

TABLE I.—ELEMENTS, SYMBOLS AND INTERNATIONAL ATOMIC WEIGHTS, 1912.

Aluminum.....	Al.....	27.10	Molybdenum... Mo.....	96.00
Antimony.....	Sb.....	120.20	Neodymium.... Nd.....	144.30
Argon.....	A.....	39.88	Neon..... Ne.....	20.20
Arsenic.....	As.....	74.96	Nickel..... Ni.....	58.68
Barium.....	Ba.....	137.37	Niton..... Nt.....	222.4
Bismuth.....	Bi.....	208.00	Nitrogen..... N.....	14.01
Boron.....	B.....	11.00	Osmium..... Os.....	190.90
Bromine.....	Br.....	79.92	Oxygen..... O.....	16.00
Cadmium.....	Cd.....	112.40	Palladium..... Pd.....	106.70
Cæsium.....	Cs.....	132.81	Phosphorus.... P.....	31.04
Calcium.....	Ca.....	40.07	Platinum..... Pt.....	195.20
Carbon.....	C.....	12.00	Potassium..... K.....	39.10
Cerium.....	Ce.....	140.25	Praseodymium . Pr.....	140.60
Chlorine.....	Cl.....	35.46	Radium..... Ra.....	226.40
Chromium.....	Cr.....	52.00	Rhodium..... Rh.....	102.90
Cobalt.....	Co.....	58.97	Rubidium..... Rb.....	85.45
Columbium*....	Cb.....	93.50	Ruthenium.... Ru.....	101.70
Copper.....	Cu.....	63.57	Samarium..... Sa.....	150.40
Dysprosium....	Dy.....	162.50	Scandium..... Sc.....	44.10
Erbium.....	Er.....	167.70	Selenium..... Se.....	79.20
Europium.....	Eu.....	152.00	Silicon..... Si.....	28.30
Fluorine.....	F.....	19.00	Silver..... Ag.....	107.88
Gadolinium....	Gd.....	157.30	Sodium..... Na.....	23.00
Gallium.....	Ga.....	69.90	Strontium..... Sr.....	87.63
Germanium....	Ge.....	72.50	Sulphur..... S.....	32.07
Glucium†.....	Gl.....	9.10	Tantalum..... Ta.....	181.50
Gold.....	Au.....	197.20	Tellurium.... Te.....	127.50
Helium.....	He.....	3.99	Terbium..... Tb.....	159.20
Hydrogen.....	H.....	1.008	Thallium..... Tl.....	204.00
Indium.....	In.....	114.80	Thorium..... Th.....	232.40
Iodine.....	I.....	126.92	Thulium..... Tm.....	168.50
Iridium.....	Ir.....	193.10	Tin..... Sn.....	119.00
Iron.....	Fe.....	55.84	Titanium..... Ti.....	48.10
Krypton.....	Kr.....	82.92	Tungsten..... W.....	184.00
Lanthanum....	La.....	139.00	Uranium..... U.....	238.50
Lead.....	Pb.....	207.10	Vanadium..... V.....	51.00
Lithium.....	Li.....	6.94	Xenon..... Xe.....	130.20
Lutecium‡.....	Lu.....	174.00	Ytterbium§.... Yb.....	172.00
Magnesium....	Mg.....	24.32	Yttrium..... Y.....	89.00
Manganese....	Mn.....	54.93	Zinc..... Zn.....	65.37
Mercury.....	Hg.....	200.60	Zirconium.... Zr.....	90.60

\*Columbium, formerly Niobium. †Glucium, formerly Beryllium.

‡Lutecium, recently separated from Ytterbium.

§Ytterbium, for which Urbain gives the name Neo-ytterbium. It is better to retain the old name.

Actinium and polonium are also recognized as elements, but no atomic weights have as yet been determined for them.

O = 16 is now the accepted basis of comparison. If at. wt. of an element be desired on basis of H = 1, use factor 0.9925.

Example.—Carbon = 12.

$12 \times 0.9925 = 11.91$ , which was at. wt. of C when H = 1.

Tabulation of old numbers is omitted, to lessen danger of error in "taking out" from wrong table.

TABLE II.—CHEMICAL FACTORS AND THEIR LOGARITHMS.

	Known.	Required.	Factor.	Logarithm.
Aluminum.....	Al <sub>2</sub> O <sub>3</sub>	Al	0.5303	9.7245
	AlPO <sub>4</sub>	Al <sub>2</sub> O <sub>3</sub>	0.4185	9.6217
	Al <sub>2</sub> O <sub>3</sub>	KAl(SO <sub>4</sub> ) <sub>2</sub> + 12H <sub>2</sub> O	9.2869	0.9678
Antimony.....	Sb <sub>2</sub> S <sub>3</sub>	Sb	0.7142	9.8538
	Sb <sub>2</sub> O <sub>4</sub>	Sb	0.7897	9.8975
Arsenic.....	Mg <sub>2</sub> As <sub>2</sub> O <sub>7</sub>	As	0.4827	9.6837
	Mg <sub>2</sub> As <sub>2</sub> O <sub>7</sub>	As <sub>2</sub> O <sub>3</sub>	0.6373	9.8043
	Mg <sub>2</sub> As <sub>2</sub> O <sub>7</sub>	As <sub>2</sub> O <sub>5</sub>	0.7403	9.8694
	As <sub>2</sub> S <sub>3</sub>	As	0.6091	9.7847
	As <sub>2</sub> S <sub>3</sub>	As <sub>2</sub> O <sub>3</sub>	0.8041	9.9053
	As <sub>2</sub> S <sub>3</sub>	As <sub>2</sub> O <sub>5</sub>	0.9341	9.9704
	Ag (from Ag <sub>3</sub> AsO <sub>4</sub> )	As	0.2316	9.3647
Barium.....	AgCl (from Ag <sub>3</sub> AsO <sub>4</sub> )	As	0.1743	9.2413
	BaSO <sub>4</sub>	Ba	0.5885	9.7698
	BaSO <sub>4</sub>	BaO	0.6570	9.8176
	BaCO <sub>3</sub>	Ba	0.6960	9.8426
Bismuth.....	BaCO <sub>3</sub>	BaO	0.7771	9.8905
	BaCrO <sub>4</sub>	Ba	0.5420	9.7340
	BaCrO <sub>4</sub>	BaO	0.6051	9.7819
	Bi <sub>2</sub> O <sub>3</sub>	Bi	0.8966	9.9526
	BiOCl	Bi	0.8017	9.9040
	BiOCl	Bi <sub>2</sub> O <sub>3</sub>	0.8942	9.9514
	Boron.....	B <sub>2</sub> O <sub>3</sub>	B	0.3143
Bromine.....	AgBr	Br	0.4256	9.6290
	AgBr	HBr	0.4309	9.6344
	HBr	Br	0.9875	9.9945
	KBr	Br	0.6715	9.8270
	Cadmium.....	CdO	Cd	0.8754
Calcium.....	CaO	Ca	0.7146	9.8541
	CaO	CaCO <sub>3</sub>	1.7847	0.2516
	CaSO <sub>4</sub>	Ca	0.2943	9.4688
	CaSO <sub>4</sub>	CaO	0.4119	9.6148

TABLE II.—CHEMICAL FACTORS AND THEIR LOGARITHMS—Continued.

	Known.	Required.	Factor.	Logarithms.
Calcium, <i>continued</i> ..	CaCO <sub>3</sub>	Ca	0.4004	9.6025
	CaCO <sub>3</sub>	CaO	0.5603	9.7484
Carbon.....	CO <sub>2</sub>	C	0.2727	9.4357
	C	CO <sub>2</sub>	3.6667	0.5643
Chlorine.....	AgCl	Cl	0.2474	9.3934
	AgCl	HCl	0.2544	9.4055
	Ag	Cl	0.3287	9.5168
	Ag	HCl	0.3380	9.5289
	HCl	Cl	0.9724	9.9879
Chromium.....	Cr <sub>2</sub> O <sub>3</sub>	Cr	0.6842	9.8352
	Cr <sub>2</sub> O <sub>3</sub>	CrO <sub>3</sub>	1.3158	0.1192
	PbCrO <sub>4</sub>	Cr	0.1609	9.2066
	PbCrO <sub>4</sub>	CrO <sub>3</sub>	0.3095	9.4907
	BaCrO <sub>4</sub>	Cr	0.2052	9.3122
Cobalt.....	BaCrO <sub>4</sub>	CrO <sub>3</sub>	0.3947	9.5963
	CoSO <sub>4</sub>	Co	0.3803	9.5801
	CoSO <sub>4</sub>	CoO	0.4835	9.6844
Copper.....	Co	CoO	1.2713	0.1042
	Cu	CuO	1.2517	0.0975
	Cu	Cu <sub>2</sub> S	1.2522	0.0977
	CuO	Cu	0.7989	9.9025
	Cu <sub>2</sub> S	Cu	0.7986	9.9023
	Cu <sub>2</sub> S	CuO	0.9996	9.9998
	CuSO <sub>4</sub>	Cu	0.3982	9.6001
Fluorine.....	CaF <sub>2</sub>	F	0.4866	9.6871
	CaF <sub>2</sub>	HF	0.5124	9.7096
Gold.....	Au	AuCl <sub>3</sub>	1.5394	0.1873
Hydrogen.....	H <sub>2</sub> O	H	0.1119	9.0487
	HCl	H	0.0276	8.4409
Iodine.....	AgI	I	0.5405	9.7328
	AgI	HI	0.5448	9.7362
Iron.....	Fe	FeO	1.2865	0.1094
	Fe	Fe <sub>2</sub> O <sub>3</sub>	1.4298	0.1553
	Fe	Fe <sub>3</sub> O <sub>4</sub>	1.3820	0.1405
	Fe	FeS <sub>2</sub>	2.1486	0.3322
	FeO	Fe	0.7773	9.8906
	FeO	Fe <sub>2</sub> O <sub>3</sub>	1.1114	0.0459
	Fe <sub>2</sub> O <sub>3</sub>	Fe	0.6994	9.8447
	Fe <sub>2</sub> O <sub>3</sub>	FeO	0.8998	9.9541
	Fe <sub>2</sub> O <sub>3</sub>	Fe <sub>3</sub> O <sub>4</sub>	0.9666	9.9853
	Fe <sub>2</sub> O <sub>3</sub>	FeS <sub>2</sub>	1.5028	0.1769
	Fe <sub>3</sub> O <sub>4</sub>	Fe	0.7236	9.8595
	FeS <sub>2</sub>	Fe	0.4654	9.6678
	FeS <sub>2</sub>	FeO	0.5988	9.7773

TABLE II.—CHEMICAL FACTORS AND THEIR LOGARITHMS—Continued.

	Known.	Required.	Factor.	Logarithms.
Iron, <i>continued</i> .....	FeS <sub>2</sub>	Fe <sub>2</sub> O <sub>3</sub>	0.6654	9.8231
	S	FeS <sub>2</sub>	1.8706	0.2720
Lead.....	PbO	Pb	0.9283	9.9677
	PbS	Pb	0.8659	9.9375
	PbS	PbO	0.9328	9.9698
	PbSO <sub>4</sub>	Pb	0.6831	9.8345
	PbSO <sub>4</sub>	PbO	0.7359	9.8668
	PbSO <sub>4</sub>	PbS	0.7888	9.8969
	PbSO <sub>4</sub>	PbCO <sub>3</sub>	0.8810	9.9450
	PbCrO <sub>4</sub>	Pb	0.6408	9.8067
	PbCrO <sub>4</sub>	PbO	0.6903	9.8390
	Lithium.....	LiCl	Li	0.1637
LiCl		Li <sub>2</sub> O	0.3524	9.5470
Magnesium.....	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	Mg	0.2184	9.3393
	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	MgO	0.3621	9.5588
	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	MgCO <sub>3</sub>	0.7572	9.8792
	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	MgCl <sub>2</sub>	0.8552	9.9321
	MgCO <sub>3</sub>	MgO	0.4782	9.6796
Manganese.....	MgO	Mg	0.6032	9.7805
	Mn <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	Mn	0.3870	9.5877
	Mn <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	MnO	0.4998	9.6988
	Mn <sub>3</sub> O <sub>4</sub>	Mn	0.7203	9.8575
	Mn <sub>3</sub> O <sub>4</sub>	MnO	0.9301	9.9685
	MnS	Mn	0.6313	9.8002
	MnS	MnO	0.8153	9.9113
Mercury.....	Hg	HgO	1.0798	0.0333
	HgS	Hg	0.8622	9.9356
	HgS	HgO	0.9309	9.9689
	HgCl	Hg	0.8498	9.9293
	HgCl	HgO	0.9176	9.9627
Molybdenum.....	MoO <sub>3</sub>	Mo	0.6667	9.8240
	MoO <sub>3</sub>	MoS <sub>2</sub>	1.1119	0.0460
Nickel.....	NiO	Ni	0.7858	9.8953
	NiSO <sub>4</sub>	Ni	0.3792	9.5789
	NiSO <sub>4</sub>	NiO	0.4826	9.6836
	NiSO <sub>4</sub>	NiO	0.4826	9.6836
Nitrogen.....	Pt	N	0.1435	9.1569
	Pt	NH <sub>3</sub>	0.1745	9.2418
	Pt	NH <sub>4</sub>	0.1849	9.2669
	(NH <sub>4</sub> ) <sub>2</sub> PtCl <sub>6</sub>	N	0.0631	8.8000
	(NH <sub>4</sub> ) <sub>2</sub> PtCl <sub>6</sub>	NH <sub>3</sub>	0.0767	8.8848
	(NH <sub>4</sub> ) <sub>2</sub> PtCl <sub>6</sub>	NH <sub>4</sub>	0.0813	8.9101
	N	NH <sub>3</sub>	1.2158	0.0848
	N	N <sub>2</sub> O <sub>5</sub>	3.8551	0.5861
Oxygen.....	H <sub>2</sub> O	O	0.8881	9.9484

TABLE II.—CHEMICAL FACTORS AND THEIR LOGARITHMS—Continued.

	Known.	Required.	Factor.	Logarithms.
Phosphorus.....	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	P	0.2787	9.4451
	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	PO <sub>4</sub>	0.8534	9.9312
	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	P <sub>2</sub> O <sub>5</sub>	0.6379	9.8048
	(UO <sub>2</sub> ) <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	P <sub>2</sub> O <sub>5</sub>	0.1987	9.2982
Platinum.....	Pt	PtCl <sub>4</sub>	1.7266	0.2372
	PtCl <sub>4</sub>	Pt	0.5791	9.7628
Potassium.....	KCl	K	0.5244	9.7197
	KCl	K <sub>2</sub> O	0.6317	9.8005
	K <sub>2</sub> PtCl <sub>6</sub>	K	0.1609	9.2066
	K <sub>2</sub> PtCl <sub>6</sub>	K <sub>2</sub> O	0.1938	9.2874
	K <sub>2</sub> PtCl <sub>6</sub>	KCl	0.3069	9.4870
	Pt	K	0.4006	9.6027
Selenium.....	Pt	K <sub>2</sub> O	0.4826	9.6836
	Se	SeO <sub>2</sub>	1.4040	0.1473
Silicon.....	SiO <sub>2</sub>	Si	0.4693	9.6715
	Si	SiO <sub>2</sub>	2.1308	0.3285
Silver.....	AgCl	Ag	0.7526	9.8766
	AgBr	Ag	0.5744	9.7592
	AgI	Ag	0.4595	9.6623
	Ag <sub>2</sub> S	Ag	0.8706	9.9398
	NaCl	Na	0.3934	9.5948
Sodium.....	NaCl	Na <sub>2</sub> O	0.5303	9.7245
	Na <sub>2</sub> CO <sub>3</sub>	Na <sub>2</sub> O	0.5849	9.7671
	Na <sub>2</sub> SO <sub>4</sub>	Na <sub>2</sub> O	0.4364	9.6399
	SrSO <sub>4</sub>	Sr	0.4770	9.6785
Strontium.....	SrSO <sub>4</sub>	SrO	0.5641	9.7514
	BaSO <sub>4</sub>	S	0.1374	9.1380
Sulphur.....	BaSO <sub>4</sub>	SO <sub>3</sub>	0.3430	9.5353
	BaSO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub>	0.4202	9.6235
	BaSO <sub>4</sub>	SO <sub>4</sub>	0.4115	9.6143
	Tin.....	SnO <sub>2</sub>	Sn	0.7881
Titanium.....	TiO <sub>2</sub>	Ti	0.6005	9.7786
Tungsten.....	WO <sub>3</sub>	W	0.7931	9.8994
Uranium.....	(UO <sub>2</sub> ) <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	U	0.6671	9.8242
	(UO <sub>2</sub> ) <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	U <sub>3</sub> O <sub>8</sub>	0.7865	9.8957
	U <sub>3</sub> O <sub>8</sub>	U	0.8483	9.9286
Vanadium.....	V <sub>2</sub> O <sub>5</sub>	V	0.5604	9.7485
Zinc.....	ZnO	Zn	0.8034	9.9049
	ZnO	ZnS	1.1975	0.0783
	ZnS	Zn	0.6709	9.8267
	ZnS	ZnO	0.8351	9.9217

The above table of factors is calculated from the atomic weights as given by the "International" committee of 1912.

TABLE III.—NAMES, SYMBOLS, MOLAR WEIGHTS AND PERCENTAGE COMPOSITION OF THE MORE IMPORTANT INORGANIC COMPOUNDS, CHEMICALLY CLASSIFIED.

Names.	Formulae.	Molar Wts.	Percentage Composition.
ANHYDRIDES.			
Arsenic.....	As <sub>2</sub> O <sub>5</sub>	229.92	As, 65.21 . O, 34.79
Arsenious.....	As <sub>2</sub> O <sub>3</sub>	197.92	As, 75.75 . O, 24.25
Antimonic.....	Sb <sub>2</sub> O <sub>5</sub>	320.40	Sb, 75.03 . O, 24.97
Boric.....	B <sub>2</sub> O <sub>3</sub>	70.00	B, 31.43 . O, 68.57
Carbonic.....	CO <sub>2</sub>	44.00	C, 27.27 . O, 72.73
Chromic.....	CrO <sub>3</sub>	100.00	Cr, 52.00 . O, 48.00
Molybdic.....	MoO <sub>3</sub>	144.00	Mo, 66.67 . O, 33.33
Nitric.....	N <sub>2</sub> O <sub>5</sub>	108.02	N, 25.94 . O, 74.06
Nitrous.....	N <sub>2</sub> O <sub>3</sub>	76.02	N, 36.86 . O, 63.14
Permanganic.....	Mn <sub>2</sub> O <sub>7</sub>	221.86	Mn, 49.52 . O, 50.48
Phosphoric.....	P <sub>2</sub> O <sub>5</sub>	142.08	P, 43.69 . O, 56.31
Phosphorous.....	P <sub>2</sub> O <sub>3</sub>	110.08	P, 56.39 . O, 43.61
Silicic.....	SiO <sub>2</sub>	60.30	Si, 46.93 . O, 53.07
Sulphuric.....	SO <sub>3</sub>	80.07	S, 40.05 . O, 59.95
Sulphurous.....	SO <sub>2</sub>	64.07	S, 50.05 . O, 49.95
Titanic.....	TiO <sub>2</sub>	80.10	Ti, 60.05 . O, 39.95
Tungstic.....	WO <sub>3</sub>	232.00	W, 79.31 . O, 20.69
Vanadic.....	V <sub>2</sub> O <sub>5</sub>	182.00	V, 56.04 . O, 43.96
ARSENIATES.			
Hydrogen.....	H <sub>3</sub> AsO <sub>4</sub>	141.984	As <sub>2</sub> O <sub>5</sub> , 80.97 . H <sub>2</sub> O, 19.03
Am.-Magnesium.....	(NH <sub>4</sub> MgAsO <sub>4</sub> ) <sub>2</sub> H <sub>2</sub> O	380.65	NH <sub>3</sub> , 8.95 . MgO, 21.19 . As <sub>2</sub> O <sub>5</sub> , 60.40 . H <sub>2</sub> O, 9.46
Mg. (pyro.).....	Mg <sub>2</sub> As <sub>2</sub> O <sub>7</sub>	310.56	MgO, 25.97 . As <sub>2</sub> O <sub>5</sub> , 74.03 (As = 48.27)
Silver.....	Ag <sub>3</sub> AsO <sub>4</sub>	462.60	Ag, 69.96 . As, 16.20 . (O <sub>4</sub> = 13.84)
ARSENITES.			
Hydrogen.....	H <sub>2</sub> AsO <sub>3</sub>	125.984	As <sub>2</sub> O <sub>3</sub> , 78.55 . H <sub>2</sub> O, 21.45
Mg. (tertiary)....	Mg <sub>3</sub> (AsO <sub>3</sub> ) <sub>2</sub>	318.88	As <sub>2</sub> O <sub>3</sub> , 62.07 . MgO, 37.93
Ag. (tertiary)....	Ag <sub>3</sub> AsO <sub>3</sub>	446.60	Ag, 72.47 . As, 16.78 . O <sub>3</sub> = 10.75
BORATES.			
Hydrogen.....	B(OH) <sub>3</sub>	62.024	H <sub>2</sub> O, 43.57 . B <sub>2</sub> O <sub>3</sub> , 56.43
Borax (glass)....	Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub>	202.00	Na <sub>2</sub> O, 30.69 . (B <sub>2</sub> O <sub>3</sub> ) <sub>2</sub> , 69.31
Borax (cryst.)....	Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> + 5Aq.	292.08	H <sub>2</sub> O, 30.87 . Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> , 69.13
BROMIDES.			
Hydrogen.....	HBr	80.928	H, 1.25 . Br, 98.75
Potassium.....	KBr	119.02	K, 32.85 . Br, 67.15

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
Silver.....	AgBr	187.80	Ag, 57.44 . Br, 42.56
Sodium.....	NaBr	102.92	Na, 22.35 . Br, 77.65
CARBONATES.			
Hydrogen.....	H <sub>2</sub> CO <sub>3</sub>	62.016	H <sub>2</sub> O, 29.05 . CO <sub>2</sub> , 70.95
Ammonium.....	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>	96.084	NH <sub>3</sub> , 35.46 . H <sub>2</sub> O, 18.75 CO <sub>2</sub> , 45.79
Am. (primary)...	NH <sub>4</sub> HCO <sub>3</sub>	79.05	NH <sub>3</sub> , 21.55 . H <sub>2</sub> O, 22.79 CO <sub>2</sub> , 55.66
Barium.....	BaCO <sub>3</sub>	197.37	BaO, 77.71 . CO <sub>2</sub> , 22.29
Calcium.....	CaCO <sub>3</sub>	100.07	CaO, 56.03 . CO <sub>2</sub> , 43.97
Ferrous.....	FeCO <sub>3</sub>	115.85	FeO, 62.02 . CO <sub>2</sub> , 37.98 (Fe = 48.20)
Lead.....	PbCO <sub>3</sub>	267.1	PbO, 83.53 . CO <sub>2</sub> , 16.47 (Pb = 77.54)
Lithium.....	Li <sub>2</sub> CO <sub>3</sub>	73.88	Li <sub>2</sub> O, 40.44 . CO <sub>2</sub> , 59.56
Magnesium.....	MgCO <sub>3</sub>	84.32	MgO, 47.82 . CO <sub>2</sub> , 52.18
Manganese.....	MnCO <sub>3</sub>	114.93	MnO, 61.72 . CO <sub>2</sub> , 38.28
Potassium.....	K <sub>2</sub> CO <sub>3</sub>	138.2	K <sub>2</sub> O, 68.16 . CO <sub>2</sub> , 31.84
Potassium (prim.)	KHCO <sub>3</sub>	100.108	K <sub>2</sub> O, 47.05 . H <sub>2</sub> O, 9.00. CO <sub>2</sub> , 43.95
Sodium.....	Na <sub>2</sub> CO <sub>3</sub>	106.0	Na <sub>2</sub> O, 58.49 . CO <sub>2</sub> , 41.51
Sodium (primary)	NaHCO <sub>3</sub>	84.008	Na <sub>2</sub> O, 36.90 . H <sub>2</sub> O, 10.72 CO <sub>2</sub> , 52.38
Sodium (cryst) ..	Na <sub>2</sub> CO <sub>3</sub> + 10Aq.	286.16	Na <sub>2</sub> CO <sub>3</sub> , 37.04 . H <sub>2</sub> O, 62.96 . (Na <sub>2</sub> O, 21.67)
Strontium.....	SrCO <sub>3</sub>	147.63	SrO, 70.20 . CO <sub>2</sub> , 29.80
Zinc.....	ZnCO <sub>3</sub>	125.37	ZnO, 64.90 . CO <sub>2</sub> , 35.10
CHLORATES.			
Hydrogen.....	HClO <sub>3</sub>	84.468	H, 1.19 . Cl, 41.98 . O, 56.83
Potassium.....	KClO <sub>3</sub>	122.56	K, 31.90 . Cl, 28.93 . O, 39.17
Sodium.....	NaClO <sub>3</sub>	106.46	Na, 21.60 . Cl, 33.30 . O, 45.10
Strontium.....	Sr(ClO <sub>3</sub> ) <sub>2</sub>	254.55	Sr, 34.42 . Cl, 27.86 . O, 37.72
CHLORIDES.			
Hydrogen.....	HCl	36.468	H, 2.76 . Cl, 97.24
Aluminum.....	AlCl <sub>3</sub>	133.48	Al, 20.30 . Cl, 79.70
Ammonium.....	NH <sub>4</sub> Cl	53.502	NH <sub>3</sub> , 33.72 . Cl, 66.28 (NH <sub>3</sub> , 31.84)

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
Antimonious.....	SbCl <sub>3</sub>	226.58	Sb, 53.05 . Cl, 46.95
Arsenious.....	AsCl <sub>3</sub>	181.34	As, 41.34 . Cl, 58.66
Barium.....	BaCl <sub>2</sub>	208.29	Ba, 65.95 . Cl, 34.05
Barium (cryst.) .	BaCl <sub>2</sub> + 2H <sub>2</sub> O	244.322	BaCl <sub>2</sub> , 85.25 . H <sub>2</sub> O, 14.75
Bismuth.....	BiCl <sub>3</sub>	314.38	Bi, 66.17 . Cl, 33.83
Cadmium.....	CdCl <sub>2</sub>	183.32	Cd, 61.32 . Cl, 38.68
Calcium.....	CaCl <sub>2</sub>	110.99	Ca, 36.10 . Cl, 63.90
Cuprous.....	CuCl	99.03	Cu, 64.19 . Cl, 35.81
Cupric.....	CuCl <sub>2</sub>	134.49	Cu, 47.27 . Cl, 52.73
Ferric.....	FeCl <sub>3</sub>	162.22	Fe, 34.42 . Cl, 65.58
Ferrous.....	FeCl <sub>2</sub>	126.76	Fe, 44.05 . Cl, 55.95
Gold.....	AuCl <sub>3</sub>	303.58	Au, 64.96 . Cl, 35.04
Iodine.....	ICl <sub>3</sub>	233.30	I, 54.40 . Cl, 45.60
Lead.....	PbCl <sub>2</sub>	278.02	Pb, 74.49 . Cl, 25.51
Lithium.....	LiCl	42.40	Li, 16.37 . Cl, 83.63
Magnesium.....	MgCl <sub>2</sub>	95.24	Mg, 25.54 . Cl, 74.46
Manganous.....	MnCl <sub>2</sub>	125.85	Mn, 43.65 . Cl, 56.35
Mercuric.....	HgCl <sub>2</sub>	271.52	Hg, 73.88 . Cl, 26.12
Mercurous.....	HgCl	236.06	Hg, 84.98 . Cl, 15.02
Nickel.....	NiCl <sub>2</sub>	129.60	Ni, 45.28 . Cl, 54.72
Phosphoric.....	PCl <sub>5</sub>	208.34	P, 14.90 . Cl, 85.10
Phosphorous.....	PCl <sub>3</sub>	137.42	P, 22.59 . Cl, 77.41
P-oxychloride....	POCl <sub>3</sub>	153.42	P, 20.23 . O, 10.43 . Cl, 69.34
Platinum.....	PtCl <sub>4</sub>	337.04	Pt, 57.92 . Cl, 42.08
Pt. Ammonium... .	(NH <sub>4</sub> ) <sub>2</sub> PtCl <sub>6</sub>	444.044	N, 6.31 . Pt, 43.96 . Cl, 47.91 . H, 1.82
Pt. Potassium... .	K <sub>2</sub> PtCl <sub>6</sub>	486.16	K, 16.09 . Pt, 40.15 . Cl, 43.76
Potassium.....	KCl	74.56	K, 52.44 . Cl, 47.56
Silicon.....	SiCl <sub>4</sub>	170.14	Si, 16.63 . Cl, 83.37
Silver.....	AgCl	143.34	Ag, 75.26 . Cl, 24.74
Sodium.....	NaCl	58.46	Na, 39.34 . Cl, 60.66
Strontium.....	SrCl <sub>2</sub>	158.55	Sr, 55.27 . Cl, 44.73
Sulphur.....	S <sub>2</sub> Cl <sub>2</sub>	135.06	S, 47.49 . Cl, 52.51
Tin.....	SnCl <sub>4</sub>	260.84	Sn, 45.62 . Cl, 54.38
Titanium.....	TiCl <sub>4</sub>	189.94	Ti, 25.32 . Cl, 74.68
Zinc.....	ZnCl <sub>2</sub>	136.29	Zn, 47.96 . Cl, 52.04
CHROMATES.			
Hydrogen.....	H <sub>2</sub> CrO <sub>4</sub>	118.016	H <sub>2</sub> O, 15.27 . CrO <sub>3</sub> , 84.73
Barium.....	BaCrO <sub>4</sub>	253.37	BaO, 60.53 . CrO <sub>3</sub> , 39.47
Lead.....	PbCrO <sub>4</sub>	323.10	PbO, 69.05 . CrO <sub>3</sub> , 30.95

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
Potassium.....	$K_2CrO_4$	194.20	$K_2O$ , 48.51 . $CrO_3$ , 51.49
K. (bichromate).	$K_2Cr_2O_7$	294.20	$K_2O$ , 32.02 . $CrO_3$ , 67.98
Silver.....	$Ag_2CrO_4$	331.76	$Ag_2O$ , 69.86 . $CrO_3$ , 30.14
Sodium.....	$Na_2CrO_4$	162.00	$Na_2O$ , 38.27 . $CrO_3$ , 61.73
CYANIDES.			
Hydrogen.....	HCN	27.018	H, 3.73 . C, 44.41 . N, 51.85. (CN = 96.26)
Potassium.....	KCN	65.11	K, 60.05 . C, 18.43 . N, 21.52. (CN = 39.95)
Sodium.....	NaCN	49.01	Na, 46.93 . C, 24.48 . N, 28.59. (CN = 53.07)
Ferric ferroCy....	$Fe_4(FeCy_6)_3$	859.06	Fe, 45.50 . CN, 54.50
K ferricyanide....	$K_3Fe(CN)_6$	329.20	K, 35.63 . Fe, 16.96 . CN, 47.41
K ferrocyanide..	$K_4FeCy_6 + 3H_2O$	422.348	K, 37.03 . Fe, 13.22 . CN, 36.95 . $H_2O$ , 12.80
K sulphocyanide..	KCNS	97.18	K, 40.23 . CNS, 59.77 (CN, 26.77 . S, 33.00)
Cyanogen.....	$C_2N_2$	52.02	C, 46.14 . N, 53.86
FLUORIDES.			
Hydrogen.....	HF	20.008	H, 5.04 . F, 94.96
Boron.....	$BF_3$	68.00	B, 16.18 . F, 83.82
Calcium.....	$CaF_2$	78.07	Ca, 51.33 . F, 48.67
Silicon.....	$SiF_4$	104.3	Si, 27.13 . F, 72.87
HYDRIDES.			
Ammonia.....	$NH_3$	17.034	N, 82.25 . H, 17.75
Arsine.....	$AsH_3$	78.024	As, 96.12 . H, 3.88
Boron hydride....	$BH_3$	14.984	B, 78.44 . H, 21.56
Phosphine.....	$PH_3$	34.064	P, 91.12 . H, 8.88
Stibine.....	$SbH_3$	123.224	Sb, 97.55 . H, 2.45
Silicon.....	$SiH_4$	32.332	Si, 87.53 . H, 12.47
HYDROCARBONS.			
Methane.....	$CH_4$	16.032	C, 74.84 . H, 25.16
Acetylene.....	$C_2H_2$	26.016	C, 92.25 . H, 7.75
Ethylene.....	$C_2H_4$	28.032	C, 85.62 . H, 14.38
Ethane.....	$C_2H_6$	30.048	C, 79.87 . H, 20.13
Propane.....	$C_3H_8$	44.064	C, 81.70 . H, 18.30
Butane.....	$C_4H_{10}$	58.08	C, 82.64 . H, 17.36
Benzol.....	$C_6H_6$	78.048	C, 92.25 . H, 7.75

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
HYDROXIDES.			
Aluminum.....	$Al(OH)_3$	78.124	$Al_2O_3$ , 65.41 . $H_2O$ , 34.59
Ammonium.....	$NH_4OH$	35.05	$NH_3$ , 48.60 . $H_2O$ , 51.40
Barium.....	$Ba(OH)_2$	171.386	$BaO$ , 89.49 . $H_2O$ , 10.51
Bismuth.....	$Bi(OH)_3$	259.024	$Bi_2O_3$ , 89.57 . $H_2O$ , 10.43
Calcium.....	$Ca(OH)_2$	74.086	$CaO$ , 75.68 . $H_2O$ , 24.32
Ferric.....	$Fe(OH)_3$	106.864	$Fe_2O_3$ , 74.71 . $H_2O$ , 25.29
Lead.....	$Pb(OH)_2$	241.116	$PbO$ , 92.52 . $H_2O$ , 7.48
Potassium.....	KOH	56.108	$K_2O$ , 83.94 . $H_2O$ , 16.06
Sodium.....	NaOH	40.008	$Na_2O$ , 77.48 . $H_2O$ , 22.52
Zinc.....	$Zn(OH)_2$	99.386	$ZnO$ , 81.87 . $H_2O$ , 18.13
IODIDES.			
Hydrogen.....	HI	127.928	H, 0.79 . I, 99.21
Lithium.....	LiI	133.86	Li, 5.18 . I, 94.82
Potassium.....	KI	166.02	K, 23.55 . I, 76.45
Silver.....	AgI	234.80	Ag, 45.95 . I, 54.05
MOLYBDATES.			
Hydrogen.....	$H_2MoO_4$	162.016	$H_2O$ , 11.12 . $MoO_3$ , 88.88
Ammonium.....	$(NH_4)_2MoO_4$	196.084	$(NH_4)_2O$ , 26.56 . $MoO_3$ , 73.44
Lead.....	$PbMoO_4$	367.10	$PbO$ , 60.77 . $MoO_3$ , 39.23 (Pb = 56.42)
NITRATES.			
Hydrogen.....	$HNO_3$	63.018	$H_2O$ , 14.29 . $N_2O_5$ , 85.71 . H, 1.60 . N, 22.23 . O, 76.17
Ammonium.....	$NH_4NO_3$	80.052	$H_2O$ , 11.25 . $NH_3$ , 21.28 . $N_2O_5$ , 67.47
Barium.....	$Ba(NO_3)_2$	261.39	$BaO$ , 58.68 . $N_2O_5$ , 41.32
Bismuth.....	$Bi(NO_3)_3$	394.03	$Bi_2O_3$ , 58.88 . $N_2O_5$ , 41.12
Bismuth (cryst.)	$Bi(NO_3)_3 + 5Aq.$	484.110	$Bi(NO_3)_3$ , 81.39 . $H_2O$ , 18.61
Calcium.....	$Ca(NO_3)_2$	164.09	$CaO$ , 34.17 . $N_2O_5$ , 65.83
Copper.....	$Cu(NO_3)_2 + 3Aq.$	241.638	$CuO$ , 32.93 . $N_2O_5$ , 44.70 $H_2O$ , 22.37
Lead.....	$Pb(NO_3)_2$	331.12	$PbO$ , 67.38 . $N_2O_5$ , 32.62
Lead (basic).....	$Pb(NO_3)(OH)$	286.118	$PbO$ , 77.97 . $N_2O_5$ , 18.87 . $H_2O$ , 3.16
Mercuric.....	$Hg(NO_3)_2$	324.62	$HgO$ , 66.72 . $N_2O_5$ , 33.28
Mercurous.....	$HgNO_3$	262.61	$Hg_2O$ , 79.43 . $N_2O_5$ , 20.57
Potassium.....	$KNO_3$	101.11	$K_2O$ , 46.58 . $N_2O_5$ , 53.42
Silver.....	$AgNO_3$	169.89	$Ag_2O$ , 68.21 . $N_2O_5$ , 31.79

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
Sodium.....	NaNO <sub>3</sub>	85.01	Na <sub>2</sub> O, 36.47 . N <sub>2</sub> O <sub>5</sub> , 63.53
Strontium.....	Sr(NO <sub>3</sub> ) <sub>2</sub>	211.65	SrO, 48.96 . N <sub>2</sub> O <sub>5</sub> , 51.04
NITRITES.			
Hydrogen.....	HNO <sub>2</sub>	47.018	H <sub>2</sub> O, 19.16 . N <sub>2</sub> O <sub>3</sub> , 80.84
Ammonium.....	NH <sub>4</sub> NO <sub>2</sub>	64.052	(NH <sub>4</sub> ) <sub>2</sub> O, 40.66 . N <sub>2</sub> O <sub>3</sub> , 59.34 . { N <sub>2</sub> = 43.75 2H <sub>2</sub> O = 56.25
Potassium.....	KNO <sub>2</sub>	85.11	K <sub>2</sub> O, 55.34 . N <sub>2</sub> O <sub>3</sub> , 44.66
Silver.....	AgNO <sub>2</sub>	153.89	Ag <sub>2</sub> O, 75.30 . N <sub>2</sub> O <sub>3</sub> , 24.70 (Ag = 70.10)
Sodium.....	NaNO <sub>2</sub>	69.01	Na <sub>2</sub> O, 44.92 . N <sub>2</sub> O <sub>3</sub> , 55.08
OXIDES.			
Hydrogen.....	H <sub>2</sub> O	18.016	H, 11.19 . O, 88.81
Hydrogen (per)...	H <sub>2</sub> O <sub>2</sub>	34.016	H, 5.93 . O, 94.07
Aluminum.....	Al <sub>2</sub> O <sub>3</sub>	102.2	Al, 53.03 . O, 46.97
Antimony.....	Sb <sub>2</sub> O <sub>3</sub>	288.4	Sb, 83.35 . O, 16.65
Barium.....	BaO	153.37	Ba, 89.57 . O, 10.43
Barium (per)....	BaO <sub>2</sub>	169.37	Ba, 81.11 . O, 18.89
Bismuth.....	Bi <sub>2</sub> O <sub>3</sub>	464.0	Bi, 89.66 . O, 10.34
Cadmium.....	CdO	128.4	Cd, 87.54 . O, 12.46
Calcium.....	CaO	56.07	Ca, 71.46 . O, 28.54
Carbon.....	CO	28.0	C, 42.86 . O, 57.14
Carbon (di-)....	CO <sub>2</sub>	44.0	C, 27.27 . O, 72.73
Chromium.....	Cr <sub>2</sub> O <sub>3</sub>	152.0	Cr, 68.42 . O, 31.58
Cobaltic.....	Co <sub>2</sub> O <sub>3</sub>	165.94	Co, 71.07 . O, 28.93
Cobaltous.....	CoO	74.97	Co, 78.66 . O, 21.34
Cupric.....	CuO	79.57	Cu, 79.89 . O, 20.11
Cuprous.....	Cu <sub>2</sub> O	143.14	Cu, 88.82 . O, 11.18
Ferric.....	Fe <sub>2</sub> O <sub>3</sub>	159.68	Fe, 69.94 . O, 30.06
Ferro-ferric....	Fe <sub>3</sub> O <sub>4</sub>	231.52	Fe, 72.36 . O, 27.64
Ferrous.....	FeO	71.84	Fe, 77.73 . O, 22.27
Lead.....	PbO	223.1	Pb, 92.83 . O, 7.17
Lead (per).....	PbO <sub>2</sub>	239.1	Pb, 86.62 . O, 13.38
Magnesium.....	MgO	40.32	Mg, 60.32 . O, 39.68
Manganic.....	Mn <sub>2</sub> O <sub>3</sub>	157.86	Mn, 69.59 . O, 30.41
Manganous.....	MnO	70.93	Mn, 77.44 . O, 22.56
Manganese (per).	MnO <sub>2</sub>	86.93	Mn, 63.19 . O, 36.81
Mercuric.....	HgO	216.60	Hg, 92.61 . O, 7.39
Mercurous.....	Hg <sub>2</sub> O	417.2	Hg, 96.16 . O, 3.84
Nickel.....	NiO	74.68	Ni, 78.58 . O, 21.42
Nitric.....	NO	30.01	N, 46.70 . O, 53.30

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
Nitrous.....	N <sub>2</sub> O	44.02	N, 63.65 . O, 36.35
Potassium.....	K <sub>2</sub> O	94.2	K, 83.01 . O, 16.99
Sodium.....	Na <sub>2</sub> O	62.00	Na, 74.19 . O, 25.81
Strontium.....	SrO	103.63	Sr, 84.56 . O, 15.44
Tin.....	SnO <sub>2</sub>	151.0	Sn, 78.81 . O, 21.19
Uranic.....	UO <sub>3</sub>	286.5	U, 83.25 . O, 16.75
Uranous.....	UO <sub>2</sub>	270.5	U, 88.17 . O, 11.83
Uranous-ic.....	U <sub>3</sub> O <sub>8</sub>	843.5	U, 84.83 . O, 15.17
Zinc.....	ZnO	81.37	Zn, 80.34 . O, 19.66
PHOSPHATES.			
Hydrogen Meta..	HPO <sub>3</sub>	80.048	H <sub>2</sub> O, 11.24 . P <sub>2</sub> O <sub>5</sub> , 88.75
Hydrogen Pyro..	H <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	178.112	H <sub>2</sub> O, 20.23 . P <sub>2</sub> O <sub>5</sub> , 79.77
Hydrogen Ortho..	H <sub>3</sub> PO <sub>4</sub>	98.064	H <sub>2</sub> O, 27.56 . P <sub>2</sub> O <sub>5</sub> , 72.44
Aluminum.....	AlPO <sub>4</sub>	122.14	Al <sub>2</sub> O <sub>3</sub> , 41.84 . P <sub>2</sub> O <sub>5</sub> , 58.16
Ammonium.....	NH <sub>4</sub> H <sub>2</sub> PO <sub>4</sub>	115.098	(NH <sub>4</sub> ) <sub>2</sub> O, 22.62 . H <sub>2</sub> O, 15.66 . P <sub>2</sub> O <sub>5</sub> , 61.72
Microcosmic salt.	NH <sub>4</sub> NaHPO <sub>4</sub> +4Aq	209.154	(NH <sub>4</sub> ) <sub>2</sub> O, 12.45 . H <sub>2</sub> O, 4.31 . Na <sub>2</sub> O, 14.82 . P <sub>2</sub> O <sub>5</sub> , 33.96 . (H <sub>2</sub> O, cryst. 34.46)
Am. Magnesium..	NH <sub>4</sub> MgPO <sub>4</sub> +6H <sub>2</sub> O	245.498	(NH <sub>4</sub> ) <sub>2</sub> O, 10.61 . MgO, 16.42 . P <sub>2</sub> O <sub>5</sub> , 28.94 . H <sub>2</sub> O of cryst. 44.03
Am. Manganese..	NH <sub>4</sub> MnPO <sub>4</sub>	168.012	(NH <sub>4</sub> ) <sub>2</sub> O, 15.50 . MnO, 42.22 . P <sub>2</sub> O <sub>5</sub> , 42.28
Calcium (prim)..	CaH <sub>4</sub> (PO <sub>4</sub> ) <sub>2</sub>	234.182	CaO, 23.94 . H <sub>2</sub> O, 15.39 . P <sub>2</sub> O <sub>5</sub> , 60.67
Calcium (2nd)...	CaHPO <sub>4</sub>	136.118	CaO, 41.19 . H <sub>2</sub> O, 6.62 . P <sub>2</sub> O <sub>5</sub> , 52.19
Calcium (3rd)...	Ca <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	310.29	CaO, 54.21 . P <sub>2</sub> O <sub>5</sub> , 45.79
Ferric.....	FePO <sub>4</sub>	150.88	Fe <sub>2</sub> O <sub>3</sub> , 52.91 . P <sub>2</sub> O <sub>5</sub> , 47.09
Lithium.....	Li <sub>3</sub> PO <sub>4</sub>	115.86	Li <sub>2</sub> O, 38.68 . P <sub>2</sub> O <sub>5</sub> , 61.32
Magnesium pyro..	Mg <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	222.72	MgO, 36.21 (P=27.87) P <sub>2</sub> O <sub>5</sub> , 63.79
Manganese pyro..	Mn <sub>2</sub> P <sub>2</sub> O <sub>7</sub>	283.94	MnO, 49.96 . P <sub>2</sub> O <sub>5</sub> , 50.04
Potassium, 1st ..	KH <sub>2</sub> PO <sub>4</sub>	136.156	K <sub>2</sub> O, 34.58 . H <sub>2</sub> O, 13.24 P <sub>2</sub> O <sub>5</sub> , 52.18
Potassium, 2nd ..	K <sub>2</sub> HPO <sub>4</sub>	174.248	K <sub>2</sub> O, 54.06 . H <sub>2</sub> O, 5.17 . P <sub>2</sub> O <sub>5</sub> , 40.77
Potassium, 3rd ..	K <sub>3</sub> PO <sub>4</sub>	212.34	K <sub>2</sub> O, 66.55 . P <sub>2</sub> O <sub>5</sub> , 33.45
Silver.....	Ag <sub>3</sub> PO <sub>4</sub>	418.68	Ag <sub>2</sub> O, 83.03 . (Ag, 77.30) P <sub>2</sub> O <sub>5</sub> , 16.97

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
Sodium.....	NaH <sub>2</sub> PO <sub>4</sub>	120.046	Na <sub>2</sub> O, 25.82 . H <sub>2</sub> O, 15.01 P <sub>2</sub> O <sub>5</sub> , 59.17
Sodium, 2nd....	Na <sub>2</sub> HPO <sub>4</sub>	142.048	Na <sub>2</sub> O, 43.65 . H <sub>2</sub> O, 6.34 P <sub>2</sub> O <sub>5</sub> , 50.01
Sodium, 3rd....	Na <sub>3</sub> PO <sub>4</sub>	164.04	Na <sub>2</sub> O, 56.69 . P <sub>2</sub> O <sub>5</sub> , 43.31
Na., 2nd, cryst....	Na <sub>2</sub> HPO <sub>4</sub> +12Aq	358.24	Na <sub>2</sub> O, 17.31 . H <sub>2</sub> O, 2.51 . P <sub>2</sub> O <sub>5</sub> , 19.83. Water of crystallization, 60.35
SULPHATES.			
Hydrogen.....	H <sub>2</sub> SO <sub>4</sub>	98.086	H <sub>2</sub> O, 18.37 . SO <sub>3</sub> , 81.63
Hydrogen pyro...	H <sub>2</sub> S <sub>2</sub> O <sub>7</sub>	178.156	H <sub>2</sub> O, 10.11 . SO <sub>3</sub> , 89.89
Aluminum.....	Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	342.41	Al <sub>2</sub> O <sub>3</sub> , 29.85 . SO <sub>3</sub> , 70.15
Aluminum cryst..	Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> +18Aq	666.698	Al <sub>2</sub> O <sub>3</sub> , 15.33 . SO <sub>3</sub> , 36.03 . H <sub>2</sub> O, 48.64
Ammonium.....	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	132.154	(NH <sub>4</sub> ) <sub>2</sub> O, 39.41 SO <sub>3</sub> , 60.59
Ammonium alum	NH <sub>4</sub> Al(SO <sub>4</sub> ) <sub>2</sub> +12Aq	453.474	(NH <sub>4</sub> ) <sub>2</sub> O, 5.74 . Al <sub>2</sub> O <sub>3</sub> , 11.27 . SO <sub>3</sub> , 35.31 . Water cryst. 47.68
Am-ferrous.....	Fe(NH <sub>4</sub> ) <sub>2</sub> (SO <sub>4</sub> ) <sub>2</sub> +6Aq	392.16	(NH <sub>4</sub> ) <sub>2</sub> O, 13.28 . FeO, 18.32 . SO <sub>3</sub> , 40.84 . Water cryst. 27.56
Barium.....	BaSO <sub>4</sub>	233.44	BaO, 65.70 . SO <sub>3</sub> , 34.30
Cadmium.....	CdSO <sub>4</sub>	208.47	CdO, 61.69 . SO <sub>3</sub> , 38.31
Calcium.....	CaSO <sub>4</sub>	136.14	CaO, 41.18 . SO <sub>3</sub> , 58.82
Calcium, gypsum.	CaSO <sub>4</sub> +2H <sub>2</sub> O	172.172	CaO, 32.57 . SO <sub>3</sub> , 46.51 . 2H <sub>2</sub> O, 20.92
Chrome alum....	CrK(SO <sub>4</sub> ) <sub>2</sub> +12Aq	499.432	K <sub>2</sub> O, 9.44 . Cr <sub>2</sub> O <sub>3</sub> , 15.22 . SO <sub>3</sub> , 32.05. Water of crystallization, 43.29
Cobalt.....	CoSO <sub>4</sub>	155.04	CoO, 48.36 . SO <sub>3</sub> , 51.64
Copper.....	CuSO <sub>4</sub>	159.64	CuO, 49.84 . SO <sub>3</sub> , 50.16
Copper, cryst....	CuSO <sub>4</sub> +5H <sub>2</sub> O	249.72	CuO, 31.86 . SO <sub>3</sub> , 32.07 H <sub>2</sub> O, 36.07
Ferric.....	Fe <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	399.89	Fe <sub>2</sub> O <sub>3</sub> , 39.93 . SO <sub>3</sub> , 60.07
Ferrous cryst....	FeSO <sub>4</sub> +7H <sub>2</sub> O	278.022	FeO, 25.84 . SO <sub>3</sub> , 28.80 . H <sub>2</sub> O, 45.36
Lead.....	PbSO <sub>4</sub>	303.17	PbO, 73.59 . SO <sub>3</sub> , 26.41 (Pb, 68.31)
Lithium.....	Li <sub>2</sub> SO <sub>4</sub>	109.95	Li <sub>2</sub> O, 27.18 . SO <sub>3</sub> , 72.82
Magnesium.....	MgSO <sub>4</sub>	120.39	MgO, 33.49 . SO <sub>3</sub> , 66.51
Manganese.....	MnSO <sub>4</sub>	151.00	MnO, 46.97 . SO <sub>3</sub> , 53.03
Mercuric.....	HgSO <sub>4</sub>	296.66	HgO, 73.01 . SO <sub>3</sub> , 26.99
Mercurous.....	Hg <sub>2</sub> SO <sub>4</sub>	497.26	Hg <sub>2</sub> O, 83.90 . SO <sub>3</sub> , 16.10

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
Nickel.....	NiSO <sub>4</sub>	154.75	NiO, 48.26 . SO <sub>3</sub> , 51.74
Potassium, 1st....	KHSO <sub>4</sub>	136.178	K <sub>2</sub> O, 34.59 . H <sub>2</sub> O, 6.61 . SO <sub>3</sub> , 58.80
Potassium, 2nd..	K <sub>2</sub> SO <sub>4</sub>	174.27	K <sub>2</sub> O, 54.05 . SO <sub>3</sub> , 45.95
Potassium alum..	KAl(SO <sub>4</sub> ) <sub>2</sub>	258.34	K <sub>2</sub> O, 18.24 . Al <sub>2</sub> O <sub>3</sub> , 19.78 . SO <sub>3</sub> , 61.98
K alum cryst....	KAl(SO <sub>4</sub> ) <sub>2</sub> +12Aq	474.532	K <sub>2</sub> O, 9.93 . Al <sub>2</sub> O <sub>3</sub> , 10.77 SO <sub>3</sub> , 33.74. Water of crystallization, 45.56
Silver.....	Ag <sub>2</sub> SO <sub>4</sub>	311.83	Ag <sub>2</sub> O, 74.32 . SO <sub>3</sub> , 25.68
Sodium, primary.	NaHSO <sub>4</sub>	120.078	Na <sub>2</sub> O, 25.82 . H <sub>2</sub> O, 7.50 . SO <sub>3</sub> , 66.68
Sodium, 2nd....	Na <sub>2</sub> SO <sub>4</sub>	142.07	Na <sub>2</sub> O, 43.64 . SO <sub>3</sub> , 56.36
Sodium, cryst....	Na <sub>2</sub> SO <sub>4</sub> +10Aq	322.23	Na <sub>2</sub> O, 19.24 . H <sub>2</sub> O, 55.91 . SO <sub>3</sub> , 24.85
Strontium.....	SrSO <sub>4</sub>	183.70	SrO, 56.41 . SO <sub>3</sub> , 43.59
Zinc.....	ZnSO <sub>4</sub>	161.44	ZnO, 50.40 . SO <sub>3</sub> , 49.60
Zinc, cryst.....	ZnSO <sub>4</sub> +7Aq	287.552	ZnO, 28.30 . (H <sub>2</sub> O, 43.85) . SO <sub>3</sub> , 27.85
SULPHIDES.			
Hydrogen.....	H <sub>2</sub> S	34.086	H, 5.92 . S, 94.08
Ammonium.....	(NH <sub>4</sub> ) <sub>2</sub> S	68.154	(NH <sub>4</sub> ) <sub>2</sub> , 52.95 . S, 47.05 . (2NH <sub>3</sub> , 50.01) . H <sub>2</sub> S, 49.99
Antimony.....	Sb <sub>2</sub> S <sub>3</sub>	336.61	Sb, 71.42 . S, 28.58
Arsenic.....	As <sub>2</sub> S <sub>3</sub>	246.13	As, 60.91 . S, 39.09
Bismuth.....	Bi <sub>2</sub> S <sub>3</sub>	512.21	Bi, 81.22 . S, 18.78
Cadmium.....	CdS	144.47	Cd, 77.80 . S, 22.20
Calcium.....	CaS	72.14	Ca, 55.54 . S, 44.46
Cuprous.....	Cu <sub>2</sub> S	159.21	Cu, 79.86 . S, 20.14
Cupric.....	CuS	95.64	Cu, 66.47 . S, 33.53
Ferric (di).....	FeS <sub>2</sub>	119.98	Fe, 46.54 . S, 53.46
Ferrous.....	FeS	87.91	Fe, 63.52 . S, 36.48
Lead.....	PbS	239.17	Pb, 86.59 . S, 13.41
Manganese.....	MnS	87.00	Mn, 63.14 . S, 36.86
Mercuric.....	HgS	232.67	Hg, 86.22 . S, 13.78
Molybdenum....	MoS <sub>2</sub>	160.14	Mo, 59.96 . S, 40.04
Molybdenum....	MoS <sub>3</sub>	192.21	Mo, 49.95 . S, 50.05
Nickel.....	NiS	90.75	Ni, 64.66 . S, 35.34
Potassium.....	K <sub>2</sub> S	110.27	K, 70.92 . S, 29.08
Silver.....	Ag <sub>2</sub> S	247.83	Ag, 87.06 . S, 12.94
Sodium.....	Na <sub>2</sub> S	78.07	Na, 58.92 . S, 41.08
Zinc.....	ZnS	97.44	Zn, 67.09 . S, 32.91

TABLE III.—Continued.

Names.	Formulae.	Molar Wts.	Percentage Composition.
SULPHITES.			
Hydrogen.....	H <sub>2</sub> SO <sub>3</sub>	82.086	H <sub>2</sub> O, 21.95 . SO <sub>2</sub> , 78.05
Ammonium, 1st..	NH <sub>4</sub> HSO <sub>3</sub>	99.12	(NH <sub>4</sub> ) <sub>2</sub> O, 26.27 . H <sub>2</sub> O, 9.09 . SO <sub>2</sub> , 64.64 (NH <sub>3</sub> , 17.18 . H <sub>2</sub> O, 18.18)
Ammonium, 2nd.	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>3</sub>	116.154	(NH <sub>4</sub> ) <sub>2</sub> O, 44.84 . SO <sub>2</sub> , 55.16 . (NH <sub>3</sub> , 29.33 . H <sub>2</sub> O, 15.51)
Potassium.....	KHSO <sub>3</sub>	120.178	K <sub>2</sub> O, 39.19 . H <sub>2</sub> O, 7.49 . SO <sub>2</sub> , 53.32
Potassium, 2nd..	K <sub>2</sub> SO <sub>3</sub>	158.27	K <sub>2</sub> O, 59.52 . SO <sub>2</sub> , 40.48
Silver.....	Ag <sub>2</sub> SO <sub>3</sub>	295.83	Ag <sub>2</sub> O, 78.34 . SO <sub>2</sub> , 21.66
Sodium, primary.	NaHSO <sub>3</sub>	104.078	Na <sub>2</sub> O, 29.79 . H <sub>2</sub> O, 8.65 . SO <sub>2</sub> , 61.56
Sodium, 2nd.....	Na <sub>2</sub> SO <sub>3</sub>	126.07	Na <sub>2</sub> O, 49.18 . SO <sub>2</sub> , 50.82
THIOSULPHATES.			
Sodium.....	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	158.14	Na <sub>2</sub> O, 39.21 . S <sub>2</sub> , 40.56 . O <sub>2</sub> , 20.23
TUNGSTATES.			
Calcium.....	CaWO <sub>4</sub>	288.07	CaO, 19.47 . WO <sub>3</sub> , 80.53

The above data are calculated from the "International" atomic weights of 1912.

TABLE IV.—SPECIFIC GRAVITIES, MELTING POINTS (CENTIGRADE), ATOMIC VOLUMES AND SPECIFIC HEATS OF MOST OF THE ELEMENTS.

Elements.	Sp. Gr.	M. P.	At. Vol.	Sp. Heat.	t° Cent.
Aluminum.....	2.58	657	10.50	0.214	60
Antimony.....	6.71	450	17.91	0.0508	55
Arsenic.....	5.73	*	13.08	0.0814	55
Barium.....	3.6	Red heat	38.16	0.049†	...
Bismuth.....	9.9	265	21.01	0.0308	55
Boron.....	2.63	Not det.	4.18	0.366	233
Bromine.....	3.18	-7.3	25.13	0.0843	-51
Cadmium.....	8.6	320	13.07	0.0548	50
Cæsium.....	1.87	26.5	71.07	Not det.	...
Calcium.....	1.6	800	25.05	0.170	50
Carbon (diamond).....	3.5	Not det.	3.43	0.467	978
Carbon (graphite).....	2.25	Not det.	....	0.500	1000
Carbon (charcoal).....	1.45+	Not det.	....	....	...

TABLE IV.—Continued.

Elements.	Sp. Gr.	M. P.	At. Vol.	Sp. Heat.	t° Cent.
Cerium.....	6.72	500?	20.87	0.0448	49
Chlorine.....	1.56 <sup>a</sup>	....	22.7	0.1241 <sup>b</sup>	....
Chromium.....	6.8	1720	7.66	0.100	36
Cobalt.....	8.9	1500	6.62	0.107	55
Copper.....	8.9	1080	7.14	0.952	58
Fluorine.....	....	....	12.7?	Not det.	....
Gallium.....	5.9	30	11.86	0.079	17
Germanium.....	5.47	900	13.25	0.077	?
Glucinum.....	1.8	Not det.	5.05	0.397 <sup>c</sup>	20
Gold.....	19.32	1060	10.21	0.032	55
Hydrogen.....	0.07	....	14.3?	0.99 <sup>d</sup>	....
Hydrogenium.....	0.62 <sup>e</sup>	....	1.6?	....	....
Indium.....	7.4	176	15.54	0.057	50
Iodine.....	4.95	114	25.65	0.054	59
Iridium.....	22.4	1950	8.62	0.033	60
Iron (pure).....	7.85	1503	7.11	0.1124	31
Iron (wrought).....	8 (ave)	1400	....	....	....
Iron (cast).....	var.	1050+	....	....	....
Lanthanum.....	6.16	Not det.	22.55	0.045	50
Lead.....	11.37	300	18.21	0.314	34
Lithium.....	0.59	180	11.76	0.941	64
Magnesium.....	1.74	700	13.98	0.245	36
Manganese.....	8.00	1800+	6.87	0.122	55
Mercury.....	13.59	-39.5	14.76	0.032	-59
Molybdenum.....	8.6	1750	11.16	0.072	55
Nickel.....	9.1	1427	6.44	0.108	55
Nitrogen.....	0.885	....	? <sup>f</sup>	0.237	....
Osmium.....	22.48	2500?	8.50	0.031	60
Oxygen.....	1.124	....	? <sup>f</sup>	0.217	13 to 200
Palladium.....	11.5	1400	9.26	0.059	55
Phosphorus.....	1.83	44.4	16.96	0.174	?
Phosphorus (red).....	2.19	§	14.16	0.170	67
Platinum.....	21.5	1710	9.07	0.032	55
Potassium.....	0.87	62.5	44.94	0.166	-34
Rhodium.....	12.1	2000	8.51	0.058	?
Rubidium.....	1.53	38.5	55.9	0.075	?
Ruthenium.....	12.3	1800	8.27	0.061	?
Selenium.....	4.8	217	16.5	0.076	59
Silicon.....	2.49	1300	11.36	0.203	232
Silver.....	10.5	960	10.27	0.057	55
Sodium.....	0.97	96	23.71	0.293	-14
Strontium.....	2.5	Red heat	35.04	0.078?†	....
Sulphur.....	2.07	114.5	15.5	0.178	67
Tantalum.....	10.8	2300	16.7	Not det.	....



TABLE IV.—Continued.

Elements.	Sp. Gr.	M. P.	At. Vol.	Sp. Heat.	t° Cent.
Tellurium.....	6.4	452	19.9	0.047	55
Thallium.....	11.8	290	17.3	0.0335	58
Thorium.....	11.0	293.9	21.14	0.0276	50
Tin.....	7.3	232	16.3	0.056	50
Titanium.....	3.59	2600?	13.4	0.129	?
Tungsten.....	19.0	3000?	9.68	0.033	55
Uranium.....	18.7	1500	12.75	0.0277	49
Vanadium.....	5.5	1800	9.27	Not det.	...
Zinc.....	7.1	419	9.27	0.0935	50
Zirconium.....	4.15	Not det.	21.8	0.066	50

Certain elements have had specific gravities, hence atomic volumes, attributed to them from their positions in the "periodic" scale. Thus:

	Sp. gr.	At. vol.
Scandium.....	2.6	17
Columbium.....	7.0	13
Yttrium.....	3.6	25

Some of the high temperatures in the above table are mere approximations.

The last column is temperature at which the specific heat determinations were made.

In the sp. gr. column figures are given for crystallized condition when there is any appreciable difference between that and the amorphous state. In metals the highest sp. gr., usually that of the metal hammered or drawn into wire, is chosen.

All degrees are centigrade.

Boron and carbon have never been fused.

\* Arsenic melts only under high pressure.

† The specific heats of Ba and Sr are not known by direct determination.

§ Red phosphorus when rapidly heated changes to normal at about 260° C.

<sup>a</sup> <sup>b</sup> 1.56 is sp. gr. of liquefied chlorine. Figure given for sp. heat is as referred to = vol. of water as unity. This is at constant pressure and at minus 200°. At constant volume the figure becomes 0.0928.

<sup>c</sup> Glucinum, sp. heat at 100° = 0.47. At 257° = 0.58.

<sup>d</sup> 0.07 is sp. gr. of liquefied hydrogen. The sp. heat 0.99 is referred to = vol. of air as unity. With = wt. of water as unit it would be 2.4.

<sup>e</sup> "Hydrogenium." Hypothetical element as in alloys (Palladium, etc.).

<sup>f</sup> Theory would give as rough values for solid "N" and "O" as follows: "N," sp. gr. = 3, at. vol. = 5. "O," sp. gr. = 2, at. vol. = 8. A similar "guess" would make fluorine about sp. gr. 1.5, with at. vol. about as in the table.

TABLE V.—GASES AND VAPORS. THEIR FORMULÆ, DENSITIES, SPECIFIC GRAVITIES (AIR=1) AND WEIGHT IN GRAMS PER LITER.

Names.	Formula.	Mol. Wt. or Density.	Sp. Gr. (Air=1).	Wt. of 1 Liter.
Air.....	.....	.....	1.000	1.293
Argon.....	A	39.88	1.376	1.780
Arsenic.....	As <sub>4</sub>	299.84	10.353	13.386
Bromine.....	Br <sub>2</sub>	159.84	5.521	7.139
Chlorine.....	Cl <sub>2</sub>	70.92	2.448	3.165
Fluorine.....	F <sub>2</sub>	38.00	1.312	1.696
Helium.....	He	3.99	0.139	0.179
Hydrogen.....	H <sub>2</sub>	2.016	0.070	0.089
Iodine.....	I <sub>2</sub>	253.84	8.768	11.337
Mercury.....	Hg	200.60	6.906	8.929
Nitrogen.....	N <sub>2</sub>	28.02	0.967	1.251
Oxygen.....	O <sub>2</sub>	32.00	1.106	1.430
Phosphorus.....	P <sub>4</sub>	124.16	4.287	5.543
Sulphur.....	S <sub>2</sub>	64.14	2.213	2.862
Cyanogen.....	C <sub>2</sub> N <sub>2</sub>	52.02	1.796	2.322
Hydrobromic acid.....	HBr	80.928	2.796	3.615
Hydrochloric acid.....	HCl	36.468	1.259	1.628
Hydrofluoric acid.....	HF	20.008	0.691	0.893
Hydriodic acid.....	HI	127.928	4.418	5.713
Hydrocyanic acid.....	HCN	27.018	0.933	1.206
Water.....	H <sub>2</sub> O	18.016	0.622	0.804
Hydric sulphide.....	H <sub>2</sub> S	34.086	1.176	1.521
Hydric selenide.....	H <sub>2</sub> Se	81.216	2.804	3.626
Hydric telluride.....	H <sub>2</sub> Te	129.616	4.475	5.786
Ammonia.....	NH <sub>3</sub>	17.034	0.588	0.760
Stibine.....	SbH <sub>3</sub>	123.224	4.254	5.501
Arsine.....	AsH <sub>3</sub>	77.984	2.693	3.481
Phosphine.....	PH <sub>3</sub>	34.064	1.177	1.521
Carbon oxide.....	CO	28.00	0.967	1.250
Carbon dioxide.....	CO <sub>2</sub>	44.00	1.519	1.964
Carbon bisulphide.....	CS <sub>2</sub>	76.14	2.628	3.398
Carbon oxysulphide.....	COS	60.07	2.073	2.681
Carbonyl chloride.....	COCl <sub>2</sub>	98.92	3.415	4.415
Methane.....	CH <sub>4</sub>	16.032	0.554	0.716
Acetylene.....	C <sub>2</sub> H <sub>2</sub>	26.016	0.878	1.161
Ethylene.....	C <sub>2</sub> H <sub>4</sub>	28.032	0.968	1.251
Ethane.....	C <sub>2</sub> H <sub>6</sub>	30.048	1.037	1.341
Propane.....	C <sub>3</sub> H <sub>8</sub>	44.064	1.521	1.967
Butane.....	C <sub>4</sub> H <sub>10</sub>	58.08	2.005	2.593
Benzol.....	C <sub>6</sub> H <sub>6</sub>	78.048	2.695	3.484
Nitrous oxide.....	N <sub>2</sub> O	44.02	1.520	1.965
Nitric oxide.....	NO	30.01	1.036	1.340
Nitrosyl chloride.....	NOCl	65.47	2.260	2.922

TABLE V.—Continued.

Names.	Formulae.	Mol. Wt. or Density.	Sp. Gr. (Air = 1).	Wt. of 1 Liter.
Sulphur dioxide.....	SO <sub>2</sub>	64.07	2.212	2.860
Sulphur dichloride.....	S <sub>2</sub> Cl <sub>2</sub>	135.06	4.662	6.028
Chlorous oxide.....	Cl <sub>2</sub> O	86.92	3.000	3.879
Chloric oxide.....	ClO <sub>2</sub>	67.46	2.329	3.011
Chromium oxychloride.....	CrO <sub>2</sub> Cl <sub>2</sub>	155.02	5.352	6.920
Boron tri-fluoride.....	BF <sub>3</sub>	68.00	2.348	3.036
Arsenic tri-chloride.....	AsCl <sub>3</sub>	181.34	6.261	8.096
Phosphorus tri-chloride.....	PCl <sub>3</sub>	137.42	4.744	6.135
Silicon fluoride.....	SiF <sub>4</sub>	104.30	3.605	4.661
Phosphorus pentafluoride.....	PF <sub>5</sub>	126.04	4.352	5.627
Methyl alcohol.....	CH <sub>3</sub> OH	32.032	1.106	1.430
Ethyl alcohol.....	C <sub>2</sub> H <sub>5</sub> OH	46.048	1.590	2.056
Ethyl ether.....	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> O	74.08	2.558	3.307
Methyl chloride.....	CH <sub>3</sub> Cl	50.474	1.742	2.253
Ethyl chloride.....	C <sub>2</sub> H <sub>5</sub> Cl	64.49	2.227	2.879

The weight of any gas in this table, per cubic foot, in grams, may be figured by multiplying the figure in the last column by 28.32, since one cubic foot contains 28.32 liters.

*Example.*—Silicon fluoride, weight in grams of 1 liter = 4.661.

$$4.661 \times 28.32 = 132 = \text{grams per cubic foot.}$$

The weight in pounds avdp. per cubic foot may be obtained by multiplying figure in last column (*i.e.*, weight in grams of one liter) by 0.0624.

*Example.*—Propane, weight in grams of one liter = 1.967.

$$1.967 \times 0.0624 = 0.1227 = \text{lbs. per cubic foot.}$$

Several of the compounds in this table are liquid at ordinary temperatures, their weights as gases are the "theoretical" reductions to normal *t*<sup>o</sup> and pressure, not representing the true physical facts.

TABLE VI.—VOLUME AND SP. GR. OF WATER AT VARIOUS TEMPERATURES.

Temperature C°.	Specific Volume.	Specific Gravity.	Temperature C°.	Specific Volume.	Specific Gravity.
0°	1.0001324	0.9998676	18°	1.0012000	0.9986220
2°	1.0000320	0.9999680	20°	1.0017728	0.9982303
4°	1.0000000	1.0000000	22°	1.0022083	0.9977966
6°	1.0000320	0.9999680	26°	1.0032006	0.9968097
8°	1.0001241	0.9998759	36°	1.0063297	0.9937101
10°	1.0002730	0.9997271	38°	1.0070584	0.9929911
12°	1.0004756	0.9995246	50°	1.01200	0.98813
14°	1.0007292	0.9992713	100°	1.04327	0.95863
16°	1.0010314	0.9989697			

100 vols. water at 0° yield 109 vols. ice at 0°. Sp. gr. of ice = 0.9173. One vol. water at 100° C. yields 1696 vols. steam at 100°.

Sp. gr. steam = 18.02 (O = 32), or 0.622 (air = 1). 1 liter weighs 0.59 gram.

Critical temp. of water + 370°, critical vol. = 2.33, critical pressure 195.5 atmospheres. (Critical temperature is same as "absolute boiling point.")

TABLE VII.—SPECIFIC GRAVITIES OF AQUA AMMONIA AT 15° CENTIGRADE.

Beaumé degrees.	Sp. gr.	Per cent. NH <sub>3</sub> .	Beaumé degrees.	Sp. gr.	Per cent. NH <sub>3</sub> .
10.0	1.000	0.00	19.2	0.938	16.22
10.3	.998	0.45	19.5	0.936	16.82
10.5	.996	0.91	19.9	0.934	17.42
10.7	.994	1.37	20.2	0.932	18.03
11.1	.992	1.84	20.5	0.930	18.64
11.4	.990	2.31	20.8	0.928	19.25
11.7	.988	2.80	21.1	0.926	19.87
11.9	.986	3.30	21.5	0.924	20.49
12.2	.984	3.80	21.8	0.922	21.12
12.5	.982	4.30	22.1	0.920	21.75
12.8	.980	4.80	22.5	0.918	22.39
13.1	.978	5.30	22.8	0.916	23.03
13.4	.976	5.80	23.1	0.914	23.68
13.7	.974	6.30	23.5	0.912	24.33
14.0	.972	6.80	23.8	0.910	24.99
14.2	.970	7.31	24.1	0.908	25.65
14.6	.968	7.82	24.5	0.906	26.31
14.9	.966	8.33	24.8	0.904	26.98
15.2	.964	8.84	25.2	0.902	27.65
15.5	.962	9.35	25.5	0.900	28.33
15.8	.960	9.91	25.9	0.898	29.01
16.1	.958	10.47	26.0	0.897	29.20
16.4	.956	11.03	26.2	0.896	29.69
16.7	.954	11.60	26.4	0.894	30.37
17.0	.952	12.17	26.9	0.892	31.05
17.3	.950	12.74	27.3	0.890	31.75
17.6	.948	13.31	27.6	0.888	32.50
17.9	.946	13.88	28.0	0.886	33.25
18.3	.944	14.46	28.3	0.884	34.10
18.6	.942	15.04	28.7	0.882	34.95
18.9	0.940	15.63			

TABLE VIII.—SPECIFIC GRAVITY OF SULPHURIC ACID AT 15° CENTIGRADE.

Sp. gr.	Beaumé degrees.	% H <sub>2</sub> SO <sub>4</sub>	Sp. gr.	Beaumé degrees.	% H <sub>2</sub> SO <sub>4</sub>	Sp. gr.	Beaumé degrees.	% H <sub>2</sub> SO <sub>4</sub>
1.000	0	0.09	1.310	34.2	40.35	1.640	56.3	71.99
1.005	0.7	0.83	1.320	35.0	41.50	1.650	56.9	72.82
1.010	1.4	1.57	1.330	35.8	42.66	1.660	57.4	73.64
1.015	2.1	2.30	1.340	36.6	43.74	1.670	57.9	74.51
1.020	2.7	3.03	1.350	37.4	44.82	1.680	58.4	75.42
1.030	4.1	4.49	1.360	38.2	45.88	1.690	58.9	76.30
1.040	5.4	5.96	1.370	39.0	46.94	1.700	59.5	77.17
1.050	6.7	7.37	1.380	39.8	48.00	1.710	60.0	78.04
1.060	8.0	8.77	1.390	40.5	49.06	1.720	60.4	78.92
1.070	9.4	10.19	1.400	41.2	50.11	1.730	60.9	79.80
1.080	10.6	11.60	1.410	42.0	51.15	1.740	61.4	80.68
1.090	11.9	12.99	1.420	42.7	52.15	1.750	61.8	81.56
1.100	13.0	14.35	1.430	43.4	53.11	1.760	62.3	82.44
1.110	14.2	15.71	1.440	44.1	54.07	1.770	62.8	83.32
1.120	15.4	17.01	1.450	44.8	55.03	1.780	63.2	84.50
1.130	16.5	18.31	1.460	45.4	55.97	1.790	63.7	85.70
1.140	17.7	19.61	1.470	46.1	56.90	1.800	64.2	86.90
1.150	18.8	20.91	1.480	46.8	57.83	1.810	64.6	88.30
1.160	19.8	22.19	1.490	47.4	58.74	1.820	65.0	90.05
1.170	20.9	23.47	1.500	48.1	59.70	1.825	65.2	91.00
1.180	22.0	24.76	1.510	48.7	60.65	1.830	65.5	92.10
1.190	23.0	26.04	1.520	49.4	61.59	1.835	65.7	93.43
1.200	24.0	27.32	1.530	50.0	62.53	1.840	65.9	95.60
1.210	25.0	28.58	1.540	50.6	63.43	1.8405	....	95.95
1.220	26.0	29.84	1.550	51.2	64.26	1.8410	....	97.00
1.230	26.9	31.11	1.560	51.8	65.08	1.8415	....	97.70
1.240	27.9	32.28	1.570	52.4	65.90	1.8410	....	98.20
1.250	28.8	33.43	1.580	53.0	66.71	1.8405	....	98.70
1.260	29.7	34.57	1.590	53.6	67.59	1.8400	....	99.20
1.270	30.6	35.71	1.600	54.1	68.51	1.8395	....	99.45
1.280	31.5	36.87	1.610	54.7	69.43	1.8390	....	99.70
1.290	32.4	38.03	1.620	55.2	70.32	1.8385	....	99.95
1.300	33.3	39.19	1.630	55.8	71.16			

TABLE IX.—SPECIFIC GRAVITY OF HYDROCHLORIC (MURIATIC) ACID.  
15° CENTIGRADE.

Sp. gr.	Beaumé degrees.	% HCl.	Sp. gr.	Beaumé degrees.	% HCl.	Sp. gr.	Beaumé degrees.	% HCl.
1.000	0.0	0.16	1.075	10.0	15.16	1.145	18.3	28.61
1.005	0.7	1.15	1.080	10.6	16.15	1.150	18.8	29.57
1.010	1.4	2.14	1.085	11.2	17.13	1.152	19.0	29.95
1.015	2.1	3.12	1.090	11.9	18.11	1.155	19.3	30.55
1.020	2.7	4.13	1.095	12.4	19.06	1.160	19.8	31.52
1.025	3.4	5.15	1.100	13.0	20.01	1.163	20.0	32.10
1.030	4.1	6.15	1.105	13.6	20.97	1.165	20.3	32.49
1.035	4.7	7.15	1.110	14.2	21.92	1.170	20.9	33.46
1.040	5.4	8.16	1.115	14.9	22.86	1.171	21.0	33.65
1.045	6.0	9.16	1.120	15.4	23.82	1.175	21.4	34.42
1.050	6.7	10.17	1.125	16.0	24.78	1.180	22.0	35.39
1.055	7.4	11.18	1.130	16.5	25.75	1.185	22.5	36.31
1.060	8.0	12.19	1.135	17.1	26.70	1.190	23.0	37.23
1.065	8.7	13.19	1.140	17.7	27.66	1.195	23.5	38.16
1.070	9.4	14.17	1.142	18.0	28.14	1.200	24.0	39.11

TABLE X.—SPECIFIC GRAVITY OF NITRIC ACID AT 15° C.  
(Compare Water at 4° C.)

Sp. gr.	Bé.	% HNO <sub>3</sub>	Sp. gr.	Bé.	% HNO <sub>3</sub>	Sp. gr.	Bé.	% HNO <sub>3</sub>	Sp. gr.	Bé.	% HNO <sub>3</sub>
1.000	0.0	0.10	1.155	19.3	25.60	1.310	34.2	49.07	1.465	45.8	81.42
1.005	0.7	1.00	1.160	19.8	26.36	1.315	34.6	49.89	1.470	46.1	82.90
1.010	1.4	1.90	1.165	20.3	27.12	1.320	35.0	50.71	1.475	46.4	84.45
1.015	2.1	2.80	1.170	20.9	27.88	1.325	35.4	51.53	1.480	46.8	86.05
1.020	2.7	3.70	1.175	21.4	28.63	1.330	35.8	52.37	1.485	47.1	87.70
1.025	3.4	4.60	1.180	22.0	29.38	1.335	36.2	53.22	1.490	47.4	89.60
1.030	4.1	5.50	1.185	22.5	30.13	1.340	36.6	54.07	1.495	47.8	91.60
1.035	4.7	6.38	1.190	23.0	30.88	1.345	37.0	54.93	1.500	48.1	94.09
1.040	5.4	7.26	1.195	23.5	31.62	1.350	37.4	55.79	1.501	....	94.60
1.045	6.0	8.13	1.200	24.0	32.36	1.355	37.8	56.66	1.502	....	95.08
1.050	6.7	8.99	1.205	24.5	33.09	1.360	38.2	57.57	1.503	....	95.55
1.055	7.4	9.84	1.210	25.0	33.82	1.365	38.6	58.48	1.504	....	96.00
1.060	8.0	10.68	1.215	25.5	34.55	1.370	39.0	59.39	1.505	48.4	96.39
1.065	8.7	11.51	1.220	26.0	35.28	1.375	39.4	60.30	1.506	....	96.76
1.070	9.4	12.33	1.225	26.4	36.03	1.380	39.8	61.27	1.507	....	97.13
1.075	10.0	13.15	1.230	26.9	36.78	1.385	40.1	62.24	1.508	48.5	97.50
1.080	10.6	13.95	1.235	27.4	37.53	1.390	40.5	63.23	1.509	....	97.84
1.085	11.2	14.74	1.240	27.9	38.29	1.395	40.8	64.25	1.510	48.7	98.10
1.090	11.9	15.53	1.245	28.4	39.05	1.400	41.2	65.30	1.511	....	98.32
1.095	12.4	16.32	1.250	28.8	39.82	1.405	41.6	66.40	1.512	....	98.53
1.100	13.0	17.11	1.255	29.3	40.58	1.410	42.0	67.50	1.513	....	98.73
1.105	13.6	17.89	1.260	29.7	41.34	1.415	42.3	68.63	1.514	....	98.90
1.110	14.2	18.67	1.265	30.2	42.10	1.420	42.7	69.80	1.515	49.0	99.07
1.115	14.9	19.45	1.270	30.6	42.87	1.425	43.1	70.98	1.516	....	99.21
1.120	15.4	20.23	1.275	31.1	43.64	1.430	43.4	72.17	1.517	....	99.34
1.125	16.0	21.00	1.280	31.5	44.41	1.435	43.8	73.39	1.518	....	99.46
1.130	16.5	21.77	1.285	32.0	45.18	1.440	44.1	74.68	1.519	....	99.57
1.135	17.1	22.54	1.290	32.4	45.95	1.445	44.4	75.98	1.520	49.4	99.67
1.140	17.7	23.31	1.295	32.8	46.72	1.450	44.8	77.28			
1.145	18.3	24.08	1.300	33.3	47.49	1.455	45.1	78.60			
1.150	18.8	24.84	1.305	33.7	48.26	1.460	45.4	79.98			

## PART II

### CALCULATION OF FURNACE CHARGES