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TABLE I.—TEMPERATURE CONVERSION TABLE.

(Dr. L. Waldo, in *Metallurgical and Chemical Engineering*, March, 1910.)

C	0	10	20	30	40	50	60	70	80	90		
	F	F	F	F	F	F	F	F	F	F	C°	F°
-200	-328	-346	-364	-382	-400	-418	-436	-454		
-100	-148	-166	-184	-202	-220	-238	-256	-274	-292	-310		
- 0	+ 32	+ 14	- 4	- 22	- 40	- 58	- 76	- 94	-112	-130		
0	32	50	68	86	104	122	140	158	176	194		
100	212	230	248	266	284	302	320	338	356	374	1	1.8
200	392	410	428	446	464	482	500	518	536	554	2	3.6
300	572	590	608	626	644	662	680	698	716	734	3	5.4
400	752	770	788	806	824	842	860	878	896	914	4	7.2
500	932	950	968	986	1004	1022	1040	1058	1076	1094	5	9.0
600	1112	1130	1148	1166	1184	1202	1220	1238	1256	1274	6	10.8
700	1292	1310	1328	1346	1364	1382	1400	1418	1436	1454	7	12.6
800	1472	1490	1508	1526	1544	1562	1580	1598	1616	1634	8	14.4
900	1652	1670	1688	1706	1724	1742	1760	1778	1796	1814	9	16.2
1000	1832	1850	1868	1886	1904	1922	1940	1958	1976	1994	10	18.0
1100	2012	2030	2048	2066	2084	2102	2120	2138	2156	2174		
1200	2192	2210	2228	2246	2264	2282	2300	2318	2336	2354		
1300	2372	2390	2408	2426	2444	2462	2480	2498	2516	2534		
1400	2552	2570	2588	2606	2624	2642	2660	2678	2696	2714	1	0.56
1500	2732	2750	2768	2786	2804	2822	2840	2858	2876	2894	2	1.11
1600	2912	2930	2948	2966	2984	3002	3020	3038	3056	3074	3	1.67
1700	3092	3110	3128	3146	3164	3182	3200	3218	3236	3254	4	2.22
1800	3272	3290	3308	3326	3344	3362	3380	3398	3416	3434	5	2.78
1900	3452	3470	3488	3506	3524	3542	3560	3578	3596	3614	6	3.33
2000	3632	3650	3668	3686	3704	3722	3740	3758	3776	3794	7	3.89
2100	3812	3830	3848	3866	3884	3902	3920	3938	3956	3974	8	4.44
2200	3992	4010	4028	4046	4064	4082	4100	4118	4136	4154	9	5.00
2300	4172	4190	4208	4226	4244	4262	4280	4298	4316	4334	10	5.56
2400	4352	4370	4388	4406	4424	4442	4460	4478	4496	4514	11	6.11
2500	4532	4550	4568	4586	4604	4622	4640	4658	4676	4694	12	6.67
2600	4712	4730	4748	4766	4784	4802	4820	4838	4856	4874	13	7.22
2700	4892	4910	4928	4946	4964	4982	5000	5018	5036	5054	14	7.78
2800	5072	5090	5108	5126	5144	5162	5180	5198	5216	5234	15	8.33
2900	5252	5270	5288	5306	5324	5342	5360	5378	5396	5414	16	8.89
3000	5432	5450	5468	5486	5504	5522	5540	5558	5576	5594	17	9.44
3100	5612	5630	5648	5666	5684	5702	5720	5738	5756	5774	18	10.00
3200	5792	5810	5828	5846	5864	5882	5900	5918	5936	5954		
3300	5972	5990	6008	6026	6044	6062	6080	6098	6116	6134		
3400	6152	6170	6188	6206	6224	6242	6260	6278	6296	6314		
3500	6332	6350	6368	6386	6404	6422	6440	6458	6476	6494		
3600	6512	6530	6548	6566	6584	6602	6620	6638	6656	6674		
3700	6692	6710	6728	6746	6764	6782	6800	6818	6836	6854		
3800	6872	6890	6908	6926	6944	6962	6980	6998	7016	7034		
3900	7052	7070	7088	7106	7124	7142	7160	7178	7196	7214		
C	0	10	20	30	40	50	60	70	80	90		

Examples. 1347° C.=2444° F.+12.6° F.=2456.6° F.; 3367° F.=1850° C.+2.78° C.=1852.78° C.

TABLE II.—MELTING POINTS (C.) OF THE CHEMICAL ELEMENTS.*

(Standard Temperatures are in small capitals.)

Element.	Melting point.	Remarks.
Helium.....	<-269?	{ B. P. He=-268.5. Kamerlingh-Onnes. Travers-Jaquered.
Hydrogen.....	-259	
Neon.....	-253?	
Oxygen.....	-230?	Range -227 to -235.
Fluorine.....	-223	Moissan-Dewar.
Nitrogen.....	-210.5	Fischer-Alt.
Argon.....	-188	Ramsay-Travers.
Krypton.....	-169	Ramsay-Travers.
Xenon.....	-140	Ramsay-Travers.
Chlorine.....	-101.5	Johnson-McIntosh.
MERCURY.....	-38.7±0.5	
Bromine.....	-7.3	Range -7.5 to -7.0.
Cæsium.....	26	Range 25.3 to 26.5.
Gallium.....	30.1	Lecoq-Boisbaudran.
Rubidium.....	38	Range 37.8 to 38.5.
Phosphorus.....	44.1	Hulett.
POTASSIUM.....	62.3±0.2	
Sodium.....	97.5±1.0	
Iodine.....	114±1	
Sulphur.....	113.5 to 119.5	Various forms.
Indium.....	154.5±0.5	
Lithium.....	186	Kahlbaum.
Selenium.....	217 to 220	Various forms. Saunders.
TIN.....	231.9±0.2	
Bismuth.....	270	Range 267.5 to 271.5.
Thallium.....	302±1	
CADMIUM.....	321.0±0.2	Range 320.0 to 321.7.
LEAD.....	327.4±0.4	
ZINC.....	419.4±0.3	Range 418.2 to 419.4.
Tellurium.....	451±1	
Arsenic.....	{ 500? 850	Guntz-Broniewski. Jolibois.
ANTIMONY.....	630±1	"Kahlbaum" purity only.
Cerium.....	635	
Magnesium.....	650±2	
ALUMINIUM.....	658±1	
Calcium.....	805±5	
Lanthanum.....	810?	Muthmann-Weiss.
Strontium.....	>Ca, <Ba?	
Neodymium.....	840?	Muthmann-Weiss.
Barium.....	850	Guntz.
Germanium.....	<Ag	Winkler.
Praseodymium.....	940?	Muthmann-Weiss.
SILVER.....	961±2	
Radium.....	600 to 1200?	Unknown.
GOLD.....	1063±3	

* G. K. Burgess, *Jl. Wash. Acad. Sci.*, 1, p. 16, 1911.

MELTING POINTS (C.) OF THE CHEMICAL ELEMENTS. (Cont'd.)

Element.	Melting point.	Remarks.
COPPER	1083 ± 3	
Manganese	1225 ± 15	
Yttrium	1000 to 1400?	Unknown.
Samarium	1300 to 1400	Muthmann-Weiss.
Scandium	1000 to 1400?	Unknown.
Silicon	1420 ± 15	
NICKEL	1450 ± 10	Day-Sosman = 1452.
Cobalt	1490	Day-Sosman.
Chromium	1505 ± 15	
IRON	1520 ± 15	
PALLADIUM	1550 ± 15	Day-Sosman = 1549.
Zirconium	> Silicon	Troost.
Thorium	> 1700, < Pt	Wartenberg.
Vanadium	1730 ± 30	
PLATINUM	1755 ± 20	Waidner-Burgess = 1753.
Beryllium	> 1800	Parsons.
Ytterbium	1600 to 2000?	Unknown.
Titanium	2200 to 2400?	Weiss-Kaiser.
	1800 to 1850	Hunter.
Rhodium	1920?	Range 1907 to 1970.
Ruthenium	> 1950	Joly.
Niobium	2200?	v. Bolton = 1950.
Boron	2200 to 2500	Weintraub.
Iridium	2300?	Range 2100 to 2350.
Uranium	near Mo	Moissan.
Molybdenum	2500?	Range 2110 to > 2500.
Osmium	2700?	Waidner-Burgess.
Tantalum	2850	Waidner-Burgess = 2910.
TUNGSTEN	3000 ± 100	Range 2575 to 3250.
		Waidner-Burgess = 3080.
Carbon	?	Unknown.

TABLE III.—BOILING POINT OF WATER.
Temperature Centigrade; Barometer in mm. of Mercury.

mm.	0	1	2	3	4	5	6	7	8	9
730	98.880	98.918	98.956	98.994	99.032	99.069	99.107	99.145	99.183	99.220
740	99.258	99.295	99.333	99.370	99.407	99.445	99.482	99.519	99.557	99.594
750	99.631	99.668	99.705	99.742	99.779	99.816	99.853	99.890	99.926	99.963
760	100.000	100.037	100.073	100.110	100.146	100.183	100.219	100.256	100.292	100.327

TABLE IV.—BOILING POINT OF SULPHUR.
Temperature Centigrade; Barometer in mm. of Mercury.

mm.	0	1	2	3	4	5	6	7	8	9
730	442.00	442.09	442.18	442.27	442.36	442.45	442.53	442.62	442.71	442.80
740	442.89	442.98	443.07	443.16	443.25	443.34	443.43	443.52	443.61	443.70
750	443.79	443.88	443.97	444.06	444.15	444.24	444.34	444.43	444.52	444.61
760	444.70	444.79	444.88	444.97	445.06	445.15	445.25	445.34	445.43	445.52

This table is based on the assumption that the normal boiling point of sulphur is 444.70°. The other temperatures are computed by Holborn and Henning's formula.

TABLE V.—RESISTANCE THERMOMETER SCALE
(CENTIGRADE).

Values of Temperature Centigrade (*t*) in Terms of Platinum Temperatures (*pt*) for Thermometers with $\delta = 1.500$.

<i>pt</i>	<i>t</i>	Difference for 1° <i>pt</i> .	<i>pt</i>	<i>t</i>	Difference for 1° <i>pt</i> .	<i>pt</i>	<i>t</i>	Difference for 1° <i>pt</i> .	<i>pt</i>	<i>t</i>	Difference for 1° <i>pt</i> .
0	0.000	0.985	250	255.99	1.066	500	534.89	1.170	750	844.26	1.313
10	9.867	0.988	260	266.67	1.070	510	546.62	1.175	760	857.42	1.319
20	19.762	0.991	270	277.38	1.073	520	558.40	1.180	770	870.65	1.326
30	29.687	0.994	280	288.13	1.077	530	570.22	1.185	780	883.95	1.333
40	39.641	0.997	290	298.92	1.081	540	582.10	1.190	790	897.32	1.340
50	49.625	1.000	300	309.75	1.084	550	594.03	1.195	800	910.76	1.347
60	59.639	1.003	310	320.61	1.088	560	606.00	1.200	810	924.28	1.355
70	69.683	1.006	320	331.51	1.092	570	618.03	1.205	820	937.87	1.363
80	79.758	1.009	330	342.46	1.096	580	630.11	1.210	830	951.54	1.370
90	89.863	1.012	340	353.44	1.100	590	642.24	1.216	840	965.28	1.378
100	100.000	1.015	350	364.46	1.104	600	654.43	1.222	850	979.10	1.386
110	110.17	1.018	360	375.52	1.108	610	666.67	1.227	860	993.01	1.394
120	120.37	1.021	370	386.62	1.112	620	678.97	1.232	870	1007.00	1.403
130	130.60	1.024	380	397.76	1.116	630	691.32	1.238	880	1021.07	1.411
140	140.86	1.027	390	408.95	1.120	640	703.73	1.244	890	1035.23	1.420
150	151.16	1.031	400	420.18	1.125	650	716.20	1.250	900	1049.47	1.428
160	161.49	1.034	410	431.45	1.129	660	728.73	1.256	910	1063.80	1.437
170	171.85	1.038	420	442.77	1.134	670	741.32	1.261	920	1078.21	1.445
180	182.25	1.041	430	454.13	1.138	680	753.97	1.267	930	1092.71	1.455
190	192.68	1.044	440	465.53	1.142	690	766.67	1.274	940	1107.31	1.464
200	203.14	1.048	450	476.97	1.146	700	779.44	1.280	950	1122.00	1.474
210	213.64	1.052	460	488.46	1.151	710	792.27	1.286	960	1136.79	1.484
220	224.18	1.055	470	500.00	1.156	720	805.17	1.293	970	1151.69	1.494
230	234.75	1.058	480	511.58	1.160	730	818.13	1.299	980	1166.68	1.503
240	245.35	1.062	490	523.21	1.165	740	831.16	1.306	990	1181.76	1.513
250	255.99	1.066	500	534.89	1.170	750	844.26	1.313	1000	1196.95	1.524

TABLE VI.—RESISTANCE THERMOMETER SCALE (FAHR.).

$\delta = 1.50.$

Platinum temperatures.	Gas scale temperatures.	Platinum temperatures.	Gas scale temperatures.	Platinum temperatures.	Gas scale temperatures.	Platinum temperatures.	Gas scale temperatures.
0	0.56	510	522.7	1040	1122.8	1570	1805.5
10	10.35	520	533.4	1050	1134.8	1580	1819.4
20	20.19	530	544.2	1060	1146.9	1590	1833.4
30	30.03	540	554.9	1070	1158.9	1600	1847.4
32	32.0	550	565.7	1080	1171.0	1610	1861.6
40	39.9	560	576.5	1090	1183.1	1620	1875.6
50	49.8	570	587.3	1100	1195.3	1630	1889.9
60	59.7	580	598.2	1110	1207.5	1640	1904.1
70	69.5	590	609.1	1120	1219.7	1650	1918.3
80	79.5	600	620.0	1130	1232.0	1660	1932.5
90	89.4	610	630.9	1140	1244.3	1670	1946.8
100	99.4	620	641.8	1150	1256.6	1680	1961.2
110	109.3	630	652.8	1160	1270.0	1690	1975.7
120	119.3	640	663.8	1170	1281.3	1700	1990.2
130	129.3	650	674.8	1180	1293.7	1710	2004.7
140	139.4	660	685.8	1190	1306.1	1720	2019.3
150	149.4	670	696.9	1200	1318.7	1730	2034.0
160	159.4	680	707.9	1210	1331.1	1740	2048.7
170	169.5	690	719.0	1220	1343.7	1750	2063.4
180	179.6	700	730.1	1230	1356.3	1760	2078.2
190	189.7	710	741.3	1240	1368.9	1770	2093.1
200	199.8	720	752.5	1250	1381.5	1780	2108.0
210	209.9	730	763.6	1260	1394.2	1790	2123.0
212	212.0	740	774.8	1270	1406.9	1800	2138.0
220	220.1	750	786.0	1280	1419.6	1810	2153.1
230	230.3	760	797.3	1290	1432.4	1820	2168.3
240	240.5	770	808.6	1300	1445.2	1830	2183.5
250	250.7	780	819.9	1310	1458.1	1840	2198.7
260	260.9	790	831.2	1320	1471.0	1850	2213.0
270	271.2	800	842.6	1330	1483.9	1860	2229.4
280	281.4	810	854.0	1340	1496.8	1870	2244.9
290	291.7	820	865.4	1350	1509.8	1880	2260.4
300	302.0	830	876.8	1360	1522.9	1890	2276.0
310	312.3	840	888.3	1370	1535.9	1900	2291.6
320	322.7	850	899.7	1380	1549.1	1910	2307.3
330	333.0	860	911.2	1390	1562.1	1920	2323.0
340	343.4	870	922.7	1400	1575.3	1930	2338.9
350	353.8	880	934.3	1410	1588.5	1940	2354.8
360	364.2	890	945.9	1420	1601.8	1950	2370.8
370	374.6	900	957.5	1430	1615.1	1960	2386.8
380	385.1	910	969.1	1440	1628.4	1970	2402.9
390	395.6	920	980.8	1450	1641.8	1980	2419.0
400	406.1	930	992.5	1460	1655.2	1990	2435.3
410	416.6	940	1004.2	1470	1668.7	2000	2451.6
420	427.1	950	1015.9	1480	1682.2	2010	2468.0
430	437.6	960	1027.7	1490	1695.7	2020	2484.4
440	448.2	970	1039.5	1500	1709.3	2030	2500.8
450	458.8	980	1051.3	1510	1722.9	2040	2517.5
460	469.4	990	1063.1	1520	1736.6	2050	2534.2
470	480.0	1000	1075.0	1530	1750.3	2060	2551.0
480	490.6	1010	1086.9	1540	1764.0
490	501.3	1020	1098.8	1550	1777.8
500	512.0	1030	1110.8	1560	1791.6

TABLE VII.—AUXILIARY TO TABLES V AND VI.

Corrections to t for small changes in δ .

Centigrade scale.				Fahrenheit scale.			
	Δt for $\Delta\delta = 0.01.$		Δt for $\Delta\delta = 0.01.$		Δt for $\Delta\delta = 0.01.$		Δt for $\Delta\delta = 0.01.$
50	-0.002	550	+0.247	100	-0.003	1100	+0.53
100	.000	600	.300	200	.000	1200	.64
150	+ .008	650	.357	300	+ .014	1300	.76
200	.020	700	.420	400	.038	1400	.90
250	.037	750	.487	500	.07	1500	1.05
300	.060	800	.560	600	.11	1600	1.23
350	.087	850	.637	700	.18	1700	1.38
400	.120	900	.720	800	.25	1800	1.56
450	.157	950	.807	900	.33	1900	1.73
500	.200	1000	.900	1000	.42	2000	1.95

Computations of t from pt are made by Table V, as if the thermometer had $\delta = 1.50$. The above corrections (Δt) are then applied to the computed values of t for the value of δ proper to the thermometer.

Example. Let $pt = 470.00$, whence $t = 500.00^\circ \text{C.}$ by Table V. If $\delta = 1.52$, the corrected value of t is 500.40°C. by Table VII.

TABLE VIII.—TEMPERATURE CORRECTIONS FOR PLATINUM OF DIFFERENT δ .

[Thermometer calibrated by Callendar method, ice, steam, and S. B. P.]

Temperature $^\circ \text{C.}$	Correction in $^\circ \text{C.}$ for values of δ given below.							
	1.525	1.550	1.575	1.600	1.650	1.700	1.800	1.900
200	+0.02	+0.05	+0.08	+0.10	+0.14	+0.16	+0.20	+0.21
300	+ .02	+ .05	+ .08	+ .11	+ .19	+ .27	+ .45	+ .55
400	.00	.00	.01	.03	.08	.14	.29	.37
500	- .02	- .05	- .09	- .11	- .18	- .24	- .39	- .57
600	- .09	- .18	- .30	- .40	- .62	- .88	- 1.42	- 1.96
700	- .33	- .70	- 1.03	- 1.32	- 1.78	- 2.2	- 2.9	- 3.5
800	- .90	- 1.65	- 2.24	- 2.7	- 3.6	- 4.4	- 5.8	- 7.1
900	- 1.90	- 3.1	- 4.0	- 4.9	- 6.5	- 8.1	- 10.8	- 13.5
1000	- 3.3	- 5.2	- 6.8	- 8.2	- 10.7	- 13.1	- 17.1	- 20.8
1100	- 5.5	- 8.1	- 10.3	- 12.2	- 15.7	- 18.7	- 24.3	- 29.1

The above table applies only when the value of δ is that given by using the S. B. P. as third calibration point of a resistance thermometer.

TABLE IX.—TRANSFORMATION TABLE FOR ABSORPTION COEFFICIENTS.

Values of A' corresponding to c' from values of A corresponding to c .

A	c/c'	HIGH TEMPERATURES														
		14,200 to 14,300	14,200 to 14,400	14,200 to 14,500	14,200 to 14,600	14,200 to 14,700	14,300 to 14,400	14,300 to 14,500	14,300 to 14,600	14,300 to 14,700	14,400 to 14,500	14,400 to 14,600	14,400 to 14,700	14,500 to 14,600	14,500 to 14,700	14,600 to 14,700
.05	.049	.049	.048	.048	.048	.047	.049	.049	.048	.048	.049	.049	.048	.049	.049	.049
.1	.098	.097	.095	.094	.092	.098	.097	.095	.094	.094	.098	.097	.095	.098	.097	.098
.2	.19	.19	.19	.18	.18	.19	.19	.19	.18	.18	.19	.19	.19	.19	.19	.19
.3	.29	.29	.28	.27	.27	.29	.29	.28	.27	.27	.29	.29	.28	.29	.29	.29
.4	.39	.38	.37	.36	.35	.39	.38	.37	.36	.36	.39	.38	.37	.39	.38	.39
.5	.49	.48	.46	.45	.44	.49	.48	.46	.45	.45	.49	.48	.46	.49	.48	.49
.6	.59	.57	.54	.53	.52	.59	.57	.54	.53	.53	.59	.57	.54	.59	.57	.59
.7	.68	.66	.64	.62	.60	.68	.66	.64	.62	.62	.68	.66	.64	.68	.66	.68
.8	.77	.75	.73	.70	.69	.77	.75	.73	.70	.70	.77	.75	.73	.77	.75	.77
.9	.87	.84	.82	.79	.77	.87	.84	.82	.79	.79	.87	.84	.82	.87	.84	.87

Table based on equation: $c/c' \log A = \log A'$, for use with Wien's law, p. 251, to reduce observations to common value of c_2 .
Example. An observer has taken $c_2 = 14,200$ in Eq. III, p. 251; it is desired to reduce his results to $c_2 = 14,500$. If A observed was 0.50 the corrected value of A' is 0.46 from the table.

TABLE X.—ABSORBING POWERS* FOR POLISHED METALS AND OTHER SUBSTANCES.

Substance.	Values of λ .		Blue, 0.4	Green, 0.5	Orange, 0.6	Red, 0.7	Infra red.		
							2.0	5.0	8.0
Silver.....	0.10	0.10	0.10	0.10	0.075	0.058	0.021	0.015	0.012
Gold.....	.72	.53	.42	.36	.30	.24	.19	.14	.10
Platinum.....	.52	.42	.36	.31	.26	.21	.16	.11	.08
Palladium.....		.42	.36	.31	.26	.21	.16	.11	.08
Rhodium.....		.24	.23	.21	.19	.17	.14	.11	.08
Iridium.....		.25	.25	.24	.22	.20	.17	.14	.11
Iron.....	.50	.45	.42	.41	.39	.37	.34	.31	.28
Copper:									
Liquid.....		.35	.35	.35	.35	.35	.35	.35	.35
Solid.....		.47	.47	.47	.47	.47	.47	.47	.47
Nickel.....		.47	.47	.47	.47	.47	.47	.47	.47
Tungsten.....		.39	.39	.39	.39	.39	.39	.39	.39
Tantalum.....		.53	.53	.53	.53	.53	.53	.53	.53
Molybdenum.....		.62	.62	.62	.62	.62	.62	.62	.62
Chromium.....	.56	.55	.52	.50	.48	.46	.43	.40	.37
Vanadium.....		.45	.45	.45	.45	.45	.45	.45	.45
Antimony.....		.44	.44	.44	.44	.44	.44	.44	.44
Magnesium.....		.47	.47	.47	.47	.47	.47	.47	.47
Tellurium.....		.28	.27	.27	.27	.27	.27	.27	.27
Siicon.....		.52	.52	.52	.52	.52	.52	.52	.52
Graphite:		.66	.66	.66	.66	.66	.66	.66	.66
Polished.....		.70	.70	.70	.70	.70	.70	.70	.70
Matt.....		.79	.78	.77	.76	.75	.74	.73	.72
Caprous oxide.....			.70	.70	.70	.70	.70	.70	.70
Iron oxide.....			.70	.70	.70	.70	.70	.70	.70
Chromium oxide.....			.70	.70	.70	.70	.70	.70	.70
Porcelain.....		>.90	>.90	>.90	>.90	>.90	>.90	>.90	>.90
Thorin (pure).....			.07 to	.07 to	.07 to	.07 to	.07 to	.07 to	.07 to
Alumina.....			.10 to	.10 to	.10 to	.10 to	.10 to	.10 to	.10 to
Zirconia.....			.06 to	.06 to	.06 to	.06 to	.06 to	.06 to	.06 to
Magnesia.....			.06 to	.06 to	.06 to	.06 to	.06 to	.06 to	.06 to
Lime.....			.10 to	.10 to	.10 to	.10 to	.10 to	.10 to	.10 to

* The absorbing power a = emissive power $e = 1 - r$, where r = reflecting power.