MINOR NOTICES.

Power of Movement in Plants. By Charles Darwin. [D. Appleton & Co. $2.00.]

This compact volume, of nearly six hundred pages, and two hundred figures and diagrams, is occupied in explaining and discussing an elaborate series of experiments, by its eminent author, upon the "Circumnutation of Plants." Circumnutation, as the term is used by the writer, means the rotary or revolving movement common to all tips of growing shoots and roots.

If we look, for instance, at a great acacia tree, we may feel assured that every one of the innumerable growing shoots is constantly describing small ellipses: as is each petiole, sub-petiole, and leaflet. The latter, as well as ordinary leaves, generally move up and down in nearly the same vertical plane, so that they describe very narrow ellipses. The flower-peduncles are likewise continually circumnutating. If we could look beneath the ground, and our eyes had the power of a microscope, we should see the tip of each rootlet endeavouring to sweep small ellipses or circles, as far as the pressure of the surrounding earth permitted. All this astonishing amount of movement has been going on year after year since the time when, as a seedling, the tree first emerged from the ground." (p. 558.)

The opening chapters of the book show how these gyratory movements in the tips of the germinating seedling enable the peduncle to bend upwards towards the light while the radicle turns downward, and works its way through the soil, its sensitive tip moving towards moisture and away from the light, and any obstructions that may lie in its path. Succeeding chapters are devoted to "modified circumnutation," as shown in the bending and climbing of plants, sleep of leaves, sensitiveness to light, gravitation, etc. It may be safely said that no more scientific or

exhaustive treatment of one of the great problems of plant life can be found, even in painstaking Germany. A convenient arrangement by which the experiments and more strictly technical portions are put in smaller type enables the general reader to gain a good view of this most interesting subject without laboring through a mass of details, valuable mainly to the specialist. For a trifle it would be pleasant to have Mr. Darwin show by what principle of "heredity" or "survival of the fittest" he persists everywhere in using *whilst* instead of *while*.