C.	0.3118	4.7822	4.7757
10	" cut and polished.....	" "	18.5° C.	1.8145	4.7191	4.7127
14	" pale green.....	Ceylon.	19° C.	0.4160	4.5021	4.4951
	F. W. Clarke gives a range from 4.047 to 4.709 at 21° C.....					