

danger of using their flesh for food is exceedingly great, and very numerous cases of severe disorder and death are on record, both here and on the Continent. With reference to pleuropneumonia, which brings so many beasts prematurely to the shambles, it is satisfactory to learn that although the flesh is deteriorated, it "cannot be called poisonous;" and strange as it may seem, the occurrence of this disorder has furnished the milkmen with a profitable mode of carrying on their trade. Professor Gamgee says, "In the city of Edinburgh there are dairymen who never knew what it was to make money until pleuropneumonia appeared. They originally paid £10 or £15 for a rich-milking Ayrshire, which they kept a twelvemonth or more. They now pay £25 or £30 for a fat crossbred short-horn cow, which they calculate on selling diseased within three months from entering their dairy, and they find the latter system most profitable. . . . They have gone so far as to say, "We do not want disease out of the country; it is keeping everything high."

We need not pursue the subject further, especially as the valuable papers of Dr. Cobbold have exposed the dangers of introducing parasites in company with food. We will, however, observe, on the authority of Professor Gamgee, that *many* persons suffer from tape-worm through indulging in a nasty propensity for eating raw pork. Our benevolence does not prevent our saying, "served them right;" but while such savage feeding may have its appropriate reward, we must enter a strong protest in favour of those who are poisoned against their will.

THE WAYS OF THE ORCHIDS.*

ORCHIDS are universal favourites: the children love to pick them in the meadows, and they occupy the place of honour in the costly conservatory. They combine beauty with grotesqueness, strangeness with elegance, to an extent not paralleled by any other tribe of plants; and now that they have secured an eloquent and erudite interpreter in the person of Mr. Charles Darwin, they make their appearance as Floral Professors, delivering to us the profoundest lectures on methods of adaptation, theories of evolution, and other wondrous mysteries of organization and life. Mr. Darwin is one of the few writers so possessed with his subject as to be incapable of circumlocution. He speaks out of the fulness of his heart and brain, and

* *On the Various Contrivances by which British and Foreign Orchids are Fertilized by Insects, and on the Good Effects of Intercrossing*, by Charles Darwin, M.A., F.R.S., etc. London: John Murray. 1862.

crowds his pages with rich stores of clearly elucidated, carefully arranged, and for the most part recondite facts. The Origin of Species is always present to his mind: but whatever may be our opinion of the great theory which will hereafter be associated with his name, we cannot lay down his volume without acknowledging that he helps us to know, and teaches us to think. Philosophers have often invented hypotheses, and promulgated doctrines, which tended to darken counsel and limit enquiry, which acted as a poisonous narcotic upon the intellect, and placed a pretended explanation, like a barrier, across the path of truth. In Mr. Darwin's speculations we discover none of this evil tendency. They form no opiate to lull us into repose, but suggest endless fields of investigation, and spur us on to a vigorous collection and examination of facts. In this way they are good. They may be refuted; they may be swallowed up in an ampler exposition of ultimate laws; but whatever their fate, they will have assisted to train fresh bands of keen observers, and they will have scattered far and wide the seeds of scientific thought.

The stories of the orchids belong to the "fairy tales of science." In the structure of these eccentric plants we meet with startling contrivances elaborately combined to produce unexpected results. In the Bee Ophrys alone has Mr. Darwin discovered "perfectly efficient contrivances for self-fertilization," and even then combined with "manifest adaptations" for the occasional transport of pollen from one flower to another. As a rule, these curious plants are dependent for their perpetuation upon humble members of the animal world, and their structure exhibits a combination of peculiar difficulties with still more peculiar facilities, for the accomplishment of the final act of vegetable existence, the production of a fertile seed. For a detailed exposition of these arrangements we must refer to Mr. Darwin's book, but we will endeavour to explain the leading facts of orchid history, and just glance at their value in a scientific point of view. In ordinary flowers, the stamens, supporting the pollen-bearing anthers, surround one or more organs of a different shape, called the pistils. When the right time comes the pollen grains fall upon the pistils, and send forth slender tubes, which reach the ovaries and fertilize the germs which they contain. In "all common orchids there is only one stamen, and this is confluent with the pistil, forming the column." The anther is divided into two cells, which often gives the appearance of their being two anthers instead of one. In common plants the pollen, when ripe, is detached with great facility as a fine powder; in orchids the grains are coherent, tied together in masses by peculiar threads, and "often supported by a very curious appendage called the caudicle" or little tail.

The pollen masses with their appendages are collectively called *Pollinia*, a word which we shall have occasion to use. The orchids are botanically considered to have "three united pistils or female organs." The two lower stigmas* are often confluent, so as to appear as one. The upper pistil exists in a very modified and curious condition, having its stigma converted into the *Rostellum*, of which it is very difficult to give an intelligible description without the aid of a drawing, which time will not allow us to prepare. Mr. Darwin observes: "the rostellum is a nearly spherical, somewhat pointed projection, overhanging the two almost confluent stigmas." It either includes, or is formed of viscid matter, and has two discs to which the pollen masses are attached by means of their caudicles. These organs, as we shall see, have a most important work to perform, and they may be discovered in any common orchid, by removing the sepals, or leaves of the calyx, and the petals or flower leaves, except the lowest, which has the most singular shape, and is called the *labellum*, or lower lip. This lip forms a convenient landing-place for insects, "*it secretes nectar*, in order to attract them, and is often produced into a long spur-like nectary." If an insect alights on the lip, and tries to reach the nectary with his proboscis, it finds the rostellum in the way, and in pushing by it detaches one or more of the viscid discs to which the pollen masses are attached. Mr. Darwin succeeded in imitating this action by introducing a pointed pencil, and on drawing it back the disc was firmly attached. While these discs are in their place a liquid keeps their cement moist, but when they are removed it sets in a few minutes, and causes the pollen masses to be firmly fixed to the intruding body. This is essential to the process of fertilization, for if it slipped on one side or the other it would not come into contact with the right portion of the pistil of the flower to which the insect paid its next visit. Nor would it succeed if it preserved the upright attitude in which the adhesion took place. Let the reader hold a finger upright, and suppose the pollen mass attached to its tip, let him then curve the finger horizontally—that is the position which the anther must attain. This change is effected in about half a minute, by the contraction of the adhesive disc. Thus, while an insect flies from one flower to another, this highly curious apparatus arranges itself exactly in the right direction for its work. Now comes another interesting adaptation, noticed long ago by Robert Brown. The stigma or pistil head is very sticky, but not so tenacious as to pull off all the pollen after a single contact. Its resistance to an insect's return snaps some of the threads by which the

* The *stigma* is the fleshy extremity of the pistil, and may be seated upon the ovary, or elevated upon a stalk—the *style*.

pollen grains are fastened, but it leaves others for another flower to catch in turn. This description applies, especially to *O. maculata*, and similar flowers, but it affords the key to the process which takes place throughout the tribe. In *O. pyramidalis* the viscid disc is single and saddle-shaped, and the labellum, or lip leaf, is furnished with two ridges "expanding outwards like the mouth of a decoy," and which will guide any fine flexible body to the trap which the plant contains. The proboscis of a moth, or a bristle, in an artificial experiment, finds itself saddled with the adhesive disc, and Mr. Darwin gives a drawing of the head of an *Acantia luctuosa*, to whose proboscis seven pairs of pollinia are attached.

There is a highly interesting question of orchid manners not quite solved, although an explanation suggested by Darwin appears likely to prove true. In many orchids no secreted nectar has been discovered, and it was supposed that they were the Jeremy Diddlers of the vegetable world, existing by an "organized system of deception." Mr. Darwin chivalrously endeavours to rescue their morality from so odious a charge, which likewise impugns the sagacity of countless generations of moths, and, after sundry experiments, he arrived at the conclusion that the insects have to bore through a delicate membrane to arrive at the treasured sweets, and that this delay gives the adhesive matter of the discs time to set. In five species he found the honied bait within the nectaries, and in them the cement solidified so quickly that the plant had no need to detain its useful guest.

In the genus *Ophrys*, important varieties of structure are met with, and the motive of the insects for visiting the flowers is not clear, but, nevertheless, their curious intervention is proved to take place. In another great tribe of British orchids, the *Neottea*, a new set of difficulties, and special arrangements to overcome them, appear. Thus, in the Marsh *Epispactis* an insect could enter without touching the rostellum, but when once inside the labellum would spring up, and he would have to back out, and place himself in the right position for the rostellum to fit him with a membranous cap, bearing the pollen grains. In the Ladies' Tresses, *spiranthes autumnalis*, the rostellum is "a long, thin, flat projection," bearing in its middle what Mr. Darwin terms the "boat-formed disc." The touch of an insect's proboscis, the vapour of chloroform, or a natural change in the condition of the plant, splits a fine membrane, and sets the apparatus free.

In three genera of British orchids, the *Malaxis*, *Listera*, and *Neottea*, "no portion of the exterior membranous surface of the rostellum is permanently attached to the pollinia." The first we shall pass over, but the second introduces us to

new wonders. The *Listera ovata*, or "Tway-blade," derives its English and most expressive name, from the singular cleft form of the labellum. In this tribe "the pollen grains are attached together in the usual manner by a few elastic threads; but the threads are weak, and large masses of pollen can be easily broken off." The rostellum, according to Dr. Hooker, is internally divided into a series of little chambers (*loculi*) which contain and shoot out drops of viscid matter. It is, in fact, a vegetable spring-gun, and the moment it is touched, off goes the sticky shot, carrying with it the pollen it catches in its way. "As the pointed tips of the loose pollinia," says Dr. Darwin, "lie on the crest of the rostellum, they are always caught by the exploded drop. I have never once seen this fail. So rapid is the explosion, and so viscid the fluid, that it is difficult to touch the rostellum with a needle quickly enough not to catch the pollinia already attached to the partially hardened drop." In two or three seconds the cement hardens, and the pollen mass is securely fixed to the object which this vegetable artillery has assailed.

We have thus given a very faint idea of the ways of the British orchids. Of their splendid foreign relatives we must not now speak, nor anticipate the delight which the student will experience in reading Mr. Darwin's book. Such themes remind us of the beautiful picture given by Longfellow, in his *Fiftieth Birthday of Agassiz*, where, reverting to the infancy of the great philosopher, he makes "Nature, the old nurse," take the child upon her knee—

Saying: "Here is a story-book
Thy Father hath written for thee.

"Come wander with me, she said,
Into regions yet untrod,
And read what is still unread
In the manuscript of God.

"And he wandered away and away,
With Nature, the dear old nurse,
Who sang to him night and day
The rhymes of the Universe.

"And whenever the way seemed long,
Or his heart began to fail,
She would sing a more wonderful song,
Or tell a more wonderful tale."

These "wondrous tales" become more wonderful when science endeavours to explain the enigmas which they present. Most botanists would agree with Darwin in tracing the relation which the various parts of the orchids bear to those of ordinary plants. The science of homology, as he tells us, "clears away all mist from such terms as the scheme of nature, ideal

types, archetypal patterns, or ideas, etc. The naturalist, thus guided, sees that all homologous parts or organs, however much diversified, are modifications of one and the same ancestral organ: in tracing existing gradations he gains a clue in tracing, as far as that is possible, the probable course of a modification during a long line of generations. He may feel assured that, whether he follows embryological development, or searches for the merest rudiments, or traces gradations between the most different beings, he is pursuing the same object by different routes, and is tending towards the knowledge of the actual progenitor of the group as it once grew and lived." Following Robert Brown, Mr. Darwin resolves the orchid into five simple parts, three sepals and two petals, and two compounded parts, the column and the labellum. The latter he considers as "formed of one petal and two petaloid stamens of the outer whorl, likewise completely confluent." Those who deny the modification for which Darwin contends would explain the agreements and correspondences which he traces, by a theory of "types;" but he asks "Can we, in truth, feel satisfied by saying that each orchid was created exactly as we now see it, on a certain ideal type; that the omnipotent Creator, having fixed on one plan for the whole order, did not please to depart from his plan; that He, therefore, made the same organ to perform divers functions—often of trifling importance compared with their proper functions—converted other organs into mere purposeless rudiments, and arranged all as if they had to stand separate, and then made them cohere? It is not a more simple and intelligible view that all orchids owe what they have in common to descent from some monocotyledonous plant, which, like so many other plants of the same division, possessed fifteen organs arranged alternately, three within three in five whorls, and that the now wonderfully changed structure of the flower is due to a long course of slow modifications—each modification having preserved that which was useful to each plant during the incessant changes to which the organic and inorganic world has been exposed."

Thus speaks Mr. Darwin in defence of his ingenious scheme, upon which we feel no call to pronounce sentence, because the means of final decision do not as yet exist. To prove inductively what really was the order of the universe in any great group of facts, requires that we should have a complete series of the facts before us, which in this case we have not. To prove deductively the correctness of any hypothesis, demands the previous establishment of the general laws from which the particular phenomena spring, and this has not yet been done. We are entitled to say to Mr. Darwin: we suspend decision with more or less doubt against you, because, as you know, your

proof is incomplete ; but we are not justified in demanding the production of a particular kind of evidence, unless we can show that it exists and might be obtained. We may, for example, logically say, "If your theory be true, connecting links and transition forms must have existed during the lapse of time, and until you can prove that they did exist, we are not convinced." But if we ask for so many connecting links within certain limits of time or space, we are bound to show the probability of their having existed within those limits if ever they existed at all.

Fortunately, it is not necessary that we should make positive affirmations concerning things of which we know little, or nothing at all ; and if, speaking physically, science enlarges the sphere of action assigned to secondary causes, our conception of the First Cause becomes grander in proportion to the precision and complexity of the work which we see performed. If the orchids be only modified descendants of a more ordinary kind of plant, what a wonderful picture of powers, forces, and relations is presented to our view. How inconceivable the Wisdom which established and guides the whole, and which secured the occurrence of the most skilful and amazing changes of parts and organs, precisely at the right time. If a little flower moved a great poet to "thoughts too deep for tears," surely the "Ways of the Orchids," may excite a reverential contemplation of Nature, far removed from the arrogant dogmatism which prejudice and ignorance so readily beget.

THE HAIRLESS MEN OF AUSTRALIA.

THE following curious account of the Bald men of the Balonne is taken from the *Sydney Empire*, Feb. 19th, 1862, and as it suggests very curious inquiries, both ethnological and physiological, it is to be hoped that further information may be obtained.

"It is now some few years since a report first obtained currency, that, far in the Western interior, beyond the Balonne River, a tribe of aboriginal natives existed who exhibited remarkable physical distinctions from those with whom explorers and other colonists have so long been familiar. It was said that the natives in question were entirely destitute of hair, even on the head, which was as bald as a billiard ball. Other remarkable peculiarities were also mentioned, but the absence of ocular proof led most people to doubt them, and it was pretty generally believed that either the blacks alluded to were merely suffering from some cutaneous disorder, or the tale was one of those bush 'yarns' which outlying settlers think it no harm to hoax the townsman withal. Yesterday, however, we had an op-