

EXPERIMENTS ON DEVELOPING EGGS.

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The greatest mysteries in the biological world are undoubtedly locked up in the egg. If we can understand the intricate changes that go on in a developing egg we have accomplished much. Considerable light has been thrown upon this subject during the past few years. Eminent biologists all over the world are spending their lives trying to solve the mysteries. Various experiments have been devised to try to throw light upon these early changes in the egg.

These experiments which I performed were under the direction of Dr. Lillie, of the Chicago University, at the Woods Holl Marine Laboratory.

Experiment 1.—The egg of a common sea minnow, the *Fundulus*, was used. When the egg was in the two-celled stage one of the blastomeres was punctured with a needle and pressed out of the vitelline membrane. The other blastomere went on developing. Its development, however, was slower. It went through all the regular changes and became an embryo. The only difference that could be discerned was in size. It was considerably smaller than the normal embryo. I succeeded in keeping it alive seven days. I have not studied the embryo any more to see whether there are internal changes that are different from the normal embryo. The significance of this ability of one blastomere to develop into a complete embryo is not fully understood. In this egg it seems to indicate that the developing power is equally distributed throughout the egg.

Experiment 2.—In this experiment the eggs of the sea-urchin *Arbacia* were used. The eggs just fertilized were placed under a long cover-glass with a thin piece of cover-glass under one end, thus giving a graded pressure upon them. In the segmentation of these eggs the first and second cleavage planes were natural, but the third was parallel to the first, the same as in the *Fundulus*. The blastoderm in the eight-celled and sixteen-celled stages were almost identical with corresponding stages of *Fundulus*. The eggs did not develop further than thirty-two cells where the pressure was greatest.

Experiment 3.—*Arbacia* eggs five minutes after fertilization were shaken violently for about a minute. The membranes surrounding the eggs were thereby broken; the eggs were then placed in artificial sea water in which there was no calcium. Eggs were thus treated at two-celled, four-celled and eight-celled, with the following results:

Those separated at the two-celled stage lived to form plutei.

Those separated at the four-celled stage formed regular blastulae in most cases.

Those separated at the eight-celled stage also formed regular blastulae.

Experiment 4.—This is an experiment in artificial parthenogenesis in arbacia. Plutei six days old were reared by Dr. H. J. Hunter, of Kansas University. He carried on the work longer and he has specially reported on this, hence only this reference.

These experiments are very interesting and may be of considerable importance when we learn how to perfectly interpret them.

THE EYE OF PALEMONETES ANTRORUM.

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Contributions from the Zoölogical Laboratory of the Indiana University, under the direction of C. H. Eigenmann. No. 47.

A blind shrimp, *Palaemonetes antrorum*, evidently occurs in abundance in the subterranean streams about San Marcos, Texas. It comes out of the artesian well of the United States Fish Commission at that place in large numbers. The well is about one hundred and ninety feet deep and has a yield of about one thousand gallons per minute.

A brief description of *Palaemonetes* was published by Benedict, 1896.

The material examined consists of young specimens, 5 to 5.5 mm. long from tip of rostrum to tip of telson and adult specimens measuring 15 mm. along the same line. Most of them were collected by Dr. C. H. Eigenmann at the San Marcos well in September, 1899. Others have since been sent by Mr. J. L. Leary, Superintendent of the United States Hatchery at that place.

The material at my disposal was preserved in 4 per cent. formalin. The anterior end of the cephalo thorax was dehydrated and imbedded in paraffin by the chloroform method. Sections were floated out on warm water and fixed to the slide with glycerin-albumen and stained with Mayer's haemalum, followed by eosine. Specimens of *P. exilipes*, which were used for comparison, were treated with Perenyi's fluid for forty-eight hours before imbedding and the sections were depigmented in 10 per cent. nitric acid for ten hours. The cuticle of the blind shrimp was found to section readily without softening in Perenyi's fluid.