Insectivorous Plants.—Three ways are now recognized by which plants entrap insects. First, as in *Dionæa muscipula*, or Venus's fly-trap, where the two blades of the leaf close rapidly together, and the cilia upon the edges interlock so as to imprison any insect which may happen to be inside; second, as in different species of Drosera, where the leaves are covered with hairs, at whose tips is a sticky exudation by which insects are caught; third, as in different species of Utricularia, where the leaves are furnished with small bladders, into which small insects crawl, but are prevented from leaving by a peculiar arrangement of hairs around the orifice. In Dionæa there are three highly sensitive hairs in the centre of the two lateral portions of the upper-part leaf, and the closing of the leaf takes place when insects or foreign bodies come in contact with these hairs. In addition to the highly sensitive hairs just mentioned, there are also glands on the

upper surface of the leaf which secrete an acid juice by which the captured insects are digested. In Drosera, when any body has been caught by the sticky fluid at the end of a hair, an impulse is conveyed through the hair to those on other parts of the leaf, which causes them to bend over until they touch the object caught. They then secrete an acid juice by which it is digested. In Utricularia, the insects caught in the leaf-bladders slowly decompose. Darwin has made very careful investigations on the process of digestion in Drosera and Dionæa, and comes to the conclusion that the secreted fluid in both cases is closely allied to, if not identical with, the gastric juice. Although contact of almost any foreign body will cause, in one case, the hairs to bend over toward it, in the other the leaf itself to close suddenly, the digestive power of the secreted fluids in both cases is only capable of digesting nitrogenous substances. Salts of ammonia seem to have the greatest effect on the hairs of Drosera, and especially phosphate of ammonia, extremely minute quantities of which have a powerful effect. The leaves of both Drosera and Dionæa seem to be insensible to falling drops of rain and currents of air.

Since the appearance of Darwin's book on this subject, several observers, among whom is Professor Rees, have published results confirming Darwin's experiments with regard to *Drosera*, and Mr. Francis Darwin has published (*Quarterly Journal of Microscopical Science*, July, 1876) some details of the process to which his father applied the name of aggregation, in *Drosera rotundifolia.* With reference to the digestive powers of *Dionæa*, Dr. Fraustadt has made a careful study of the anatomy of its vegetative organs. The attention of botanists has more especially been turned of late to the digestive power of the *Sarraceniæ*, or pitcher-plants, concerning which an article appeared in *Harper's Magazine* from the pen of Mrs. Mary Treat. Mr. Burgess reported at a meeting of the Natural History Society in Boston that he had found that the lip of the leaf of *Sarracenia purpurea* secreted sugar. M. Casimir de Candolle, in a paper in the *Geneva Archives des Sciences Physiques et Naturelles*, doubts whether the animal matter caught by the leaves of *Dionæa* is utilized by them.

Mr. Darwin's new work on insectivorous plants has been a great success, 2250 copies of the English edition having been sold in a very short time. The most interesting and novel point which he brings out is the existence in *Drosera*, *Dionæa*, and some other plants which come under this designation, of an actual digestive fluid, which in the case of *Drosera* becomes acid only when the secreting glands are excited by the presence of nitrogenous matter, a substance being formed apparently closely analogous to the pepsin

contained in the gastric juice of animals. The excessively minute quantities of nitrogenous substance which cause inflection of a gland of *Drosera* are very astonishing—in the case of carbonate of ammonia about a twenty millionth of a grain.

A NEW WORK BY MR. DARWIN.

Mr. Darwin has lately published in England, under the title of "The Movements and Habits of Climbing Plants," a reprint of his paper on this subject printed some years ago in the Journal of the Linnæan Society of London, which first attracted public attention to the remarkable phenomena connected with the rotation of climbing stems and tendrils. A good deal of fresh matter is also inserted. Mr. Darwin's work on "Insectivorous Plants" has met with a large sale, being already in a third edition. Professor E. Morren, of Liege, has published in the *Bulletin de l'Académie Royale de Belgique* a record of a series of experiments which, while they abundantly confirm the insecticidal powers of the leaves of *Drosera* and *Pinguicula*, lead him to doubt the power of absorption and digestion assigned to them by Mr.

Darwin. MM. Reess and Will, on the other hand, in the *Botanische Zeitung*, abundantly confirm Mr. Darwin's results in the case of *Dionæa* and *Drosera*, as is also the case with two independent series of observations carried on in England by Dr. Lawson Tait and Mr. J. W. Clark. The former gentleman claims to have established the absorptive power of the leaves of *Drosera* by planting in perfectly pure silver sand plants from which the roots had been entirely removed, and feeding them with extract of beef and phosphate of ammonia; the latter by feeding the leaves with bodies of flies soaked in a solution of citrate of lithium, and then finding the lithium in other parts of the plant by means of the spectroscope.