3685

Self Differentiation of Intestine in Larvae of Sand Urchin, Dendraster Eccentricus.

A. R. MOORE.

From the Hopkins Marine Station of Stanford University, Pacific Grove, Calif.

Exogastrulae formed spontaneously, or induced by means of Herbst's lithium chloride method, develop into otherwise normal plutei. In such plutei the everted gut is differentiated clearly into intestine, stomach and oesophagus. On the free end of the oesophagus a tuft of amoeboid endoderm forms, which has adhesive properties. If the amoeboid endodermal tufts of two individuals meet they coalesce, and the walls of the two oesophageal tubes fuse so as to form a continuous tube between the two animals. This result suggests that normally the attachment of the oesophagus to the stomodeum is accomplished by a similar mechanism. In the exogastrulae the gut grows out from the anal surface of the animal at an angle, the mirror image of which (as is the case in the normal animal) would bring the end of the structure in close proximity to the stomodeum. The fact that differentiation takes place in the case of the everted gut outside the animal, removed from the influence of other tissues, except at the point of attachment, suggests that differentiation is not a result of interaction of tissues, but that it is predetermined in the primitive cells. Whether this view is correct was tested by means of microdissections.

Larvae in the gastrula stage were cut in two at various levels, across the longitudinal axis. The parts were separated, and each set aside in a watch glass to develop. Some of the diagonal cuts resulted in one-armed plutei, showing that the pattern already had been laid down in the cells of the gastrula. In some cases just enough material was contained in the vegetal piece for the formation of alimentary tissue. Such pieces showed differentiation into stomach, oesophagus and amoeboid endoderm. The oesophagus in such cases was round and not cylindrical, as in the normal. This result suggests that attachment to the more rigid skeletal structure is necessary for the proper tensions in the growing alimentary tract. The experiments prove that in the gastrula stage, approximately the vegetal third of the larva contains the elements for self differentiation of the gut.