We were unable to extract any of the lytic material from the testis of a bull. The origin may be in the testis, prostate, or seminal vesicle.

Semen strongly reduces thionin to a colorless compound. The material responsible for this reduction is thermostabile, dialyzable through collodion, and is carried down by precipitation with phosphomolybdic acid, alcohol, or std. ammonium sulphate.

Semen, with guaiac or benzidine, shows no indication of oxidase or peroxidase. It contains catalase. It does not contain glutathione. It is very strongly buffered.

This is a preliminary report.

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Weight of Mouse Embryos 10-18 Days After Conception, a Logarithmic Function of Embryo Age.

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The following methods were adopted in the endeavor to provide the optimum developmental conditions and to reduce the variability of the mouse embryos as far as possible. The mothers were self-colored, intense, brown-agoutis, F_1 hybrids between two highly inbred, pedigreed strains, the females from the Bagg albino and the males from the Storrs-Little, characterized by pink-eyed dilute brown self-color. The albino grandmothers at conception were over ten weeks old and had not nursed young for at least three weeks; the mothers were nursed in litters that had been cut down to six at birth; they were weaned at four weeks and held in large mating boxes, not more than six to a box, until over three months old before mating was first permitted. The fathers of the embryos weighed came from the inbred line 89,-self-colored, intense, brown-agouti; they were kept individually in small boxes. This type of mating gives embryos that may be called triple hybrids; they bear the maximum heterozygosity and hence show the minimum amount of segregation. When matings were desired each male was placed with the females in a certain box for one hour and the females then examined for vaginal plugs as evidence of copulation. Each female with a plug was immediately given a small box to herself until the

hour assigned for weighing the embryos; she was killed at some exact multiple of 24 hours from the end of the hour she was with the male.

The membranes and placentae were removed with the aid of a binocular microscope; for embryos of 10, 11 and 12 days this was done in Locke's solution. As soon as a dissection was finished the excess fluid was blotted off and the embryo placed in a glass ring of appropriate size between cover glasses, or in a small weighing bottle (18-day embryos), and carried at once to the balance pan. While one embryo was being weighed the next was dissected. A Sartorious balance of 1/10 mg. sensitivity was used and the weights recorded with four figures of three significant digits. The original records for the fourth place are in the form of pointer readings.

TABLE I.

Conception age t	Embryo age (t-7)	Frequencies		Average weight	
		Litters	Embryos	Observed $\Sigma W/n$	Calculated $W = .000188\ (t\text{-}7)^{3.056}$
10	3	7	59	.0086	.0104
11	4	10	101	.0329	.0299
12	5	11	77	.0762	.0675
13	6	11	100	.1298	.1315
14	7	11	74	.2288	.2311
15	8	10	75	.3651	.3766
16	9	12	95	.5926	.5793
17	10	11	89	.8467	.8515
18	11	10	91	1.190	1.206

The table gives the number of litters and the number of embryos of each age weighed. The averages give each litter weighted by the number of individuals, (the sum of the individual weights over the total number of embryos). Plotted on uniform coordinate paper, these averages form a fairly smooth curve; plotted on semi-logarithmic paper they give a strongly curved line, which shows that this series can not be expressed by an exponential equation. The graph obtained on double logarithmic paper is also a curved line. By shifting the zero point for age to various positions it was found that a close approximation to a straight line was obtained on double logarithmic paper when age t was changed to t-7. This indicates that during the period of observation the weight of the embryo is a logarithmic function of its age, if the *embryo age* is given as 7 days less than conception age. The equation for this curve is the power function of the form, $W = Kt^n$, in which W is the weight, t the age, n the slope of the graph on double logarithmic paper and

K the intercept on the W axis, that is, the weight at the end of the first day. The constants obtained when substituted in this equation in logarithmic form give: $\log W = 3.656 \log (t\text{-}7) + \log .000188$.

Since the first stages of development of a mammal consist of the formation of the pro-embryo, a considerable period elapses before the first organization of the embryo proper. This is the justification for assuming embryo age to be less than conception age. In the mouse the first differentiation of the embryo proper (primitive streak) is not found before the end of the first week. Thus the embryological evidence bears out the purely graphical result obtained by shifting the age (t-7) until the embryo weights fit a logarithmic straight line. Data for younger embryos are being collected.

The mouse embryo at seven days after conception and the chick embryo at the beginning of incubation are in practically the same stage of development. Starting the age scale at these points, the data for both animals lie on straight lines on double logarithmic paper, whose slopes are practically identical (chick, $n = 3.6$, Murray[1]; mouse, $n = 3.656$) though the intercept on the W axis is considerably higher for the chick ($K = .665$). These constants seem to indicate that the mouse embryo starts out with less material than the chick, but at the same age the rate of growth in both cases is practically the same. Handled graphically as above the prenatal weight data for guinea pig (Draper[2]), rat (Stotsenberg[3]), and man (Streeter[4]) appear to give fair indications of the time when the respective primitive streak stages are reached, and support the conclusion that the growth of the pro-embryo requires a different equation from that of the embryo. In studying the embryo, embryo age instead of conception age provides a more accurate basis for comparison.

This is a preliminary report.

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[1] Murray, H. A., *J. Gen. Physiol.*, 1926, ix, 39.

[2] Draper, R. L., *Anat. Rec.*, 1920, xviii, 369.

[3] Stotsenberg, J. M., *Anat. Rec.*, 1915, ix, 667.

[4] Streeter, G. L., *Pub. Carnegie Inst.*, 1920, cclxxiv, 153.