the site, and this motion, known as circumvolition, goes on so long as the plant continues to grow. Mr. Darwin has found that this revolving motion, which is usually in an anticlockwise direction, is common to every growing part of every plant, although often on a small scale. He has observed that, as the next to the extremity of the lowest part, any growing point in a plant is, for some time at least, a little variable. All surrounding circumstances will allow of it. This is no more in evidence on the part of the author, but the result of actual observation of the different directions of growth in different plants, made with the aid of an ingenious registering apparatus, the numerous diagrams with which the book is furnished giving an idea of the part magnified tracings of the circumvolating movements actually observed. So general a phenomenon as this can hardly be supposed to have been noticed before, and yet Mr. Darwin concludes that it follows, in some unknown way, from the manner in which vegetable growth is affected. Time, however, is mainly important in supplying "a basis of ground-work for the arrangement, according to the requirements of the main points of division of the stems." It is a sort of raw material ready to be drawn upon at all times for any beneficial development or modification, just as the tendency to vary which exists in all living things, and in the origin of which is equally mysterious, has, according to the author's more famous theory, affected the common starting point for the evolution of new species.

The work is chiefly devoted to a study of the various modifications of this primitive revolving motion, which the struggle for existence among plants has been instrumental in producing. Among the most marvelous of these are the so-called sleep movements of plants. The leaves of many plants belonging to widely separate groups fold together upwards, and in some cases downwards, like the simple umbrella, in the evening, and expand again horizontally in the morning. The leaves thus avoid facing the sun and thereby obtain no heat—for they are always moving but without incident, thus this way protected from the chilling effects of nocturnal radiation. Neither is this a mere or trivial instance of Mr. Darwin having demonstrated the fact by forcibly bringing to the notice of an entire class of great naturalists the result being that they suffered much more from frost than did those leaves which were allowed to assume their vertical sleeping position. The fact is, however, that the facility of this movement was soon to become so far established, probably through inheritance, that the evening and morning positions were assumed for some time after they had been relegated to total darkness; in others, however, the want of the proper degree of illumination by day prevents the acquisition of this habit. That the various forms of so-called sleep movements are merely useful modifications of the original revolving motion is shown to all plants, is fairly borne out by the consideration, among others, that these sleeping leaves have no other movement than this, and therefore, if it is to be considered in the same class as the latter must be awakening, and this, as Mr. Darwin's researches have shown, "would be a most instructive study." The modifications of movements, also the results, according to the author, of modified circumvolating, are those excited in plants by light. To plants which live by day, the memory of the past is not important, and Mr. Darwin adduces abundant evidence of its marvelously attractive influence. Plants, in the absence of a lateral light, the few exceptions being unfined, by which because they are too simple to notice, the work is full of interest on the other hand, the tip of the stem being turned towards the light. Another instance of the importance of this leaves is placed in the best position for the attractive force, turned towards the light. Another instance of this is in the case of the twining plants, which, were they to be attracted strongly towards a side light, would suffer injury by the stronger force, and the tendrils would be twisted. Many experiments were made to test the degree of sensitiveness to light in plants, and with the result that a sleep movement, such as the seedlings of Phacelia, which had been raised in darkness, was placed in a completely dark room, at a distance of 12 feet from a


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