ON THE

ORIGIN OF GENERA.

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From the Proceedings of the Academy of Natural Sciences of Philadelphia, Oct., 1868.

PHILADELPHIA:
MERRIHEW & SON, PRINTERS,
243 Arch Street.
1869.

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Introduction.—The present fragmentary essay is a portion of what other occupation has prevented the author from completing. It does not therefore amount to a complete demonstration of the points in question, but it is hoped that it may aid some in a classification of facts with a reference to their signification. When all the vast array of facts in possession of the many more learned than the writer, are so arranged, a *demonstration* of the origin of species may be looked for somewhere in the direction here attempted to be followed.

Conclusions of any kind will scarcely be reached, either by anatomists who neglect specific and generic characters, or secondly by systematists who in like manner neglect internal structure. Such will never perceive the system of nature.*

Analysis of the subject.

I. Relations of allied genera.

First; in adult age.

Second; in relation to their development.

α. On exact parallelism.

β. On inexact or remote parallelism.

γ. On parallelism in higher groups.

δ. On the extent of parallelisms.

II. Of retardation and acceleration in generic characters.

First; metamorphoses in adult age.

α. The developmental relations of generic and specific characters.

β. Probable cases of transition.

γ. Ascertained cases of transition.

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* It might seem incredible that either class should systematize with confidence, yet a justly esteemed author writes even at the present day, "However, there is scarcely a systematist of the present day who does not pay more or less attention to *anatomical* characters, in establishing the higher groups!" (The italics are our own.) As though a system was of any value which is not based on the *whole structure*, and as though *lower* groups were only visible in external characters: in a word, as though external (muco-dermal, dental, etc.) characters were not "anatomical!"

Second; earlier metamorphoses.

δ. The origin of inexact parallelisms.

III. Relations of higher groups.

α. Of homologous groups.

β. Of heterology.

γ. Of mimetic analogy.

IV. Of natural selection.

α. As affecting class and ordinal characters.

β. As affecting family characters.

γ. As affecting generic characters.

δ. As affecting specific characters.

ε. On metaphysical species.

V. Of epochal relations.

The laws which have regulated the successive creation of organic beings will be found to be of two kinds, as it appears to the writer. The first, that which has impelled matter to produce numberless ultimate types from common origins; second, that which expresses the mode or manner in which this first law has executed its course, from its commencement to its determined end, in the many cases before us.

That a descent, with modifications, has progressed from the beginning of the creation, is exceedingly probable. The best enumerations of facts and arguments in its favor are those of Darwin, as given in his various important works, The Origin of Species, etc. There are, however, some views respecting the laws of development on which he does not dwell, and which it is proposed here to point out.*

In the first place, it is an undoubted fact that the origin of genera is a more distinct subject from the origin of species than has been supposed.

A descent with modification involves continuous series of organic types through one or many geologic ages, and the co-existence of such parts of such various series at one time as the law of mutual adaptation may permit.

These series, as now found, are of two kinds; the uninterrupted line of specific, and the same uninterrupted line of generic characters. These are independent of each other, and have not, it appears to the writer, been developed pari passu. As a general law it is proposed to render highly probable that the same specific form has existed through a succession of genera, and perhaps in different epochs of geologic time.

With regard to the first law of development, as above proposed, no one has found means of discovering it, and perhaps no one ever will. It would answer such questions as this. What necessary coincidence of forces has

resulted in the terminus of the series of fishes in the perches as its most specialized extreme; or, of the Batrachia, in the fresh-water frogs, as its ultimum; or, of the thrushes, among birds, as their highest extreme: in a word, what necessity resulted in man as the crown of the Mammalian series, instead of some other organic type? Our only answer and law for these questions must be, the will of the Creator.

The second law, of modes and means, has been represented to be that of natural selection by Darwin. This is, in brief, that the will of the animal, applied to its body, in the search for means of subsistence and protection from injuries, gradually produces those features which are evidently adaptive in their nature. That, in addition, a disposition to a general variation on the part of *species* has been met by the greater or less adaptation of the results of such variation to the varying necessities of their respective situations. That the result of such conflict has been the extinction of those types that are not adapted to their immediate or changed conditions, and the preservation of those that are.

In determining those characters of plants and animals, which constitute them what they are, we have, among others of higher import, those which constitute them species and those which constitute them genera. What we propose is: that of the latter, comparatively very few in the whole range of animals and plants are *adaptations* to external needs or forces,—and of the former a large proportion are of the same kind. How then could they owe their existence to a process regulated by adaptation?

Darwin is aware of these facts to some degree, but, as already said, he does not dwell on them. Where he does, he does not attempt to account for them on the principle of natural selection.

There are, it appears to us, two laws of means and modes of development. I. The law of acceleration and retardation. II. The law of natural selection.

It is my purpose to show that these propositions are distinct, and not one a part of the other: in brief, that while natural selection operates by the "preservation of the fittest," retardation and acceleration act without any reference to "fitness" at all; that instead of being controlled by fitness, it is the controller of fitness. Perhaps all the characteristics supposed to mark generalized groups from genera up (excepting, perhaps, families), to have been evolved under the first mode, combined with some intervention of the second, and that specific characters or *species* have been evolved by a combination of a lesser degree of the first with a greater degree of the second mode.

I propose to bring forward some facts and propositions in the present essay illustrative of the first mode.