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The relation between body-length and body-weight in the human embryo and fetus.

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It has been generally assumed that the weight of the body in prenatal life may be represented by a cube of a fraction of the total or crown-heel length. In a study of the lengths and dead-weights of 2202 embryos and fetuses we have found that this relation can be more accurately expressed by the formulae:

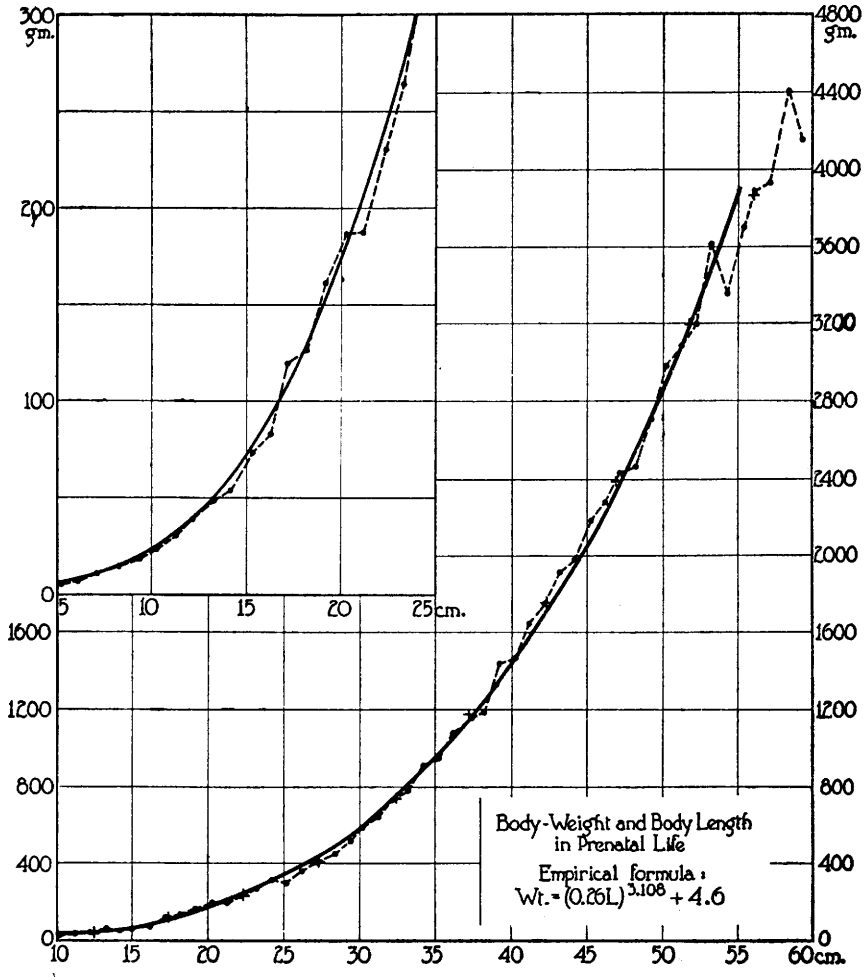
$$(1)\quad W = (0.26\ L)^{3.108} + 4.6, \text{ or}$$

$$(2)\quad L = 3.846\ \sqrt[3.108]{W - 4.6}$$

In these expressions W is the weight in grams, and L is the total or crown-heel length in centimeters. These formulae are satisfactory from 5 to 55 cm. body-length but do not hold good above the latter limit and, probably, not below the former. The following graph shows the relation between the observed values and the calculated curve of weight increase, in respect to length; and the accompanying table gives the observed and calculated mean weights for each 5 cm. range of body-length, and the absolute and percentage differences between these values.

The live and dead-weights of fetuses of the same body-length are quite different, the former being distinctly the greater. Therefore the majority of the published tables and curves of weight increment in prenatal life are not strictly correct, for they include both types of material.

In order to estimate the amount of this difference we have computed the mean body-weight of living fetuses and newborn children for each 5 cm. range of body-length from 35 to 55 cm. inclusive. These computations are based on a series of 5674 observations. A comparison of these values with the calculated values for dead material at the same mean lengths shows an average difference of 219.3 gm. in favor of the living material. The 5 cm. range differences showed no consistent increase with increasing body-length. Therefore the relation between live-



weight and body-length in the latter part of prenatal life may be approximated by the empirical formulae:

$$(3)\quad W = (0.26\ L)^{3.108} + 223.9, \text{ or}$$

$$(4)\quad L = 3.846\ \sqrt[3.108]{W - 223.9}$$

No consistent sex differences in the relation of body-weight to body-length were noted in either the living or the dead material.

Calculated and Observed Dead-weight and Length in Prenatal Life.
Empirical formula:
Wt. (gm.) $=$ [0.26 Lth. (cm.)]$^{3.108}$ + 4.6.

Length (cm.)		Weight (gm.)		Deviation of calculated number from observed values		
Range	Mean	Observed	Calculated	Absolute (gm.)	Relative (per cent)	Number of cases
5-10	7.7	13.05	13.08	+0.03	+0.19	33
10-15	12.3	40.54	41.68	+1.14	+2.82	68
15-20	17.3	114.61	111.65	—2.96	—2.58	78
20-25	22.3	238.71	241.24	+2.53	+1.06	117
25-30	27.2	405.08	441.49	+36.41	+8.99	143
30-35	32.3	750.31	749.91	—0.40	—0.05	194
35-40	37.2	1163.16	1160.67	—2.49	—0.21	328
40-45	42.2	1758.39	1715.51	—42.88	—2.44	414
45-50	46.9	2389.17	2380.03	—9.14	—0.38	456
50-55	51.7	3204.89	3220.47	+15.58	+0.49	371
		Sum of deviations		113.56	19.21	2202
		Unweighted mean deviation		11.36	1.92	
		Weighted mean deviation		15.63	1.42	

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The purification of jack bean urease.

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Thirty per cent alcohol extracts of jack bean meal contain the enzymes urease and amylase associated with the globulins canavalin and concanavalin A and B, albumin, proteose, pentose and hexose carbohydrates and a yellow coloring matter. On cooling the alcoholic extract to —5° C. the urease is almost entirely precipitated and can readily be centrifuged off. This procedure if repeated separates the urease from everything but the three globulins. It is best, however, to treat the precipitated urease with