segregation of one coulisse after another, and that these separated ranges subsided later to greater degrees. Some of the peaks have remained above the surface as the present 'high' islands, while others were more completely submerged to serve as the bases for the growth of corals and corallines."

Finally he states that so far as the distribution of the species and varieties of this genus throughout the island of Moorea is concerned, "the only tangible conclusion is that it is completely accounted for by local differentiation among the members of ancient stocks, more or less disseminated by their own unaided movements."

In the Galleria Antica e Moderna in Florence there is a tapestry representing God giving Adam supremacy over the animals, and the long winding procession of all animals known to the artist, which is passing before Adam, is led by a land snail. This artistic conception should form the frontispiece of any future volume which Professor Crampton may publish on the genus Partula, as indicating the important place occupied by this humble animal in the procession of the living.

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Morphologische Gesetzmässigkeiten der Evolution. By PROFESSOR DR. A. N. SEWERTZOFF. Gustav Fischer, Jena, 1931. xv, 372 pp., 21 diagrams, 131 figures. Gr. 8vo.

PROFESSOR SEWERTZOFF, in this work, brings to culmination the chief results of over forty years of study of the embryology and comparative anatomy of the vertebrates. It is, however, the immediate product of the new "Laboratory for Evolutionary Morphology of the Academy of Science of the U. S. S. R." where the author and his colleagues now continue their investigations.

The discussion centers about the evolutionary history of the lower vertebrates. An attempt is made to develop the course of phylogeny of the main groups from the facts of embryology, paleontology and comparative anatomy and with the aid of schematized, hypothetical "primitive" forms built up by combining the most general characters of existing types. Remarks are made concerning the morphological methods of phylogenetic investigation and monophyletic theory of evolution. Some of the author's previously published concepts—branchiomery, the theory of the roofing bones of the skull, the theory of the articulation of the lower jaws with the neurocranium—are elaborated. Also one notices some changes in the classification of the ganoid fishes and a criticism of Stensiö's views on the relationships of the Ostracoderms to the two modern groups of Cyclostomes. This first part of the work is intended as a basis for the subsequent section dealing with a chain of related morphological theories.

In this second part the author is concerned more with the courses than the causes of evolution. He seeks the cause of organic change in the changes of the environment and inclines to the Darwinian explanation without definitely committing himself. Believing that the whole course of evolution is an adaptive process he deals principally with structural adaptations—attempting to gain insight into the ways in which these manifest themselves, their various categories, their manner of origin in the embryo and their behavior in regressive or degenerative forms.

He seeks to develop what he calls the morphological laws of phylogenetic development, adopting a rigid system of classification of adaptations, structures and embryological processes together with elaborate definitions, and a brand new set of terms. He finds it desirable, for example, to segregate organs into two classes—those which are directly influenced by the environment and those which are not so influenced. Changes induced in the former may secondarily influence certain of the latter, these in turn may affect others functionally or topographically united to them. Upon this foundation are erected two general theories: (1) the morphobiological theory of the course of evolution, in which the general and special laws of phylogenesis are set forth, and (2) the theory of phylembryogenesis, which considers the time element in the development of phyletic changes in ontogeny.

It is believed that evolution "can only follow two chief directions—progressive (struggle for existence) and recessive (extinction)." The one is characterized by increase in number of individuals, increase in range of groups owing to crowding and subdivision of the larger groups into greater number of subgroups. The other path leads to smaller numbers, diminished range and reduction in subgroups.

It is further stated that four general methods of progressive evolution exist: (1) Morpho-physiological progression or altering of the entire construction of the form with general increased intensity of active functioning as in a bird compared with a reptile; (2) special adaptation of organs involving no general bodily change; (3) embryological change without change of adult structure, leading to increased capacity of the young to survive; (4) general morpho-physiological degradation in which some "passive organs" (*i.e.*, reproductive system) develop progressively and active organs are reduced.

There are again set down two groups of phylogenetic changes: (1) in which the function of the evolving organ is only quantitatively changed and

(2) in which a qualitative change takes place. In degeneration there may be "rudimentation" when the structure is not of use to the embryo and starts to disappear at the beginning of ontogeny, and "aphanisis," in which the structure develops normally in the embryo and disappears in the adult. Interesting examples of these categories are given, one being the dorsal vertebral musculature of the turtles, which develops to a certain period in the embryo and is later carried completely away, apparently by phagocytosis.

Again it is said that coordinations between organs or groups of organs which are changing in the course of phylogeny may be placed into two groups: (1) Morpho-physiological coordinations, in which each member of a network of parts is functionally necessary to the other, and (2) topographic coordinations, in which the organs are not united functionally. To the first group belong, for example, the central nervous system, the motor system and the skeletal muscles; to the second the brain, the roofing bones of the skull and the chondrocranium, all of which may change together owing to proximity.

Differing rates of development of various coordinated parts in the embryo lead to profound results in phylogeny. This brings the author to his theory of phylembryogenesis, which seeks to explain how and in what periods of embryonic life the changes come about that lead up to alterations in the organism. "It is usually considered that the phyletic changes begin with small, heritable variations (mutations). Our investigations bring us to the viewpoint of Fritz Muller that the phylogenetic changes in the developed organs are led up to through an alteration of the course of embryonic development of these organs.

The various modes of alteration of the ontogeny are: (1) new characters appearing at the end of ontogenesis (anaboly), in which case a true recapitulation or repetition is preserved, (2) a deviation at some intermediate stage in ontogeny resulting in recapitulation only of the earlier stages of the history, and (3) changes in the first period of ontology (archallaxis), where no traces of recapitulation can remain. A change in the tempo or rate of development of various parts gives acceleration or retardation. Such an effect can not be gained by "deviation" or "archallaxis."

Finally, it is noted that archallaxis is a method of development of entirely new structures, of rapid replacement of old organs and of rapid adaptation to new or rapidly changing environments. Anaboly is a method of accumulating small heritable variations, resulting perhaps in many diverse adaptations or in adaptations to slow changes of environment. Deviation is a process intermediate between these two extremes.

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SCIENTIFIC MEETINGS

THE COPENHAGEN MEETING OF THE SECOND INTERNATIONAL CONGRESS ON LIGHT

MODERN phototherapy had its beginning in Copenhagen in 1895 when Dr. Niels R. Finsen (1866–1904) demonstrated the curative effects of the ultra-violet rays from the carbon arc in healing a tuberculous skin disease called lupus. In the meantime the treatment of certain diseases by means of light rays has become world-wide.

It was therefore singularly fitting that after a lapse of almost four decades a recently established organization (Congrès International de la Lumière—biologique, physique, therapeutique) should hold its meeting in the city of the father of phototherapy and that this meeting was officered by members of the Finsen Institute; among others, including Doctors Axel Reyn, chief physician (president of the congress), Svend Lomholt, director of the laboratory, H. M. Hansen, professor of biophysics at the university, and A. Kissmeyer, the genial secretary of the second congress, through whose forethought and methodical arrangements everything pertaining to this congress functioned without a single interruption.

The purpose of the Second International Congress on Light, which met in Copenhagen on August 15 to 18, 1932, was for the presentation of reports and new data on all questions relating to biological and biophysical researches made in connection with light and the therapeutic uses of light. There was an attendance of some 300, representing 26 different countries.

The scope and the total amount of work presented at this meeting represent a long step in advance of the humble beginnings of the First International Congress (on "Actinology"), which met in Paris in July, 1929.

The Third International Congress on Light is scheduled to meet in Wiesbaden, Germany, in 1936. In view of the wide field of activities now laid out, it would appear that the next meeting of this congress may be expected to be distinguished from its