

purpose? Or would the most ›orthodox‹-antivitalist accept as adequate or satisfactory an explanation on purely physico-chemical lines?

Seeing, then, that to explain machines we must invoke the foresight and future purpose of living beings, the loyal acceptance of the mechanical explanation of life demands the admission of the validity of PALEY's ›watch and design‹ argument, and the trespass across the boundaries of Natural Science into the domains of Natural Religion.

Machines differ from the organisms that produce them in many points. No machine grows and retains its general character by interstitial assimilation. No machine divides into smaller machines similar to itself, or produces such by abstriction of its parts; no machine can become by differentiation a yet more complex machine. As a sequence of moderate strain or fatigue it does not grow stronger or more efficient: it cannot repair external damage, nor replace parts removed.

The organism is everywhere greedy of matter and of energy, increasing the amount of both in its aggregations: in the accumulation of bound energy organic growth is the very opposite of crystallisation to which it has been compared. Of growth, strengthening, repair, and regeneration, I need not speak in the pages of this Archiv.

The chemical explanation of protoplasmic life anticipated by HAECKEL some thirty years ago is as remote as ever. He sought especially for it in the growth of the science of colloids; our knowledge of colloids has been largely increased, and so has that of protoplasm. We know now that protoplasm is in no sense a unitary chemical substance, crystalloid or colloid; consequently it can have no chemical molecule, from the properties of which to deduce the necessary behaviour of the cell or the organism.

During the last half century or so the terms ›Force‹, ›Energy‹ have received precise definitions from the physicists, and can no longer be used in the vague way that previously justified the biologist in speaking of ›Vital Force‹, ›Vital Energy‹. The retention of these terms by biologists after their broader meanings had become obsolete and proscribed elsewhere in science did much to prejudice the educated against vitalistic ideas. Even the term ›Vital Arrangement‹ supposes that the characters of living beings are purely due to their physical configuration — which we do not know. But we have a right to speak of that ›Vital Behaviour‹ which distinguishes living organisms from machines, which are their creation, and still more from Things-at-large.

Marcus Hartog.

Prof. MARCUS HARTOG, Cork, ›The Transmission of acquired Characters‹. (›Contemporary Review‹, September, 1908.)

This article deals with the repeated assertions of one school of English biologists, headed by Dr. ALFRED RUSSEL WALLACE, to the effect that 1) there is no valid argument for Lamarckian transmission; 2) that ›almost all the chief biological thinkers and workers‹ reject the Lamarckian factor in heredity.

An ›acquired character‹ is defined as a change in the character of an organism, anatomical, physiological or pathological, determined by environment; and usually a character that will make it more efficient. Thus wounds and mutilations are not acquired characters, but the capacity to heal and to regenerate may be.

The a priori objection to the absence of demonstrable means for transmission from soma to stirp or germ, and so to the offspring, is not a final objection: it assumes that no mechanism can exist that escapes our knowledge.

Instances of Lamarckian transmission are cited in Protista including Fungi, Metazoa, and Metaphytes. The only explanation of the migration of the central nervous system in ontogeny is based on Lamarckian transmission, and the same applies to many anatomical characters, such as joints formed in utero, and to the widening of the female pelvis before puberty. The full argument is almost syllogistic. The Lamarckian factor is demonstrable in Protista, where the mechanism is easily explicable. It constitutes such a valuable asset for evolution that it could not be eliminated by Natural Selection unless it were inconsistent with the complex multicellular structure of Higher Organisms. Since its operation has been demonstrated in a certain number of cases among these, its existence is not incompatible with their structure. Therefore it is probably a wide-spread factor of heredity among Higher Organisms.

The alleged consensus of opinion among biologists of mark is an optimistic assertion, which does not conform to the facts. CHARLES and FRANCIS DARWIN, ROMANES, HAECKEL, GOEBEL, OSCAR HERTWIG, DELAGE, LE DANTEC, HENRY F. OSBORN are biologists of the highest rank who accept the Lamarckian factor. I may add here that in citing these names I did not suggest that their authority should induce anyone to accept Lamarckian views; but to show the absence of any such consensus of authority as has been paraded by the English Anti-Lamarckians in articles professing to enlighten the public, and in what professes to be expert evidence before a Royal Commission.

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