males, the probability of the truth of this conclusion being 142:1.[1]

The weight of the infants at birth increases regularly with the length of the period of gestation. Plotting these weights as ordinates with the corresponding periods of gestation as abscissae the curve of growth thus obtained passes smoothly into the extra-uterine curve of growth for South Australian infants, without any indication of a slackening of growth such as occurs at or near the junction of two growth-cycles. The intra-uterine growth of infants, subsequent to implantation of the embryo, therefore appears to be part of a single growth-cycle which culminates towards the end of the first year of extra-uterine life. At or near this period a junction of growth-cycles (slackening of growth) occurs, and Macgregor[2] has shown that an unusual proportion of infants are of subnormal weight at this period and that these infants are selectively attacked by certain zymotic diseases. This period therefore corresponds with the critical period detected by Read in the intra-uterine growth of guinea-pigs. That it occurs during intra-uterine growth in guinea-pigs and during extra-uterine growth in human beings corresponds with the fact that guinea-pigs are born in a relatively more adult condition of development than man.

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The post-natal loss of weight in infants and the compensatory overgrowth which succeeds it. (Preliminary Communication.)

By T. BRAILSFORD ROBERTSON.

[*From the Rudolph Spreckels Physiological Laboratory of the University of California.*]

As stated in the preceding communication, it is possible, by plotting the weights of infants born somewhat before the expiry of the mean term of gestation against the length of the period of gestation, to obtain a curve of intra-uterine growth which continues without any break or any period of loss of weight into the

[1] For the method of computing this probability cf. C. B. Davenport, "Statistical Methods," 2d ed., New York, 1904, p. 14.

[2] A. S. Macgregor "Physique of Glasgow Children," *Royal Philosophical Society of Glasgow Proceedings*, April 21, 1909.

normal curve of extra-uterine growth. It represents the continuation of this latter curve backwards from the time of birth. In the same way, plotting the weights of children born somewhat later than the average term, we obtain a curve which is identical with and overlies the normal curve of extra-uterine growth for the period which it covers. By combining these various data a continuous curve of intra- and extra-uterine growth is obtained without any interruption due to the post-natal loss of weight which normally occurs during the first week after birth. From this we can readily estimate what would be the average rate of growth in an infant during its first two weeks of extra-uterine life were it not for the shock due to birth. For South Australian male infants I find that the gain during the first week following birth should be six ounces, during the second seven ounces. But the average male infant in South Australia actually weighs 6.2 ounces less at one week than it did at birth. Since it should have weighed 6 ounces *more* than it did at birth the true loss of weight due to birth is 12.2 ounces which is 9 per cent. of its weight at birth. At the end of the second week of extrauterine growth the average South Australian male infant weighs 3.4 oz. more than it did at birth, but since it should have gained 13 oz. since birth the loss of weight due to birth is now 9.6 oz. Part of the effect of the shock of birth is therefore overcome during the second week of post-natal life by compensatory overgrowth, for whereas the deficit in weight due to birth at the end of the first week is 12.2 oz., at the end of the second it is only 9.6 oz., *i. e.*, 2.6 oz. of compensatory overgrowth have occurred. Corresponding figures were obtained for females. Hence it appears probable that the average weight of an infant at any given age represents a true dynamic equilibrium, any disturbance of which tends to be rectified by compensatory gains or losses.

The post-natal loss of weight is greater the greater the weight, and, consequently, the size of the infant at birth. It appears probable therefore that the post-natal loss of weight is primarily due to mechanical shock; although defective nutrition and functional shock doubtless contribute to it.