

HEREDITY.

By J. T. SEARCY, M. D.,

Tuscaloosa, Ala.

Heredity may be said to be the continuous transition of habits-of-action along the line-of-descent.

I use the word *transition*, instead of *transmission*, to emphasize the fact that the process is a continuous *going-over*, or *going-along* of action, instead of a sending-over; that there is no interruption of the process at the passing from one generation into the next; that there is a perfect continuity of living material through all the generations from the beginning to the present; that this line of living material is not interrupted at all at the point when it takes or assumes the single cell stage; that the morphologic and physiologic activities it exhibits are possessed by the whole line-of-descent, modified, it may be, in the length of its life in those stages that we call the generations.

The line-of-descent, the phylum, is a continuous line of living material all along its length through the succeeding generations, endowed with certain habits-of-action that it inherently possesses, not to discuss how they started or were acquired; the microscopic genetic cell possesses these properties, or habits, when it connects the generations, as much as the adults on either side of it.

These habits-of-action, we may say, vary from time to time; they are not fixed and stable; they are morphologic, by which we mean they are shape-taking, and correspondingly physiologic or function-showing, by the individual himself, taken as a whole, and by the different organs and parts of his body, severally.

The habits-of-action of this long continuity of living material, the phylum, make it assume or render it capable of assuming morphologically in its succeeding stages, which we call the

generations, a certain definite form for each of its organs or parts, and for its whole, which are peculiar to that line, or phylum, and to a number of similar lines, or phyla, which collectively we call the species. In a certain sense there is a constancy in these transition modes-of-action, which is so constant that it leads us to expect always that there will be a more or less exact repetition of the modes it exhibited in the preceding generations; that like will follow like, "beget like." At the same time, if we understand and appreciate the full significance of the adjustability of the phylum through its generations to a varying environment, we know that the morphology and physiology are not altogether constant to previous type.

As soon as the phylum starts out from its genetic cell stage, it does so by proliferating into other cells which, in separate colonies, aggregate themselves according to phylal habits-of-life, into the several parts, structures and organs, which compose the whole-man—each structure or organ has, in its aggregate capacity, a function, relating to the preservation or living continuance of the whole-man; still each cell in each organ or structure preserves in considerable degree its individuality.

There is a property, which belongs to all living things, and, in different degrees, distinguishes them from things non-living; it is sentiency. This, however, is only one such property; there are self-adjustability, and the faculty of exertion for its own preservation, together with other properties or capacities for action possessed by living things, which indicate that they are living. As a result of or concomitant to sentiency we witness volition or voluntary motion; this is a property of living or sentient beings.

The individual cells, each in its own environment in the body of man, possess this property of volition, or voluntary motion. There is every grade of it, from the imperceptible capacity of the cells of the cuticle of the skin, to the highly volitional cells of the cerebral cortex. In their aggregates in the several structures and organs there are different kinds and grades of organic sentiency and self-motion in the performance of their functions; so that throughout the whole man there is every kind and grade of capacity of this kind, of the organs, ranging from that where it is hardly perceptible to the highest consciousness of the cortex.

Functional work everywhere depends upon this property. The internal equilibration of the body depends upon it. Indeed, we may well divide the functions of the nervous system into those of the lower brain and cord that relate to the equilibration of the organs within the body to each other, and those of the high-brain that relate to the equilibration of the whole man to his environment; or to the equilibration of his environment. Grades of structure pervade the man throughout, differing in the possession and exhibition of such properties. There is every conceivable grade of structure endowed with habits-of-action, that relate directly and indirectly to the living continuance of the individual and of his phylum; graded in their degrees of sentiency, of volition, etc. Not only the amoeboid movements of the blood-cells show it as they independently move and act in that fluid, but those cells, also, fixed in the structures of the organs. They volitionally appreciate and appropriate food, or decline it, and adjust themselves to the cells around them and to the impulses brought to them through the nerve-lines from distant parts. The living-motions that occur everywhere throughout the body, nutritious, morphologic and physiologic, are, in different grades according to the structure, sentient and volitional. Capacity for this kind of action determines largely the living continuance of the cells of the structures and of the whole-man. Strength and capacity of his cellular system and of his cellular brain largely determine the living continuance of the person.

These habits-of-action, capacities and capabilities, of the whole-man are in much the larger part the possessions of the phylum, or coalesced phyla, of which he in his time and generation is the exhibit; not to forget the fact, however, that they are not stable and fixed by any means, but vary themselves and are varied in the length of time. Indeed, the instability of human capacities, of all kinds, is one of the most interesting of studies.

The fact that man is sexed tends, in tracing the transition of abilities and disabilities through succeeding generations, to complicate the already complex processes still further and render the tracing and explanation of variations more difficult.

When the human phylum is in the single-cell-stage it cannot

continue its living without coalescing with a similar cell from another parent. For this reason the doubling of ancestral lines in each antecedent generation, in making a genealogical tree to represent the heredity, multiplies the difficulty of saying whence certain traits of excellence or defectiveness have come.