ANIMAL CALORIMETRY.

TWENTY-FOURTH PAPER.

ANALYSIS OF THE OXIDATION OF MIXTURES OF CARBOHYDRATE AND FAT.

A CORRECTION.

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In 1901 Zuntz and Schumburg[1] published a standard table showing the caloric value of a liter of oxygen when used to oxidize mixtures of carbohydrate and fat. Figures were given for respiratory quotients varying from 1.00, for pure carbohydrate, to 0.707, for pure fat. The writer elaborated this table[2] and introduced columns showing the relative quantity in calories of carbohydrate and fat consumed. That these figures were in error was pointed out to me by Dr. H. H. Mitchell in a letter dated June 26, 1917, and the error has since been called to my attention by my students. To one of them, Mr. A. M. Michaelis, I am indebted for the following corrected table. Although the error is not great, yet it is worthy of note and of record. The table serves to illuminate the charts recently prepared by Dr. E. F. Du Bois, which he presents in the article immediately following this.

[1] Zuntz, N., and Schumburg, Studien zu einer Physiologie des Marsches, Berlin, 1901, 361.

[2] Williams, H. B., Riche, J. A., and Lusk, G., *J. Biol. Chem.*, 1912, xii, 357. Lusk, G., The elements of the science of nutrition, Philadelphia, 3rd edition, 1917, 61.

TABLE I.

Analysis of the Oxidation of Mixtures of Carbohydrate and Fat.

R. Q.	Percentage of total oxygen consumed by:		Percentage of total heat produced by:		Calories per liter O_2.	
	Carbohydrate. (1)	Fat. (2)	Carbohydrate. (3)	Fat. (4)	Number. (5)	Logarithm. (6)
0.707	0	100.0	0	100.0	4.686	0.67080
0.71	1.02	99.0	1.10	98.9	4.690	0.67114
0.72	4.44	95.6	4.76	95.2	4.702	0.67228
0.73	7.85	92.2	8.40	91.6	4.714	0.67342
0.74	11.3	88.7	12.0	88.0	4.727	0.67456
0.75	14.7	85.3	15.6	84.4	4.739	0.67569
0.76	18.1	81.9	19.2	80.8	4.751	0.67682
0.77	21.5	78.5	22.8	77.2	4.764	0.67794
0.78	24.9	75.1	26.3	73.7	4.776	0.67906
0.79	28.3	71.7	29.9	70.1	4.788	0.68018
0.80	31.7	68.3	33.4	66.6	4.801	0.68129
0.81	35.2	64.8	36.9	63.1	4.813	0.68241
0.82	38.6	61.4	40.3	59.7	4.825	0.68352
0.83	42.0	58.0	43.8	56.2	4.838	0.68463
0.84	45.4	54.6	47.2	52.8	4.850	0.68573
0.85	48.8	51.2	50.7	49.3	4.862	0.68683
0.86	52.2	47.8	54.1	45.9	4.875	0.68793
0.87	55.6	44.4	57.5	42.5	4.887	0.68903
0.88	59.0	41.0	60.8	39.2	4.899	0.69012
0.89	62.5	37.5	64.2	35.8	4.911	0.69121
0.90	65.9	34.1	67.5	32.5	4.924	0.69230
0.91	69.3	30.7	70.8	29.2	4.936	0.69339
0.92	72.7	27.3	74.1	25.9	4.948	0.69447
0.93	76.1	23.9	77.4	22.6	4.961	0.69555
0.94	79.5	20.5	80.7	19.3	4.973	0.69663
0.95	82.9	17.1	84.0	16.0	4.985	0.69770
0.96	86.3	13.7	87.2	12.8	4.998	0.69877
0.97	89.8	10.2	90.4	9.58	5.010	0.69984
0.98	93.2	6.83	93.6	6.37	5.022	0.70091
0.99	96.6	3.41	96.8	3.18	5.035	0.70197
1.00	100.0	0	100.0	0	5.047	0.70303

Formula for Column (R. Q. = R)

(1) $\%$ $= 100\,\dfrac{R - 0.707}{0.293}$

(2) $\%$ $= 100\,\dfrac{1.00 - R}{0.293}$

(3) $\%$ $= \dfrac{504.7\,(R - 0.707)}{5.047\,(R - 0.707) + 4.686\,(1.00 - R)}$

(4) $\%$ $= \dfrac{468.6\,(1.00 - R)}{5.047\,(R - 0.707) + 4.686\,(1.00 - R)}$

(5) Calories $= 4.686 + \dfrac{R - 0.707}{0.293} \times 0.361$

(6) Logarithm = log of Column 5