# SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.



FRIDAY, APRIL 4, 1902.

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MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson, N. Y.

## AMERICAN MORPHOLOGICAL SOCIETY.

### I.

AT the annual meeting of the American Morphological Society, held at the University of Chicago December 31, 1901, and January 1 and 2, 1902, the following papers were presented:

*The Physiological Zero and the Index of Development for the Egg of the Domestic Fowl, Gallus Domesticus:* CHARLES LINCOLN EDWARDS.

From the study of 238 eggs distributed in 23 incubations of about six days each, and from the measurement of 59 unincubated eggs the following conclusions were derived:

1. The physiological zero, or the temperature below which there is no development, previously given by most authors at 28°, and by one at 25°, is established at the degree included between 20° and 21°.

2. The index of development is given for temperatures from 20°–21° to 30.75°.

The first phase shows a very gradual rise in the percentage of development of the embryo to 14 per cent. at 27°–29°, the primitive streak alone showing. The second phase, beginning with notochord, neural plate and groove, and mesodermic somites, presents an abrupt rise to 54.83 per cent. of normal development at 30.75°.

3. The normal average diameter of the blastoderm of the unincubated egg, as determined from the measurement of fifty-nine individuals, is 4.41 mm. with a standard deviation of 0.4792 mm. and a coefficient of variability of 0.1087.

4. The normal average diameter of the area pellucida of the unincubated egg as determined from the measurement of fifty individuals is 2.51 mm. with a standard deviation of 0.3382 mm. and a coefficient of variability of 0.1347.

5. From 136 blastoderms in which primitive streaks have not developed, the form of the area pellucida is 59 19/34 per cent. round, 12½ per cent. nearly round, 23 9/17 per cent. oblong and 4 7/17 per cent. oval.

6. The normal average volume of the egg, as determined from the measurement of 100 individuals, is 51.67 c.c., with a standard deviation of 4.8602 c.c. and a coefficient of variability of 0.0942. In 85 per cent. of fifteen unincubated eggs where the volume was noted the diameter of the blastoderm varies directly with the volume of the egg, but the variates are so evenly distributed about the average that the general averages of the measurements in this paper would not be especially affected by this element.

7. The introduction of successively higher stages, and the increased growth of blastoderms without primitive streaks as the temperature rises, together with a continued growth of the primitive streak with the non-appearance of other features of the embryo at a low temperature, 20°–21° to 27°–28°, would indicate a direct dependence of ontogenetic organization upon warmth.

*Differentiation without Cleavage in the Egg of the Annelid Chætopterus pergamentaceus:* Frank R. Lillie.

This phenomenon was observed in both fertilized and unfertilized ova. The essential point is briefly this: That by the action of certain solutions the eggs are preserved alive, sometimes for as long as thirty-six to forty-eight hours, although neither cytoplasm nor nucleus divides. During this period the cytoplasm slowly passes through certain well-defined phases of differentiation, the yolk accumulating in a dense mass in the interior and the peripheral cytoplasm becoming vacuolated and ciliated. The ciliated ectoplasm and the yolk-laden endoplasm are analogous to the ectoderm and endoderm of the trochophore, and the phases of differentiation resemble some of the normal processes; though the resulting object can by no stretch of the term be properly called a trochophore.

The solutions employed were sea water with the addition of KCl or $CaCl_2$, or both these salts. The eggs were left in the solutions for an hour and then transferred to sea water. If the solutions were above a certain density, the formation of the polar bodies was suppressed; but this did not interfere with the subsequent differentiation. During the period of time usually occupied by the cleavage the eggs were markedly amœboid; in some cases (especially after $CaCl_2$) throwing out a bewildering number and variety of long pseudopodia, and actually creeping like amœbæ. All intermediate conditions between this and actual cleavage were observed. During this period, in typical cases, the nucleus became enormously enlarged, and some chromatin was diffused through the cell. Fusion of ova frequently took place, and, in solutions containing $CaCl_2$, large num-