ON GERMINAL SELECTION AS A SOURCE OF DEFINITE VARIATION

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649346301

On Germinal Selection as a Source of Definite Variation by August Weismann

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

www.triestepublishing.com

AUGUST WEISMANN

ON GERMINAL SELECTION AS A SOURCE OF DEFINITE VARIATION

Trieste

ON GERMINAL SELECTION

ON

GERMINAL SELECTION

AS A

SOURCE OF DEFINITE VARIATION

BY

AUGUST WEISMANN

CHICAGO
THE OPEN COURT PUBLISHING COMPANY
(LONDON: 17 Johnson's Court, Fleet St., E. C.)
1896

PREFACE.

THE present paper was read in the first general meeting of the International Congress of Zoologists at Leyden on September 16, 1895. Several points, which for reasons of brevity were omitted when the paper was read, have been re-embodied in the text, and an Appendix has been added where a number of topics receive fuller treatment than could well be accorded to them in a lecture. The address was first printed in *The Monist* for January 1896, and afterwards in a German pamphlet.

The basal idea of the essay—the existence of Germinal Selection—was propounded by me some time since[1], but it is here for the first time fully set forth and tentatively shown to be the necessary complement of the process of selection. Knowing this factor, we remove, it seems to me, the patent contradiction of the assumption that the general fitness of organisms, or the adaptations *necessary* to their existence, are produced by *accidental* variations—a contradiction which formed a serious stumbling-block to the theory of selection. Though still assuming that the *primary* variations are "accidental," I yet hope to have demonstrated that an interior mechan-

[1] *Neue Gedanken zur Vererbungsfrage, eine Antwort an Herbert Spencer*. Jena. 1895.

ism exists which compels them to go on increasing in a definite direction, the moment selection intervenes. *Definitely directed variation exists*, but not predestined variation, running on independently of the life-conditions of the organism, as Naegeli, to mention the most extreme advocate of this doctrine, has assumed; on the contrary, the variation is such as is elicited and controlled by those conditions themselves, though indirectly.

In basing my proof of the doctrine of Germinal Selection on the fundamental conceptions of my theory of heredity, a few words of justification are necessary, owing to the fact that the last-mentioned theory has been widely and severely assailed since its first emergence into light and even repudiated as absolutely futile and erroneous.

In the first place, many critics have characterised it as a "pure creation of imagination." And to a certain extent it is such, as every theory is. But is it on that account necessarily wrong? Can not its fundamental ideas still be quite correct, and consequently itself perfectly justified as a means of further progress?

Surely my critics cannot be ignorant of the prominent part which imagination has recently played in the exactest of all natural sciences—physics? Are they unaware that the English physicist Maxwell "constructed from liquid vortices and friction-pulleys enclosed in cells with elastic walls, a wonderful mechanism, which served as a mechanical model for electro-magnetism"?[1] He hoped "that further research in the domain of theoretical electricity would be promoted rather than hindered

[1] See Boltzmann, *Methoden der theor. Physik*, Munich, 1892. (In the catalogue of the mathematical exhibit.)

by such mechanical fictions." And so it actually happened, for Maxwell found by means of them "the very equations, whose singular and almost incomprehensible power Hertz has so beautifully portrayed in his lecture on the relations between light and electricity." "Maxwell's formulæ were the direct outcome of his mechanical models." "These ideal mechanisms"—so relates Boltzmann in the same interesting essay—"were at first widely ridiculed, but gradually the new ideas worked their way into all fields. They were themselves more convenient than the old hypotheses. For the latter could be maintained only in the event of everything proceeding smoothly; whereas now little inconsistencies were fraught with no peril, for no one can take amiss a slight hitch in a mere analogy.—Ultimately Maxwell's ideas were philosophically generalised as the theory that all knowledge consists of the disclosure of analogies."

But not only does it seem that there is little appreciation among biologists for the scientific import of imagination, they also appear to have little sense for the significance of theory. It is a favorite attitude nowadays to look upon theory as a sort of superfluous ballast, as a worthless survival from the epoch of decrepit "nature-philosophies." People pronounce with pride the miscomprehended utterance of Newton, *Hypotheses non fingo*, and place the value of the slightest new fact infinitely higher than that of "the most beautiful theory."[1] And

[1] Of late this saying of Newton's is frequently quoted as if Newton were a downright contemner of scientific hypotheses. But if we read the passage in question in its original context, we shall discover that his renunciation of hypotheses referred solely to a definite case, viz., to that of universal gravitation, of whose character Newton could form no conception and hence was unwilling to construct hypotheses concerning it. Indeed, such a wholesale repudiation of hypotheses is

yet theory originally fashions science out of facts and is the indispensable precondition of every important scientific advance.

Heinrich Hertz,[1] the discoverer of electric undulations, had the same thought in mind when he said: "We form inward simulacra or symbols of outward objects, the construction being such that the results that follow logically and necessarily from the symbols are in turn always symbols of the results flowing naturally and necessarily from the objects." "The symbols or mental images are fashioned after familiar objects possessed of familiar properties and so constituted that from their motions result effects similar to the ones which we observe in the objects to be explained. Experience teaches us that the requirements here made can be fulfilled and that consequently such 'correspondences' between reality and the supposed images [or, as Hertz says, between nature and mind] actually exist. Having succeeded in extracting from the accumulated experience of the past, representative images or pictures fulfilling all these necessary requirements, we can then reproduce by them, as we should by models, in a short space of time, results that in the outward world require a long space of time for their realisation or can be produced only as the consequence of our personal intervention," etc.

Such representative models, or pictures, now, in my theory of heredity, are the *determinants*, which may be

---

antecedently incredible on the part of the inventor of the emission-theory of light, in which, to speak of only one daring conjecture, "fits" were ascribed to the luminous particles. Compare Newton, *Philosophiæ Naturalis Principia Mathematica*, second edition, 1714, page 484.

[1] H. Hertz, *Die Principien der Mechanik*.