

... will be disposed to concur.
In the production of "The Power of Movement
in Plants" (London: John Murray) Mr. Darwin
has had the assistance of his son, Mr. Francis
Darwin. Although it is not likely to achieve
anything approximating the popularity of "The
Origin of Species," no more extraordinary work is
associated with the name of the distinguished
advocate of the theory of descent. The attribution
of carnivorous powers to certain plants surprised
many people; but the discovery that all plants are
endowed with something analogous to the brain of
the lower animals will be still more startling.
Indeed, as a German feuilletonist puts it, just
as Mr. Darwin's earlier work tended to show
that the difference between man and the lower
animals is quantitative rather than qualitative,
so the present work seems to demonstrate
that the difference between the lower animals and
plants is also in all respects merely one of degree.
Plants are continually in motion, and some of their
movements are not only directed by something
situated only in a given part of the plant, but they
are varied in obedience to the law of self-preserva-

tion, they are independent of such outside influences as light and the attraction of gravity, and they are even exerted in opposition to those forces. These results have been arrived at by means of a surprising number of experiments, performed and described with a patience which will exhaust that of the great majority of readers. For the convenience of the latter, however, each chapter is interspersed with summaries of the observations, printed in larger type than the detailed portions, and the whole work is summed up in a concluding chapter written in Mr. Darwin's usually clear and interesting manner. The ordinary movements of plants were observed by means of plates of smoked glass on which the growing roots traced their own movements, and by means of light threads of glass fastened as indicating arms to the stems and leaves, and observed through plates of transparent glass. A dot was made on the latter opposite the ends of the pointers at intervals, and the dots were then connected by straight lines drawn from the first to the second, and so on. It was thus shown that every part of the plants, the roots, stems, twigs, and leaves, continually endeavoured to perform a gyratory movement, of which the drawings on the glass were diagrams magnified in proportion to the length of the indicators. These diagrams have been reproduced in the volume. The movement in question may be regarded as the fundamental movement, which is differentiated in various ways to serve the life of the plant. There are various special movements; some plants move towards the light, others away from it; there is apparently a mysterious response to the influence of gravitation, resulting in the roots and some stems turning towards the centre of the earth or from it as the case may be; other plants assume given positions with the approach of night, that is, they go to sleep, and they do this apparently by an inherited tendency irrespective of the presence or absence of light. Plants also assume various positions at right angles or otherwise to the rays of light. That these phenomena, though associated with outside influences, are apparently not mechanically dependent upon them, is a very important advance made by Mr. Darwin on the opinions previously held by students of botanical physiology. The most remarkable of all the experiments, however, were those made with the growing radicles of seedlings suspended over water inside glass vessels. The movements of these radicles were seen to be "determined by the tip." So long as the tip was preserved the radicle behaved, so to speak, in a rational manner; when the tip was removed it became the mere slave of mechanic forces until the tip had been reproduced. "If the tip be lightly pressed, or burnt, or cut, it transmits an influence to the upper adjoining part, causing it to bend away from the affected side; and what is still more surprising, the tip can distinguish between a slightly harder and a softer object by which it is simultaneously pressed on both sides." This was shown by fixing minute pieces of paper of different thicknesses on each side. But while the tip turns from an object, "if the radicle is pressed by a similar object a little above the tip the pressed part does not transmit any influence to the more distant parts, but bends abruptly towards the object," this bend being seemingly due merely to arrested growth on the side pressed. The tip of the radicle is alone sensible to the attraction of gravity, and hence, says Mr. Darwin, "gravity does not appear to act in a more direct manner upon a radicle than it does on any lowly organised animal, which moves away when it feels some weight or pressure." We have said enough to justify our statement about the remarkable character of this book, and must send our readers to its pages if they would have their incredulity removed.