

THE AXIAL ROTATION OF AQUATIC MICROORGANISMS AND ITS SIGNIFICANCE.

L. B. WALTON.

Some studies concerning the axial rotation of aquatic microorganisms occupying my attention during the last two years, have yielded results which it is believed are of decided importance in connection with the principles underlying evolution.

In general it may be stated that the positively phototactic free swimming forms of the northern hemisphere rotate clockwise, assuming the observer in front of the advancing organism, and the negatively phototactic forms counter-clockwise, while in the southern hemisphere there are reverse conditions. The apparent exceptions thus far noted have been found closely allied to northern forms and may have been introduced subsequent to the origin of the southern forms.

The evidence although far from complete is gradually accumulating that the characteristic is one which has been gradually impressed upon the organisms through the rotation of the earth and the apparent path of the sun from east to west. Any attempt to account for it on the basis of natural selection can scarcely gain credence. While the possible effects of the angular velocity of the earth or of certain electrical conditions may be considered, it does not seem that the result could in this way be explained. Experimental attempts to reverse or to diminish the rapidity of the rotation of the organisms have thus far failed.

The problem is an interesting one from the geophysical as well as the biological point of view, and many interesting principles come under consideration. Among these may be mentioned the Pendulation Theory, Bipolar Distribution, The Twining of Plants, The Tropism Theory, etc. Similarly the direction of the spirals in *Spirochaeta*, *Spirulina*, *Arthrospira*, *Spirogyra*, etc., are of interest.

Modern genetics throws light on the distribution but not on the origin of the character producing genes or factors. These units have in general long been in existence. It is to some such principle as the one suggested that we must look for evidence sufficiently definite to overcome the prejudice which has arisen against the old acquired character ideas as to the fundamental origin of characters.

There is need of studying, in this connection, the behavior of microorganisms near the equator as well as in the southern hemisphere, particularly in an experimental way, before definite conclusions may be drawn.

Kenyon College, Gambier, O., Oct. 15, 1917.
