

Imponderable Agents.—No. 7.
[Second Series.]

LIGHT, ELECTRICITY, AND HEAT—Prof. Faraday has proven, that there is a near and intimate relationship between light and electricity, and the theory has been put forth that light, electricity and heat are identical in their nature, though different in their effects. Light whether solar or terrestrial produces heat, and powerful combustion, always produces both light and heat. Light heat and electricity are produced by an electric machine, and the results of different actions of the electric current; charcoal presented to an electric current produces light. The light emitted by the deflagration of metals at the poles of a battery, varies in color with the nature of the metal. Thus silver produces a beautiful green light, copper a bluish white with red sparks, and lead a beautiful purple.—When the poles of a battery, consisting of numerous series of large plates, so as to develop an electric current of considerable quantity and intensity, terminate in charcoal points, the most brilliant light which can be made artificially, is emitted, whenever those points are brought into contact. And if they be gradually drawn apart, the current will still continue to flow between them through the rarified air, even at the distance of several inches, forming an arch of light of dazzling brightness, in which the most refractory substances, are either fused or deflagrated. This light is not produced by combustion for the charcoal is not burned, and the two points weigh nearly the same both before and after the experiment though there is a transfer of matter from one to the other in a vitrified state. It was at one time supposed that the deflagration of metals could only be produced by very large and powerful batteries, but Dr. Wollaston proved this idea to be incorrect by means of a battery made of a lady's thimble, with which he fused a very fine platinum wire. He thus proved, that the only condition requisite to produce intense heat by the electric current, is that the conducting wire should be of insufficient size to transmit freely, the quantity of electricity generated by the battery. Thus it appears that light, heat, and electricity, are related so intimately that it would be presumptuous to claim for each a separate individuality.

It has not been actually demonstrated that light, heat, and electricity are one substance exhibiting different qualities under different conditions, and indeed so many objections may be urged against such an idea, that it is better not to put forth any dogmatic opinions on the point. But the objection "that one substance cannot possibly exhibit so many phenomena under different conditions," which has been urged against, the *one* substance theory, is just as good against light and electricity in themselves, or in their union. Thus there are three totally distinct colors produced by the different actions of a ray of light, and both heat, light, and electricity, are developed in a single ray, and a ray also exhibits, chemical and non-chemical qualities. The phenomena of light are exceedingly numerous; and embrace a very extensive range of science. It is the same with electricity, the electric current exhibits both chemical and mechanical phenomena, it produces light and heat, and exhibits all the varied colors in the solar spectrum according to the media employed. Heat is almost a ponderable, and yet is as subtle in some respects as light and electricity. Heat and light are generally associated together.

Hay Meal.

It is now becoming common to grind corn with the cobs, and many consider such meal to be, on the whole, more valuable than that made from the corn alone. A writer in the German-town Telegraph proposes to go a step further and grind hay. He says:

"I have no doubt that a meal made of hay, or even of cornstalks, would possess sufficient additional value over and above the raw material to defray the expense, and I have no question that before many years, hay ground or hay meal, if it be not too absurd to use such a term, will be as common as indian meal or rye meal now is. I have some facts to communicate hereafter in reference to this matter, which I think will be interesting to your readers. We are in the 'midst of a revolution,' in

farming affairs, and are beginning to look around us with our eyes open for the light I trust."

The Bull-Rush Caterpillar of New Zealand.

HAMLET—"There are more things in Heaven and Earth, Than are dreamt of in your philosophy."

About eight or ten years ago, a notice appeared in the "Athenæum," of certain transactions at a meeting of one of the Scientific Societies in London, at which meeting, if we be not greatly mistaken, it was stated that Professor Owen had described an insect, a species of Caterpillar indigenous to New Zealand, which was in the habit of running about with a young tree growing out of its body—that the insect sought for a soft suitable soil, and then and there buried itself, thus planting out and extending the forest.

We do not pretend to recollect, with sufficient accuracy to repeat here, the very words said to have fallen from the learned lecturer; we may be taking liberties with the language, but our impression is, as we have written it, and having considered it at the time, as very curious if true, we hung up the whole lot, New Zealand Forest, Professor Owen and the Caterpillar, on a little peg in a corner of our brain, to be taken down and examined when an opportunity offered.

Some years afterwards found us on the Southern side of the Mountains of Lebanon, not far from the Cedars of Solomon; and here, by chance, we fell in with a traveller, wending his way through Syria; he was a good-natured jolly way-farer, and, when informed that we were from Bengal bound to Pennsylvania, laughingly told us he was from Glasgow, bound to New Zealand.

He obtained the benefit of our experience and geographical knowledge as to the most interesting path to follow on his journey through the Holy Land, and when we parted (remembering the lot hanging on the little peg), we asked him to send us, as an especial favour, an insect such as that described above; the Scotchman smiled, but promised; and a few days ago we received from Auckland, New Zealand, a little box, with the flowery label of "Premier qualite Eau de Cologne," and this box contained the much-wished-for Animo-vegeto-Bull-rush Caterpillar.

Our friend unfortunately tells us very little of this interesting production, merely observing that he had procured the vegetable phenomenon from the North of the island of New Zealand, near the extensive wooded plains; that is only found in one locality and under one particular tree, called by natives "Rata;" that at first it appears as a parasite, but at last it kills the tree to which it clung, and extending itself, becomes no mean occupant of the forest.

Being greatly interested in the subject, we have endeavoured to find out all that has been written about it by travellers and men of science, and before recording the opinion formed from such evidences as we have been able to produce, we will detail such information as we have collected in our researches.

In Dr. McClelland's "Calcutta Journal of Natural History," Vol. VI., for April 1845, at page 71, there is a description of this interesting insect, under the title of the "Vegetable or Bull-rush Caterpillar," by Dr. Thompson, of the British Hospital, Damascus. Dr. Thompson calls it a very remarkable plant, and "one of the most curious vegetable productions with which we are at present acquainted;" to this paper an illustration is annexed, giving a very accurate representation of the dried specimen, such as we now see it; but the subject of the paper is called on the plate the "Sphœria Robertsii," and the description commences as follows:—

"There are birds which dispossess others of their nests, and marine animals which take up their abode in deserted shells; but this plant surpasses all in killing and taking possession, making the body of an insect—and that too in all probability during the life-time of the insect the origin from which the future plant rears its stem, &c., &c. We may therefore look upon this vegetable as one of the most surprising links between the animal and vegetable kingdom. The natives call it "Amato Hotete," and it is only found at the root of one particular

tree, the "Rata." There are no leaves, a solitary stem comprises the entire plant, and should this stem be, by accident, broken off, a second stem arises from the same spot, which is one of the peculiarities of this plant, and not known to occur with any other plant with which we are as yet acquainted in the vegetable kingdom.—The body is not only always found buried, but the greater portion of the stalk as well; the seed vessel alone being above ground. The vegetating process invariably proceeds from the nape of the neck, &c., &c., &c."

It is, therefore, very clear, that Dr. Thompson, although he seems satisfied, relative to the link between the animal and the vegetable, does not believe that the Sphœria Robertsii extends beyond the little bull-rush head, which just peeps above the ground. Let us, therefore, hear what is said about it by travellers who have examined it (or ought to have done so) in its native region.

The Hon'ble Captain Keppel, in his "Voyage of the Meander to the Indian Archipelago, Vol. II., pages 151—154, quotes from "Remarks by the Rev. W. Taylor of Warinote," New Zealand; and the remarks are nearly word for word the same as Dr. Thompson has chosen in the description we have referred to.

Both writers commence in the same strain:—"There are birds which dispossess others of their nests, and marine animals, &c."—and the phraseology continues throughout to prove that the original of both descriptions is from one and the same pen. Dr. T. does not tell us from whence he obtained his information, but in all probability, the resident at "Warinote" furnished the particulars; it not being very likely that the physician of Damascus supplied such intelligence to the learned New Zealand Colonist; this, indeed, would have been carrying coals to Newcastle.

In a work recently published, 1853—"W. Tyrone Power's three years' Residence in China," chap. 31, page 350, we find the "Parasites" which cover the trees (of New Zealand) are in many instances extremely beautiful.—The "Tana" is by far the most remarkable one; it first assumes vitality in the body of a Caterpillar, somewhat larger and thicker than a silk-worm, into which it has probably found its way as food; the young sprout quickly absorbs the vital moisture of the insect's body, in changing it in a ligneous substance, resembling in material a dried chesnut; in this state it forms a root to the plant, which curls its delicate tendrils round some forest tree, as the ivy round the oak. Rapid in growth, it becomes each day stronger and stronger, till crushing to death, in its iron embrace, the pillar which supported its youth, it stands alone, one of the finest and most vigorous of the forest trees, and perhaps the most valuable for the timber, which is hard, tough, and crooked, is the best suited for knees of ships, and the like purposes.

One more quotation from the Hon'ble Captain Keppel of the "Meander," or Dr. Taylor of Warinote, or Dr. Thompson of Damascus—the "Tria juncta in uno:"—

If these views should be corroborated by future investigations, and found to be correct, the case of these plants, and changes produced, will be an instance of a retrograde step in nature, where the insect, instead of rising to the higher order of the butterfly and soaring aloft to the skies, sinks into a plant, and remains attached to the soil in which it buried itself.

"Corder," the celebrated German naturalist, in his elaborate work, the "Icones Fungorum," describes this curious formation as the "Lphœria Robertsii," from an account received from Baron Hugal, and a dried insect; in his opinion, the "Fungus" arises from the dead body of the Caterpillar, and the apparently ligneous fibre is nothing more than "mycellium," which fills up the body of the animal.

And now, here we have it before us—seven beautiful specimens, and all agreeing in their general appearance; and we may therefore examine at our leisure, and then form our own conclusion. There cannot be any mistake about the Caterpillar—it is the larva of a butterfly, or a moth; its identity is not the least destroyed the insect is dried up, of course, but it is quite perfect in all its parts, from three and a half to four inches long, and somewhat thicker than

a swan-quill. The head is formed very much like the head of the tusser silk-worm; its horny covering, and the hardened mandibles, remain entire, and from near the "posterior" extremity of the insect's body, a single shoot of the ligneous fibre springs forth from eight or nine inches in length, surmounted by a top resembling the head of a bull-rush in miniature.

This preternatural production is beyond all doubt Fungus—the "Sphœria Robertsii" as described; and never advances beyond the excrescence as we now see it. It cannot grow into a tree, it cannot bear a leaf, it is of the very lowest order of plants, (it plant we may call it), and as a humble member of the Fungus family, is unable to claim relationship with any vegetable in a higher position than a mushroom.

The "Sporules," floating in the air, may fasten themselves upon the Caterpillar while it is seeking for a hiding place, in which to undergo its transformation; and finding a suitable soil in the insect's body, destroy life with their growth, and finally fill up the carcass with the white spongy substance which dissection discloses. The friends we have quoted must have been mistaken if they referred altogether to our Caterpillar; but why should there not be another insect as willing to carry about a seed, as this one has been so busy burying itself with a Spore? Or it may be, that a parasitic plant, the seed of which has been transported either by an insect or a bird, seizes upon a fitting resting place, and when grown apace, "crushing to death, in its iron embrace, the pillar which supported its youth, stands alone."

We need not travel far in this country to see how often the seed of the "peepul" tree takes advantage of the crevice in a wall, or the neglected masonry on the deserted house top, and how securely it plants itself, and how vigorously it advances.

Before we leave this subject for the present, let us turn to "Maudslayi's Scientific and Literary Treasury," London, 1848—Article Pojojoy—

"In September, 1839, at the ordinary scientific meeting of the Zoological Society, the first communication read was a letter from Mr. Mackay of the British Consulate at Maracaibo, on a plant called "Pojojoy," in the country from which it is derived, and which arrives in this state from the strange metamorphose of an insect. In the insect which was described, some of the legs had been already changed into roots, and in this state it was presented to the contributors. It was announced that a similar insect had been discovered in North Carolina, which assumed alternately that form, along with a plant; when this hybrid creature assumes the form of an insect, or animal, it is about an inch in length, and much resembles a wasp in appearance; when the insect has attained its full length, it disappears under the surface of the ground and dies; soon after which the hind-legs begin to sprout and vegetate, the shoots extending upwards, and the plant in a short time reaching the length of six inches. The branches and the leaves are like the trefoil, and at the extremities of the former, there are buds which contain neither leaves nor flowers, but an insect, which, as it grows, falls to the ground, or remains on its parent plant, feeding on the leaves till the plant is exhausted, when the insect returns to the earth, and the plant shoots forth again."

We must be cautious when we attempt to pry through the veil which as yet conceals so much of the wondrous mysteries of creation! But we do wish, that somebody would send a "Pojojoy" to

CHAS. HUFFNAGLE,
U. S. Consul.

Calcutta, Doorga Pooja Holidays, 1853.

Australian Enterprize.

The interior of Australia, a barren and sandy desert, has been found to be considerably below the level of the sea. It is now proposed to employ British convicts in cutting a narrow canal from the ocean to the desert a distance of about 250 miles, when it is expected that the rush of water would be so great as to widen the canal and cause the formation of an inland sea almost as large as the Mediterranean, to the incalculable benefit of a vast extent of territory at present wholly useless.