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ANNUAL REPORT OF THE INTERNATIONAL COMMITTEE ON ATOMIC WEIGHTS, 1912.

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Since the report of the Committee for 1911 was prepared, a number of important determinations of atomic weight have been published, which may be summarized as follows:

Nitrogen.—Guye and Drouginine,[1] from seven analyses of N_2O_4, find, in mean, N = 14.010.

Sulfur.—Burt and Usher,[2] by analysis of nitrogen sulfide, N_4S_4, have determined the ratio S : N : : 1.0 : 0.43687. Hence, calculating with N = 14.009, S = 32.067; in good agreement with the accepted value.

Chlorine.—Burt and Gray[3] have continued their work upon the density of hydrochloric acid, and confirmed their former determination of Cl = 35.46.

Iodine.—Baxter[4] has redetermined the ratio of iodine to silver with extreme care. Combining his results with the previously determined ratio of silver to iodine pentoxide he finds Ag = 107.864 and I = 126.913. The value for silver varies from that found by Richards and Willard, and the discrepancy is as yet unexplained.

Sodium.—Goldbaum[5] has made analyses of sodium chloride and bromide by a new electrolytic method. The salts were electrolyzed with a mercury cathode and a weighed silver anode, and on the latter the halogen was collected in weighable form. From the chloride, with Cl = 35.458,

[1] *J. chim. phys.*, 32, 513.
[2] *Proc. Roy. Soc.*, 85A, 82.
[3] *Chem. News*, 103, 161, 170.
[4] THIS JOURNAL, 32, 1591.
[5] *Ibid.*, 33, 35.

Goldbaum found Na = 22.997; the bromide, with Br = 79.920, gave Na = 22.998.

Calcium.—Two papers by Richards and Hönigschmid[1] on the atomic weight of calcium have appeared. From analyses of calcium bromide, Ca = 40.070, when Ag = 107.88. From analyses of the chloride, Ca = 40.074. The value 40.07 is adopted in the table at the end of this report.

Cadmium.—Perdue and Hulett,[2] from electrolytic analyses of cadmium sulfate, conclude that the atomic weight of cadmium is near 112.30. This is lower than the accepted value; but as the investigation is being continued with other salts of cadmium, any change in the table should be deferred.

Mercury.—Easley[3] has continued his work on the atomic weight of mercury, varying his methods. New analyses of the chloride give Hg = 200.63, in confirmation of his former determinations. In a private communication he states that analyses of the bromide lead to the same value. The new figure, Hg = 200.6, should be adopted.

Vanadium.—McAdam,[4] by reducing sodium vanadate to sodium chloride, by heating in a stream of dry hydrochloric acid, finds V = 50.967, or 51, in round numbers. The latter figure is as probable as any.

Tantalum.—Balke,[5] by hydrolysis of tantalum pentachloride, has determined the ratio $2TaCl_5 : Ta_2O_5$. The mean of five concordant determinations gives Ta = 181.52, when Cl = 35.46. The rounded-off value 181.5 should be accepted.

Tellurium.—Flint[6] has continued the work reported by Browning and Flint in 1909 on the fractionation of tellurium by hydrolysis of the tetrachloride. With successive fractions the atomic weight steadily decreased. Seven analyses of the basic nitrate representing the tenth fractionation gave values for Te ranging from 124.25 to 124.42. As the work is still in progress, any acceptance of these low figures would be premature.

Iron.—Baxter, Thorvaldson and Cobb,[7] from analyses of ferrous bromide, find Fe = 55.838 when Ag = 107.88. In another communication[8] Baxter and Thorvaldson find Fe = 55.836. The latter figure is the mean of two series, *meteoric* iron being taken as the starting point. The value 55.84 is given in the table.

[1] THIS JOURNAL, **32**, 1577; **33**, 28.
[2] *J. Physic. Chem.*, **15**, 155. See also Richards, THIS JOURNAL, **33**, 1888.
[3] THIS JOURNAL, **32**, 1117.
[4] *Ibid.*, **32**, 1603.
[5] *Ibid.*, **32**, 1127.
[6] *Am. J. Sci.*, [4] **30**, 209.
[7] THIS JOURNAL, **33**, 319.
[8] *Ibid.*, p. 337.

Uranium.—Oechsner de Coninck,[1] by reduction of UO_2Cl_2 and $UO_3.H_2O$ to UO_2 in hydrogen, concludes that U = 238.5. The work is only approximate in character.

Scandium.—Meyer and Winter,[2] in a preliminary series of experiments, find values for Sc ranging from 44.86 to 45.37; in mean, 45.12. This is higher than the recognized value, but its adoption would be premature. More details are needed.

Neodymium.—By extended and careful analyses of the chloride, Baxter and Chapin[3] have redetermined the atomic weight of neodymium. From the ratio $NdCl_3 : 3Ag$, Nd = 144.268. From the ratio $NdCl_3 : 3AgCl$, Nd = 144.272. A small correction raises the value to 144.275. The rounded-off value 144.3, given in the table, may be properly retained.

Erbium.—Hofmann,[4] from analyses and syntheses of the sulfate of "neo-erbium," finds Er = 167.68. This may be rounded to 167.7.

Argon.—Determinations of the density of argon, by Fischer and Froboese,[5] give a mean value of 19.95. Hence A = 39.90.

Niton.—Gray and Ramsay,[6] with the aid of the microbalance, have determined the density of the gaseous emanation from radium, to which they give the name *niton*. The mean value found gives Nt = 223, but the value 222.4 is preferred. The gas is a member of the argon group, and seems to be entitled to recognition in the table. Debierne,[7] by a different method, has found the value 220 for the emanation, which is in fair agreement with the determination by Gray and Ramsay.

The table of atomic weights for 1912 follows.

In accordance with a suggestion received from Germany, the changed values are indicated by an asterisk. The changes are few in number, and only in two cases are they large.

NOTE.—The publication of this report has been unavoidably delayed by the difficulties of correspondence between the widely separated members of the committee. Since it was written, several noteworthy papers upon atomic weights have appeared. Harcourt and Baker have thrown doubt upon Flint's work relative to tellurium. Staehler and Meyer have investigated the ratio $KClO_3$ to KCl. There are also papers upon holmium, by Holmberg, on iridium by Hoyermann, on selenium by Kuzma and Krehlik, and on tantalum by Chapin and Smith. F. W. C.

[1] *Compt. rend.*, 152, 711 and 1179.
[2] *Z. anorg. Chem.*, 67, 398.
[3] *Proc. Am. Acad.*, 46, 215.
[4] *Ber.*, 43, 2635.
[5] *Ibid.*, 44, 92.
[6] *Proc. Roy. Soc.*, 84 A, 536.
[7] *Compt. rend.*, 151, 126.

International Atomic Weights, 1912.

	Symbol.	Atomic weight.
Aluminium	Al	27.1
Antimony	Sb	120.2
Argon	A	39.88
Arsenic	As	74.96
Barium	Ba	137.37
Bismuth	Bi	208.0
Boron	B	11.0
Bromine	Br	79.92
Cadmium	Cd	112.40
Caesium	Cs	132.81
*Calcium	Ca	40.07
Carbon	C	12.00
Cerium	Ce	140.25
Chlorine	Cl	35.46
Chromium	Cr	52.0
Cobalt	Co	58.97
Columbium	Cb	93.5
Copper	Cu	63.57
Dysprosium	Dy	162.5
*Erbium	Er	167.7
Europium	Eu	152.0
Fluorine	F	19.0
Gadolinium	Gd	157.3
Gallium	Ga	69.9
Germanium	Ge	72.5
Glucinum	Gl	9.1
Gold	Au	197.2
Helium	He	3.99
Hydrogen	H	1.008
Indium	In	114.8
Iodine	I	126.92
Iridium	Ir	193.1
*Iron	Fe	55.84
Krypton	Kr	82.92
Lanthanum	La	139.0
Lead	Pb	207.10
Lithium	Li	6.94
Lutecium	Lu	174.0
Magnesium	Mg	24.32
Manganese	Mn	54.93
*Mercury	Hg	200.6
Molybdenum	Mo	96.0
Neodymium	Nd	144.3
Neon	Ne	20.2
Nickel	Ni	58.68
*Niton (radium emanation)	Nt	222.4
Nitrogen	N	14.01
Osmium	Os	190.9
Oxygen	O	16.00
Palladium	Pd	106.7
Phosphorus	P	31.04
Platinum	Pt	195.2
Potassium	K	39.10
Praseodymium	Pr	140.6
Radium	Ra	226.4
Rhodium	Rh	102.9
Rubidium	Rb	85.45
Ruthenium	Ru	101.7
Samarium	Sa	150.4
Scandium	Sc	44.1
Selenium	Se	79.2
Silicon	Si	28.3
Silver	Ag	107.88
Sodium	Na	23.00
Strontium	Sr	87.63
Sulphur	S	32.07
*Tantalum	Ta	181.5
Tellurium	Te	127.5
Terbium	Tb	159.2
Thallium	Tl	204.0
Thorium	Th	232.4
Thulium	Tm	168.5
Tin	Sn	119.0
Titanium	Ti	48.1
Tungsten	W	184.0
Uranium	U	238.5
*Vanadium	V	51.0
Xenon	Xe	130.2
Ytterbium (Neoytterbium)	Yb	172.0
Yttrium	Yt	89.0
Zinc	Zn	65.37
Zirconium	Zr	90.6

Signed, F. W. CLARKE,
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