Hans Adolf Eduard Driesch (1867-1941) [1]

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Although educated as a scientist who studied with both August Weismann [4] and Ernst Heinrich Haeckel, Hans Adolf Eduard Driesch was first employed as a professor of philosophy and became a strong proponent of vitalism [5]. Driesch was born on 28 October 1867, the only child of Josefine Raudenkolb and Paul Driesch. He grew up in a wealthy merchant family in Hamburg, Germany, where he was educated at the humanistic Gymnasium Gelehrtenschule des Johanneums that had been founded by a friend of Martin Luther. In 1886 he spent two summers studying with Weismann at the University of Freiburg [6] and then entered the University of Jena [7], where he received his doctorate in 1889 with a study of hydroid colonies. By 1890 Driesch had lost interest in Haeckel?s popular phylogenetic approach to zoology and instead focused on experimental embryology [8].

In 1891 Driesch performed an important experiment: the separation of developing sea urchinblastomeres. He discovered that if the sea urchin [9] blastomeres were separated at the 2?cell stage, two complete but smaller than normal sea urchins would develop. This suggested that the fate of each cell is not already fixed at the 2?cell stage, as Wilhelm Roux [10] had suggested, and that the fate of a cell is determined by its relationship to the whole. Driesch began a series of important papers addressing the experimental results and interpretations, *Entwicklungsmechanische Studien*.

These results and interpretations contrasted sharply with results obtained by Wilhelm Roux [10] in his 1888 study of the two-cell frog [11] egg [12]. Roux observed that if one cell is destroyed at the 2?cell stage, the remaining cell will develop to form a half?embryo. Roux theorized that development was mosaic; each cell was determined by the two-cell stage, as each cell division results in an unequal distribution of cellular material. Driesch disagreed, suggesting that development must involve the power to regulate in response to changing environmental conditions.

Driesch continued to work with sea urchins, shaking them in calcium-free sea water to separate them at later developmental stages [13]. He also fused two sea urchin [9] embryos at the blastula [14] stage to produce a single giant larva. His work was not limited to sea urchins, but also included experiments on eggs of other invertebrates and especially echinoderms, ctenophores (with T.H. Morgan), and ascidians [15]. He studied regeneration extensively in hydra [16] and ascidians [15], with results that later informed Driesch?s philosophical work. In 1907 and 1908 Driesch was invited to give the Gifford lectures in natural theology at the University of Aberdeen, wherein he summarized his experiments and philosophical conclusions, published in 1908, as *Science and Philosophy of the Organism* *[17]*. Driesch carried out his embryological work as an independent scholar. He had sufficient income to avoid the trouble of navigating the German academic hierarchy and instead traveled extensively, often with his good friend Curt Herbst [18] whom he had met in Jena in 1887. He married Margarete Reifferscheidt on 23 May 1899 and had two children who later became musicians, Kurt and Ingeborg.

Although not habilitated until 20 years after receiving his doctorate, Driesch made many valuable contributions to experimental embryology [8], mostly carried out at the Stazione Zoologica [19] in Naples, Italy. Driesch performed his last experiments in 1909, the same year he obtained a faculty appointment in natural philosophy on the Faculty of Natural Sciences of Heidelberg. As a philosopher he was broadly interested in the concepts of organic form and wholeness, the mind-body problem, logic, and metaphysics, where he was strongly influenced by Kant. He also became interested in parapsychology, but when he applied to investigate psychic research further in Oslo in 1935, the Nazis denied his passport and he did not pursue that work further.

Driesch?s elegant embryological research not only challenged existing theories but succeeded in making great, long-lasting contributions to both embryological thought and practice.

Sources

1. Oppenheimer, Jane. *Dictionary of Scientific Biography* 4: 186?89.

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