Science, Invention, Discovery.

AN INSECTIVOROUS PLANT.

THE fact that so distinguished a student and observer as Darwin has chosen as a title for his last work "Insectivorous Plants," and devoted long-continued and careful study to the subject, is sufficient evidence of its interest and significance. On several previous occasions, the attention of the reader has been directed to the peculiar structure and functions of these curious members of the vegetable kingdom, for as vegetables they are still regarded, though possibly more nearly allied to the animal than has yet been admitted. On returning to a consideration of this subject, we shall direct attention to a new member of this insect-capturing family, which, while differing in structure widely from those already described, seems to be in the possession of powers equally as potent and effective. To the observations of Mrs. Mary Treat, of Vineland, New Jersey, we are indebted for the first suggestions as to the peculiar functions of the bladders of the several *Utricularia*, though others, including Darwin himself, seem to have been simultaneously engaged in the same course of investigation. Mrs. Treat, under the title "Plants that eat Animals," republishes in the *American Naturalist* for December, 1875, a revised edition of an earlier communication on the same subject, which appeared in the *New York Tribune*. Subsequently, Mr. Darwin, in the work to which we have alluded, entered upon

an exhaustive review of the subject, and it is to the labors of these observers that we are indebted for the general facts herewith presented.

Under the familiar name of bladder-wort, the unprofessional reader will the more readily recognize the subject of these recent researches, and it is to one member of this family, the *Utricularia clandestina*, that Mrs. Treat devotes special attention. Some of these plants grow wholly or partially out of the water, though the species here mentioned is wholly immersed. Fig. 1 will serve to convey a just impression as to its form, natural size, and the number and location of the bladders, or insect-traps. It was formerly supposed that these bladders were intended to act merely as buoys to float the plant at the time of flowering; and so satisfied were the early botanists of this, that they failed to observe that often the stems most heavily laden with bladders sunk the lowest in the water. While studying these plants, and having submitted them to a microscopic examination, Mrs. Treat noticed animalcules, dead Entomostraca, etc., apparently imprisoned in the bladders. Observing, however, that the mouths to these bladders always seemed to be open, she failed at first to perceive that they partook in any way of the form of a trap.

Fig. 1.

Further observations, however, disclosed the presence within the walls of these cells

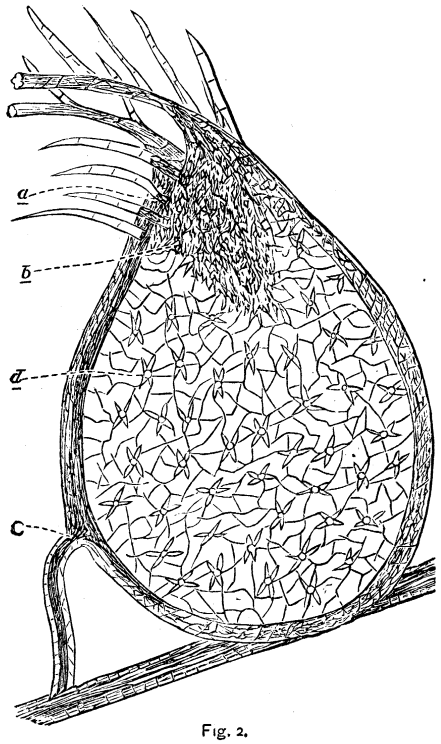

Fig. 2.

of larger animals, including the larvæ of certain aquatic insects, and it was only after observing the struggles and final death of one of these imprisoned larvæ that a definite course of experiment was determined upon. In order that this method of experiment and its results may be the better understood, we have taken the liberty to reproduce (Fig. 2) the magnified illustration of one of these bladders.

Having by frequent dissections determined the presence within the bladder of various minute insects and animalcules, including also Entomostraca — *Daphnia*, *Cyclops*, and *Cypris*—Mrs. Treat determined to detect, if possible, the *modus operandi* by which they were caught. Referring to the illustration, it will be observed that the entrance into the bladder, *a*, has the appearance of a tunnel-net open at the outer end, but closed below. What appears to be a net, however, is in fact merely a simple valve, opening inward and surrounded about its outer edge by a dense mass of hairs, which serve to impel the insect forward toward the opening. It is the construction of this valve, its peculiar sensitiveness to any pressure from without, and power to resist any force from within, that constitute the peculiar feature of the plant. In describing the *Utricularia neglecta*, one of the many kinds of bladder-wort, Mr. Darwin states that the valve which slopes into the cavity of the bladder is attached on all sides to it, excepting by its posterior margin, which is free and forms one side of the slit-like orifice leading into the bladder. This margin is sharp, thin, and smooth, and rests on the edge of a rim or collar, which dips deeply into the bladder; it is colorless, highly transparent, flexible, and elastic. In his special efforts to determine as to the peculiar fitness of this valve for the special purpose indicated, Mr. Darwin, with his usual ingenuity and thoroughness, instituted a series of experiments, of which the following may be described:

Observing how minute and weak were some of the animals which gained admittance to the bladder through this entrance, he determined to test the sensitiveness of the valve. In the first instance a thin human hair fixed to a handle, and cut off to project one-quarter of an inch, when pressed against the valve, caused it to open. On three other occasions minute particles of blue glass were placed in the valves while under water, and on trying gently to move them with a needle they disappeared so suddenly that it was thought that they had been flirted off. A subsequent examination of the contents of the bladder, however, disclosed their presence within it. These and many other kindred experiments having proved the fitness of the valve for the exercise of the special functions for which it was designed, attention may now be directed to the manner in which the minute insects or larvæ are actually captured and killed.

Referring to the capture of these minute creatures by *Utricularia clandestina* (Fig. 2), Mrs. Treat observes that, on placing the bladders in water inhabited by them, they would sometimes dally about the open entrance for a short time, but would sooner or later venture in, and easily open or push apart the closed entrance; once fairly captured, return to the outer world was impossible. The description of the capture of a *Cypris* is worthy of special notice, as it not only illustrates the operations of the valve, but seems to suggest that even these minute organisms are possessed of a curiosity which is allied to that of humanity itself. "The lively little *Cypris*," she writes, "is incased in a bivalve shell, which it opens at pleasure and thrusts out its feet and two pairs of antennæ with tufts of feathers like filaments. This little animal was quite wary, but nevertheless was often caught coming to the entrance of a bladder. It would sometimes pause a moment and then dash away; at other times it would come up close and even venture part way into the entrance, and back out as if afraid; another, more heedless, would open the door and walk in, but it was no sooner in than it manifested alarm, drew in its feet and antennæ, and closed its shell; but after its death the shell unclosed again, displaying feet and antennæ."

So far these observations seem clearly to prove that these bladders are specially designed to catch these creatures, and the fact that none ever escape would indicate that their presence there was essential to the life of the plant. It should be observed, however, that these facts do not of necessity

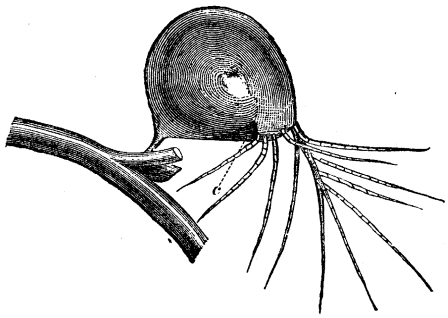

Fig. 3.—Utricularia neglecta.—Bladder, much enlarged.

prove that, in the process of capturing or retaining its prey, the plant displays what we understand as animal intelligence, nor is it yet established that the process of digestion follows the death of the victim. Mrs. Treat, by a careful series of observations, seems to have proved that the nutritive properties of the insect are assimilated by the plant, and yet, so far as indicated, she hardly seems justified in the further conclusion that the process of assimilation is preceded by one of actual digestion. It would appear rather to be one of simple decay, which decay or putrefaction may, however, be hastened, owing to the presence of certain secretions. This latter view is entertained by Darwin, who plainly states, as the final conclusion to which he was led by his many experiments and observations, that "the bladders have no power of digesting animal matter." This distinction between decay and digestion is in the present instance a vital one, since the former function has heretofore been regarded as in the sole possession of the animal organisms; therefore, if it can be proved that certain plants are endowed with these special functions, it is evident that a new classification of the two kingdoms must follow, as the result of which the long-despised bladder-

wort may attain to the dignity of an animal organism, from which station it may claim kinship with the numberless hosts which recognize man as their brother and friend.

THE *Boston Journal of Chemistry* directs attention to the following curious extract from an ancient publication, which contains the first rude suggestions of the telegraphic dial. The work from which the passage is taken was written by Father John Laurechon, a Jesuit, in 1624, the title of the publication being "Récréation mathématique composée de plusieurs problèmes plaisants et facétieux." The selection quoted reads as follows: "It is stated that, by means of a magnet, or any stone of the kind of loadstones, absent persons could communicate with each other—for example, Claudius being in Paris, and John in Rome, if each had a needle rubbed with some stone having the power, as one needle should move in Paris the other could move correspondingly at Rome; Claudius and John could have similar alphabets, and having arranged to communicate at a fixed time every day, when the needle had run three times and a half round the dial, this would be the signal that Claudius wished to speak to John and to no other. And, supposing that Claudius wants to tell John that 'the king is at Paris,' he would move the needle to the letters *t*, *h*, *e*, and so on. The needle of John agreeing with that of Claudius would, of course, move and stop at the same letters, and by such means they could easily understand and correspond with each other. This is a fine invention, but I do not believe there is in the world a loadstone having such a power; and, besides, it would not be expedient, as then treason would be too frequent and too secret." Accompanying this suggestive hint toward the modern telegraph is the diagram of a dial with twenty-four letters. Thus it appears that, two centuries before its adoption, magnetism was hit upon as that force by whose agency signals might be transmitted from widely-separated points.

WHILE the Committee on Appropriations at Washington is overwhelmed with appeals to reduce the army budget and curtail the expenses of the navy, the English Admiralty are yearly, and in what would appear a most reckless fashion, increasing their demands upon the royal treasury. We have already presented a detailed description of the new eighty-ton gun, which has cost over sixty-five thousand dollars, and which it is now proposed to enlarge by an additional increase of bore. From an account of the recent experiments with this monster weapon we learn that in some of the rounds fired the shot weighed fourteen hundred and sixty-five pounds, and this mass of metal was hurled forth with a velocity amounting to over fourteen hundred feet per second at the muzzle of the gun. One round was fired with no less than two hundred and fifty pounds of powder in two-inch cubes, but the result was a lower muzzle-velocity than had previously been obtained with the twelve hundred and sixty pound projectile and two hundred and forty pounds of powder, a result attributable mainly to the size of the "grains" of powder, the two-inch cubes being too large for the gun in its present state, though they will probably give better results when the gun is bored out to sixteen inches in diameter, a job for which a new lathe is being specially constructed.

THE progress which has been made in the utilization of natural gas in Western Pennsylvania, and the marked success which has attended its use as a lighting medium in Rochester and other Western New York towns, direct attention to the fact that this example is being followed in other countries, even so far distant as New Zealand. "We note," says *The Engineer*, "that at Gisborne, New Zealand, the sinking of an artesian well led to the finding, at a depth of two hundred and seventy feet, of a continuous stream of gas. The work was being done in connection with an hotel, and the landlord seems to have been a man of ready invention. The statement is that, by way of experiment, he partially sank a hogshead over the bore, into which a pipe was inserted, and carried along for several yards to the hotel. Here a burner was secured on to the pipe, the tap was turned on, and when a flame was applied and the gas lighted, it burned with a steady light, as pure and bright as manufactured gas." While this incident is of interest on account of the single experiment, it is of special value since it suggests the possible presence of coal or oil in that far-off land.

A NEW substitute for lubricants has been recently patented in England, which is said to have been proved of great efficiency. It is furnished under two receipts, as follows: First, plumbago thirty-five parts, talc or asbestos twenty-five, sulphur twenty, and wax or paraffine twenty. The second form is varied in its composition, as follows: Plumbago thirty parts, bone glue fifteen, water thirty-two, sulphur twelve, and wax or paraffine eleven. Either of these compositions, when laid over bearings, acts as a substitute for lubricants. From what is known of the anti-friction metal called "metalline," this new lubricant appears more simple in its composition; whether it is likely to prove a formidable rival to that valuable American discovery remains yet to be proved.

ALTHOUGH the planting of the *Eucalyptus* in the Roman swamps and low lands has not resulted as favorably as was hoped, it is yet possible that indirectly the gain may be a decided one. Père Gildas, the abbot of the Monastery of St.-Paul of the Three Fountains, is said to have discovered that the leaves of the tree furnish a decoction which has proved to be very efficacious in cases of fever. We confess to a full share of incredulity as regards the discovery of these "elixirs," and should advise a suspension of judgment until the so-called decoction or the still more suspicious powder be submitted to analysis and a systematic series of practical tests.

IN a "Note" which appeared in the JOURNAL of January 8th, a description of MM. Delachanal and Mermet's apparatus for determining the spectra of solution was preceded by a brief comment which may have confused the reader as to the true distinction between the so-called absorption spectra and the spectra obtained directly from solutions. In calling our attention to this point, Dr. Piffard properly defines an absorption spectrum as the spectrum obtained by interposing between the spectroscope and a white light certain colored solutions or certain transparent colored bodies, such as sheets of gelatine, etc.

Miscellanea.

TEMPLE BAR has an article on "A Neglected Humorist"—one Foote, who flourished something more than a hundred years ago in London, and gained notoriety for his imitations of the best-known actors of the time, in a somewhat novel kind of entertainment:

Not only did he mimic the peculiarities of actors, but of statesmen, doctors, lawyers, or any persons whom the public would recognize or laugh at. It was the success of this part which induced him, in 1747, to open the Haymarket Theatre with a piece of his own writing, entitled "The Diversions of the Morning." The advertisement of the performance was as follows:

"At the theatre in the Haymarket this day (April 22, 1747) will be performed a Concert of Music, with which will be given *gratis* a new entertainment, called 'The Diversions of the Morning,' to which will be added a farce taken from 'The Old Bachelor,' called 'The Credulous Husband.' *Fondle Wife*, Mr. Foote; with an Epilogue, to be spoken by the B—d—d Coffee House. To begin at 7."

The house was crammed. The "Diversions" consisted of the old imitations of Bayes, and some new ones. The epilogue was a satirical mimicry of the frequenters of the Bedford. But the selection from "The Old Bachelor" got him into hot water. The theatre was not licensed,[1] and the actors of the patent houses called upon the Westminster magistrates to interfere; so, on the second night, a *posse* of constables entered and dispersed the audience.

But Foote was not to be so easily put down; on the very next morning he issued another announcement in the *General Advertiser*:

"On Saturday afternoon, exactly at 12 o'clock, at the new theatre in the Haymarket, Mr. Foote begs the favor of his friends to come and drink a dish of chocolate with him; and 'tis hoped there will be a great deal of comedy and some joyous spirits; he will endeavor to make the Morning as Diverting as possible. Tickets to be had for this entertainment at George's Coffee House, Temple Bar, without which no one will be admitted. N. B.—Sir Dilbury Diddle will be there, and Lady Betty Frisk has absolutely promised."

A densely-crowded house followed this advertisement; curiosity was on tiptoe to know what it meant. Foote came forward, and, bowing to the audience, informed them that, "as he was training some young performers for the stage, he would, with their permission, while chocolate was getting ready, proceed with his instructions before them." Under pretense of teaching these pupils, he again introduced his imitations. The authorities made no further attempt to interfere with him; and in a few weeks he altered the time of his entertainment from morning to evening, and the title from "chocolate" to "tea." To drink a dish of tea with Mr. Foote became the rage of the season. The actors exclaimed that his mimicry would ruin them. Upon which the wit replied that in that case it would be his duty to provide another situation for each lady and gentleman who, instead of murdering blank-verse, and assuming the characters of kings, queens, lords, and ladies, for which their abilities were far from being suitable, should be placed where their talent and behavior could with more propriety be employed. Quin he appointed, on account of his deep voice and ponderous manner, to be a watchman; another actor, who had but one eye, was to be a beggar; a third, who was noted for a shrill voice, an itinerant razor-grinder; Peg Woffington, an orange-girl, etc. Finding that every move they made against him only ended in defeat and further ridicule, the actors at length, in sheer despair, let him take his course unmolested. The year afterward he appeared in a similar entertainment, which he called "An Auction of Pictures." New characters were introduced—notably *Sir Thomas de Veil*, a Westminster justice; *Mr. Cock*, a celebrated auctioneer; and the notorious *Orator Henley*. This piece, as well as

[1] The patent laws strictly limited the houses of theatrical entertainment to two, Drury Lane and Covent Garden; and dramatic performances could be given elsewhere only by such evasions as announcing a concert to which the public was admitted by tickets, and a play *gratis*.