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Literature.

The prompt mention in our list of "Books of the Week" will be considered by us an equivalent to their publishers for all volumes received. The interests of our readers will guide us in the selection of works for further notice.

INSECTIVOROUS PLANTS.*

When Mr. Darwin writes he is sure of readers. Those who agree with him turn with pleasure to his pages; those who regard him as an antagonist are anxious to know what new difficulties they have to overcome. What Mr. Darwin writes is sure to be new, and this commends his work to the general reader, who has no particular theories, but who wants to keep pace with the progressive discoveries of the day. Whatever may be said of Mr. Darwin's views, he is a true soldier of science. Few scientific men have drawn the concentrated fire of so many whom he might call enemies; but regardless of all he works away at his defenses, strengthening here and building there, as happy and unconcerned as a child in its summer play. This work is a model of patient, persevering industry, and we doubt whether anything equal to this labor has ever been made known to the scientific world.

The Drosera, or Sun Dew, is a peculiar genus of plants, comprising nearly one hundred species, which are pretty widely scattered over the world. Some are found in the Arctics, and others extend down through our continent toward the Tropics, and in various places throughout the four great quarters of the world. These plants are covered with hairs, surmounted by a gland which secretes a liquid, and from which the plant derives its popular name. Insects from a time back beyond the memory of man have been found adhering to this sticky secretion, and in this way met a miserable death. But the fact has always been passed over as one of the mysteries of Nature, for which there was no solution, and no further thought taken of it. Mr. Darwin, however, is a believer in the principle that all things have a special purpose, and that every act of a plant or animal is either for its own immediate good, the remains of some benefit in the past of which the habit without the results continue, or the development of some power which is to be of benefit in the near future. Thus, if he examines a man's face, he finds out that the eyes and nose and mouth and other organs are of immediate use to his existence; when he comes to his beard and whiskers, he concludes that they are the remains of the past, of no particular value now, but which in some especial way were essential in ages now long since gone. Fourteen years ago Mr. Darwin's attention was called to the insects caught by *Drosera rotundifolia*, an English species; and we can readily understand how it was that, with his views of the nature of things, he saw here a problem which it was probably in the power of man to solve. He at once set himself to work; and, after so long a task, this book is the result.

Mr. Darwin found that the hairs (he calls them tentacles) are sensitive to the touch, that the motion is from the outer edge of the leaf to the center or disk, and that when the tentacles are excited the edges of the leaf itself incurve, forming a shallow cup. When an insect is caught on the gland surmounting one of these tentacles an impulse is communicated down the tentacle, through the cellular matter of the leaf, to the other tentacles, and up them to the glands. These glands, which before secreted mere viscid liquid, now pour forth an acid similar to pepsin, which aids digestion in animals, and the tentacles themselves bend in and cover the prisoner and secretary powers of the glands, and found that whenever they were tempted into action by substances which they could not digest no change whatever took place in the tentacular cells; but in other cases they presented a wholly changed appearance. The uniformly homogeneous purple transparent fluid becomes broken up into aggregated masses of protoplasm, representing in their outlines forms as varied as the Amœba found in blood. This change was in all cases parallel with the vital power. In experiments with warm water, as the leaves approached the death temperature the influence of the choicest luxuries in the food line was less and less on the motion. The proof of actual absorption is clear, and Mr. Darwin found here the key to numerous other results following his observations, as well as on many other disputed or but half-conceded points in plant life. Thus it is clear from some of his experiments that the single cell is really the individual being. A plant is a sort of a republic, made up of various communities, in the shape of separate organs, and these communities formed of the individual cells, each of which has its own internal government. It is possible to destroy large numbers of these without materially affecting the general prosperity of the commonwealth. Again, he proves that, though digestion is similar in these plants and animals, and in many respects the action of various foods is the same, there are some remarkable divergencies. For instance, benzoic acid in the smallest quantity destroys the Drosera, while the poison of the cobra, so deadly dangerous to men, is rather relished as if it were holiday fare. Ammonia in its various forms is always welcome. In the form of a carbonate—about one part of carbonate of ammonia to one hundred and forty-five of water—it was often used by the author in his experiments. He was rather astonished that so small a quantity as the millionth part of a grain of phosphate of ammonia placed on a gland should produce tentacular inflection and protoplasmic disturbance. The mind of man can scarcely grasp this fact; yet, as Mr. Darwin suggests, the particles which give scent from a deer are so minute that an innumerable number of dogs could receive enough to lead to pursuit, even at long distances away. All these facts, and the book abounds with such, are mere incidents. The main point proved is that *Drosera rotundifolia* can make use of nitrogenous material absorbed through the glands of the leaves. The examination is then continued through allied plants, in the same genus, and in others, as the Dionœa, or "Venus Fly-trap," of North Carolina, Aldrovanda, of Australia, Drosophyllum, of Portugal, Roridula, of the Cape of Good Hope, and others. He finds in these reasons, to which no one will object, for the belief that, though the details of insect capture differ, the function in all is essentially the same. Utricularia has no secretory glands. It catches its prey by small bladdery traps, in which they remain till they disintegrate "of themselves," and the dissolved matter then appears to be absorbed by the plant.

The discoveries connected with these curious plants naturally suggested trials with others having viscid hairs, and he found that some Saxifrages, the Chinese Primrose, our common garden Geraniums, and some others clearly absorbed nitrogen in this way, and probably Tobacco and others did also. Mr. Darwin, of course, gives only his own direct experiments; yet he is generous in his references to Drs. Gray and Mellichamp and Mrs. Treat and Mr. Canby, as regards their labors in this

"acquired its highly-developed powers of movement" since it was evolved from some progenitor that had not these powers. He suggests that the power to absorb nitrogen from the atmosphere would be of great use to a plant which came to finding itself in very poor soil, and this power, being of great use, would consequently be developed; and those plants which developed the power the most rapidly would, according to the laws of natural selection, crowd out those which developed slowly. Then Mr. Darwin refers to the fact that Drosera and Pinguicula have very small roots in proportion to their parts above ground. In brief, it may be said that, from Mr. Darwin's view, these plants were crowded out of rich pastures by plants which had found some advantage which Drosera could not attain, and had to take refuge in poor soil, where the enemy could not follow. It was no use to send out roots in search of food where there was nothing to eat. They may not have had the power to do so, for all are not constructed alike. They had, however, the power of absorbing by the "primordial glandular hairs," and these by use became tentacles, as we find them. The whole argument depends on an undeveloped power being found useful. We must judge of the usefulness by the results. Mr. Darwin finds in the remarkable distribution of Drosera over the world a proof that it has had some advantages; but then the other genera have not. Pinguicula is by no means abundantly distributed, and all except Drosera are comparatively local; while Dionœa, confined to a very small spot near Wilmington, North Carolina, seems rather on the high road to extinction. Still Mr. Darwin might contend that they would have been long ago quite extinct but for the development of this peculiar power. It may be only this which has saved them so long. Again, it might be contended that the original of Drosera, if it had any original beyond itself, was an aquatic; and this might be built up on Mr. Darwin's statement that the Drosera roots now absorb water only—that it now lives solely on what it receives from its atmospheric structure. The water is hardly so crowded that the whole genus of Drosera—one hundred or more species—should be compelled to take to the half-dry land. All these and more objections will probably arise when the renewed controversy opens, as it doubtless will when the facts really discovered shall be applied to the doctrine of the "survival of the fittest," by foes as well as friends.

Aside from abstract questions like these, the practical value of Mr. Darwin's discoveries promises to be great to agriculture. There may be other ways and means by which the stems and leaves of plants can absorb ammonia, independently of glandular hairs or similar structures. A Lemna, that has no roots and a perfectly smooth surface, manages to live on the water as well as those which have roots; the Tobacco, which is a remarkably strong-rooting plant and requires, as every Connecticut farmer knows, a large amount of nitrogenous matter at the roots to do well yet, according to Mr. Darwin, is probably a leaf-absorber of atmospheric nitrogen as well; and the Tomato, covered as it is with such an immense quantity of viscid secretion, and yet catching no insects, may be feeding on the atmosphere, in order to achieve its enormous weight of fruit and foliage, as well as on the mass of stable-manure on which it so much delights.

These are among the possibilities of the future; and, whatever the result may be as

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