

glycogen, and a plant with its blanched starch-storing tissues, is striking in many ways. May not "migration," which plays so important a part in vegetable physiology, occur in the animal economy in reference to other substances besides fat?

IV. "On the Development of certain Infusoria." By J. SAMUELSON, Esq. Communicated by WILLIAM CROOKES, Esq. Received November 8, 1865.

(Abstract.)

The chief object of this paper is to account in some degree for the successive appearance, in organic infusions, of what seem to be distinct species of Protozoa rising in the developmental scale; but the author commences with some general remarks on the origin of these animalcules, and states, among other conclusions at which he has arrived, his disbelief in spontaneous generation as it is understood by Pouchet and his disciples.

Proceeding to the immediate purpose of the paper, the author first refers to the well-known fact, that when an infusion of decaying organic matter is exposed to the air, the types of Protozoa which first appear in it are the so-called Monads, and occasionally the particles of organized protoplasm known as *Amæbæ*, but that these in a few days in great part disappear, and are succeeded by ciliated infusoria, such as *Kolpoda*, *Cyclidium*, *Glaucoma*, and sometimes *Vorticella*—oftentimes followed in their turn by other types, as *Oxytrichum*, *Euplotes*, *Kerona*, &c. This phenomenon, he remarks, has been accounted for in different ways; but his own observations and experiments justify, in his opinion, the conclusion that the monadine form which first appears is the earlier or larval stage of at least one, if not more of the ciliated infusoria, into which it becomes metamorphosed in the progress of development. In the first place, he states that he and Dr. Balbiani have observed the regular occurrence of monads belonging to the species of *Cercomonas fusiformis* or *acuminata* of Dujardin, in pure distilled water which has been exposed some time to the atmosphere. These, or their zoospores, would seem to be wafted by the air along with particles of dust to which they cling. They readily appear when dust is sifted into distilled water, and in this way have been obtained from different localities at home, and, along with other forms, in dust shaken from rags imported from various distant parts of the world. An experiment is then related, conducted by the author during the hot weather of last summer, in which a comparison was made between the animalcules which made their appearance in a vessel of pure distilled water exposed to the air, and those successively appearing in distilled water to which extract of lettuce had been added. In both liquids *Cercomonades* speedily showed themselves; but whilst they remained unchanged in form in the pure water till near the end of the experiment (a period of about three weeks), they entirely disappeared from the lettuce-infusion in six or seven days, and were suc-

ceeded by ciliated infusoria. The fusiform body of the *Cercomonas* bears a long whip-like cilium at its anterior end, and a short hair-like caudal process at the opposite extremity. Now this characteristic figure was retained by the monads in the distilled water; they continued to grow larger during the progress of the observations, but without change of form; only, towards the end, some of them lost their caudal process, and fixed themselves by their anterior cilium, and others, retaining both appendages, became fixed by the caudal one as on a pedicle; finally, on exposure to undue heat and light, they shrank up, and then sometimes their soft substance was ejected from its enclosure and assumed the aspect and characters of an *Amæba*. On the other hand, the *Cercomonades* of the lettuce-infusion in a few days lost both appendages, and, changing their manner of swimming, began to move through the water like ordinary ciliated infusoria. Moreover a few days later these animalcules, on being fed with indigo, readily ingested it, whereas, although that substance was supplied freely to the *Cercomonades*, it was never observed within their bodies. Figures to illustrate these phenomena accompany the paper.

From these observations, the author infers that the *Cercomonades* are larvæ or earlier forms of the ciliated animalcules which succeed them; and he concludes his paper by remarking that, whilst he has confidence in the general accuracy of his observations, and in the views deduced from them, nevertheless, seeing the difficulties which attend such observations, and their consequent liability to error, he should be pleased were the same experiments repeated by others, in order to the confirmation or, if need be, the correction of his statements.

December 14, 1865.

Lieut.-General SABINE, President, in the Chair.

The following communications were read:—

- I. "Numerical Elements of Indian Meteorology.—Series III. Temperatures of the Atmosphere, and Isothermal Profiles of High Asia." By HERMANN DE SCHLAGINTWEIT, Sakünlünski, Ph.D., LL.D., Corr. Memb. Acad. Leop.-Carol., &c. Communicated by Lieut.-General SABINE, P.R.S. Received August 21, 1865.

The principal object of this paper was to trace the relation between the decrement of mean temperature and the increment of height above the level of the sea in different regions of High Asia, to connect the variations observed from the general mean of the whole (390 feet increase of height for a diminution of 1° F. in mean temperature) with the variations