

no regeneration of parts in embryos operated after the definite organ systems are formed.

<sup>1</sup> Morgan, T. H., *Anat. Anz.*, 8, and *J. Morph.*, 10.

<sup>2</sup> Stockard, C. R., *Amer. J. Anat.*, 28.

<sup>3</sup> Kellicott, Wm. E., *Amer. J. Anat.*, 10.

<sup>4</sup> Harrison, R. G., *J. Exp. Zool.*, 25.

<sup>5</sup> Spemann, H., *Arch. Entw.-Mechanik*, 43.

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## THE ACTION OF Na, K AND Ca CHLORIDES ON THE EGG OF FUNDULUS

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Most of our knowledge concerning the action of chemicals on the egg and larva of the marine fish, *Fundulus*, has resulted from the extensive researches of Loeb and his co-workers.<sup>1</sup> The results of this work seem conclusively to have shown that marked differences in reactions of the egg and hatched embryo or larva to different salts exist. Inasmuch as the conclusions drawn from this work are based almost entirely upon the egg and hatched embryo or larva, it was thought highly desirable to recheck the observations using not only the eggs and larvae but also embryos dissected out or freed from the egg membrane. By means of an operative technic devised by Dr. J. Nicholas of Yale University, the details of which will be published elsewhere, it has been possible to remove the egg membrane from the embryo and yolk sac without, in any apparent way, interfering with the further development of the embryo.

The action of various salts, Na, K and Ca chlorides, has been investigated using the eggs, embryos dissected from the eggs as well as the recently hatched larvae. The results obtained have been of considerable interest inasmuch as they afford a quantitative means of measuring the relative resistance of the different stages of the embryo to the salts as well as a method for estimating the relative influence of the salt on the membrane and on the contained embryo. The results, the details of which will be published elsewhere, also show, in general, that the embryo dissected from the egg is quite resistant to NaCl solutions while the hatched larva is quickly killed in the same solution. The egg's resistance to NaCl increases with age. Both K and Ca chlorides kill the dissected-out-embryo much quicker than the egg while the recently hatched larvae are much more sensitive to the two salts. Combinations of these salts

show antagonistic action as demonstrated by Loeb<sup>1</sup> but with many exceptions and corrections. A point of considerable interest is that Na + Ca mixtures are not toxic for eggs but are markedly so for the embryo freed from the egg membrane.

To the writer it seems that by the methods outlined above definite quantitative information can be gained as to the fundamental site of action of various chemicals on the egg of *Fundulus*.

<sup>1</sup> Loeb, J., *Archiv ges. Physiol.*, 1894, 4, 530; 1901-02, 38, 68; 1905, 107, 252.

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## ABSORPTION OF ULTRA-SONIC WAVES BY HYDROGEN AND CARBON DIOXIDE

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While measuring the velocity of very high frequency waves in CO<sub>2</sub>, Pierce<sup>1</sup> noticed that the gas highly absorbs the waves. The following experiment confirms his observation and furthermore shows the somewhat astonishing fact that the lighter gas hydrogen also absorbs the waves more than air.

The experiment consists in passing an ultra-sonic beam through a mixture of air and CO<sub>2</sub> (or H<sub>2</sub>) and measuring the intensity of the emergent beam by the pressure it exerts on a torsion vane. The source of the ultra-sonic beam is a piezo-electric crystal about 5.0 × 4.5 × 0.46 cm. connected to an oscillating circuit. It radiates waves with a frequency of 612,000 per second in the direction of the shortest dimension through a circular hole in the electrode. The beam, after passing through a brass tube of about 1.25 cm. inside diameter and 5 cm. long which is closed on both ends by very thin celluloid films,<sup>2</sup> strikes a mica vane 1.5 cm. square. The crystal, tube and vane are all enclosed in a brass box, the inside of which is lined with wool. A dry mixture of air and CO<sub>2</sub> flows continuously through the tube. By means of a glass bulb of volume about 250 cc., through which the mixture passes before entering the tube, a sample of it can be taken.