

THE POWER OF MOVEMENT IN PLANTS.

This is a contribution to biological science, of a rather high order, published in the form of a popular treatise. It is an illustration, very marked of its kind, of the power of a high scientific reputation to carry a work before the general public, which published under any other authorship would find, no matter how great its scientific merit, only a comparatively limited circle of appreciative readers. The name of Darwin, which, as some one has lately said, is popularly attached to one-half of all science, and the theory of evolution, would almost make a memoir on a subject as abstruse as quaternions a popular work and a paying business investment for its publisher.

It is not meant by the above that the present volume is incomprehensible or uninteresting to at least the average student of natural science. It is one that every student in biology will do well to peruse, and it is well that the subject is introduced under such favorable auspices, as it will the more readily receive the attention it deserves. It is not an unattractive one; there are few observers of nature who have not wondered at and speculated upon the varied, and in some cases, extraordinary-appearing motions of vegetable organisms, such as the sleep of flowers and leaves, and the almost animal irritability of the sensitive plant. But some of the most universal and apparently commonplace phenomena of plant-life are, when we consider them, not less remarkable. In some of his former works Mr. Darwin has discussed the more obvious and striking peculiarities of climbing and insectivorous plants; in the present one he takes up and studies the less striking but not less wonderful phenomena of the movements of growth; how, from the buried seed the plant finds its way to the light and how the rootlet selects its downward route, the sleep of leaves, etc. He finds that the most widely prevalent movement, and one common to nearly all plants, is rotation of its growing tip to all points of the compass, and to this motion he gives the name circummutation. This is due, not to an alternating increased growth on the different sides of the plant, as was once supposed to be the case, but to an increased turgescence of cells on different sides of the tip successively, which is prior to and therefore independent of growth proper. Moreover, in cases of plants provided with pulvini, or little cushions of small cells that early cease to grow, this movement is kept up long after the growth of the plant has ceased. This motion of circummutation in all its phases and modifications covers a large part of the useful movements of plants, and is therefore essential to their existence. Among its modifications are included by Mr. Darwin the revolving mutation of the tendrils and tips of climbing plants, the nyctitropic or sleep movements of leaves and cotyledons, and the immense class of movements excited by light and gravitation. It is not a property of the aerial system alone; the tip of the rootlet or radicle possesses the same motion, and by it selects its passage through the more resistant materials through which it makes its downward progress. This tip of the radicle alone is sensitive to gravitation, and, being thus sensitive, it leads, so to speak, the root downward toward the centre of the earth. Circummutation is not in itself explained; the fact that it occurs and is essential to the life of the plant, and that its modifications account for the greater part of vegetable movements, is noted and closely followed out. These modifications themselves are not always explainable,—at least they are not explained in the present state of our knowledge. A few movements of plants are not apparently to be referred to modified circummutation, such, for example, as the movements of plants sensitive to contact on being touched, the curling of a tendril, etc. These, however, do not form so large and important a class as do the others, though they are not at all infrequent or unimportant.