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ON EGG-STRUCTURE AND HEREDITY OF INSTINCTS.

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THE instinctive actions of animals are hereditary, and can only be transmitted through the sexual cells. The problem of heredity from the physiological standpoint is, in brief, as follows: How can an egg, a simple vesicle filled with a viscous liquid which contains some solid consituents, be the bearer of such complicated mechanisms as the hereditary instincts? Two views are possible *a priori*: either the simplicity and homogeneity of the egg is only an illusion, and in reality it contains an invisible mysterious structure, of a similiar degree of complexity to the adult animal; or the complicated mechanism of the instincts is the result of very simple circumstances which do not require any complicated structure for their transmission through the egg. All other possible suppositions are only compromises between the two possibilties. We shall here briefly present an argument in favor of the latter solution, which, we hope, will do away with some of the mystic aspects of heredity, and render a number of very complicated, albeit ingenious, theories redundant.

I.

The first view, which has been of late very ably expounded to the readers of *The Monist*, is held, among others, by Nageli and Weismann; not so much, however, for the sake of accounting for the heredity of instincts as for the explanation of the continuity of the forms in general. As the mysterious egg-structure which this theory presupposes is admittedly invisible, it is impossible to prove its non-existence. To the second view we are necessarily led when we attempt to analyse the instincts into their elements, which will deprive them of much that seemed very mysterious before. A few salient examples will be sufficient to throw a new light on the subject.

1. The larvæ of a certain butterfly (*Porthesia chrysorrhea*) hatch in Germany in the fall and hibernate in large numbers in a web on trees and shrubs. The warm spring sun drives the larvæ out of their nest, and they creep upward on the branches of the tree until they reach the highest points, where they find in the young buds their first food. As soon as they have eaten, they creep down on the branches until they find new buds or leaves which in the meantime have appeared in abundance. It