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Autor: Løvtrup, Søren

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or two molecules of any enzyme was present, and thus the question remained unsettled. There is, in my opinion, a shortcut to the solution of the problem, i.e., the logical approach. I presume that, in contrast to opinions held in earlier times, nobody maintains today that the embryo is preformed in the egg, ready to develop by what may be called a growth process. In other words, none of the morphological entities, liver, brain ... etc. are present, only the genetical information required for the establishment of these structures, if and when the developmental processes proceed according to a certain, causally determined spatio-temporal pattern. However, if the various organs are absent it would seem an obvious inference that no organ-specific proteins can occur, since the synthesis of these compounds must depend upon the activity of the respective differentiated cells.

A particularly complex situation arises if it is contended that organ-specific proteins are present and that they, in order to exert their (determinative?) function must become distributed in the embryo in accordance with the organ and tissue differentiation. This mechanism would seem to imply that the substances be distributed according to a very intricate pattern already in the unfertilized egg. It is very difficult to see how such a requirement be reconcilable with various results obtained in experimental embryology, e.g. by the rotation experiments of ANCEL and VINTEMBERGER (1948). Anyhow, enzyme molecules are not self-reproducing units; what is required for synthesis is not an enzyme prototype, but the code which is present in the nucleus of any cell.

The question of epigenesis-preformism may also be approached from the phylogenetic point of view. According to this way of thinking the unfertilized egg, in spite of its higly complex organization in certain respects, must represent the archaic cell type, on the basis of whose properties all later development rests. It follows that this cell can contain only such substances as are typical for this stage of development, any enzyme or other protein which is characteristic for cell types derived from the original one by differentiation cannot be present, even though, of course, the template for their formation is present in the genome.

Acknowledgement.—The appearance of the present work owes much to Dr. TRYGGVE GUSTAFSON, my friend. Not only has his own contributions to many different aspects of the research on sea urchin embryology captured my fascination many years ago, but it has been strengthened during many stimulating and instructive discussions.

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