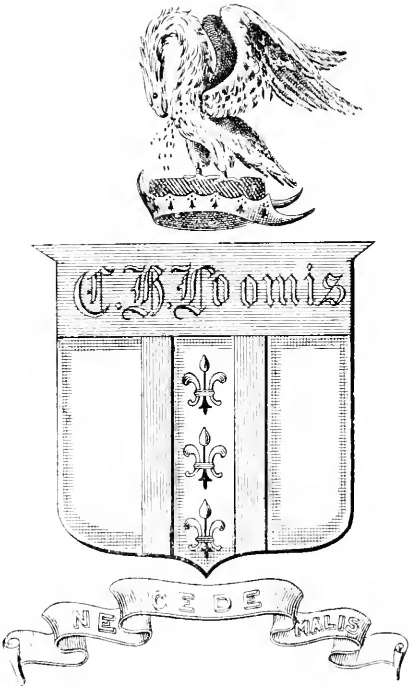
SCIENCE
GOSSIP


C. H. Loomis
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HARDWICKE'S

SCIENCE-GOSSIP

FOR 1866.

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Science-Gossip:

AN ILLUSTRATED MEDIUM OF INTERCHANGE AND GOSSIP

FOR STUDENTS AND

LOVERS OF NATURE.

EDITED BY M. C. COOKE,

AUTHOR OF "A PLAIN AND EASY ACCOUNT OF THE BRITISH FUNGI," "MICROSCOPIC FUNGI,"
"A MANUAL OF BOTANICAL TERMS," AND OF "STRUCTURAL BOTANY,"
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SCIENCE-GOSSIP.

I crave forbearance for having thought that even the busiest mind might not be a stranger to those moments of repose, when the clock of time clicks drowsily behind the door, and trifles become the amusement of the wise and great.

LONGFELLOW. "*Outre Mer.*"

IT is natural to some minds, we would almost believe, to look with horror on the face that can wear a smile, or to shudder at the sound of a hearty laugh. Let us hope that the torments of enduring Christmas have not driven any such to the extremity of renouncing mankind for ever, and all association with laughing bipeds. It is related of two ancient worthies, who flourished, we know not how many centuries ago, that one passed his life in smiles and the other in tears. One laughed continually at the follies of his race, the other wept for them, as though their follies were crimes. *That* was the spectator of a continual comedy, *this* an actor in a tragedy without end. Each of these had his followers; perhaps some may be living at this hour, or else we can scarcely account for the fact that the harmless enjoyments of some of the human species can cause sighs and sorrows in others of the same great family. Not only will a season of festivity plant thorns in the morbid bosoms of such men, but "the trifles which become the amusement of the wise and great" in moments of repose are magnified into monsters that disturb their rest, and inflict upon them an eternal nightmare. It has been whispered abroad that we, in our humble endeavours to "Gossip" freely over the little extracts which we collect from the book of Nature are giving offence. Not that we act as "snappers up of unconsidered trifles," but because we give to them an undignified name. On the threshold of the temple of Janus, with our first volume under our arm, we again announce our name, however undignified it may be, and with it gain admission to the fireside of thousands, whilst the same talisman excludes us, we hope, only from the drawing-rooms of a few. Parents seldom give to their children names which satisfy all their friends, and we cannot hope to be more successful than they. Yet, after all, a name may degenerate, or become dignified, by its associations. We make no great pretensions, our desire being to gossip with our readers, as a man chats to his friend, of passing events in which we are interested, to ask and answer queries, and pass a pleasant half-hour in talking of scientific subjects in the language of the fireside, and not as *savans*. We do not aspire to be an oracle in Natural History, nor to enter deeply into the mysteries of Science, neither do we think it beneath our dignity to confess ourselves Gossipers, or criminal to unbend ourselves and seek amusement, as well as instruction, in trifles.

There is moreover a charge of frivolity to which we will scarcely advert, since our readers are the best judges of their own feelings, and if any of them should consider a long face and a grim visage the best style of physiognomy for a monthly visitor, who just drops in for a chat, we would not hurt his feelings by hinting at doubts of his sanity. Manner, or matter, we imagine our verdict must be, that as to changing the title, we couldn't if we would, and as to the substance, we wouldn't if we could. Not that we are above consulting our friends or taking their advice, but because we believe that in this decision we only represent the feelings of those whom it is our privilege and interest to serve—the supporters, readers, and contributors to our journal. If we were, ever so politely, solicited to commit personal suicide, we think that we should feel bound, as politely, to decline the honour of self-sacrifice at the shrine of friendship. So, when invited to perform a similar act figuratively, our impulse is strongly in favour of self-preservation. Therefore we trim the quill, poke the fire, dust the glasses, snuff the candle, and settle down for another year of SCIENCE-GOSSIP.

THE STORE-KEEPER.

ONE of the liveliest, prettiest, merriest, and, to judge from appearances, the happiest little animal one meets with in north-western wilds, is a tiny Squirrel, known and feared by the Indians, who have a name for it, unpronounceable by any mouth of ordinary conformation; and to attempt writing it is only to give a long list of double and single letters, the type-pattern for spelling Indian words. For example,—*ch-a-ta la-ch*,—what can you make of that? Corkscrew the word out, giving it all the throat sound and tongue-twisting you can manage, and it has as little resemblance to the name as rolled out from the larynx of a Red-skin, as the wheeze of a bagpipe has to the clear, rich, mellow note of the Mocking-bird.

To the scientific world my furry friend is known as *Tamias* (nearly as bad as Indian); *tamias* being Greek for store-keeper, the generic title. The specific name tells us that he has four stripes, or "*ribbons*," marking his skin. The Missouri Striped Squirrel is the familiar appellation of the white settler; the Ogress Squirrel of the savage—why so named will be shown in the sequel.

The specific characters are briefly: tail quite as long as the body, a grey stripe along the top of the head, joining two others passing below the eyes, a hoary patch behind the ears; general colour, deep ferruginous red; back marked with four equidistant stripes, nearly black, extending from the neck to the tail; length four inches, without the tail.

Incisors (cutting-teeth) strong, and deep orange-colour on the outer surface; on each side of the mouth is a large pouch, opening just anterior to the molar teeth, and extending back to the shoulder.

In these capacious sacks, seeds, bits of favourite roots, indeed anything either eatable or storeable, is carried to the "Store-keeper's" residence. The pouches are filled from the mouth; the fore feet being used much the same as hands, to press the cargo back, and tightly pack it; when emptying them, the fore feet are again called into requisition; placed behind the corpulent bags, the contents are pressed out by a kneading kind of movement.

Where a more striking evidence of Divine wisdom and forethought? but for these leather bags, it would be utterly impossible for this little animal to carry in a store of provisions sufficient for his winter supply; he does not sleep, like the "Rock Whistler," and live on his own fat, but only *partially* hybernates, and hence needs a stock of food, with which he provides himself during the sunny summer days.

His mansion is usually under a fallen tree, or amidst the tangled roots of the giant pines. A small burrow neatly dug, and round as an auger-hole, leads in a slanting direction to an open cavity, neatly lined with dry leaves, blades of grass, and moss, a bed soft as eider down, wherein the "Store-keeper" sleeps. In an adjoining opening, on a kind of earthen shelf, is his store neatly piled away, to be carefully hoarded, until the biting blasts of winter, sweeping through the forests, stripping land and tree alike of their verdure, warn the provident workman to retire into his snug quarters, not to shiver, cold and hungry, until the spring-time comes, and bids the flowers ope their blossoms and the buds burst into leaf,—not a bit of it—his industry has provided not only a snug residence, but food in abundance, to supply his daily necessities; a garrison in which he can defy wind, rain, frost, and snow, and bide his time until the Ice-king yields his sceptre to the genial ruler of the summer.

This squirrel seems to live everywhere. Wander round the margin of the emerald-green prairie, and there, amidst the hazel, mohonia, vine maple, and various shrubs that love the sunshine, the "Store-keeper" is sure to be seen, skipping along on a dead stick, or scudding through the bushes; stopping continually to have a peep at the intruder; sitting bolt upright, with its tail erected, defiantly chatters angrily, in a kind of half-laugh, half-bark, then uttering a shrill chirp, the danger signal to others, makes for its hole and disappears. Paddle in a canoe down the surging stream, past the piles of drift-wood, heaped mountains of dead trees; and as the frail bark shoots by, you are certain to see the "Store-keeper" scampering from log to log, his scolding and whistling lost in the noisy rush of the torrent. Dive into the dark shadow of the pine forest,—where mouldy life holds high festival, where huge fungoid growths, and giant agarici spring in flabby clusters from the oozy logs,—where the pools, thick and slimy, are covered with the green fleshy leaves of the "skunk cabbage," and each branch and spray, draped with the black lichen (*Lichen jubatus*), seem mourning over the death and decay on every side: in these damp solitudes lives the "Store-keeper" merry and quarrelsome, as in brighter scenes. Climb the mountain-side and scramble through the rock-walled ravine, where the pine clings to the stones rather than grows from their clefts; there, no murmuring streamlet cools and refreshes thirsty nature, or breaks the solemn silence with its rippling music; not even the footfall of the savage disturbs its echoes; and naught living, save the denizens of the air, that peep into its weird depths from the tree-tops, ever visits it; yet in the very loneliest of these glens the "Store-keeper" is sure to be met with; climb on, higher, higher, to the perpetual snow-line, marking the boundary betwixt life and icy desolation, and there too, on the very frontier, he bounds, and jumps, from rock to rock, ever scolding, laughing, whistling, and toiling, to garner in his harvest.

Two of them, husband and wife, took up their abode in an old saw-pit, close to our winter-quarters, on the Upper Columbia, and there constructed a nest during the month of July, for the mamma to bring forth and rear her offspring in. I carefully watched them from day to day, and with the exception of an occasional scolding, they took little heed of my presence. A hollow place was first cleared under one of the cross timbers of the saw-pit, then both worked hard bringing blades of dried grass, leaves, and moss. I observed they carefully collected fragments of rag, and pieces of paper left by the sawyers; so, to gratify this taste for the use of novel material, I brought out continually small bundles, composed of coloured threads, rags, paper, fragments of scarlet cloth, and small portions of gold and silver lace from my fishing tackle stock; all these were greedily seized on, and woven into the nest, that, when completed, after about sixteen days' work, presented the most extraordinary appearance imaginable. Such a nuptial nest no squirrel ever had before, or, perhaps, will ever have again. I am sure they were proud of their achievement, and deemed it a triumph of squirrel architecture.

The family in due time came into the world; but any attempt to approach the nest was resented so furiously, yet combined with such evident terror for the safety of their babies, that I had not the heart to gratify my curiosity to see how many there were, and what they were like. Nearly three weeks passed, when the love of prying overcame all other scruples, and a peep into the snug, cosy, chequered retreat was irresistible. Separating with the utmost caution the walls of the entrance-hole, three baby squirrels were visible,—such queer little annimals, they seemed all eyes and tail. The papa and mamma were both loud in their remonstrances, and frightfully angry at the impertinent intrusion; but as I did not touch the infants, and, as far as practicable, mended the torn entrance, why it appeared to me there was not much ground for complaint.

Visiting my pets on the following day, imagine my surprise at finding the nest empty, and the old and young vanished together. First I thought some poaching weasel had murdered the innocents; but no: the old ones had carried them away into some other retreat, because I had looked at them, and meddled with the nest.

Instinct here appears vastly near akin to reason; what had happened once, the "Store-keeper" evidently *thought* might occur again, and wisely took the precautionary measure of concealment, selecting a spot unknown to the intruder.

Its name, "Ogress Squirrel," arises from a singular Indian tradition, that I think is quite worth, as it shows us how readily uncivilized man seizes on the supernatural to account for everything beyond his comprehension. Spiritual agencies and wild myths form subjects for the daily chat round the lodge fire; everything becomes mysterious that is not understood; the very language of the Red-man is a tangled chaos of symbols, figures, and metaphors.

A prominent performer in all their legends is a terrible old woman, half witch, half ogress, of very doubtful reputation, armed with teeth like a wolf, and the claws of a grizzly-bear; her entire time spent in doing evil, eating children, and waging unceasing war on the good and virtuous.

To make the story brief, it seems this amiable old lady (at some period far away in the dim history of the past) spied a fat, dainty, young "Red-skin," the son of a brave and good chief, playing by the side of a mountain burn, not far from the wigwam of its parents. With wily words of endearment, and holding out a basket filled with ripe berries and gaudy flowers, the witch-woman coaxed the baby savage within reach of her terrible claws; as she clutched it, the father and mother saw their loved one's peril, too late to rescue, to save, beyond all human power; there was but one chance, one last frail hope to cling to; falling on their knees, both prayed, and in the agony of despair, besought the "Great Spirit" to use his power and save their child; give it back to them, or change it into any form, so that it escape the teeth and talons of the dreaded ogress. The prayer was heard, and the boy assuming at once the form of a tiny squirrel, deftly slipped from out her grip; but not unscathed, the marks inflicted by four of her claws remain to this day on its *back* as evidence of the story's truthfulness.

Hence it is that Indian boys seldom kill this squirrel, ill luck befalling all such profane transgressors, and that "medicine men" (the doctors and conjurors of the tribes) wear its skin as a potent and all-powerful charm.

The "Store-keeper bearing on its back the marks of the wicked old woman's" finger nails, may be seen by any who choose to visit the British Museum, where a specimen I shot is set up very near the "Rock Whistler."

THE ROBIN.—There are many anecdotes of the sanguinary habits of the Robin. I have to add another to the list. Many years since, during a very severe winter, I was looking into an enclosed yard, where I saw a Robin pecking furiously at another Robin that was dead. Seeing no cause for this animosity, I went to the birds, and found that the head of the dead one had been entirely deprived of its feathers by its antagonist, but for what purpose I could not then ascertain. A short time after, I had occasion to enter the yard again, and seeing the dead bird still there, I took it up, and perceived that the back of its skull was broken, and all the brains scooped out by his enemy; thus explaining why he had worked so hard, and proving that Robin Redbreast is a *Cannibal*.—*J. B. A.*

A CAPTIVE OWL.

Although the true method of obtaining a knowledge of the animal world is to follow up the study out in the fields, where every creature is to be seen free from all restraint, save the laws of its being; yet there are many habits and peculiarities belonging to various species that would probably never have been known but by watching them in a state of captivity; *e. g.* the method of feeding the young, in the case of such birds as the Owl, Wryneck, and others building in dark and often inaccessible holes; the different ways in which birds of prey eat their food; the modes of spinning cocoons by caterpillars, &c. An objection is, however, sometimes advanced, to the effect that we must not form too decided on opinion of the habits of any animal when perfectly free by what it does when placed under restraint, and necessarily in altered circumstances. But I think we must not attach undue weight to this. Let the creature have as much freedom as possible, so long as you can keep it in your view, and then its habits will undergo very little change. I do not like to see any bird in a cage too small for it to exercise its wings in, and, above all things, I have a horror of confining a lark, which is truly a creature of the upper firmament, in a low-roofed house, where it spends a considerable portion of its time in beating its head in the many vain attempts to follow out its native instincts. On the other hand, few of us can afford, like Charles Waterton, to construct a natural paradise of our own, and therefore we must be content with imitating Nature according to our means. I have kept the commoner kinds of finches in a large airy cage at different times, and they have been a never-tiring source both of amusement and instruction. They had sufficient space to fly about in, were able to build their nests, and to bathe to their hearts' content.

But, as my title warns me, it is of the Owl that I am to write; and though, perhaps, many facts that will be brought forward will not be new, yet there may be a few that have not been at least set forth in print. They are all from personal observation, and so, if there is any error, I must be accountable for it.

It was a long time before I could ascertain the existence of any Owls at all in this immediate neighbourhood; I could not meet with any satisfactory accounts either of young ones or eggs being found. At length, induced by promise of reward, a boy came in triumph one day, saying he had a "screech-owl's egg," and after considerable care produced it from a covering he had wrapped round it. His hopes sank as he neared it, for he found the covering very moist with albumen flowing freely from a gaping aperture in the shell; however, as he remarked, there it was, though unfortunately, it had been laid by a Kestrel. But in the month of October, 1863, two young ones were brought to me half-fledged; one died in a little more than a week, but his partner is still in my possession, and is a very fine bird. I have turned him occasionally into a large room at night, which he very much enjoyed; and very ghostly he looked sailing backwards and forwards with noiseless flight in the gaslight that streamed through the windows; the feet were, I believe, always stretched out behind. His appetite developed itself at a very early age. Before I had had him a fortnight, and while his body was still partially covered with down, he one night took six full-grown mice for supper (breakfast?) and would have taken more if he could have got them: he swallowed them all whole. He does not, however, as some naturalists say, invariably bolt them head first; I have seen him take them tail foremost. When any live prey is given him, he always seizes it by the head and neck with his claws, and it is dead almost immediately, apparently strangled. After one shriek from a bird (and that is seldom given), the victim lies perfectly quiet and resigned, and if not dead, looks about it perfectly free from any terrified appearance. I cannot help thinking that the death which is inflicted by carnivorous animals is much freer from pain than we are apt to suppose. When he has killed his prey, or if it is dead when given him, he passes it between his jaws, crushing the bones, and then, if a mouse, he swallows it whole; if a bird, or any large creature, he tears it to pieces. His instinct leads him to break imaginary bones in a piece of meat in the same way when he has it. He once endeavoured, after plucking off the head and larger feathers, to swallow a greenfinch whole; he took two or three minutes, and apparently succeeded, for he closed his mouth, and it quite disappeared. Very soon after, however, he brought it back and plucked it to pieces. As usual, he casts up all fur and bones in pellets; but it is curious to observe that these pellets are also cast up when he has had nothing but soft raw flesh to eat; they then consist mostly of sand and small stones which have clung to the food as it lay on the floor of the cage.

Besides mice and birds, he also takes rats, moles, rabbits (which he does not seem to care about), frogs, and black slugs, but he rejects grey ones. He flies to the food, and takes it from the hand, and the sound of a knife being sharpened brings him at once to look out for meat. The only noises he makes are what is called snoring, a sharp snapping with the mandibles, and a quiet internal twittering, something like that of the house-swallow, but not so shrill; he makes this when the dog or cat goes near him, but very often when there is no cause. He is not frightened at the cat, nor does he bear any ill-will towards her, though she occasionally steals his meat. Once she got shut up with him all night, but they never quarrelled. The snapping noise is not a simple clashing of the mandibles; they are brought nearly close, with the tongue exserted on one side: this is suddenly withdrawn, and the result is—*snap.*

His movements, when any live prey is put in the cage, appear to the observer ridiculous in the highest degree, owing to the great size of the head and the large round dark eyes. When he has more food than he wants, he stores it up in a corner. Although the outer front toe is reversible, I have never seen him perching but with two toes before and two behind.

Until very lately I believed that the Owl never touched water; for though I had frequently placed it in his cage, and kept it there for two or three weeks, I could never find that he either bathed in it or drank from it; but a few days ago, seeing him very restless, I gave him another trial. He seemed quite pleased with it, and, hastening to it, drank heartily, and then jumped in and completely drenched himself with it. He does not appear to moult his feathers so often or so completely as other birds; for the primary wing-feathers have not been changed since I first had him. Hy. Ullyett.

STICKLEBACKS' NESTS.

Many of the readers of the "Science Gossip" will no doubt be inclined to dismiss the notion of nest-building fish with ridicule; nevertheless, as they with little trouble and much pleasure to themselves can prove that many, if not all of the species of Sticklebacks, those well known inhabitants of every pool left by the winter's floods, and every ditch communicating with a river, do build nests for the concealment of their eggs and the protection of their young, is a matter placed beyond all doubt.

The present writer having heard the fact reported, and read that such was the case in some popular works, but not finding it confirmed at first hand by any of the more respectable writers on Ichthyology—Yarrell not even alluding to it in the first edition of his "British Fishes," although an instance is quoted in a subsequent edition of that work, to which the writer has not had access—determined to do his utmost to put the matter beyond all doubt, at least as regarded himself, bearing in mind that non-success would prove nothing against the assertion as regards the fish in a state of nature when food and situation were favourable, while, on the other hand, success would most triumphantly prove it.

An aquarium, about nine inches deep and from fifteen to eighteen in diameter, was procured, and a layer of sand an inch or two in thickness, and some large stones placed therein (this sand was procured from a brook in order that animalcules suitable as food might be present in the water), and some Anacharis and other water plants planted in it.

The aquarium was then left to itself for some time, in order that the plants might take root, and the animalcules propagate themselves.

Two pairs of sticklebacks we procured about the middle of April; the males having already put on their spring dress of scarlet and green, and the females being full of spawn.

After some days a small hole was observed in the sand near a large stone. To this hole one of the males was paying the most assiduous and extraordinary attentions: he would poise himself at an angle of forty-five degrees or thereabout, and commence a tremendous motion of his whole body, making the centre the pivot, and at the same time beating the water with his fins. This motion increased regularly in rapidity for a minute or so, when it ceased abruptly, and the fish darted off either in pursuit of some tresspasser whom he chastised (the females not even being exempt), or to obtain materials to

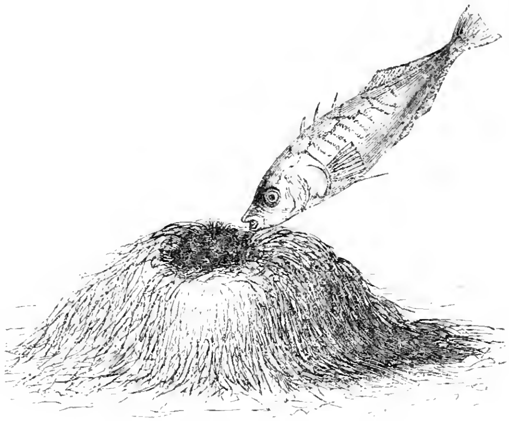


Fig. 1. Three-spined Stickleback and nest.

increase his nest. These consisted of pieces of stick or moss, which, being saturated with water, were of such gravity as to prevent their rising. He deposited these with great care, leaving a beautifully rounded hole in the middle, and then having procured a mouthful of sand laid it over the looser materials to cement them together.

When completed, the nest resembled a flattened haycock.

For about a week after its completion it seemed deserted, but one morning it was found that some eggs had been laid. These for the size of the fish are very large, being about as large as a middling-sized shot; they hatched in about from ten days to a fortnight, the young fish remaining in the nest until the yolk-bag was absorbed, when, being large enough to look after themselves, they went their ways, the parent who had so tenderly guarded them took no further heed of them, and himself died, such being the case in both instances which came under notice, both parents sickening and dying from the effects of spawning and watching, or perhaps from the aquarium not being fitted for their recovery.

From the time of the eggs being laid until the dispersion of the young fish, the male was continually hovering over them in the manner described;

and so great was his pugnacity that he would attack a stick, or even the finger if put near him; but the most remarkable instance of his pugilistic disposition was manifested when a caddis ventured near his charge: he would immediately seize it and carry it quite across the aquarium; this being the more remarkable as he did not touch it until it moved, thus perhaps showing that in his judgment, if not in the judgment of many pisciculturalists, the caddis would devour or otherwise injure the spawn. It is remarkable that the male plays the part of mamma in every way, the female taking no heed of her offspring.

Thus much for the common three-spined stickleback's nest. The nest of the ten-spined stickleback is said to be barrel-shaped and placed, not on the bottom, but among the stems and leaves of plants.

No doubt some who read this may like to try the experiment themselves. Nothing can be easier; all there is to add is this: let your aquarium be without fish for some time; perhaps it would be better without even snails. Do not omit to feed them with small worms every day, and, above all, do not over crowd them.

APHIDES OR PLANT-BUGS.—The plant-bugs (Aphides) are insects belonging to the order Hemiptera, that is to say, to the group which includes the Cicadidæ, Cimicidæ (bugs), &c. They form a very extensive genus, whose species are even yet far from being all known. These insects are genuine parasites, living upon vegetables, and in these temperate climates there is hardly a single plant but what supports its own species of Aphis, either upon its stems, or its leaves, or about its roots. Many species of Aphis may be classed among the noxious insects. Réaumur discovered that the punctures made by them, when in sufficient quantity, not only exhausted the plants, but gave rise to nodular swellings, and to alteration of the tissues. The laniger plant-bug (*Lachnus laniger*), which attacks apple-trees especially, has on many occasions destroyed the plantations of Normandy. This species, which is one of the disastrous results of commercial intercommunication with other countries, was found in England, according to M. Tougard, in 1787. In 1812, it had reached the French departments of Côtes-du-Nord, Manche, and Calvados. In 1818, it made its appearance in Paris in the garden of the "École de Pharmacie;" it was seen in the departments of the Seine-Inférieure, the Somme, and the Aisne, in 1822. Finally, it was discovered in Belgium in 1827. This formidable little insect has for some years held its sway in the southern departments, no means of destroying it having been discovered.—*Quatrefages' Metamorphoses.*

THE GREATER SPOTTED WOOD-PECKER.

IN a recent number of the *Zoologist* (March, 1864), Mr. Maurice describes his observations respecting the Greater Spotted Wood-pecker, which had attracted my notice when in Oaxaca forty years ago; and as I consider wood-peckers exceedingly clever birds, and capable of performing acts that would seem to denote, or require something more than instinct, I have been surprised not to find any explanation or suggestion regarding the wonderful provision made by the Great Spotted Wood-peckers for storing their winter food.

It is in the higher regions of the Cordilleras that the habits of the numerous species of wood-pecker may be advantageously studied. In some such localities a large and very beautiful wood-pecker exhibits the most marvellous indications of forethought and design. The acorn is its principal food, the storing of which is performed, I suppose, by the wood-pecker taking the precise measurement of an acorn, and then making a hole in the bark of the pitch- (or candle-) pine so exactly the size and shape of the acorn that it must cost some trouble to pack it the narrow end foremost (which it invariably does), and the part that was attached to the cup, outside, but not protruding from the bark. I have seen trees in Oaxaca upwards of 100 feet high, so completely stuffed with acorns, that it seemed impossible to find a place for an additional one. Trees thus treated have a very singular appearance. Some years ago (either 1854 or 1855) I saw in the *Athenæum* a similar discription to my own by a traveller in California, who considered that his observations were something quite new. But I have never seen any reason given, any guess hazarded, as to *why* the wood-pecker acts so wisely as he does in selecting the pitch-pine *alone* for storing his food. *Why* not take the white-fir, the cedar, alder, or hundreds of other trees that to an *un*observant person would appear equally, if not better adapted to the purpose? The question remains still unanswered as to why the wood-pecker prefers the pitch-pine? I therefore venture to offer my own explanation.

In the forests the wood-peckers inhabit, there is scarcely an oak-tree without a squirrel skipping along its branches. When the acorns are shed, or rotting, or producing young oaks, the squirrels have to look for food elsewhere. If the woodpeckers stored their food in the bark of the Cedar, White-Pine, or almost any other tree, the squirrels would find no difficulty in gnawing their way to the woodpecker's dinner. But they are too wise to attempt to extract a single acorn from the bark of the Pitch-Pine, for they would have to gnaw into turpentine, and would be laughed at by the woodpeckers for their pains.

F. G.

THE HOUSE SPIDER.

SPIDERS are not now ranked among insects; because, as the handbooks of entomology state, "they have no antennæ, no division between the head and the thorax; they breathe by leaf-shaped gills situated under the belly instead of spiracles in the sides; have a heart connected with these; have eight legs instead of six, and six or eight fixed eyes.

With the exception of the dragon-fly, whose head is terribly armed, there is not, perhaps, another creature possessed of such a fearful array of weapons as the spider. These weapons form beautiful microscopic objects, and as such they deserve attention.

The house spider (*Aranea domestica*) has eight simple eyes; these are set in two rows in the upper part of the head, and beneath them are the two larger jaws or mandibles; each of these mandibles contains a number of teeth, and is terminated by a large claw, a portion of the inner side of which is finely serrated. The number of teeth in a mandible is perhaps variable: there are eight in the specimens from which the figure given in this paper has been taken (fig. 2), but sometimes five only have been found. The claws frequently vary somewhat in the curvature of their ends, and are more finely pointed in some instances than in others.

I have read somewhere that the action of these claws is downward: this I have not been able to verify, for in the cases in which I have seen them in action, they were nearly horizontal, having only a slight inclination downward; and in the cast skins

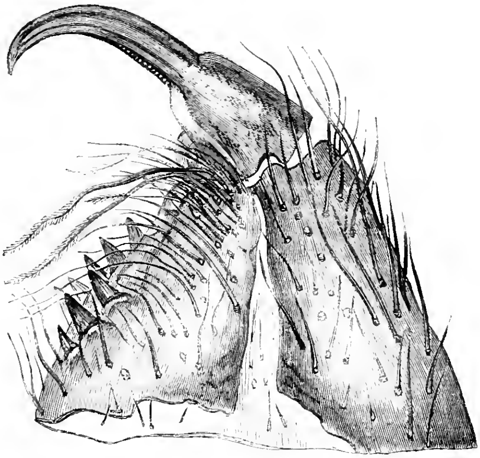


Fig. 2. Mandible of Spider.

to be found on old walls, the claws lie close to the mandibles, and in a horizontal direction. Beneath the mandibles are the maxillæ (fig. 3), or smaller jaws, each of these contains a row of very fine teeth, and at the end of each row there is a thick tuft of hair. The teeth are so placed that in all probability the two rows work against each other, and each tuft of hair is perhaps used to clean the teeth of the opposite maxilla.

Fig. 3. Maxillæ of Spider.

With the assistance of an ordinary pocket magnifying glass the action of the mandibles may be distinctly seen. It is a curious thing to watch a spider making a repast of a fly; to see with what dexterity it uses each mandible alternately, as, with the greatest ease, it turns the body of the fly round, and presses it until it becomes a shapeless mass of juicy pulp.

The mandibles contain the poison, and the poison duct may be traced to the extremity of the claw, if the latter be sufficiently bleached before mounting.

The rapidity and fatality of the action of the poison has frequently been a subject of remark; the following simple observation sets it in a clear light. A stout fly became entangled in the web of a spider: quick as lightning, out darts the spider and seizes the fly, and equally quick was the interference to the rescue; it was relieved and set at liberty, the fly then walked smartly up a window-pane, stopped awhile, brushed its wings with its hind feet, rubbed its feet, and dressed itself; this was the action of a minute. It then walked about again, apparently all right. Presently it stood without motion, and after a few seconds, when touched, it was found to be scarcely able to raise its feet, and after a few seconds more it was quite dead.

Much interesting matter relative to insects may easily be obtained by the exercise of a little patient and continued observation. The above has been written with the desire of calling the attention of the general reader to a few of the wonderful things in the common objects of nature, and pointing out to the young microscopist two objects easily found upon which the first efforts at mounting may be successfully exercised.

LEWIS G. MILLS, LL.B., *Armagh.*

IMPERFECTLY DEVELOPED PLANTS.

As the record of variations in plants, and of abnormal forms, seems to be interesting to many of the readers of Science-Gossip, I make no other apology for contributing a second chapter on the same subject.

Fig. 4.

Fig. 5.

In a very rich piece of newly broken-up ground I gathered, a few years ago, some leaves of *Dandelion* (Fig. 4), which, owing to luxuriant growth, had become enormously large and much more deeply cut than usual, being, in fact, *bi-runcinate*. Leaves often become more deeply cut from *poverty*, and more simple through *luxuriance*, but in this case the extra cutting was undoubtedly caused by the richness of the soil, there being several similar plants, each of which was nearly two feet across.

In another case, however, of *Horse-radish* (Fig. 5), the radical leaves of nearly all the plants in my garden became last year so deeply cut as to be almost pinnate. This was no doubt caused by the *dryness* of the season. The horse-radish is a plant which loves a cool, moist soil, establishing itself by the side of water, and in the half-dry beds of rivers, where it grows luxuriantly, and the continued drought impoverished the plants. It is quite the character of the order *Cruciferæ* to have pinnatifid or lyrate leaves, and it is somewhat remarkable that the horse-radish, in an unhealthy state, should so much more resemble the other plants of the tribe than it does when properly grown.

I met with a leaf of White-Clover (*Trifolium repens*) in the autumn, in which the leaflets have a tendency to become pinnate (Fig. 6). An appearance

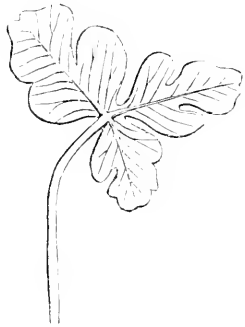


Fig. 6.

something like this often takes place when the tip of a leaf has been bitten whilst folded up, every leaflet being equally injured, but this seems so regularly formed that I think it is a natural monstrosity.

Fig. 7.

Figure 7 is a drawing of a not unfrequent form of Plantain (*Plantago lanceolata*), which has become proliferous, producing small flower-heads on footstalks and several leaves from the base of the flower. Gathered at Beaumaris during the last summer.

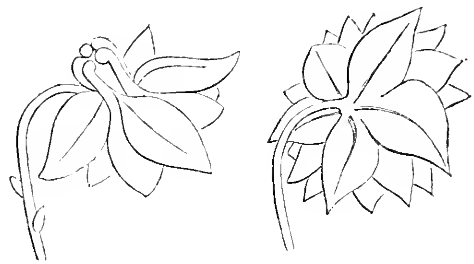
Fig. 8 is a very interesting example of Marvel of Peru (*Mirabilis jalapa*), which has grown in my garden during the last summer. This plant belongs to the natural order *Nyctaginaceæ*, a tribe in which there is no corolla, but the calyx becomes coloured, and is placed, solitary or clustered, in an involucre

Fig. 8.

of leafy bracts. In the case of the Marvel of Peru, however, no one would suppose, from merely looking at the flower, but that there was a beautiful crimson or yellow or streaked monopetalous corolla placed within an ordinary green calyx of five sepals. Botanists tell us, however, that this corolla is no corolla at all, but a calyx, and that what we supposed to be calyx is only bracts. In the specimen figured, *two* of these coloured perianths have grown within *one* pseudo-calyx, showing that the latter organ is really an involucre, and establishing the relationship of this plant with *Nyctago* and other genera in which the nature of the involucral leaves cannot be mistaken. Such specimens have been observed before, and been made use of in proving the affinities of *Mirabilis*.

I have several times noticed a curious variety of the Common Columbine (*Aquilegia vulgaris*), which I think comes up the same year after year, but on this point I am not sure. The flower of this variety is entirely destitute of the horn-shaped hollow petals so characteristic of the plant, but their place is taken by a second and often third ring of flat leaves, which are either altered petals or multiplied sepals, and which give the flower very much the appearance of the double form of Love-in-a-mist (*Nigella*), minus the pectinated involucre. I made no drawing of this variety at the time, but the following outline from memory will serve to explain it sufficiently (Fig. 9).

Whilst at Llanberis during the past summer, I found, in the garden of the hotel where we were staying, a curious flower of Weigelia, very similar in its abnormal development to a primrose which I described



a b

Fig. 9. *a*. normal; *b*. abnormal.

in No. 5 of SCIENCE-GOSSIP. There was a corolla of the usual shape and size, which contained only one perfect stamen, all the other internal organs being converted into a short branch, upon the base of which were placed two or three leaflike greenish bracts, and on the summit a second corolla, rather irregular in shape and containing half-developed stamens and pistil.

The flowers of the double-blossomed Cherry, which are so great an ornament in our gardens in May, always show us some interesting examples of abnormal development. The duplication of the flower is effected by the conversion of *some* of the numerous stamens into petals, a considerable number of the stamens remaining still unchanged, so that if the pistils were perfect, there would be no reason why the double-blossomed cherry should not always produce fruit.

If the flowers be examined, however, the pistil will be found to have suffered change, becoming, not a new series of petals, but two little green leaves, folded one within the other, in the centre of the flower. Now and then the pistil remains perfect, and if it happen to be fertilized by the stamens it grows, and we *do* find occasionally one or two ripe cherries on a tree. Last year I observed on a tree in my own garden, that in *very many* of the flowers the two little central green leaves had become a regular calyx enclosing a second double-flower.

The Poet's Narcissus (*N. poeticus*), which we in Cheshire call by the pretty name of "Sweet Nancy," is very curious in its manner of duplication. I have many patches of it, some of which are semi-double, being either double ones reverting to single, or single ones becoming double, I know not which; and in these the way in which the flower becomes double may be well seen. A single flower consists of six leaves united into a tube, around the mouth of which stands the crimson cup-shaped nectary, six stamens being attached to the sides of the tube.

If one of these semi-double flowers be examined, it will be found that each stamen has become, not merely a new petal, but actually a new flower, for it forms a tube, the mouth of which consists of, on one side a crimson nectary, on the other a white petal (fig. 10, *a*), and frequently, attached to this nectary, a bristle (fig. 10, *b*), which I take to be a rudimentary stamen. These six new petals do not unite like the outer petals of the flower, but are always distinct from each other; and if the flower becomes quite double, it is by a multiplication of these inner florets, the change sometimes extending itself to the pistil, which separates into three unshapely petals.

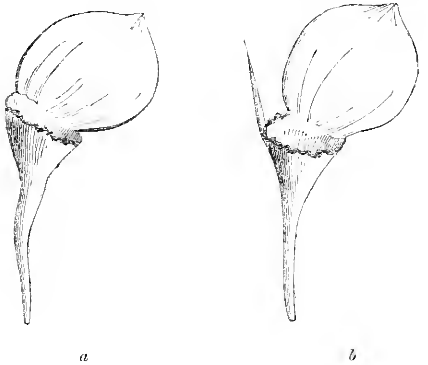


Fig. 10.

In the autumn my children brought me half-a-dozen double damsons which were all found on one tree. The old order *Rosaceæ* is, now-a-days, broken up into several minor orders, one of which is *Drupaceæ*, which is distinguished from Rosaceæ proper mainly by there being only one ovary in the flower instead of several, this one ovary becoming eventually what we call a "stone fruit." If any plum tree be examined whilst in blossom, one can scarcely fail in finding a few flowers in which there are two, three, or more pistils and as many carpels, showing a tendency in the order Drupaceæ "to assume one of the distinguishing characters of Roseworts," as noticed by the late Dr. Lindley in his "Vegetable Kingdom" (Order Drupaceæ, p. 557). Generally, I think, these polygynous flowers drop off. Sometimes, no doubt, one carpel will come to maturity and the others will dwindle away, and we have only a one-celled fruit from several pistils, as is the rule in Cocoa-nuts, Hazel-nuts, and many other plants. But occasionally all the pistils become fertilized, and the result is a compound fruit as in the present instance.

More than one botanical friend has remarked to me upon the prevalence of monstrous forms of flowers during the past summer. As far as my own experience goes, I have not found them more plentiful than usual; indeed, I think that a *wet* season is generally more productive of abnormal growth than a dry one, such as we have had. But I am rather inclined to think that I *do* see, last year, some little difference in the *character* of the abnormal forms; that, whereas, in ordinary seasons, the tendency in monstrous flowers is a *reversion to leaves;* this has not been so much the case during the dry, hot summer of 1865. ROBERT HOLLAND.

VEGETABLE FIBRES.

At a recent meeting of the Quekett Microscopical Club, a paper was read on the application of the microscope to the discrimination of vegetable fibres. The object of this communication was to point out what had been done, and to suggest what remained to be accomplished, and the best mode of performing it. Although adulterations of food have been well cared for and deeply investigated, adulterations or admixtures in fabrics, whether of animal or vegetable origin, have hitherto obtained but little attention. Yet, it is urged, the subject is an important one and well deserving systematic research. All fibres employed for commercial purposes may be divided into four classes, two of which are animal—*i. e.*, wool and silk—and two vegetable; which may be termed vascular and cellular.

WOOL has a peculiar structure, readily to be distinguished from all other animal and vegetable fibres (fig. 11, *b*), and differing slightly in its own varieties,

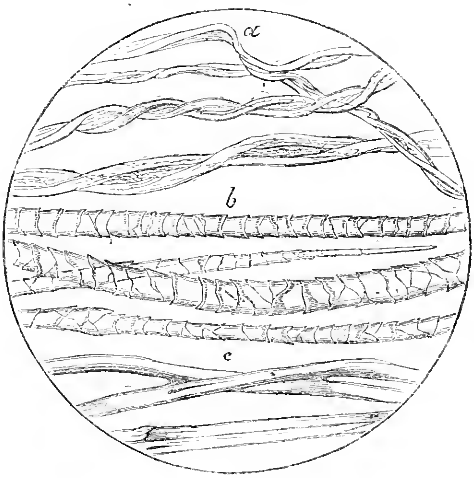


Fig. 11. *a.* Cotton; *b.* Wool; *c.* Silk.

as may be seen by reference to a paper on hairs in our first volume. (Vol. i. p. 29.) Yet we have no work of authority, and no reliable figures of the microscopic appearances of different qualities and classes of wool, even of those ordinarily met with in commerce. It must be possible to characterize microscopic features whereby Saxony can be distinguished from South-down, and Australian from East Indian.

SILK (fig. 11, *c*) is more uniform in its character, and the difficulty would be greater to point out the features which distinguish the produce of the mulberry worm from that of the Tusseh of India, the Moonga or Erie of Assam, and the Ailante of recent introduction into Europe.

Vegetable fibres of the cellular kind are hairs which invest the seeds of certain plants, COTTON being of the chief importance (fig. 11, *a*). This has been described as a flat band with thickened margins, and a delicate tracery down the centre; much twisted throughout its length. This may appear to be the structure on a superficial examination of the dried cotton, but the normal structure is certainly that of a cylindrical hair with thin walls, readily collapsing and twisting as it becomes dry, its apparent margin being formed by incomplete compression and the resistance at the edges as seen in the following section of a fresh(fig. 12, *a*) and dried hair (*b*). The supposed tracery is an optical illusion,

Fig. 12.

caused by the irregular wrinkling of the two opposite walls when in contact. Very important investigations on this subject have been commenced in Manchester. Are there really any distinguishable microscopic differences between Sea Island and Egyptian, New Orleans and African, or between Brazilian and Surat?

Vascular fibres are derived either from the inner bark (liber) of exogenous or the vascular bundles of the leaves of endogenous plants. Each of these groups would possess their own peculiar features.

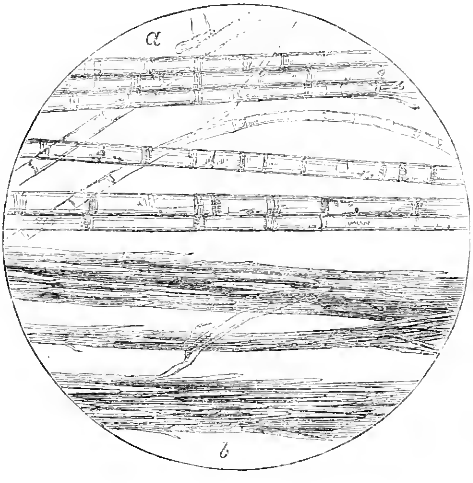


Fig. 13. *a*. Flax; *b*. Jute.

The most important of liber-fibres is FLAX, obtained from the common flax plant (*Linum usitatissimum*). This possesses a variable market value according to country or climate of production. It is natural to inquire whether the microscope can detect differences between Irish and Belgian, or between Egyptian and Spanish flax. In 1860, Dr. Forbes Watson communicated an important paper to the Society of Arts, in which the microscopic character of vegetable fibres received more attention than had ever before been given to the subject, and since that period nothing has been attempted in advance. The woodcuts used to illustrate these observations were prepared for that occasion, and have been kindly placed at our disposal by Dr. Watson. The microscopic characters we are about to give are those which then accompanied the illustrations.

The *flax* fibre (fig. 13, *a*) presents at varying distances certain characteristic cross markings, the outlines of the fibres are hard and smooth, and the ultimate fibrillæ can seldom be detected until carefully detached from the ordinary fibres.

A strong fibre is obtained from the Chinese nettle, or RHEA (see S. Gos., vol. i. p. 277), known botanically as *Bœhmeria nivea*, and sometimes called China-grass. Under the microscope its fibres present a peculiarly rough appearance, and when viewed by reflected light have an appearance not unlike frosted grass.

Another Indian nettle, called the NEILGHERRY NETTLE (*Urtica heterophylla*), of which a figure has already been given (vol. i. p. 276), yields a similar but more woolly fibre. (Fig. 14, *b*.) Under the

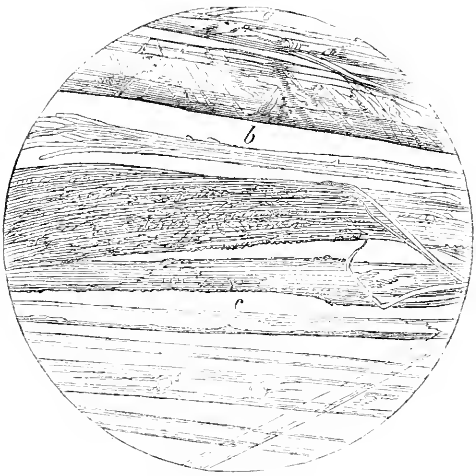


Fig. 14. *a*. Chinese nettle; *b*. Neilgherry nettle; *c*. Bedolee.

microscope it exhibits considerably greater asperities than the Rhea, and has been recommended as a substitute or for admixture with wool. A comparison of the two figures (fig. 11, *b*, and fig. 14, *b*) will prove that such an admixture could readily be detected.

The fibre of the MUDAR (*Calotropis procera*) is similar in commercial value, but characteristically different in microscopical structure (fig. 15, *c*). It is not unlike flax without its transverse markings.

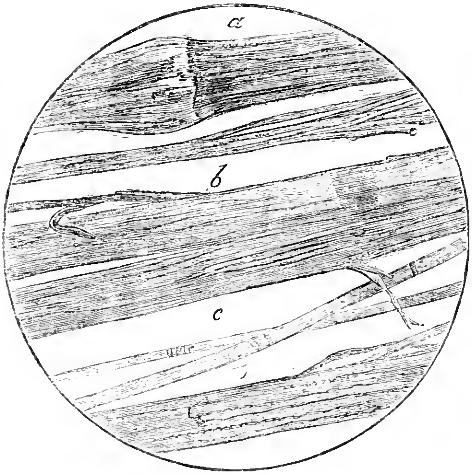


Fig. 15. *a*. Bariala; *b*. Ambaree; *c*. Mudar.

The ultimate fibres are distinctly to be seen in the ordinary bundles, which is not the case with flax.

A creeping plant called BEDOLEE (*Pæderia fœtida*) abounds in Assam, and yields a silky fibre possessed of great strength and flexibility. Under the microscope (fig. 14, *c*) it appears as a smooth solid cylinder with very slight markings.

JUTE is well known in English commerce, and is derived from two plants, *Corchorus olitorius* and *Corchorus capsularis*. The presence of this fibre, which, by the way, is an adulterant in extensive use, can be easily detected by the microscope (fig. 13, *b*). It has a rougher outline and is much more opaque than flax; it has no definite cross markings, and the cells frequently terminate in a tongue-like shape.

BARIALA is the native name of *Sida rhomboidea*, which yields a similar fibre in India. The microscopic appearance (fig. 15, *a*) is that of a regular, distinct, longitudinal structure. It is opaque and slightly woody. By reflected light it presents a pearly appearance not unlike New Zealand flax.

AMBAREE is the brown hemp of *Hibiscus cannabinus*, and under the microscope (fig. 15, *b*) is very similar to the fibre of the Bariala.

The true HEMP (*Cannabis sativa*) is well known; and fig. 16 represents the microscopic appearance of three varieties: the Russian, Himalayan, and Italian. They are not unlike flax, except as to the transverse markings, in which hemp is usually defective, and, when present, not so decided. It is difficult to distinguish some fine samples of hemp from flax.

SUNN or Bombay hemp (*Crotalaria juncea*) offers a fibre which microscopically is rather like that of hemp, but rougher, and without any indication of cross markings.

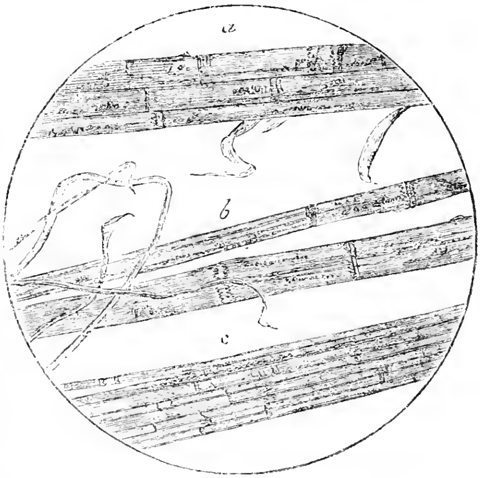


Fig. 16. *a*. Russian hemp; *b*. Himalayan hemp; *c*. Italian hemp.

JETEE (*Marsdenia tenacissima*) yields the Rajmahal bowstring hemp, a fibre much valued for its tenacity. The ultimate fibres (fig. 17, *b*) are regular

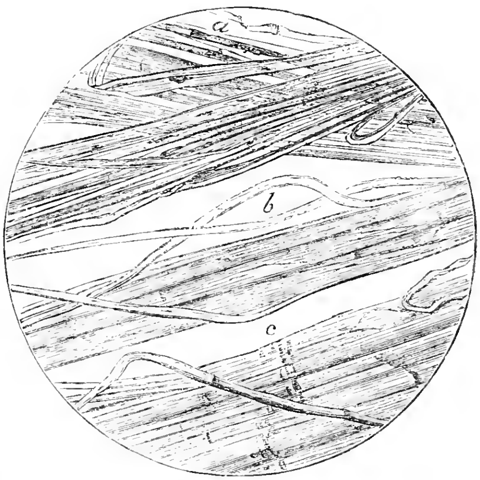


Fig. 17. *a*. Sunn; *b*. Jetee; *c*. Dhunchee.

in diameter, with slight rugosites on the surface.

DHUNCHEE (*Sesbania aculeata*) has a very regular fibre (fig. 17, *c*), with a somewhat woody structure.

We arrive now at the second group of vascular fibres, namely, those afforded by endogenous plants, of which the most important is that afforded by the PINE-APPLE (*Ananassa sativa*). Under the microscope they have a somewhat opalescent, glass-like appearance, and are very refractive.

MANILLA HEMP, the produce of a species of plantain (vol. i. p. 232) called by botanists *Musa textilis*, presents but little variation from other endogenous fibres, except in the presence of distinct cross-markings (fig. 18, *c*).

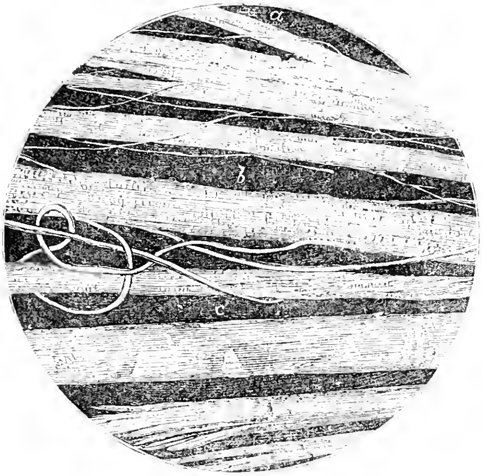


Fig. 18. *a*. Pine-apple; *b*. New Zealand flax; *c*. Manilla hemp.

The NEW ZEALAND FLAX (*Phormium tenax*) has a peculiar flossy appearance under the microscope. (Fig 18, *b*.)

Of a vastly different character are the coarser fibres, which remain to be noticed.

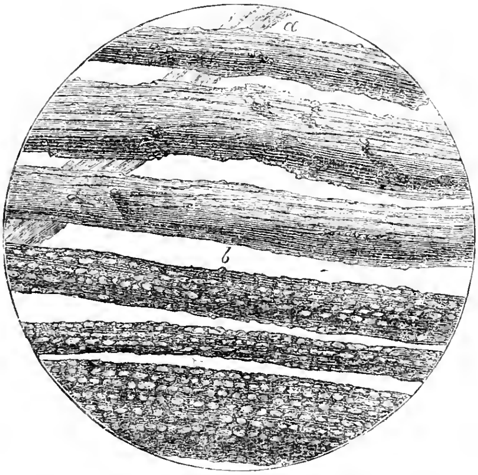


Fig. 19. *a*. Cocoa-nut coir; *b*. Ejoo.

COIR, the product of the cocoa-nut palm (*Cocos nucifera*), (fig. 19, *a*), and EJOO, the black fibres which surround the bases of the leaf-stalks and trunk of the Gomuti palm (Sc. Gos., vol. i. p. 77), *Arenga sacharifera*. The figures of these fibres (fig. 19) will render description unnecessary.

It is desirable that the investigations thus commenced should be proceeded with, that a larger number of fibres should be examined, and their characters ascertained, and especially that those already examined should be viewed with higher powers, subjected to chemical action, and viewed under all circumstances. Polarization may bring new features into notice, and boiling in nitric acid should be tried. The figures in the Micrographical Dictionary, which exhibit some of the foregoing fibres after treatment with nitric acid, may be referred to, as indicating that the present is only initiative of a larger and more comprehensive work which still remains to be accomplished.

At the last meeting of the Quekett Microscopical Club, a sub-committee was appointed to examine microscopically the different varieties of commercial fibres, with the view of ascertaining if distinct characters could be found whereby one kind might be discriminated from another, and to report thereon.

SIMPLE OBJECTS.—X.

THE SCALE OF THE PERCH.

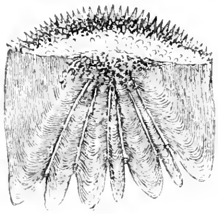


Fig. 20.

FISH scales are readily available for microscopic objects, and those of the Sole are often recommended; but the scale of the common fresh water Perch is quite as interesting, and less commonly used. Those of the Roach and Dace are by no means to be despised. Scales are generally mounted dry, being first cleaned; but when it is intended to view them with the polariscope, they must be mounted in balsam. There is so much of character in the scales of different species of fish that it is a matter for surprise that so few of the cabinets of amateurs contain even a respectable series. There are no difficulties to be surmounted either in procuring, cleaning, or mounting them; and perhaps this is one reason why they have not had the attention they deserve.*

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* Consult "Micrographic Dictionary," p. 607, and "Davies on Preparing and Mounting Microscopic Objects," pp. 53, 78.

ECONOMIC FOUNTAIN FOR AQUARIA.

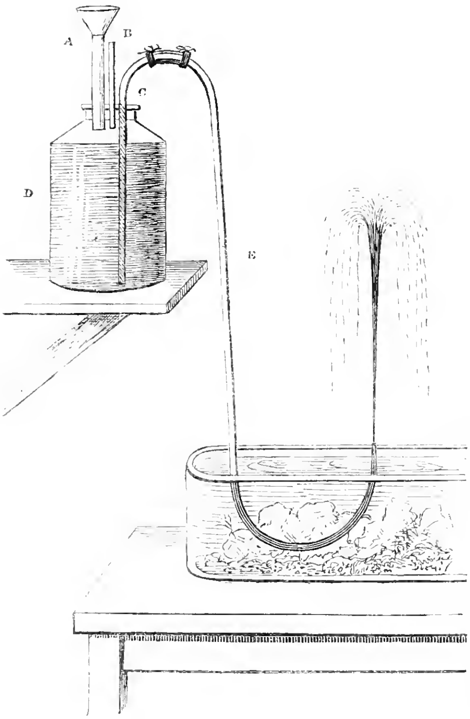


Fig. 21.

As the water in my marine aquarium requires aerating pretty frequently, and as syringing is too troublesome, I have contrived a small fountain, of which I send a sketch and description.

D is a wide-mouthed bottle, in the cork of which are drilled three holes. Through these holes pass respectively the three glass tubes, A, B, and C; the latter reaching nearly to the bottom, the other two only passing through the cork. A is a wide tube with a funnel-shaped top, B is plain, and C is slightly bent at the top, where there is attached to it (by means of a piece of indian-rubber tubing) a long tube, E, which is bent up and drawn to a point at its other extremity.

The cork and tubes should fit perfectly. To set the fountain in action, fill the bottle, and when it is full, continue to pour water gently into the funnel until it is above the level of the bend in the tube C, when a little will flow over into the long leg E of the syphon. The water will then of course continue to flow until the level of the water in the bottle falls below the mouth of the tube C.

The tube B is for the escape of the air while filling. Care should be taken to keep the bottle clean, and free from particles of sand and grit, or these will get into the pipe and stop the jet.

THE MOA OF NEW ZEALAND.

A very interesting volume, entitled "The World before the Deluge," by Louis Figuier, has recently been translated into English, in a very satisfactory manner, and published in this country. From this work, which is profusely illustrated, we have borrowed a woodcut representing the *Dinornis*, restored to what is believed to have been its natural

Fig. 22. The *Dinornis*, restored.

appearance. Writing of the post-pliocene period, the author remarks: "Two gigantic birds seem to have lived in New Zealand during this epoch. The *Dinornis*, which, if we may judge from the *tibia*, which is upwards of three feet long, and from its eggs, which are much larger than those of the ostrich, must have been of most extraordinary size for a bird. As to the *Epiornis*, the egg only has been found."

At the meeting of the Zoological Society, held on the 12th of December, Mr. W. H. Flower communicated some notes from Dr. Hector, Director of the Geological Survey, New Zealand, upon the bones of various species of *Dinornis*, which had been exhibited in the New Zealand Exhibition, recently held at Dunedin.

We were led into an error in our last number (page 282), in stating that the Moa's egg was sold for

£120. It is true that this was the highest bidding, but there was a reserve beyond that sum, and we are told that the egg is to be repacked and sent back to New Zealand, as its owner is not disposed to part with it at the price.

FOSSIL-WOOD IN FLINT.

IN searching for fossils a few weeks ago in an excavation made in this neighbourhood, for the purpsse of getting chalk for the manufacture of whiting, I met with a fine specimen of fossil-wood embedded in a large tabular flint. With difficulty I succeeded in removing the greater part of it, together with a portion of adherent flint. The specimen measured eight inches in length, and seven in circumference. It is silicious throughout, bears traces of bark, and is riddled in places with circular holes, which are filled with pellets of flint; the holes having been most likely bored by teredines before the wood had become petrified. As the silicified fibres when microscopically examined exhibit rows of circular dots, similar to those seen on the fibres of coniferous wood, there is little doubt that the specimen is part of a pine-branch. The chalk in which the fossil was found is of the kind known as upper chalk, as it is interstratified at intervals of about six feet with densely packed layers of flints, some of which are of immense size, and when broken are often found to contain beautiful specimens of silicified arborescent sponge, coloured with oxyde of iron. Some of the hollow nodular flints are lined with exquisitely coloured mammillated calcedony. The chalk itself is not very fossiliferous, having succeeded in finding only a few *Terebratulæ* with one or two of the commoner *Echini;* but the workmen had picked up from time to time several small pieces of petrified wood, which were also found to be coniferous.

That such discoveries are sometimes noticed in scientific journals would lead to the conclusion that petrified wood is not common in chalk. The *Geological Magazine* for July last contains a notice, with a figure of a similar fossil, found also in the Hampshire chalk, near Winchester. The specimen is now in the Oxford Museum. Professor Phillips, the writer of the article, describes it as "a fragment worn and rounded in some of the prominent parts;" and adds that "it looks like a small portion of a pine-branch which had been exposed to rough treatment, so as to present a wasted surface deprived of the bark. It is entirely silicious, and reveals in the utmost perfection the whole of the tissues." He then continues: "Traversing the woody fibres are several short tubular masses, swollen at the end, and marked more or less plainly with transverse rings. These are flint moulds in cavities left by boring shells, probably teredines. It appears that these animals must have begun their operations in a young state on the wood when it had been reduced to its present figure and magnitude; for the moulds which remain in their holes appear to be quite small at the surface and quickly to grow larger within." From the engraving the wood would be about five inches long, and one inch and a quarter broad, attached to a good-sized piece of flint.

J. S., *St. Mary Bourne, Hants.*

ZOOLOGY.

RED-BREASTED FLY-CATCHER (*Muscicapa parva*).—Mr. E. H. Rodd has addressed the following letter to Dr. Gray, on the occurrence of this bird at Scilly:—"It may be interesting to you to know that another example of *Muscicapa parva*, very nearly in the same state of plumage as its predecessor at Scilly, was captured on Sunday week at Trescoe Isle, Scilly. The variation in its plumage consists in the scapularies and wing-coverts being more decidedly bordered with rufus. This, I think, shows it to be a bird of the year. I expect it breeds in Britain."—*Penzance, Nov.* 14. (See also *Annals of Nat. Hist.*, 1863, vol. XI., p. 229; *Zoologist*, p. 8445.)

THE GLOW-WORM IN AUSTRALIA.—Those are mistaken who believe that the little luminous worm of this colony never displays its light unless the soil is disturbed. The first time that I observed it was in the passage at the back of an old bush house near Mount Elephant, one very wet night. The rain had beaten in under the door, and the boards were wet and dirty. I was surprised at the brilliant light, so like that of the English glow-worm, and having carried one luminous speck into a lighted room, found it to be from a little whitish, semi-transparent worm, of which several specimens might have been collected from the floor and door-posts.—*Wm. Adeny.*

THE GLOW-WORM.—It may be worth recording in SCIENCE-GOSSIP that I saw a glow-worm giving out a brilliant light, last evening, in a hedgerow near my house. It was about 7 o'clock. I never before saw a specimen later than September.—*W. W. Spicer, Itchen Abbas, Hants, Dec.* 8, 1865.

BIRD SLAUGHTER.—The President of the Naturalists' Field Club (the Rev. G. C. Abbs) stated on Thursday, at the anniversary meeting of the club, that he had been calculating the number of caterpillars which the 6,000 sparrows killed by a member of a "sparrow club" in Essex, and for which he had actually received a prize of 10s., would have eaten. The amount was 6,307,000,000. While the clod-hoppers of Essex are killing sparrows by the thousand, the Australian colonists are importing them at a considerable expense from England, to act the part of protectors of the crops, and thereby of promoters of the comforts of the people.—*Gateshead Observer.*

Fleas.—Perhaps S. J. M'Intire will allow me to make a small addition to the account of the Cat Flea. He says he has not seen the larvæ of the common flea. Once, in a hot part, where fleas are rather too common, I found a blanket abounding with their eggs and grubs. When I was a boy we took some trouble to see the habits, &c., of fleas. I got a glass tube, about two inches long, and put some cotton wool lightly into the upper part of it, with two or three fleas. The other end was stopped with a cork, and to find them I used to take this out and apply the open part to the back of the hand, when the fleas made no trouble about coming down and having a feast. In this way I kept them for some time, and they laid their eggs and hatched their larvæ. But the life of these I did not trace any further. Talking about different kinds of fleas, I would mention that our English ones are much lighter in colour than those found in Africa. They attach their eggs to the fibres of the wool or flannel. Whether they always lay the same number I do not know, but I have one I preserved many years ago, and it has five eggs of a plain oval shape.—*E. T. Scott.*

Late Appearance of Swallows.—Amongst the many characteristics of the extraordinary weather we have had this year none is more remarkable than the late period to which the Swallows have remained with us. The main body of them left us at this place on the 10th October. Almost every year it may be remarked that a few will be seen again about the middle of November, and accordingly this year a few made their appearance on the 12th and 13th November. But on the 4th of this month a few were again playing about, the weather on that day being remarkably stormy. To my surprise, however, several House Martins appeared again yesterday, the 10th. The weather was fine; the wind east; and at 3 p.m., when they were flying about, the thermometer was 48°. I noticed upon this last occasion that they kept in their flight very close along the western side of the houses in the park here, and were only out between 2 and 3 p.m. They appeared very brisk and lively, but evidently did not like to get out of the warm stratum of air immediately in contact with the houses. On the 4th, however, they were flying high up in the air on the eastern as well as the western side of the houses, the thermometer at that time being 4° higher than on the 10th. Naturalists have long been puzzled to make out where these late stragglers hide themselves, and how they subsist apparently so long without food; and also whether they eventually migrate, or remain with us till the weather kills them. A curious fact in relation to this subject came to my knowledge about twenty years ago. In removing the framework of an old clock in the tower of Oswestry Church, in order to put in a new clock, the skeletons of many scores of Swifts and Swallows (?) were found in the hollow places behind the frame of the clock. A colony of Swifts always frequented the tower every year, and they had evidently found access to the space behind the wooden frame of the face of the clock, which projected about a foot in front of the stonework. These skeletons were apparently of all ages, most of them, if I remember rightly, full grown, and the feathers adhering to them. The sexton brought me a hat full of them, and said there were great numbers of them which the workmen had turned out. I regret that I did not examine them accurately at the time, to see if they were all Swifts, or some of them Swallows. Nor do I know whether Swifts and Swallows will breed in harmony in the same places. But how came these scores of skeletons there? The only conclusion I could draw was that some of the birds every year were either the produce of a second hatching, and so perhaps too weak to migrate with the rest, or else that, having been accidentally injured, they were unable to encounter the flight to warmer latitudes, and so remained behind and perished. The appearance of Swallows so late as the 10th of December is certainly a very remarkable occurrence. I have not "White's Natural History of Selborne," at hand, to see what is the latest date at which he observed Swallows, but I think the very late period to which they have remained with us this year is worth recording in your interesting journal of Science-Gossip.—*T. Salwey, Dec.* 11.

Ægeon Alfordi.—In my hunts on our coast during this week I have had the pleasure of coming upon four specimensof the Anemone *Ægeon alfordi.* On Tuesday, December 5th, I brought home two from the pools, formed by large stones and boulders, on the beach in Porth Crapa Bay, on the south side of St. Mary's. On Wednesday, the 6th, I found another in the same wilderness of stones, nearer low water mark; and on Thursday, the 7th, I came upon the fourth in a narrow crevice of a ledge of granite under the Garrison Hill, running out into the roads on the north side of St. Mary's. All these, unlike the first specimens I found, were more or less imbedded in sand, much after the manner of *Tealia crassicornis.* The bases of all were expanded beyond the column, and of a red color. The column in all is very flexuous and distensible, the surfeac being divided into squares, with fine pellucid lines, each square containing a small crimson wart. The disc is cup-shaped. The tentacles are long and flexuous, but much more so in one specimen than in the other three. One I found with the tentacles quite hidden, but they were more concealed by the swelling of the upper part of the column than by their own retraction. As to colour, the columns of all the specimens were much like the one described by Mr. Pope, but in two red prevailed chiefly; in the others a neutral tint. The tentacles vary much; in one they are of a grass green; in the other three shades of grey and violet specked with white. Two of the latter have a rim of bright crimson round the mouth, and these have the rays of the disc more clearly marked than the others. The largest of the four, which is least attractive in its colouring, stands about five inches high without the column being fully stretched, and more than five inches in diameter of flower. Turning to another branch of natural history, you may like to hear that a Great Northern Diver, in mature plumage, was brought to me alive yesterday. It was found on the beach at Porth Crepa, too weak to make any effort to escape. It was probably driven here from a great distance by the recent storms, for, though it was miserably poor, it refused fresh fish, and died in the morning, apparently of exhaustion. It is twenty-two inches long.—*D. P. Alford, Dec.* 9.

LATE SWALLOWS.—Hearing, last week, Swallows have been seen on the wing in Norwich and its vicinity, I wished to ascertain the truth of such an unusual occurrence. On inquiry, I found the statement to be correct. A friend of mine informed me that on the 4th and 5th instant he saw them at Carrow and Bracondale, and on the 6th, 7th, and 8th they were circling round the Castle Hill; but their flight in both cases was languid. I can only suppose these birds were hatched too late in the autumn to gain strength enough of wing to migrate with the rest of their companions. Has any correspondent noticed a similar appearance of these birds in any other part of England?—*E. A., Norwich, Dec.* 11.

PHOSPHORESCENCE OF THE SEA.—In the number of SCIENCE-GOSSIP for November there is an article on the Phosphorescence of the Sea—that when animalculæ of any kind are concerned, the light always proceeds from an electrical spark. I do not undertake to say, though I cannot help fancying it does, from many experiments I have made. There is a small kind of Medusa to be found on some parts of the coast, which I have caught sometimes when the sea has been luminous. It is about half an inch in diameter, and of an hemispherical shape, with, I *think*, five rays proceeding from the centre to the circumference. This shows the light very beautifully, and can be examined in the microscope. By touching any one of the rays, or the part of the body where they are situated, the animal seems to be irritated, and a small spark of light, just like a spark of electricity, is emitted along that ray, and may be repeated at any one of the others. The shape of the animal—a kind of plain convex lens—causes the light at a little distance to illuminate the whole body; but it will always be found to be a sudden spark along one of the rays, and is evidently voluntary, being given out at that part of the body which is touched, and in colour and appearance exactly resembles a very minute electrical spark, perfectly sharp and distinct, not at all like the light from dead shell-fish.—*E. T. Scott.*

GUANO AND GUANO-BIRDS.—Much has been spoken about the Guano Islands during the last war between Spain and Peru. The three Chincha Islands contain more than 12,000,000 tons of it; the contents of the Lobos, Guañape, and other small islands is not known. From 1841—first year of the exploitation—to the 31st December, 1860, the exportation amounted to 4,026,174 tons, valuing 200 million dollars, or average value 10 millions of piastres a year; the exportation of 1864 reached 14 million dollars. The following birds are the great contributors to the produce:—The variegated gannet or *Piquero* (*Dysporus variegatus*, Ch. B.); different sorts of sea-gulls, or *Gaciota* (*Blasipus Bridgesii*, Ch. B. &c., &c.); the *Alcatraz* (*Pelecanus s. Onocrotalus thagus*, Wagler.); the inca tern or *Zarcillo* (*Sterna inca*, Less.); the *Potoyunnco* (*Pufinuria Garnotii*, Less.); the *Pájaro niño* (*Spheniscus Humboldti*); different sorts of cormorants, or *Cuervos de mar* (*Carbo cormoranus*), (*Stictocarbo Gaimardi*, Ch. B.), (*Hypoleucus Bougainvillii*, Less.); the *Anhinga* (*Plotus anhinga*, L.), &c.—*Bernardin.*

BEES AND FRUIT.—The season for collecting honey this year was very short. After Midsummer my bees did not add to their stores. When the fruit became ripe they took the place of the wasps, which are very scarce. I don't remember ever seeing them take to the fruit before as they have done this year, but don't think they obtained any honey from it, or carried any of it to their hives. They most probably lived on it, instead of consuming their scanty stock of honey, keeping that for more pressing times. The quantity of honey collected by each stock has been small in the neighbourhood. The honey-producing flowers did not appear this year as usual; the extreme dryness of last year, I believe, killed them. I found most of my stocks wanted feeding in October, to enable them to stand through the winter. My plan is to make a syrup of 2 lbs. of lump sugar to 1 pint of water; this I place in a feeding pan on the top of the hive, opening the aperture so that only the bees in the hive can get at it. They will take it in freely, if the weather is warm, and store it for winter use. I put some pieces of old comb, which I always keep by me for the purpose, into the pan, to prevent the bees drowning. I was very near losing one of my best stocks this season in feeding them; not having put sufficient comb in the pan, the weather suddenly changed to cold, and the bees ceased to take the food in. It was quite by chance I went to look how they were going on, when I was very much surprised to find the queen-bee struggling in the syrup and nearly dead. I was not long in extricating her from her perilous situation, and a little warmth soon revived her; and on restoring her to her loving subjects they immediately began to lick her, and she soon retired out of sight. I never saw the queen-bee at the feeding-pan before.—*P. P.*

GEOLOGY.

THE SHALE HEAP.—What is a shale heap? And what possible interest does it present worthy the attention of the readers of SCIENCE-GOSSIP? To the first question I answer: A large heap of refuse will be found at all collieries; but the shale heap is only found at those collieries working the *low main bed of coal*, and is formed principally of the black, slaty stone—hence its name—which immediately overlies the above-mentioned bed of coal, varying in thickness at different collieries in this district. It will be found at Dudley and the Cramlingtons to run about two inches in thickness, although I have fell in with pieces at Newsham Colliery more than four times that thickness. To the second question: The shale heap is interesting to the naturalist and the collector of fossils for microscopic objects. Vegetable fossils will occasionally be met with, but it consists chiefly of fish remains, such as jaws, spines, teeth, scales, and loose bones. For a very obvious reason, jaws and spines are not so readily met with as teeth and loose bones. Some very fine specimens, however, of jaws have been found, varying considerably in the number of teeth attached to them; but when ground and mounted, and examined through the microscope, present a most beautiful and interesting object. In no instance have I found, in my few years' experience as a fossil seeker, among this shale the slightest trace of the impression of a fish; while in the thin dark blue layer of stone, which crops out at the crag near Cullercoats, they appear to be common; the impression found there is planted on the stone in a most excellent manner. But no jaws, teeth, or scales, to the best of my knowledge, are found there. On two occasions, lately, parties of gentlemen from Newcastle and South Shields paid a visit to the shale heaps at Dudley and the Cramlingtons, with leather bags suspended from shoulder, hammer and chisel in hand, splitting and breaking, and splitting again until a bone, tooth, or jaw was found, which was immediately *bagged*, with as much interest as a disciple of Izaak Walton would *creel* a member of the finny tribe just drawn from its native element, to the no little amusement of the youngsters, and to the utter amazement of several of the seniors of the colliery village, as to what the gentlemen could want or find among the black stones on the pit heaps, although there are others courteous and willing to assist them whenever they come.—*John Sim, miner, West Cramlington Colliery.*

OBJECTS IN TUMULI.—Various small objects, entire and perforated, have been met with in tumuli. They are made of different materials, and were chiefly used as ornaments. They might, however, have been sometimes employed for purposes of exchange, as beads are still used in the slave trade in Western Africa. Among Roman remains, as at Richborough, beads and buttons, in various coloured glass, have been picked up in some quantity. The ancient Britons were accustomed to select objects already perforated, as the *Dentalium*, a cylindrical marine shell, which they strung together to form necklaces—a neck ornament of this kind, with a bronze dagger and clay beads, having been discovered not long since, in a tumulus at Winterbourne Stoke, near Salisbury. In company with *Dentalia*, joints of the stem of a *Pentacrinite*, a fossil *Echinoderm* of the Hampshire chalk, were found in a tumulus near Salisbury; and a *Diadema*, a fossil Echinus from the chalk, was also found in a barrow in the same neighbourhood. It is now in the possession of the Rev. E. Duke, and, as it is perforated, was doubtless worn by its former possessor to decorate the person. Beads of jet and amber are sometimes found in tumuli. The *Orbitolinæ globularis*, a small *foraminiferous* chalk fossil, often naturally perforated, occurs in drift deposits. They have been mistaken for fossil beads, and were supposed to furnish some proof of man's existence at the remote period of the drift, as the perforations were thought to have been artificially made. The holes, however, when they occur, for there are imperforate as well as partially bored *Orbitolinæ*, show the natural structure of the organism, and, it is suggested in the catalogue of the Salisbury Museum, may have occurred from the orbitolina having grown around the stem of some marine plant. I am not aware that these small objects were used as ornaments by the Celtic people, although, from their being commonly met with, it is not unlikely that such was the case. The Celts, like other uncivilized races, doubtless availed themselves of any pretty natural objects for personal adornment which came in their way, whether the objects were perforated or not.—*J. S., St. Mary Bourne, Hants.*

BOTANY.

AN AUSTRALIAN BURR.—A kind of burr, not before observed, is likely to become a pest to the wool-growers in Australia. Dr. Mueller gives the following account of it:—"The plant submitted for my inspection is scientifically called *Acæna Sanguisorbæ*, and is a native of Australia, where it ranges from the southern borders of Queensland to St. Vincent's Gulf. We have no English name as yet established for the plant. The generic word, 'acaena,' alludes to the prickly nature of the fruit; the specific, to the resemblance which this plant undoubtedly shows to the British Burnets (*Sanguisorba* and *Poterium*). Like its European prototypes, this acaena seems not to possess any really important useful properties, otherwise they are as yet not ascertained. The prickly fruits readily adhere to wearing apparel, fleeces, &c., and are thus easily carried about. To destroy a perennial plant like this where it abounds, I see no other means than ploughing it in."—*Ferd. Müller.*

COCO DE MER.—(S. G. Vol. I., p. 270.) A doubt is expressed whether the stem of the Lodoicea palm remains quite straight, undisturbed by tropical storms, or is so flexible that trees standing in each other's vicinity strike against each other, making an extraordinay noise. In a very interesting article, on the Coco de Mer, published February, 1865, in the *Technologist*, by Mr. G. Clark, who seems to have been on the spot, it is said "in strong breezes the plant bend considerably, while their elasticity causes them to wave in the most graceful manner." Of the root, the same writer says:—"The root is in some cases bellshaped, and in other nearly hemispherical and a vast number of rootlets radiate from it in all directions except upwards; these extend to a great distance around it, and form admirable stays to resist the strain which the play of so long a lever subjects them; and so well do they perform their office, that I have never known an instance of a Coco de Mer having been blown down."—*Bernardin.*

VEGETABLE ORIGIN OF COAL.—Though exhibiting little structure, there is no doubt of the vegetable origin of all coal. In some cases, shells and remains of insects, fishes, and even small reptiles, have been found embedded with coal, but there are no appearances of aqueous deposits of this kind in the substance of the mineral. Evidence of the mode of accumulation may no doubt be detected, not only in the position of the innumerable leaves, twigs, and stems of plants, in the neighbouring clays and sandstones, but in the substance of the coal itself. But all kinds of coal have been so greatly altered in their conversion, they have lost so much of various substances commonly present in plants, in addition to carbon; they have become so compacted and are reduced so thoroughly to the condition of a simple mineral, that the absence of vegetable structure cannot be wondered at. It still remains a mystery how coal was formed, or what combinations were necessary to produce it. In most cases, especially in thick beds, it represents a mass of vegetation that must have taken many years, or a large area, to accumulate, but yet in some instances there is proof that it must have been accumulated rapidly. That it is generally associated with certain shales, with ronstones, either in nodules or bands, and with sandstones more or less compact, and that in most cases, though not all, it seems to have been accumulated near the mouths of large rivers or low swampy flats, and in estuaries, are facts and inferences that include the results of recent discoveries and investigations in this matter.—*Ansted's Practical Geology.*

BOTANICAL CONGRESS.—An International Horticultural Exhibition and Botanical Congress is announced to be held in London, in May, 1866. The Congress will be restricted to two morning meetings, when papers, previously printed and accompanied by translations, will be read and discussed. The chair will be taken by M. Alphonse de Candolle, who will deliver an opening address. Dr. Berthold Seemann is honorary secretary to the Congress, to whom any communications should be addressed.

MICROSCOPY.

REFLECTION ON THE RETINA.—During the summer, having the chrysalis of musquito under a low power of the microscope, the part under immediate observation being the eye, which in this state of the creature's existence is simple, I was much pleased and surprised to see the window-frame, and consequently any object presented to the pupa's eye reflected on the retina. The hand with the fingers in motion was beautifully defined. I employed daylight and no condenser, the power not more than eight diameters. I have never seen this mentioned in any work on microscopy, and hope some of your readers may succeed in obtaining a sight of this interesting object.—*S., Oporto.*

MOUNTING CRYSTALS.—I have been engaged lately with crystalization in connection with the microscope and polarized light. I have only a few hours occasionally to devote to the pursuit at night after business, and I have no doubt a great many other amateur microscopists are similarly situated. It is therefore a great disappointment, night after night, to lose beautiful slides through not knowing in what medium to mount them. For instance, last night I prepared two slides of pyrogallic acid and chronic acid. If I tried to mount them "*dry*," they absorbed moisture from the air and returned to a liquid state; and in pure "Canada balsam" or "glycerine" they dissolved. Could not some one thoroughly experienced and conversant in, and with the matter, prepare a list of salts, and opposite each name put the appropriate medium or mediums for that particular salt?—*W. S.*

ALEYRODES.—This is a very pretty object prepared for the microscope by mounting in a dark cell the perfect insect and its pupa case. The *Aleyrodes* is a tiny white-winged creature, like a small moth, about the size of a large pin's head, found in clusters under pear-tree leaves, and cabbage leaves. Sometimes they rise in a crowd from the shaken branch or leaf, and settle again as mere dots upon the neighbouring plants. They multiply with great rapidity; one moth will produce 200,000 aleyrodes in twelve generations. Their transformations are very interesting and curious. The little group of eggs is so small that they appear as a mere film of white powder on the leaf. The lava is a flat semi-transparent scale upon the surface of the stem or leaf, having a folded hair-like proboscis, with which it pierces the plant, and sucks its juices, doing considerable injury thereby. The pupa case which is mounted with the perfect insect is like a fairy slipper, fringed with golden dots, or seemingly set with topaz on silver stems; it is open at the top, where the aleyrodes emerged after its brief trance. The moth, which is *not* a moth, is worth minute examination. When first I saw this pretty little creature, I thought it was the moth of a leaf-roller or leaf-miner (this was in the early days of my study in natural history), but placing it under the microscope, the *wings* were not those of a lepidoptera; they had no scales or feathers, were covered with a white mealy dust; it had no long proboscis, and only a short antennæ; the eyes were divided into two sets, on each side; the joints of the feet only two; and from all these signs it could not be a *moth*. Then I supposed it to be a coccus; but, further examination proved this to be not so, although the relationship is very near. The coccus in the winged state has only *two* wings, the aleyrodes has four. The coccus has only one joint in its feet, and this insect has two. Also, both male and female aleyroids are winged, whereas the female coccus always remains in a scale-like, quiescent state. The aleyrodes rank amongst the *Homoptera* or tribe which comprises the green-fly or Apis, the musical Cicada, the strange foreign Lanthorn Fly (Fulgora) and the coccus; but is in the border-land between the Lepidoptera and the Aphides, a connecting link which renders this preparation particularly interesting. — *L. Lane Clarke.*

How to Mount the Proboscis of the Blow-fly.—The spreading and mounting of the proboscis of the blow-fly is a process which depends for success entirely upon the dexterity and practice of the operator. The head must be taken fresh from the insect, and gently pinched with the finger and thumb between the eyes. The fluids will cause the proboscis to swell, and now is the time adroitly to apply a glass slide, and get the trunk somewhat into position; then, without relaxing the pressure, another glass slip must be gently placed over the expanded proboscis, and the whole put by to dry. When this is accomplished, the operator must return to the attack, and moisten the specimen with clean water. Now arrange the brushes in their proper places with the needlepoints, and after placing the glass slip over the trunk for the second time, put aside. An American clip may be used to keep the glasses in close proximity, when the whole has been finally arranged. If too great pressure be employed, either in pinching the head, or placing the glasses in the first part of the process, the delicate tissues will be ruptured, and all the labour thrown away. When the mounter is satisfied that the specimen is perfectly dry, he must then, with a sharp microscopic knife, remove the head from the proboscis by a clean cut. The head is by no means to be squeezed by the glasses like the proboscis, but must be kept outside their edges. All he has to do now, is to saturate the object with turpentine, and mount in balsam in the usual manner. In the preparation, frequent recourse must be had to a lens, as the task is a difficult one, needing plenty of care and patience. One of the best of Topping's beautiful slides of this object should be taken as a standard. I have seen the proboscis of the blow-fly prepared after a different plan. I think as follows: The extreme end of the trunk is cut off with fine scissors, and mounted in glycerine, so as to show the spirals as nearly as possible in the natural state. The former mode, though undoubtedly the most effective, hardly gives a true notion of the relative position of the parts. I am not aware that particular instructions are given in any book relative to the preparation of this subject, and I do not know what may be Topping's plan. The above directions are the result of an accidental discovery after many vexatious failures. *Experientia docet.—S. M'Intire.*

How to Mount the Proboscis of the Blow-fly.—In answer to your querist, "T. S.," as to a method of preparing and mounting the tongues of flies, I beg to send the following, which I have found to give good results. Sever the head from the thorax, and gently squeeze it between the thumb and forefinger, when the tongue will be projected out; soak the whole for two or three days in liquor potassæ, and well wash it in clean water; lay the head flat on a slide, and then with a needle and fine camel-hair brush arrange the various parts. Place another slide gently on the tongue so as not to disarrange it, and submit the whole to pressure in a clip until dry. The tongue may then be cut from the head with fine scissors, soaked for about forty-eight hours in turpentine, and mounted in balsam. Too long steeping in turpentine bleaches too much. I may as well state that I have a dozen or so mounted specimens of the tongue and lancets of the drone-fly, which I shall be happy to exchange for other well-mounted objects, or will forward a slide, post free, to any address on receipt of ten postage stamps.—*William Fredk. Rogers.*

FISH TATTLE.

Fish in Aquaria.—Since the communication at page 284, vol. I., I have had an opportunity of seeing two living Sand Launces (*Ammodytes lancea*) in the aquarium of Mr. A. H. Meyer, of Hamburg. He has had them for some weeks, and at present they are quite well, in a tank measuring about four feet long, two feet broad, and eighteen inches high, with about four inches of fine sand on the bottom. They were got at Kiel, on the Baltic, and are in Baltic sea water, which is much less salt than ordinary sea water, the latter containing about 26 per mil of soluble matters, while the former has only from 12 to 14 per mil, or even less. The fishes pass most of their time buried out of sight in the sand, but as they are known to be always at one particular spot they can be stirred up with a stick, when they swim about for a few moments (generally with their heads towards the light, and their noses to the hinder glass side of the tank), with an uneasy, rapid, wriggling motion, and presently they dash down into the sand with such instantaneousness that they disappear before the subsidence of the little cloud of sand which they raise in the act of vanishing. They have not been seen to eat anything. Nothing else but these two creatures are in the tank, and this, connected with the facts that the tank is in a cool cellar, with a current ever passing through the water, explains the cause of success. My specimens were obtained in warm weather. These fish would not do with sea anemones, as they would be inevitably caught by the latter. The Smelt, too (*Osmerus eperlanus*), I have now succeeded in keeping better than formerly, but I have it in fresh water not in sea water as before, and in a large, broad, shallow, and cool tank, with a fountain always playing in it. Under the same circumstances, I also maintain the Schnäpel (*Coregonus oxyrhynchus*), a fish not found in Britain, and belonging to the same genera as the Gwyniad, of Wales (*Coregonus lavaretus*), and the Vendace, of Scotland (*Coregonus Willoughbii*). These two fishes, belonging to the same family as the Salmon and the Trout, are difficult to maintain in aquaria, and it is surprising what an apparently small matter affects them. A trifling variation of temperature, a little impurity, or a difference between the oxygenating surfaces of two tanks, is a matter of life or death to them. For example, on placing some Schnäpel and Smelt in a 300 gallon fresh-water tank, with a surface of water of 25 square feet and a temperature of 60° F., the fishes turned up immediately, and would have died in a few minutes, but on being transferred to a tank of the same capacity, 300 gallons, but with a water surface of 48 square feet, and a temperature of 55° F., they revived immediately, and are still alive. Yet the amount of water running into both tanks was exactly the same—ten gallons an hour.—*W. Alford Lloyd, Zoological Gardens, Hamburg.*

Seized by a Pike.—I am indebted for the following to Dr. Genzik :—" In 1829 I was bathing in the swimming school at Vienna with some fellow-students, when one of them—afterwards Dr. Gouge, who died a celebrated physician some years ago—suddenly screamed out and sank. We all plunged in immediately to his rescue, and succeeded in bringing him to the surface, and finally, in getting him up on to the hoarding of the bath, a pike was found sticking fast to his right heel, which would not loose its hold, but was killed, and eaten by all of us in company the same evening. It weighed 32 lbs. Gouge suffered for months from the bite."—*Pennell's " Book of the Pike."*

Pilchards in Melbourne.—From politics to pilchards is not a change of topics more sudden and abrupt than was the arrival about a month ago in our bay of immense shoals of this beautiful and nutricious little fish. They were a novelty in our waters, and they came in such prodigious numbers that one shoal is described (by the captain of a vessel sailing through it) as not less than three miles long. They were caught in tons, and sold about the streets of Melbourne at sixpence a bucket full. As the drought has caused butchers' meat to be very dear at present, these fish were welcomed as a timely supplement to the table, and the butchers of Williams' Town memorialized the borough council praying that the fishermen should be compelled to use nets of a larger mesh, that the new competion might be eased off to the memorialists. During the last few days, however, these fish have been dying in millions in the bay, and will probably soon disappear as suddenly and mysteriously as they came.—*Melbourne Correspondent of the Times.*

Short-finned Tunny (*Thynnus brachypterus*).—This fish is a native of the Mediterranean, where, perhaps, it is equally common with the Tunny, with which it appears to have been confounded until distinguished by the discriminating examination of Baron Cuvier. But it appears to be less a wanderer into the ocean than that fish, and there is no record of its having been caught in the British Seas until the summer of 1865, when an example was discovered among the numbers of small mackerel taken near Mevagissey, in Cornwall, in the drift nets, and sent to me by Mr. M. Dunn, an intellegent fisherman of that place. This first example was obtained on the 8th of August, and it is worthy of notice that within a week afterwards a specimen was taken at Polperro, and in September three others at Mevagissey.—*Couch's British Fishes.*

NOTES AND QUERIES.

PLASTER CASTS.—Can you tell me where I can find any remarks on the making of plaster casts? I want to take some casts of skulls, teeth, and other bones.—*J. G.*

TO KILL SLUGS.—Can any of your readers inform me what chemical preparation it is which, when dropped upon a living slug, destroys its vitality, but preserves it with tentacles extended and colours true as if it were alive?—*E. C. T.*

CONVOCATION OF SPARROWS.—Passing up St. Dunstan's Hill to-day, at 4 P.M., I descried a flock of sparrows on two trees, about 500 or 600 in number. They made a great noise for about ten minutes, and then all flew off, creating quite a sensation among the people. *Is such a thing very common* (especially at this season of the year)? And why do they all flock, and then fly off *if it is not* common?—*J. A., jun. Dec.* 12, 1865.

BEES AND WASPS.—In several places in Belgium the same has been observed as in England—that wasps were not to be seen, and that bees attacked the fruit.—*B.*

GOOD CEMENT.—H. J. B. asks if any one can recommend a good cement for aquaria?

FIBRE OF THE COTTON PLANT.—Would it not be possible to extract the fibre of the stem of the cotton plant (*Gossypium herbaceum, &c.*)? I believe this is worth an investigation, and I recommend it to all who are acquainted with cotton growers. I tried a small delicate stem, put here in open ground, and got some fibres by beating it.—*Bernardin, Melle, near Ghent.*

[It has been done. Specimens from India were shown at the Exhibition of 1862.—ED. S.-G.]

VISITATION OF SPIDERS.—It may interest your northern correspondent and others to learn that the spiders alluded to at page 282 of your December number have visited the south. On returning from chapel after the morning service on the 12th November last, I observed the railings from St. Thomas's Street to one of the entrances to Victoria Park swarming with almost any quantity of them; but, strange to say, I could not find a single specimen on the leafless twigs of the trees in the park, and the railings beneath them had only here and there one. They were very tame, running about the hand freely, and leaving it by attaching a thread to its margin, and so dropping down five or six inches, pausing thus for a moment, and then, with almost the speed of a winged insect, mounting high in the air, where their intensely black bodies could be seen in the bright sunlight some yards away. Accepting the belief that the aerial spiders make their flights by the lightness of the silk they throw off, it would be interesting to learn—first, how our little visitors contrived to detach the thread from the hand, or whether they merely held on by it while they spun another thread that was free? Secondly, why the thread from the same creature at one time is a mere rope of suspension, and at another acts the part of a balloon? Is it possible that the spiders capable of making these atmospheric ascents have some means, hitherto unknown, of inflating the air sacks or other part so as to reduce their specific gravity? I spent some time the following morning in examining the railings, ground, and crevices in the locality where the previous day they had been so plentiful, and yet with the help of ten years' experience in such hunting I could not find a single individual. Their threads were there, stretching from point to point like fairy telegraph wires, that might have been put up by some joint-stock enterprise from the realms of Queen Mab; but of the workmen I saw none, alive or dead. Their task completed here, on what other fields has their great Maker employed them?—*W. H. Hall.*

ATMOSPHERIC PHENOMENON.—While travelling from Oxford, on the London and North-Western Railway, on the 20th July, I witnessed what, to me at least, was a novel phenomenon. The sun was 4 or 5 degrees above the horizon, the time being 7.40 P.M. In the east a dull haze extended some 9 or 7 degrees above the horizon, and terminated in light flocky clouds; above these the sky was clear. Exactly opposite the place of the sun a beam of light shot up from the horizon, extending across the haze and clouds as far as the clear sky above. In the course of about a minute three or four more beams became visible, apparently radiating from a point, situated as far below the eastern horizon as the sun was at the time above the western. The most southerly of the beams appeared faintly tinged with prismatic colours. I turned towards the west, thinking the sight I had witnessed must be a reflection of the "Moses' Horns," so often seen when the sun is on the point of setting, but could not see anything of the kind. The appearance lasted, with varying intensity, for about ten minutes, fading away gradually, and quite disappearing before the sun had set. After the sun was below the horizon, a broad streak of rosy light filled the space before occupied by the beams, as though Aurora, having mistaken the hour, was about again to open the gates of day before Apollo had had time to repose.—*W. S., Buckingham.*

THE SPAWN OF DORIS.—Would the spawn of the Doris (*Doris pilota*), deposited in my tank, ever hatch? If so, would the young ones grow in an aquarium? The Doris spawned on the 1st of November. Could any of your correspondents answer the above questions?—*W. B.*

PRESERVING BIRDS WITH WOOD ACID.—Mr. Newton, of Cambridge, says in his "Hints on making Collections of Eggs": "Birds may be preserved entire by pouring a few drops of pyroligneous acid down their throats." I presume this would only keep them for a time, until they can conveniently be skinned. Or would it entirely preserve them without any other process? Perhaps some of your correspondents have tried the plan, and could speak as to its results.—*W. F. Saunders.*

CHINA GRASS.—I believe different nettles are known under that name. According to Dr. Blume, the name of *tchoum* is given by the Chinese to *Bœhmeria spicata*, Thunb.; and to *B. longispica*, Steud.; the RHEA of Assam is *B. nivea* and *B. tenacissima*, Gaudich.; the TAMEH, RAMI, &c., of the Malay is *B. tenacissima*. Dr. Blume says (in Mus. Ludg. Bat.) that *B. tenacissima* is produced by cultivation from *B. nivea*.—*B.*

[All these names do not represent distinct species. *Bœhmeria nivea* includes *B. tenacissima*.—ED. S.-G.]

SPHINX CONVOLVULI.—Surely, the Hawk-moth generally known as the Convolvulus Hawk-moth, has not a double trunk, or proboscis. For my own part, I cannot see why it should be called the *Unicorn* Hawk-moth, if it had a double trunk; for it is probably the remarkable length of the proboscis, which is quite as long as its body, that suggested the name of unicorn.—*Helen Watney*.

BLACK BEETLES.—I think that A. H. will find that cucumber peelings form a better bait for black beetles than even beer, as these insects are quite incapable of resisting the smell of the cucumber, and will eagerly climb the sticks to reach the delicacy.—*H. J. B. H.*

PILCHARDS.—How is it that pilchards are not now to be had in London? Some years back plenty were sold. The little dried sticks called "capelins," seem to be the only substitutes.—*R. H. I.*

REMOVING THE CUTICLE OF LEAVES.—Can any one tell me how to separate the cuticle of leaves for mounting? The leaves of some plants offer great difficulty, and cannot be stripped off in the slovenly manner recommended in some treatises.—*W. W. R.*

PROBOSCIS OF BLOW-FLY.—In reply to "T. S.," I would say, that of the twelve slides usually mounted to illustrate the anatomy of the blow-fly, that containing the proboscis is the most difficult to manage. To succeed, the microscopists must exercise some ingenuity, as he is left altogether without hint or guide by the handbooks as to the method of manipulation to be pursued. I have mounted several, and as the method I have pursued may be useful to some, until a better be given I freely supply it. But first I should say, that for various purposes connected with mounting, I find that pieces of strong glass, less than an inch square, with their edges very slightly ground to take of their cutting sharpness, to be very useful. I cut off the head, and lay it on a glass slide with a little water, antennæ upwards. I then lay one of the small squares of glass upon the head, so that its edge may lie along the front edge of the head. I then find that, by pressing down the upper glass, the proboscis will shoot out, and the lobes of the ligula will expand beautifully, and, in most cases, just as I require. If the pressure be removed the tongue will relapse to its former condition. I therefore take advantage of the moment of expansion and, with another piece of glass, fix it in the expanded position, and maintain the pressure until the water has evaporated, when I supply turpentine, which gives it a permanent set. If the tongue does not expand properly, or I fail to fix it when expanded, I try another head, as it is utterly useless to work with needles, for they only tear, and mess, and lacerate the structure. I might have extended the above, so as to be more minute in giving the details, but enough has been given to guide the operator, who in other respects may improve by experience beyond any further hints I could give. I would only say, that I believe by no other method will he succeed with this object without more than usual trouble and care.—*Lewis G. Mills, LL.B., Secretary Nat. His. Soc., Armagh.*

ACTION OF FUNGI-SPORES.—Some recent investigations by French medical men serve to prove that the spores of Fungi introduced into the blood of the human subject are capable of inducing disease and causing death.

AN ANCIENT SEA-ANEMONE.—In the year 1820 the late Sir John Graham Dalzell took from the sea an Anemone (*Actinia mesembryanthemum*), which he supposed to be then about seven years old. He placed it in a glass, and kept it till he died at about the year 1852, when the specimen was transferred to Professor Fleming, and on his death it passed into the hands of the gentleman in whose keeping it, I believe, still remains. Some time ago a friend of mine told me that its then possessor was a little oppressed with the responsibility of properly keeping alive such an historically valuable animal, and that if I wrote to him, offering to take great care of it, and to provide it with a luxurious home, it might probably pass into my charge; but the answer I got was that there was no intention of parting with it. I quite forgot the gentleman's name, but if he should read this he will perhaps kindly accept it as an apology for what I did not intend as a piece of intrusiveness: I was simply misinformed. Up to the year 1850 this specimen gave birth to about 700 young ones. I have often thought whether it is possible that Sea-Anemones and some few other animals *never die of old age*, but only of accident, or neglect, cold, heat, hunger, and so forth. I have kept anemones and madrepores for many years—the same specimens,—and I have never been able to detect any signs which may be interpreted as "getting old."—*W. Alford Lloyd, Zool. Gardens, Hamburg, Nov.* 1865.

EVAPORATION AND CONDENSATION.—Over the vast area, consisting of nearly three-fourths of the whole surface of the earth, now covered by the ocean,—an area of 145,000,000 of square miles,—there is ever present an atmosphere of aqueous vapour, which, with the other air, is constantly being carried along by the winds, and at length reaches land. In passing over the land the air becomes changed in temperature and in its electrical state, and ceases to retain the aqueous vapour mixed with it. From vapour the water passes into cloud, and from cloud to rain. Water or rain falls on the fifty millions of square miles of land, this water having previously been sucked up from thrice that area of sea; and the rain that falls in the course of a single year on the land would, if accumulated, cover its whole surfcae to a depth of nearly three feet.—*Ansted's Practical Geology.*

POZZUOLANO is the name given to a natural volcanic earth or trass, of a reddish colour, originally found in the vicinity of Pozzuoli, not far from Naples. Similar material has since been obtained in large quantities from extinct volcanic districts, especially at Vivarais, in Central France, at Brühl, near Andernach, on the Rhine, and even near Edinburgh. In the latter case it is also a volcanic material, but of very ancient date. It varies in colour, but retains its mineral characteristics. — *Ansted's Practical Geology.*

NEW SPECIES OF CHARR.—At the meeting of the Zoological Society, on the 28th November last, Dr. Günther pointed out the characters of a new British species of charr, from Loch Killen, in Inverness-shire, for which he proposed the name *Salmo killenensis.*

CRESTED BLACKBIRD.—A specimen of a crested blackbird was exhibited at the last congress of the British Association, which it is supposed may eventually prove to be a distinct species.

NOTICES TO CORRESPONDENTS.

ALL communications for the Editor should be addressed to No. 192, Piccadilly, W. To avoid disappointment, contributions should be received on or before the 15th of each month. No notice can be taken of anonymous communications. All notes, queries, or articles for insertion, *must* be guaranteed by the name and address of the writer, which may be withheld from publication if so desired.

QUERIES.—Having been inundated with questions, we are compelled to announce that we cannot undertake to answer those of which the querist might satisfy himself by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, beside the querist, are likely to take an interest in them.

WE cannot undertake to return "rejected addresses."

A. G. R.—Your red fungus on Judas tree is *Tubercularia vulgaris*.

J. S.—Scarcely so thin as it should have been.

W. A. L. is thanked for his offer, but we receive "Hedwigia" egularly.

K. D.—Your shells are those of *Littorina obtusata*, the *Turbo obtusatus* of Linnæus, and *Littorina littoralis* of Forbes and Hanley. *R. T.*

R. A.—Your black Staghorn fungus from decayed timber is *Xylaria hypoxylon*, very common.

W. B. MAXFIELD would exchange thin, unmounted sections of turtle bone for human or ostrich bone, or any kind of sponge spicules.—Address, Stone, Staffordshire.

APHIDES.—Mounted specimens of Aphides will be sent to such applicants as will pay postage for them, by addressing to Discipulus, School-house, Mulbarton, Norwich.

E. C. and C. B. C.—We do not comprehend your queries.

E. G. (Grasmere) sends us an abnormal form of inflorescence of *Geum rivale* (Water avens), in which a "flower is disposed in a whorl about the stem, two inches below the terminal one." It has been forwarded to the herbarium of the Society of Amateur Botanists.

M. W.—The Micrographic Dictionary is published by Van Voorst (London), at 45s.

G. T. P.—We cannot insert such a list as you send, and can only announce that you wish to exchange Lepidoptera.—Address, 8, Clare Hill, Huddersfield.

VALLISNERIA SPIRALIS.—H. J. B. offers fragments of this plant, as well as Desmids from an aquarium, to correspondents.—44, Camberwell Road, London.

TESTACELLA MANGEI.—A few shells of this mollusk are offered in exchange for those of *Testacella Haliotidea*, var. *Scutulum*; or any of the foreign *Parmacella*.—Address, E. C., 7, Eldon Villa, Redland, Bristol.

H. J. B.—Mosses may be found almost anywhere. What species do you want locality for ?

O. I. T. corrects an error at page 286 (1865). For *Althæa cerea* read *Anthea cereus*.

K. D.—What is "Crap," of which you inquire ?

E. G.—The yellow fungus on bramble leaf is *Lecythea ruborum*, which generally precedes or accompanies the brand.

W. ROSS.—Not a vegetable production at all.

H. B.—Cuthill's treatise on the mushroom will give you the information you solicit. A dark cellar is *not* essential. The soil moist, *not* wet.

H. H.—*Tetraphis pellucida* is not considered rare.

R. H. wishes to exchange land and fresh water shells for marine or others.—36, Swine Market, Halifax.

BOTANICAL BIBLIOGRAPHY.—"Pritzel's Thesaurus," published on the Continent, may doubtless be obtained through some foreign bookseller—Williams & Norgate, Asher & Co., or Bailliere. It is the most complete Bibliography of the Science published. A list of many of the works published since was continued until lately in the "Natural History Review."

W. W.—We are not supposed to know anything of those who advertise in our "Gossip" beyond their advertisements.

I.K.—Long lists of desiderata and exchanges must be inserted as advertisements.

M. A.—We expect that "British Reptiles" will really come in with the new year, and that you will be able to obtain it on application to the Publisher, at 192, Piccadilly.

R. O.—The dried specimens of fungi to which you allude may be had at the office of this journal. There are examples of 100 species, and the price is one guinea.

L. L.—We regret that your specimens were not named for you; but suppose that either they were too many, or in an imperfect state. It is possible that they may have been mislaid; but we have no recollection of the circumstance.

J. S.—The only work, of which we have any knowledge, on the parasites of birds and animals (*Anopleura*) is "Denny's Monograph," published by H. G. Bohn, of Covent Garden.

A. T.—We purpose devoting some space during the current year to fresh-water fish, with illustrations which will probably answer your purpose.

S. J. P.—We cannot attempt to answer queries on any other subject than Natural History.

R. A. C.—If you wish to make any progress in the study of plants, you had better do what you purpose thoroughly. There is no science without technicalities.

COMMUNICATIONS RECEIVED.—A. H.—L. S.—E. T. S.—L. L. C.—W. W. S.—O. I. T.—J. R. E.—E. C. Y.—W. A. L. R. H.—L. G. M.—J. A.—J. S.—A. G. R.—H. W. N.—T. S.—W. W.—W. F. S.—R. A.—D. P. A.—J. S.—W. Ross.—K. D.—E. A.—W. S.—H. B.—E. C.—T. P.—H. W. (Oxford).—G. T. P.—H. H.—M. W.—B. H.—J. E. Y.—J. A., jun.—C. B. C.—G. S.—H. J. B.—H. U.—Prof. BERNARDIN.—J. W.—E. G.—A. N.—R. H.—M. A.—I. K.—S. W.—R. O.—W. A. S.—Annie.—L. L.—M. A. F.—G. O.—R. A. C.—W. B.—S. S. T.—W. W.—J. S.—S. J. P.

CORRESPONDENTS will please to append their own names, or initials, to their communications, which may be withheld from publication if desired; but no notice whatever can be taken of anonymous contributions.

BOOKS RECEIVED.

"The World before the Deluge." By Louis Figuier. (Translated from the Fourth French Edition; pp. 448, 8vo., illustrated.) London, Chapman and Hall, 1865.

"The Book of the Pike." By H. Cholmondeley-Pennell. London, Robert Hardwicke, 1865.

UNDER THE SNOW.

When autumn days grew pale, there came a troop
Of childlike forms from that cold mountain top;
With trailing garments through the air they came,
Or walk'd the ground with girded loins, and threw
Spangles of silvery frost upon the grass,
And edged the brook with glistening parapets,
And built it crystal bridges, touch'd the pool,
And turn'd its face to glass, or rising thence,
They shook, from their full laps, the soft, light snow,
And buried the great earth, as autumn winds
Bury the forest floor in heaps of leaves.—WILLIAM CULLEN BRYANT.

THE Snowflake, arrested in its descent and transferred to the microscope, is an object of beauty, and teeming with matter for reflection. The landscape which the frost traces during the night with delicate crystals on the window-pane is a mystery to the child and a marvel to the man. Here is exhibited beauty in combination with power. Great agents have been "frost and fire" in the physical revolutions of the world. How they began, and where they will end, let us leave for speculators to dream, and confine our business to the world as it is.

After a night's downfall, as far as the eye can scan, everywhere lies the snow. It makes the leafless trees look elegant, hides the smoke-dried city garden, and buries all evidence of the scavenger's neglect. The town is as trim and clean as a chimney-sweep in his Sunday shirt, and the country one vast tablecloth to which birds are the only guests. But under the snow lies, fearful to contemplate, all the unpleasant experiences of mud and slop. So "frost and fire" conduce alternately to our pleasure and pain.

The small experiences of snow which fall to our lot are sufficient to remind us of the glaciers and avalanches of mountainous districts. "The snow which during the whole year falls upon the mountains does not melt, but maintains its solid state, where their elevations exceed the height of 9,000 feet or thereabouts. Where these snows accumulate to great thickness, in the valleys, or in the deep mazy fractures of the soil, they harden under the influence of pressure resulting from their incumbent weight. But it always happens that a certain quantity of water, the result of momentary fusion of the superficial beds, traverses its substance, and this forms a crystalline mass of ice, granulated in structure, which the Swiss naturalists designate *névé*. From the successive melting and freezing, provoked by the heat by day and the cold by night, the infiltration of air and water in its interstices, the *névé* is slowly transformed into a homogeneous and sky-coloured block of ice, filled with an infinity of air bubbles; this is what is called *glace bulleuse*, bubbled ice. Finally, these masses are completely frozen; the water replaces the air bubbles; then the transformation is complete; the ice is homogeneous, and presents those fine azure tints so much admired by the tourist who traverses the magnificent glaciers of Switzerland and Savoy."

Such are the glaciers which fill the gorges of the Alps, and by a gradual progress move onwards to the valleys, where they continually melt, whilst at their sources they are being as continually replenished. Such the means by which great and important changes have been wrought on the surface of the globe, and such the material for many a castle in the air more fragile and evanescent than snow. The parallel roads of Glen Roy indicate the action of the glaciers of Scotland in ancient times, and other evidences may be traced amongst the mountains of Wales.

At one time a notion prevailed in the vicinity of snow-capped mountains that an avalanche might be brought down by the firing of a gun or the tinkling of a bell; that a trifling sound might cause a small fragment of snow to move, and in its motion downwards to accumulate until it became an avalanche, which, like that of Val Calanca in 1806, might transport a forest from one side of the valley to the other, or bring destruction like that of the valley of Tawich in 1794, which buried the whole village of Bueras "under the snow."

Ice has recently been made the subject of a very interesting communication to a contemporary, in which the process of crystallization during liquefaction has been thus graphically described :—" Here is a block of clear ice, such as any fishmonger can supply. Rows of air-bubbles can be seen running parallel to each other throughout the mass, and in some irregular places there is a fine gauze-like appearance produced by a web of minute bubbles. This is but the poetical way in which ice expresses a split; for this beautiful netting is the result of nothing more than some accidental blow. Cutting a slice from the block across the bubbles, let us hold it close to a naked gas-flame, and now let us observe it. The lamp of Aladdin could not have wrought a more wondrous change. The part before clear and unmarked is now studded all over with lustrous stars, whose centres shine like burnished silver. A fairy seems to have breathed upon the ice, and caused transparent flowers of exquisite beauty suddenly to blossom in myriads within the ice, and all with a charming regularity of position. It is the intangible fairy-heat that has worked this spell. The ice was laid down according to the same laws that shape the snow into those beautiful and well-known crystalline forms so often to be seen in snow-storms here and elsewhere. Ice is indeed only an aggregate of crystals similar to those of snow, which, lying together in perfect contact, render each other invisible and the block transparent. When the heat of the gas-flame entered the slab, it set to work to pick the ice to pieces, by giving it, in certain places; a rapid molecular shaking, and the fairy flowers which appear in the warmed ice are the result of this agitation. On *à priori* grounds, we should therefore infer that the shape of these liquid crystals—for they are merely water—would be the same as the solid crystals which originally built up the ice. This is found to be the case. The two are seen to be identical, each has six rays, and the serrations in both follow the common angle of 60°; just as the ice freezes, so, under suitable conditions, it liquefies; the ice-flowers, or negative crystals, appearing in the same plane as that in which they were formed. The air-bubbles in ice show this direction. The bubbles collect in widely distant layers, marking the successive stages of freezing; between the layers there is either a clear intervening space, or those perpendicular rows of bubbles already noticed. Accordingly the ice freezes parallel with the former and at right angles with the direction of the latter bubbles."

Beneath the snow and the ice we all direct our hopes for the young year. There lie buried the germs which shall make our fields green, feed our cattle, make our gardens gay, replenish our granaries, fill our tables, store our cellars, and indeed supply all the substantial materials for our daily wants. It cannot cause much surprise therefore that, at this season of the year, all should feel an interest, though but few express it, of what lies hidden "under the snow."

THE BELTED KINGFISHER.

(*Ceryle Alcyon.*)

LAKE, river, streamlet, and sea-side, are alike enlivened in the Far North-West by the presence of Kingfishers. Wherever fish are to be caught, there, attired in a quiet livery of pale-blue, one is certain to meet with a goodly sprinkling of these most greedy fish-eaters. In size, and strength of beak, it far outstrips the brilliant gem-like little bird, the Kingfisher of our own pleasant streams. Even staid old Romans looked upon Kingfishers with a superstitious love. Halcyon, the Greek name of the Kingfisher, has given rise to the everyday saying "Halcyon-days." It was believed, the bird hatched its young in a nest that floated on the surface of the water; and, being specially under the protection of the gods, could at will hush the roughest sea, during the period of incubation: hence the usually calm days near the summer solstice (corresponding to our latter half of May and first part of June) were called by sailors "Halcyon-days."

The dead body of the bird, kept as a relic, enabled its possessor to shut up a thunder-storm or quell a household riot. In Tartary, the feathers of the Kingfisher, worn as an amulet, are supposed to ensure the wearer the love of any lady he sets his mind on. Had the skin of this little bird so recently sought after to adorn the hats and bonnets of the fair a like magic power?

There are many who believe even now that the body of a Kingfisher, suspended by a thread, will invariably turn its breast to the North. The savages in North-Western America have wonderful myths relative to the Belted Kingfisher, and use its *crest*, attached to bows, as a charm to make the arrow go true to its mark.

It is always a pity to destroy poetic fancies, and demolish in five minutes the myths—very pretty, if only true—that have existed for centuries. The Belted Kingfisher never has a nest, neither has its British relative, but digs an ugly hole into a mud-bank, or, taking forcible possession of one already excavated, lays its eggs on the bare earth at the end of the burrow. I have dug out a great many nests from the sand-banks near the Columbia river, and can safely say, the only impression not likely to be readily forgotten is entirely nasal—a potent, pungent, persistent odour of rotten fish clings to the birds, their tunnel, and everything about it. One hole I dug into was twelve feet from the entrance to where the eggs were resting on the bare earth; these were ten in number, snowy white, and looked as if hewn from alabaster. The voice of this bird is most discordant, and often startling: wandering up some lone ravine, or round the rocky shore of a mountain lake, the piercing notes of three or four startled Kingfishers, as they dash past, with their crests erect, scolding angrily at the disturbance, make one think Indians, spirits, or bogies of some kind are upon him. It is not a shriek, nor a whistle, nor a hoot, neither is it analogous to any other sound made by birds and beasts in general; but is more like the noise of a chain running through a hawse-hole, than anything else I know of. As the birds settle again quietly on a jutting point of rock, watch them: motionless as if marble-birds they sit, every eye peering into the still water; one makes a sudden plunge, and ere the drops splashed into the air have time to fall, the fisher sits again upon the rock, with a struggling fish nipped by the powerful beak, as a steel-trap holds a beaver's leg. Wide as its mouth is, it cannot bolt a decent-sized fish crosswise; to loose the pincers would, in all probability, let the slippery captive escape. To avoid any risk, the crafty bird beats the head of the fish violently on the rock until there is not a flap left in it. Elevating its beak, three or four skilful jerks twist the fish, head first, then a gulp sucks it down a throat scale and fin proof. These birds never appear to be the least wet on emergence from the water, yet the feathers are not like those of the Water-rail, Dipper, or smooth-backed Duck, and its oil gland. I could never discover any secretion enabling Kingfishers to resist wet. I suppose it is the rapidity with which they dash in and out of the water that keeps them dry. They cannot swim or walk under water like the Dipper.

At Vancouver Island they frequent the sea-coast in great numbers. As the tide creeping off the rocks leaves the weedy pools stocked with captives, Kingfishers come from all directions to feast upon them; scorning to plunge into the briny water, they thrust their horny forceps under the sea-tangle and blubber, or rock, dragging out the soft-bodied hiders. Often have I watched these pool-hunters; anon one discovers a five-rayed "star-fish"; despite the clutches made at every available mooring, the sucker-armed preyer on bi-valves is dragged upon the rocks, then thumped and battered until every ray, flabby, powerless, and smashed, becomes a dainty feast, enjoyed and swallowed at the captor's leisure. Soft holothuria, chitons, crabs, and annelides share a like fate. Surely sea-faring Kingfishers banquet right royally on viands, that are turtle and white-bait compared with the small fish dinners of settlers inland.

The strong feet, armed with powerful hook-like claws, are well fitted for clinging to the slippery sides of rock-basins, and are also used, in nesting time, to hold on at the side of the hole, or, gripping the inequalities of the sand-bank, stick against it as do cliff-swallows (*H. Lunifrons*), or sand-martins (*H. Riparia*).

Has any one observed the English Kingfisher feeding on the rocks as does its American brother? Some readers of Science-Gossip can perhaps inform me.

The heads of both male and female Belted Kingfishers are crested. The feathers composing this head-dress can be erected and spread over the eyes like a sunshade; and this, I believe, is its real use. I am led to think so from watching the birds during the hot summer (for weeks at a stretch) when hunting and trapping in the Far North-West.

When undisturbed, and gazing intently into the water, should the sun shine brightly, the crest is invariably spread, and the feathers thus erected seem as if intended to intercept the sun-rays that would otherwise dazzle the eyes and produce confused vision, just as we are prone to place our hands over our eyes if looking at any object in the sunshine. Many strange appendages to the plumage of birds, that we suppose merely decorative, I am disposed to think have some direct use that we should find out if opportunity were afforded, to watch their habits closely. I may be wrong in my ideas as to the use of the Kingfisher's crest; and it may be asked why this Kingfisher has so large a crest, whilst others have not any, or too small to be of use as sun-shades. I answer by asking another question. Why has the skunk a horridly fetid secretion, and the pine-martin, fisher, and mink, none at all?—they live the same, feed alike, and have similar enemies. I know it is so, but cannot tell why.

J. K. Lord, F.Z.S.

WINGS OF BRITISH BUTTERFLIES.

The wings of moths and butterflies, as is well known, form interesting objects for examination with the microscope, but it often happens, that for want of a hint or two as to the choice of suitable specimens and the best mode of mounting them when obtained, many cabinets are destitute of examples worthy of the appellation *good*. Yet there is no real difficulty in the procuring of such slides as, while they show the infinite skill and beneficence of the Divine Creator, will likewise, simply as examples of harmonious colouring, provoke on their exhibition the warmest admiration.

The consideration of foreign Lepidoptera is in the present paper waived. The few remarks about to be made are intended for those who wish to study the wondrous beauty displayed by our native butterflies and moths, and secure from them such slides as may worthily be compared in extreme loveliness, if not in grand colouring, with exotics.

It is necessary that the wings chosen for display and permanent preservation should be perfect—a condition only to be obtained by killing the insect immediately it has completed the transformation into the imago state, and also that it be properly illuminated so that it may be seen to the best advantage.

Some of the species most suitable for selection are as follow :—

The Red Admiral, the caterpillar of which feeds upon the nettle, and may be obtained in June and July, exhibits marked contrast and depth of colouring on the upper surface of the wings. The red, black, white, and blue remind one of the glories of the denizens of warmer climates. We, however, prefer to bring microscopic power to bear on the *under-surface* of both wings. In the fore-wing a great number of tints may be found, from the brightest and most delicate to deep black, and in certain parts, small groups of scales of an iridescent green glow with refulgent beauty. The under-surface of the hind-wing presents a no less marvellous display—white, black, brown, blue, pearly grey, and iridescent green scales are scattered apparently in confusion, and yet the effect is one of surpassing loveliness. To the unaided vision these hues all blend into a warm brown marbled with other sober tints, and the indications of the sight described are so small, that few only would place this object on the microscopic stage, and expect to find anything worth special notice.

All the butterflies of this family and its allies will supply good specimens; but, in my humble opinion, the Red Admiral furnishes the most superb object, not even excepting the Peacock Butterfly, the splendour of which has been specially dwelt on more than once by able writers. I opine that there is little danger of such highly prized insects as the Camberwell Beauty, or the Purple Emperor, being cut up to make objects of. Those wings which are intended for viewing by reflected light must of course be mounted dry, in cells. Unfortunately I find they deteriorate in time. Confervoid growths make their appearance on the covering glass, and the colours themselves fade slightly.

At the meeting of the Microscopical Society, in December last, the subject of cells for objects mounted in the dry was ably and fully discussed. The merits of cells made with glass, marine glue, tin foil, india-rubber, ebonite, and paper saturated with shellac, were each reviewed, and the hints then dropped from distinguished microscopists of long experience cannot but be of great value.

The Small Tortoiseshell, any of the Fritillary Butterflies, or the Swallow Tail, will furnish a capital wing for mounting in balsam, to be viewed as a transparent object. The latter is also often mounted opaque.

The Green-veined White Butterfly, in which a greenish tint is observable on the underside of the hind wing, when placed under the microscope shows the said green tint to be merely an optical illusion caused by the mixture of black and yellow scales situated there.

Any of the Blues will make a splendid slide if mounted entire with the wings closed, suitable especially for a low power of seven or eight diameters.

The moths now claim our attention.

The Burnet moth gives a remarkably fine slide, and so does the Green Oak moth. It will be found that, owing to the iridescent property of the scales of these moths, some positions of the light bring out the colours more strongly than others. Badly illuminated the wing will look insignificant, but when everything is *comme il faut*, it will be declared magnificent, the scales having a metallic lustre, and returning from myriad-glittering surfaces the light they receive from the lamp.

Towards the end of May, and all through June, a little glossy brown or black moth with long antennæ is common in the suburbs of London. There are several species, and some will suit the collector better than others. I remember reading in Wood's "Common Objects of the Country" * a description of this little gem, and I was so determined to add it to my collection, that I lost no time in going to the British Museum to identify the insect. Having satisfied myself that I should know an Adela moth if one came in my way, I next went to Epping Forest and got plenty. Since then I have, in the neighbourhood of Battersea, Wandsworth, and Streatham, on several occasions found, on palings, in the evening, a sort of Adela, having comparatively short antennæ, which is more beautiful still, and justifies all that the author quoted has said on the subject. The scales in this moth are prismatic, and if the light by which they are illuminated is slightly shifted the effect is remarkably pretty. Vivid rainbow and metallic tints alternately appear and disappear as the beam of light passes over the wing.

No cabinet will be complete without the wing of the White Plume moth, an exquisite example of grace and beauty. The scales and hairs on this wing are of the purest white, and gleam with silvery lustre. The moth is common all over the south of England, and makes its appearance in the twilight

* In his Nat. History he says, "If an observer be walking in the woods and should keep a careful watch among the leaves of the shrubs and underwood, he will often see sundry delicate filaments, like the threads of the gossamer spider, waving in the light, but having an iridescent surface, which shows they could not have derived their origin from the spider. On following these filaments to their source, he will find they belong to a little reddish-coloured moth, which sits on the branch with closed wings, and permits the long thread-like antennæ to wave freely in the breeze."—Vol. iii., p. 542.

of July evenings*. The caterpillar, I believe, feeds on the wild convolvulus; many specimens were obtained by the writer at Battersea.

The minute moths which affect our hawthorn hedges, rose-bushes, &c., are too numerous to specify. They are, besides, when procured, so difficult to mount without injury, that the task is almost impossible. These tiny Lepidoptera may be compared to the humming birds, and the prismatic lines in both seem to be analogous.

It is very odd, but no less true, that the precise nature of the iridescence, both in the feathers of moths and the scales of insects, is scarcely understood. In some scales there are doubtless real colours present, but in others the effect seems to be brought about by the decomposition of light.

An opinion which obtains greatly is that each scale is a laminated structure, and that in many cases the inner laminæ contain the colouring matter (if colouring matter it be), while the outer ones are corrugated and quite transparent, and this is the cause of the brilliant reflections. Mr. Gosse says, "It is by the separation and reflection of prismatic hues that they appear beautiful, but by what law some reflect none but red, some none but yellow, some none but blue rays, we know not."†

S. J. M'Intire.

GILL-FANS OF SABELLÆ.

J. L. D., writing at p. 262, vol. i., asks if it is a common occurrence for Sabellæ to cast their gill-fans? Yes, very common; so much so that when I have some specimens of *S. voluticornis* (a very fine species) sent me from England to Hamburg, I never expect to find them arrive with their gill-fans attached, but I always get them separated in transport, and lying in the vessel they came in. But I place the animals in a good stream of shallow sea-water, in one of the hospital tanks of this establishment, where they are unmolested by other creatures, and where they get more air in the water than in the show-tanks. In the course of two or three weeks, or a month, according to the season, very small and tender gill-plumes have grown (to replace the old ones), and these just peep out from the ends of the tubes. They then grow quickly, and in the course of a month longer are transferred to the tanks, where the public can see them. But the new fans thus grown, though in time they get to be as large as the original ones, are always whiter and more delicate-looking than those they had when in the sea.

I have verified, with *Sabella penicillus*, *S. casta*, *S. bombyx*, and others, all that Sir John Graham Dalyell observed with respect to the manner in which the tubes of these animals are added to at both ends. With me, as with him, *Sabellæ*, when they arrive here in separate tubes, like so many sticks, instead of being fastened to some firm substance, give no signs of life, until they have burrowed their posterior extremities in the sand of the aquarium, and this they do very quickly, not caring if they cannot make a new portion of their tubes of mud (of which the tubes consist when in the sea), but continuing it in fine sand. When thus fixed, they raise themselves up from the horizontal position as when first placed in the aquarium, and expand their gill-fans, and live well for long periods. *Serpula contortuplicata* too, with me, does not display itself at first, nor till I have kept it a week or two. *Sabella tubularia* (now *Protula protensa*) I find very handy. Some time ago, I, by accident, laid one down in a tank, with the mouth of its tube close against an upright piece of slate, so that the animal could not emerge, but it soon got over this difficulty by adding to its tube a new piece of about an inch long, turned abruptly at right angles to the original tube, and then, of course, the gill-fans expanded as usual.

Much information may be got about annelids from an octavo book published this year, at seven shillings (pp. 365, with twenty plates), entitled, "A Catalogue of the British Non-Parasitical Worms in the Collection of the British Museum. By George Johnston, M.D." This, though called "a catalogue," is not a dry list, but is a very *readable* book. The late Dr. Johnston, of Berwick-on-Tweed (1798—1855), was indeed such a genial man that he could never be dull. The volume is enriched with copious extracts from the writings of two other naturalists of the same class—those who observed the lower aquatic marine animals in a *living* state: Colonel George Montague (he died in 1815) and Sir J. G. Dalyell (he died about 1852)—which is a valuable feature of the work, the books of these two naturalists being expensive. I greatly admire their style of treating their subjects, their descriptions being both exact and vivid, and given in a manner which makes one feel intuitively that they had the living animals before them, and that they really loved them. Dalyell is especially felicitous in his language; for example, in describing the suddenness with which the gill-fans of *Sabella penicillus* collapse, he says, "Let the slightest shock be communicated, and the whole instantaneously collapses and disappears within the tube, *almost before its image has faded from the eye.*"

Every one who has seen a tuberculous annelid flash out of sight, must feel how strikingly truthful are those words which I have marked in italics.

Some years ago, when collecting materials for the history of the aquarium, I applied to the late Miss E. Dalyell, the venerable sister of Sir John, for any information she could give me respecting the system

* I saw one this evening in London, Nov. 2, 1865.

† F. H. Gosse's "Life, its lower and intermediate Forms," page 163.

pursued by her brother in keeping marine animals alive; for it is well known that, from the latter end of the last century to almost the middle of the present one, Sir John maintained aquaria in his house in Edinburgh. I asked Miss Dalyell, in the first place, whether Sir John chose the vessels in which he maintained his creatures, of any particular form or proportions, so as to obtain, for example, the largest extent of air-absorbing water-surface with the smallest amount of fluid, as would be obtained by the employment of shallow aquaria; and whether he frequently changed the water, or if he depended on the aërating effects of growing vegetation; and whether, to cause more or less growth of algæ, he chose various degrees of illumination, according to modern practice, by exposing his tanks to certain aspects of the sky. Also, if he attended much to temperature, and how long he kept the same animals without dying? To which questions Miss Dalyell answered as follows:—

"In answer to your inquiries regarding the way Sir John Graham Dalyell kept his marine animals, I will certainly give you all the information I possibly can, by, in the first place, telling you that the vessels containing them were all made of the very finest, clearest glass, wide at the top, just the same width as at the bottom; they were invariably round, and all sizes—some short, some long, some wider, some not so wide. I cannot remember ever seeing more than one fine specimen in one glass. No marine plant whatever was in the water where the animals dwelt. Sir John fed them himself; what he gave them I do not exactly know, but raw mussel, I know, was one thing. He kept many of his subjects *eight and ten years* alive. He was most particular in giving them sea-water, *always taken out of the sea when it was flowing*, and he changed the water every morning, often twice a day if he perceived the smallest fragment amongst it, wiping and washing the glasses very clean. He got sea-water always twice a week, and sometimes three times. It was carried in an earthenware jar, holding about three or four gallons of water: a person was specially employed for the purpose. Sir John's subjects were always kept in a shelf under the window in his study. It was situated in the north out-look, but whether they were put there for any purpose, I don't know, but I think it was just to put them anywhere out of the way. Sometimes he had a fire in his study and sometimes none. He understood nothing of marine botany. His chief aim was water fresh from the sea, when it was flowing and full of animalculæ, and particularly clean vessels.

"If I can give you any more information on the subject, I will be happy to do it.—I remain, &c.,

"*Jan. 2nd*, 1860." "E. Dalyell.

I then wrote again to Miss Dalyell, asking if she could give me any dates of her brother's aquarium-keeping, and she replied politely thus:—

"Your letter of the 18th of January reached me, but it being a difficult task for me to perform—furnishing you with dates—I am sorry to say that I am unable to perform it further than to mention that the first aquatic subject I found was dated in the year 1790; and, as a curiosity, I desired it to be engraved upon one of the copper plates. It is the *River-worm*, which forms into a *little fly*.

"As you have the work, you will observe a *little fly, and beside it a black little worm*. The worm ought to have been of the *most brilliant scarlet colour*. I know as to the *Hydra tuba*, Sir John was busily engaged about experimenting on it in aquaria, in the years 1800 and 1803. This is all the information I can give you. I know very well once every subject was dated, but where these dates are now I cannot tell. "E. Dalyell.

"*Feb. 4th*, 1860."

I think that these two very interesting letters, bearing on the early history of the aquarium, deserve printing. W. Alford Lloyd.

A FEW WORDS ABOUT SOME ASCIDIANS.

There is one form of marine objects very little noticed by casual visitors to the sea-shore; yet on investigation we may find much of beauty and very much of curious interest among them. These are the *Ascidians* or shell-less Mollusks, of the different sorts of which a most interesting account is given in the valuable work on "British Mollusca," by Prof. Forbes and Mr. Hanley.

To attract attention, let us first look at these bits of stone or rock, under our feet, between tide-marks, glittering like bits of mica slate; plunge them in clear sea-water, and look closely: the shining particles are beautiful little stars, five to nine rayed, but the prevailing number of rays to each star is seven. These are partially imbedded in, and held together, and held fast to the stone, by a dull slimy skin. This linking medium shows us that it is not a single animal which we are looking at, but a commonwealth of beings bound together by common and vital ties. (See fig. 23, which represents "*Botryllus polycyclas*.")

Each star is a family, each group of stars is a community, and each ray of every star is an individual life, containing in its inmost recesses all the machinery of life, the respiratory gill-plates and circulatory pumps, which a microscopic investigation can discern to be producing minute whirlpools, taking in and throwing out currents of water as needful for the creature's existence. Round each star, as if marking out the rays more distinctly, is a band of deep purple colour, giving the stars the appearance of being slightly raised in relief, on their connecting skin or integument. Forbes enumerates six species of *Botryllus*, besides Botryllidæ and similar objects. The size of each individual is about one-twelfth of an inch. Botryllus represents the '*true compound Ascidians*."

Fig. 23. *Botryllus polycyclus.*

Next let us take up out of the dredge some of these "associated Ascidians," queer misshapen masses. Their slimy, tough, leathery, and yet soft, horn-like substance is not pleasing to the touch; indeed, at first it is rather repulsive, and reminds us of the "Deadman's hands" (*Alcyonium digitatum*), so disgusting an object until we have seen the beautiful polypes which emanate like flowers from the warts spread over its surface. Our tunicated Ascidians exhibit no such polypes.

It is said that most of the *tunicata* undergo a sort of tadpole state on first emerging from the egg, swim about freely in the early stages of their existence, and pass through curious transformations, before they become fixed on the ground, or rocks, or algæ, as found in their fully developed condition. Let us select this dark orange-coloured lump, or mass of lumps: it is probably *Cynthia rustica* (fig. 24). There are no polypes or whorls of tentacles on their rough, wasted, wrinkled surface; but inside each of the agglomerated coriaceous lumps, which are really the tunicæ, is an animal—a true Ascidian; and if we place the mass in sea-water we shall presently see two snouts or tubes of a bright red colour pushed out from each conelike projection; these have a square sort of opening, and the one takes in and the other ejects the fluids which support the life of the animal. These fluids are sometimes ejected with such force, that Mr. Gosse has called these creatures "squirters"; the tubes are called syphons. There are about thirteen species of *Cynthia* recorded. The animals resemble a good deal in some respects, and differ in others from, those of the Pholas and other allied families of the true Mollusca; but instead of shells they are invested in these tough coriaceous tunics, or jackets, and are hence named *Tunicata*, of which about seventy-four species are described by naturalists. M. Milne-Edwards has written very elaborately on the Ascidia; but the merit of first detecting their real nature belongs probably to Savigny; though they seem to have excited the attention of Aristotle, who gives a most graphic description of them when he says: "They are the only kind of mollusca whose whole body is enclosed in the shell, and that shell of a substance between true shell and leather; it may be cut like dry leather. If we open them we find a nervous membrane lining this leathery case, and fixed to it at two points, corresponding to the two separate openings, the one to take in, the other to eject the water." He then makes further remarks on their anatomy, which convinced him of their truly animal nature, although on the first mere external survey, the inert and sponge-like forms rooted to the ground seemed to indicate a vegetable nature. Like most philosophic naturalists, the question of the distinction between the animal and vegetable kingdoms was one of great attraction for the all-observing Aristotle, and this great father of natural history examined the Ascidia and many other creatures in

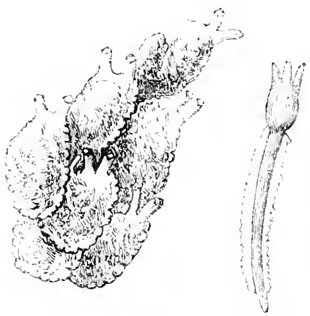


Fig. 24. *Cynthia*, and its Tadpole.

the hopes of gaining definite information respecting such distinction. This line of demarcation is eagerly sought after to the present day, but, as yet, the subtlest chemistry, the most unwearied microscopic searchings, have failed to settle the question. May it not be that the mingling and melting of one nature into the other are too gradual and imperceptible for human ken?

It is worthy of remark that, so lately as 1845, the Ascidians have again played a part in that much-vexed question, and been obliged to submit to new cross-examination, and with very unexpected results, for they have shown in the composition of their tissues an unlooked-for relation with vegetable structure.

Dr. Schmidt discovered in the tunic of an Ascidian mollusk a substance identical with cellulose. This statement was confirmed and extended by the inquiries of Professors Löwig and Kölliker, who found cellulose undoubtedly present in considerable quantities in the tissues of many tunicata, both simple and compound. They explained this by supposing it might be dissolved by the gastric juices from the diatoms and many minute vegetable organisms found in the stomachs of the Ascidians, and, being thus dissolved, was then absorbed into the tissues.

Thus, as Professor Forbes remarks, if the presence of cellulose in the tunics of the Ascidian mollusks cannot be taken as an evidence of an approach to a vegetable nature in these bodies, it affords us at least a wholesome warning against the placing of confidence in asserted chemical distinctions between the great kingdoms of nature.

P. S. B.

THE NEW ILLUMINATORS FOR HIGH POWERS.

THE principle of reflection has been made use of in optical instruments for a variety of purposes, and recently that employed in the transit instrument has been modified and brought to bear upon the microscope in a very remarkable manner. The instruments alluded to, are the new patent illuminators of Messrs. Powell and Lealand; Smith, Beck, & Beck; and a reflector by Messrs. Ross of London, and Dancer of Manchester; which latter has also adapted a small speculum answering the same purpose. That of the first-named firm consists of a tube of brass, fitted at one end with a moveable male and at the other a female screw, thereby enabling it to be screwed into the body of the instrument, and an objective into the lower opening. Midway between their two orifices is situated a small plate of parallel glass, which receives light from a lamp through a small hole drilled in the side of the before-mentioned tube; the hole is fitted with a small diaphragm plate, perforated with four openings of different sizes. The action of the new apparatus consists in transmitting, by means of the plate of glass, the light (received through the side orifice) from a lamp through the object-glass down upon and illuminating the object, the rays therefrom passing upwards through the objective again, and impinging upon the field-glass of the eyepiece as usual. The illuminator by Smith, Beck, & Beck is in substance the same, but more simply carried out. The tube for screwing into the microscope, and the orifice thereof for the objective, is lighter than that just described, the moveable upper portion which screws into the microscope being evenly burnished in, to enable the hole, through which the light from a lamp is to be thrown, to be always brought round to the left hand. In lieu of a plate of glass for the necessary reflection, a round disc of ordinary thin microscopic glass is used, the same being fixed by means of shellac into a small pin, the pin and disc gliding centrally into position through a slot cut in the tube. The pin projects, terminating in a small milled head, whereby the best angle of reflection can be obtained; this will be found to be 45°. The next method consists in making use of the left-hand tube of the binocular microscope, which is fitted with a piece of tube carrying a mirror, the light being by its means reflected on to, and through the prism, and so through the object-glass, the right tube conveying the magnified image of the object to the eye of the observers. The speculum last referred to fits into the body of the microscope just above the objective, and, reflecting a small portion of the rays, acts similarly to the illuminators first named.

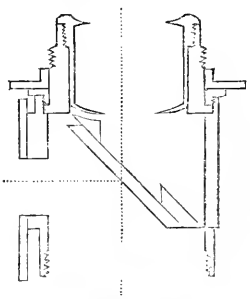


Fig. 25.

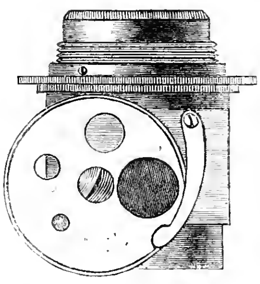


Fig. 26. Powell & Lealand's Patent Illuminator for Minute Opaque Objects.

After the above description of the apparatus, the next point to be considered is the illumination; and, indeed, upon the management of this, nearly the satisfactory working of the whole depends. My remarks now will be confined to the two illuminators first mentioned. Too much light carries flare, and the object appears foggy and indistinct. The best method I have found, is to use the small condensing lens fitted into the stand (not the stage) of the instrument, the lamp being raised to the height necessary to illuminate the whole of the lens. The circle of light transmitted by the condenser should just fill the aperture of the small diaphragm one size larger than intended to be used. With the instrument by Smith, Beck, & Beck the same object can partially be obtained by moving the lamp a little further away, or on one side. Another great improvement (with some objects) I find, can be made by causing the light to pass through a plate of thin neutral-tint glass, the flare, if not excessive, being entirely absorbed. We next arrive at the class of objects to which this description of illuminator is specially adapted; these will be found to consist of scales, say Papilio Paris, Azure Blue, thin sections of wood, &c., or, in fact, anything which is tolerably flat. With respect to objects covered with glass, no matter how thin, the illuminators will not work, the reflection from the glass-cover enveloping the object as depicted upon the field-glass of the eyepiece in total fog. The best object-glasses for use with these instruments appear to me, to be the $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{8}$, and $\frac{1}{12}$.

This brief notice of illumination for opaque objects with high powers must not close without reference to the last method previously mentioned, viz., the reflector and illuminator, which appears to possess certain elements extremely valuable. The glare is much reduced, and necessarily so, as the image of the object does not pass through any plate of glass, the binocular prism simply directing the rays of light into the objective, and thence to the object; the magnified figure being seen through the right-hand tube without any medium being interposed. There are one or two drawbacks to this plan. First, nothing can be seen binocularly, although it is well known that a $\frac{4}{10}$ and $\frac{1}{4}$ may be used with advantage in some cases in the binocular; of course, as one tube is taken up with the illuminating apparatus, the observer can only make use of the other. Secondly, as the prism cuts off half the pencils of light refracted through the object-glass, its power is sensibly diminished. Thirdly, it is somewhat difficult to get a field equably illuminated. The arrangement is nevertheless very simple and efficacious where the binocular is not required. Owners of these contrivances must not rashly condemn either, as a great deal depends, as before mentioned, upon manipulation; and there can be no doubt but that they place in our hands as microscopists, a new power, to be hereafter used in the solution of certain points which, without their aid, would remain in ambiguity.

JOHN BOCKETT.

MOUNTING CRYSTALS.

BY A. J. ROBERTS.

THE mounting of crystals, though at first sight apparently simple, is frequently attended with some difficulty, and is a sort of bugbear to microscopists. A few lines on the subject may not be altogether unacceptable to the readers of SCIENCE GOSSIP, or inappropriate to its pages; more especially as one correspondent has already expressed a desire for information on the subject.

Perhaps the first thing to consider is the medium best adapted for this purpose.

Canada balsam and castor-oil seem to be the two best media on account of their being little acted on by the substances to be mounted in them; gelatine, glycerine, and all aqueous media are, of course, quite inadmissible from their solvent power.

With regard to the salts themselves, the best method of proceeding is to place a drop or two of a solution of the salt, which it is desired to crystallize for the purpose of mounting, on an ordinary glass slide, allow it to dry slowly and completely, and then, if balsam is to be used, it must be applied in a tolerably fluid state, the glass cover put on, and the slide finished in the usual manner, with the application of as little heat as possible.

The use of castor-oil is attended with a little more difficulty. A perfectly dry spot of crystals being selected, a small portion of castor-oil should be dropped on gently, and allowed to insinuate itself over every part of the spot to the total exclusion of air bubbles. The thin glass cover must now be carefully applied, all superfluous oil removed by the application of bibulous paper, and the cover sealed with shellac-varnish, during the drying of which the slide must be kept in the horizontal position. There are some substances which it is impossible to mount, such as chromic acid and permanganate of potash; for, owing to their very powerful oxidizing properties, they become decomposed in contact with organic matter. Crystals of such compounds must therefore be prepared for observation extemporaneously, as, being very deliquescent, they soon attract moisture from the air and become liquid.

There is, however, one salt specially worthy of notice, which may be mounted with free access of air, a thin glass cover to keep out the dust being all that is required. It is the platino-cyanide of magnesium in its ordinary state; the crystals are of a rich red colour with bright green reflections. When heated it becomes yellow from loss of water, and then gradually absorbs moisture from the atmosphere, and resumes its original red colour. A slide of this, like many other objects, is, a "thing of beauty," and a never-failing source of admiration; its gorgeous colours being heightened by the polariscope will call forth expressions of pleasure from the enchanted beholder. Other salts may also be enumerated as giving pleasing results, and being tolerably easy to mount. The sulphates of copper, iron, magnesia, the double sulphate of nickel and potash, the nitrates of soda and potash, chlorate of potash; among the organic bodies, salicine, theine, quinine, and the other cinchona alkaloids. Aloine, from aloes, either Socotrine or Barbadoes, may be thus prepared. A fragment of either variety of aloes being crushed on a glass slide, sufficient proof spirit added to dissolve it, and the solution covered with thin glass, the arrangement set by that the spirit may evaporate, the aloine will crystallize out slowly (the slower the better). After a few days fine crystals will be formed, which will require no further preparation; the glass cover may be fastened down. This forms a very beautiful slide.

There is also another beautiful salt called "Herapathite." It is a salt of quinine; its method of preparation may be found in Hogg's work on the microscope, and is too long for insertion here. This salt requires great care in mounting, but forms a nice object.

In mounting crystals the great aim of the preparer should be to obtain perfect and regular specimens. These will always be of value as a reference to the typical crystalline form of any salt. Most salts, if their solutions are rapidly evaporated, form a crystalline mass, of which the component crystals are so conglomerated together that the normal form is difficult, if not impossible, to be made out. Hence the necessity for slow evaporation. It is a good plan to prepare two or three slides, and, before mounting, to select the one which has the most perfect crystals. Of course (like everything else connected with microscopy) mounting crystals requires practice, and there is a certain knack which can only be acquired by repeated operations, and the observer must not be discouraged by frequent failures. While on the subject of crystals it may not be out of place to notice one other circumstance, which, though not of any scientific importance, is a source of pleasure to the observer, and deserves more attention than is frequently given to it, viz., the act of crystallization, which is very beautifully seen under a low power with the aid of the polariscope and selenite stage. The slide on which a drop of the solution of the salt under examination has been placed should be warmed and placed under the microscope. As evaporation proceeds, delicate forms are seen darting swiftly over the field, or more leisurely pursuing their path, accompanied by the most splendid play of colours, until the whole field becomes one mass of crystals glowing with all the colours of the rainbow. Sometimes minute crystalline points dart into view, and, gradually increasing in size until they frequently join each other, form a spectacle which cannot fail to fill the mind of the thoughtful observer with wonder, and to raise questions as to what are the laws which govern the formation of those beautiful shapes presented to his gaze, and why these varied forms should differ. The great questions respecting light and heat are gradually approaching solution, and may not those relating to the formation of crystals be solved by some patient investigator?

Death-watch.—Mr. Smith lately called the attention of the Entomological Society, to a query recently put to him by a correspondent respecting the so-called "death-watch." He was inclined to think that the "ticking" said to be caused by *Atropos pulsatorium* was scarcely substantiated, as he could not conceive it possible that so soft and delicate a creature could produce any sound whatever; and, with reference to that supposed to be made by *Anobium*, he thought it more likely that this was caused by the insect's gnawing the wood, rather than as being a special independent sound, as was generally supposed.—*Entomol. Mon. Magazine.*

STARCH.

It must be premised that in writing of Starch we do not use that term in its domestic application, and that the Starch of the laundry is but one of several forms of the substance known in science under the general name of Starch, which includes also sago, tapioca, arrowroot, corn-flour, and similar alimentary substances.

It was said by a noted lady-lecturer, Lola Montez, some years ago, that "Starch makes the man," alluding to the then prevalent fashion of wearing starched collars, shirts, and other portions of male attire, not to mention the starched petticoats and other garments of the gentler sex, before the introduction of crinoline. Her assertion is true in another sense, for wheat is not inaptly termed the "staff of life" in temperate zones, and rice in tropical regions; and it is largely on account of their Starch that they are of so much benefit to mankind.

Of the history of Starch very little is recorded. It appears to have been known to the ancient Greeks; and Pliny attributes to the Islanders of Chio "the discovery of the method of extracting it from wheat." The Venetian traveller Marco Polo, who visited China and some parts of the East Indies in the thirteenth century, describes the method of extracting it from the sago-palm. According to Fosbroke, starches of various colours were imported into England from Holland in 1564—that which was yellow being esteemed the best for ruffs and other articles. In histories and novels—treating of the early part of the seventeenth century—allusion is occasionally made to the notorious Mrs. Turner, who, in addition to dealing in spells and philtres, introduced into Britain yellow-starched ruffs, &c. In the presence of many women of fashion, this introducer of starched linen made her exit on the scaffold at Tyburn, rouged and dressed as if for a ball, and wearing an enormous ruff stiffened with her own yellow Starch. Despite her example, in a few years after her exit, the fashion she had introduced died out.

It appears that much of the Starch used for stiffening the enormous ruffs worn by "the upper ten thousand" of that period was procured from the root of the *Arum maculatum;* for that quaint old botanist, Gerard, writes:—"The most pure and white Starch is made of the roots of cuckoo-pint; but most hurtful for the hands of the laundress that hath the handling of it, for it choppeth, blistereth, and maketh the hands rough and rugged, and withal smarting."

To the unaided eye, Starch, highly purified, appears simply as a powder more or less white, and sometimes with a glistening aspect. Under the microscope, however, this powder is seen to consist of granules of various forms and sizes, and on many of them is perceived, either in the centre or near one end, a small ring, groove, slit, star, or crack, termed the hile or hilum, around which may frequently be noticed faint rings, plications, or folds. The formation of the granule, the structure and uses of its hilum and rings, have been the subject of much dispute amongst microscopists. By some it is affirmed that the granule consists of a nucleus and coverings, and that the plications are due to the coverings cropping out. Others are of opinion that it is made up of layers of amylaceous matter surrounding a hilum, and that the outer layers are denser than the inner; whilst others assert that it is simply a cell filled with amylaceous matter enclosed by a plicated cell-wall.

Leuwenhoek, the eminent German microscopist, was of opinion that the granules of Starch were cells "having soluble contents, but an insoluble case." This was denied by Payen, Persoy, and Fritzsche, who stated that the granules consisted of concentric laminæ superimposed on one another. M. Martin, librarian of the Imperial Polytechnic Institute at Vienna, and Mr. Busk, a distinguished naval surgeon and microscopist, are of opinion that the Starch granule is "a cell having a cell-wall much larger than the contents of the cell in a dried state, and therefore puckered and plaited as indicated by the lines on the surface."

Lately, in a paper by Dr. Allman, of Dublin, published in the *Quarterly Journal of Microscopical Science*, the doctor agrees with Fritzsche's theory, that the Starch-granule is, in fact, "a series of cells placed within each other."

He thus sums up his remarks:—

1st. "That the Starch-granule consists of a series of lamellæ, in the form of closed hollow cells, included one within the other, the most internal inclosing a minute cavity filled with amorphous (?) Starch; that the concentric striæ visible on the granule indicate the surface of contact of these lamellæ; and that the so-called nucleus of Fritzsche corresponds to the central cavity.

2nd. "That while the lamellæ appear to be all identical in chemical constitution, yet the internal differ from the external in consistency or other conditions of integration.

3rd. "That the order of the position of the lamellæ is centripetal.

4th. "That while the Starch-granule is thus a lamellated vesicle it must be included in the category of the true vegetable cell, from which it differs not only in the absence of a proper nucleus, but in presenting no chemical differentiation between membrane and contents."

Wheat (*Triticum vulgare*).—This starch consists chiefly of large and small grains, with a few of intermediate size; those of common wheat range from ·0001 to ·0009 of an inch. The smaller are nearly globose, the larger rounded and flattened. In a few of the granules a hilum may be observed with faintly-marked concentric rings around it.

Rice (*Oryza sativa*).—The granules of rice starch are polygonal and very small, about ·00019 of an inch on an average, and the smallest of commercial starches. They do not, however, adhere in groups, as in many other irregular-shaped species.

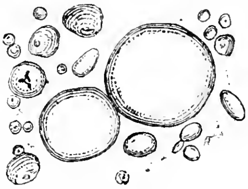


Fig. 27. Wheat.

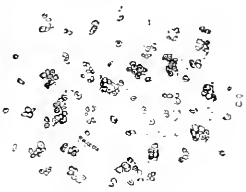


Fig. 28. Rice.

Maize (*Zea mays*).—Starch from maize has more or less angular or polyhedral granules, with a distinct hilum in the form of a cross or star. The surface is without any visible rings or markings. In size they average from ·0005 to ·0007 of an inch. They generally adhere in clusters, and present a hexangular face.

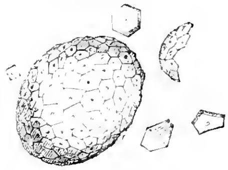


Fig. 29. Maize.

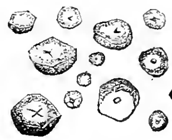


Fig. 30. Dhoora.

Dhoora (*Sorghum vulgare*).—The starch of the sorghum or dhoora bears considerable resemblance to that of Indian corn. The granules are mostly polyhedral as the result of compression. Radiate markings indicate the position of the hilum.

Oat (*Avena sativa*).—This starch consists of compressed granules, often polyhedral. They have a tolerably distinct hilum, but are without external markings. The size varies from ·0001 to ·0010 of an inch. Most starches exhibit some characteristic feature under polarized light, but in this instance scarcely any variation is observable.

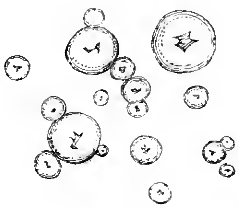


Fig. 31. Oat.

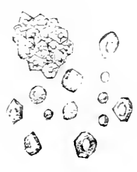


Fig. 32. Millet.

Italian Millet (*Setaria Italica*).—These granules are very similar to those of maize, differing chiefly in their smaller size (fig. 37). They are often agglomerated together in masses, and maize starch may be taken as the type, of which this and the next are varieties.

Indian Millet (*Panicum miliaceum*). — The starch yielded by this millet is small, of a polyhedral form, and very similar in all respects to that last named, except in being rather more minute.

Peas (*Pisum sativum*).—The starches of peas, beans, and lentils offer a type differing from all the preceding in the sinuosities of the margins of the granules. That of the pea has alternate elevations and depressions on the surface, and a deep central groove, from which the furrows diverge.

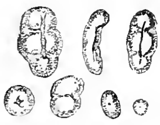


Fig. 33. Peas.

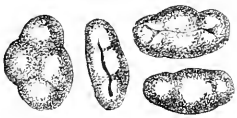


Fig. 34. Beans.

Beans (*Phaseolus vulgaris*).—These granules are also remarkable for the undulations of their surface. They are larger than those of the pea, and present the same appearance of an elongated hilum, which is in reality the central groove.

Sago (*Sagus Rumphii*).—The granules of Sago starch are irregularly elliptical, from ·0005 to ·0022 of an inch long by ·0008 to ·0016 of an inch wide. They are generally more or less broken, with a circular hilum near one extremity. A few faint concentric rings are discernible on some of the granules.

Fig. 35. Sago.

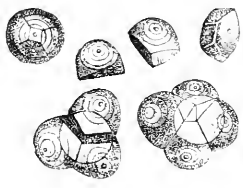


Fig. 36. Cycas.

Cycas (*Cycas circinalis*).—These granules are of a remarkable structure, apparently formed by the agglomeration of sphærical grains, which on separation exhibit a sharp angular form at the points of contact. Each of these portions has its individual hilum.

Potato (*Solanum tuberosum*).—These granules are intermediate in size between those of the West Indian arrowroot and Tous les Mois. The most characteristic resemble an oyster-shell, all exhibit a hilum, and the concentric lines are larger and coarser than in most starches.

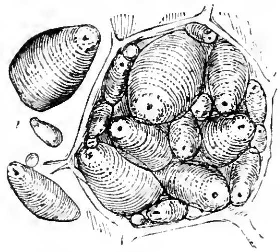


Fig. 37. Potato.

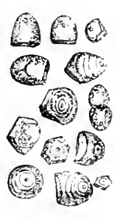


Fig. 38. Sweet Potato.

Sweet Potato (*Batatas edulis*).—The starch of the Sweet Potato bears considerable resemblance to that of the Cycads, in the angular form of some of the faces of the granules and the rotundity of others. It is, however, smaller and less distinctly marked.

Tous les Mois (*Canna edulis, &c.*).—This is the largest and most beautiful of all the starches. The characteristic granules are egg-shaped, with a ring or hilum near one end, surrounded by rings or plaits which are fine, crowded, and regular. Under the polariscope the crosses are clear and better defined than on any other starch.

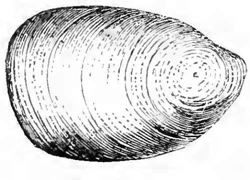


Fig. 39. Tous les Mois.

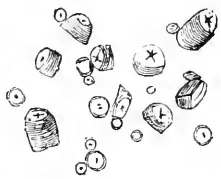


Fig. 40. Tapioca.

Tapioca (*Jatropha manihot*).—In this starch the granules are muller-shaped, though, when seen endways, they appear circular. The hilum is sometimes circular, and at others a slit with a few faint rings.

Bermuda Arrowroot (*Maranta arundinacea*).—The granules are much smaller than those of Tous les Mois, narrow, and tapering, frequently terminating in an obtuse point, while some display small papillæ or knobs. The hilum is generally a ring, but occasionally a slit, in the narrow end, and around it a few faint rings may be observed.

Fig. 41. Arrowroot.

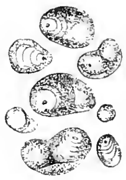


Fig. 42. Hyacinth.

Indian Arrowroot (*Curcuma angustifolia*).—The granules in this starch are long, narrow, and shell-shaped, the hilum is a ring in the narrow extremity of the granule, but it is very indistinct. On all the granules lines or plications occur, which, however, mark only segments of a circle.

Hyacinth (*Agraphis nutans*).—The granules of the bulbs of the hyacinth somewhat resemble those of the lily, but are smaller, more irregular, and like them often exhibit more than one hilum. The granules are also often constricted in the centre.

Lily (*Lilium candidum*).—These granules are almost pear-shaped, more or less elongated. The hilum is often double in the same grain, and there are faint indications of concentric markings on the surface.

Fig. 43. Lily.

Fig. 44. *Orchis bifolia.*

Orchis (*Orchis bifolia* & *O. latifolia*).—The starch grains of Orchis corms are more or less ovoid, with a hilum in the largest part of the granule. Those of *O. bifolia* have often two conical projections, one at each extremity of the same axis. Those of *O. latifolia* have the hilum often double.

Fig. 45. *Orchis latifolia.*

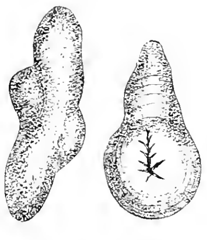


Fig. 46. Colombo.

Colombo (*Menispermum palmatum*).—There are two noticeable distinctions in the granules of Colombo root, the protuberances on the sides and the position of the hilum in the largest portion of the granule. They are of considerable size and very irregular, as will be observed by our figure.

These may be accepted as types of starch granules. Many others might have been enumerated and figured, but the above will serve to indicate that the subject is one which affords variety and interest. Polarized light is a great instrument in the hands o those who study starch granules, and we heartily recommend the student to examine some of these common objects for himself.

J. Brown.

The Cucumber.—Mr. Aiton mentions the cucumber as being first cultivated here in the year 1573, in the reign of Queen Elizabeth. This appears to be an error, as cucumbers were very common in this country in the reign of Edward III.; but being unattended to during the wars of York and Lancaster, they soon after became entirely unknown, until the reign of Henry VIII., when they were again introduced into this kingdom.—*Gough's "British Topography."*

FOSSIL PLANTS OF THE CARBONIFEROUS LIMESTONE.

For the following picture of the vegetation of the carboniferous limestone we are indebted to Figuier's "World before the Deluge," and for the illustrations to the publishers* of the English translation.

The vegetation which covered the numerous islands of the carboniferous sea consisted of ferns, of *Equisetaceæ* (horse-tails), of *Lycopodiaceæ*, and *dicotyledonous Gymnosperms.* The *Annularia* and

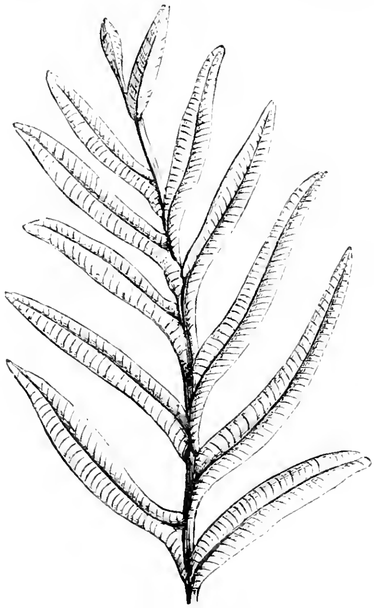


Fig. 47. *Pecopteris lonchitica* (enlarged.)

Sigillaria belong to families completely extinct of the last-named class.

The *Annularia* were small herbaceous plants which floated on the surface of fresh-water lakes and ponds; their leaves were verticillate—that is, arranged in a great number of whorls, at each articulation of the stem with the branches. The *Sigillaria* were, on the contrary, great trees consisting of a simple trunk, surmounted with a bunch or panicle of slender leaves, drooping at the extremity, the bark often channelled and preserving impressions or markings of the old leaves, which, from their resemblance to a seal (*sigillum*), gave origin to their name.

The *Stigmaria*, according to many paleontologists, were *Cryptogamia*, of subterranean fructification. We only know the long roots which carry the reproductive organs, which, in some cases, are as much as sixteen feet long. This was suspected by

* London: Chapman & Hall, 193, Piccadilly.

Brongniart, on botanical grounds, to be the roots of *Sigillaria*, and recent discoveries have confirmed this opinion. Sir Charles Lyell, in company with Dr. Dawson, examined several erect *Sigillaria* in the sea cliffs of the South Joggins, in Nova Scotia,

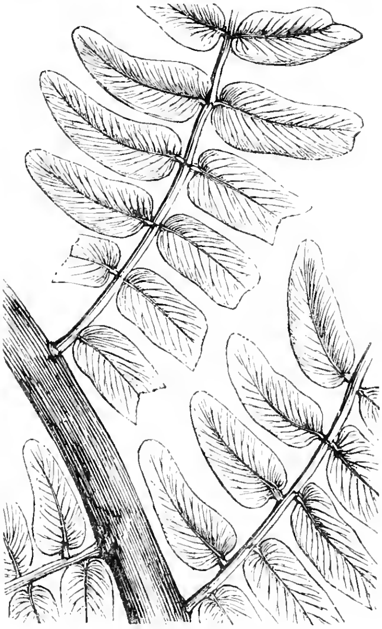


Fig. 48. *Neuropteris gigantea.*

and found that, from the lower extremities of the trunk, they sent out *Stigmaria* as roots, which divided into four parts, and these again threw out eight continuations, and these again divided into pairs.

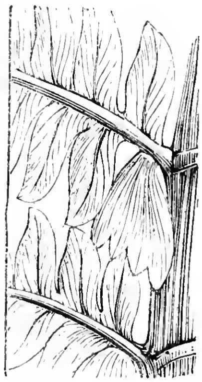


Fig. 49. *Odontopteris Brardii.*

Two other gigantic trees filled the forests of this period: these were *Lepidodendron carneatum* and *Lomatophloyos crassicaule*, both belonging to the family of *Lycopodiaceæ*; which includes, in our age, only very small species. The trunk of the *Lomatophloyos* threw out numerous branches, which terminated in thick tufts of linear and fleshy leaves.

The *Lepidodendrons*, of which there are about forty species known, have a cylindrical stem or trunk, bifurcated in the branches—that is, the branches were evolved in pairs. The extremities of the branches were terminated by a fructification in the form of a cone formed of linear scales, to which the name of *Lepidostrobus* has been given. In many of the coal-fields fossil cones have been found, to which this name has been given by earlier paleontologists. They sometimes form a nucleus of concrete balls of clay ironstone, and are well preserved, having a conical axis, surrounded by scales compactly imbricated. The opinion of Brongniart is now generally adopted, that they are the fruit of the *Lepidodendron*. At Colebrookdale and elsewhere these have been found as terminal tips of a branch of a well-characterised *Lepidodendron*. Both Hooker and Brongniart place them with the *Lycopods*, having cones with similar spores and sporangia like that family. Nevertheless, many of these branches seem to have been sterile, simply terminating in fronds or elongated leaves. Most of them were large trees. One tree of *S. Sternbergii*, nearly fifty feet long, was found in the Jarrow Colliery, near Newcastle, lying in the shale parallel to the plane of stratification. Fragments of others found in the same shale indicated, by the size of the rhomboidal scars which covered them, a still greater size.

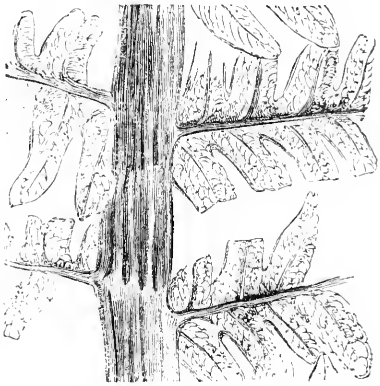


Fig. 50. *Lonchopteris Bricii.*

The ferns composed a great part of the vegetation of the carboniferous period, both in the herbaceous and arborescent form. Ferns differ chiefly in some of the details of the leaf. *Pecopteris*, for instance (fig. 47), has the leaves once, twice, or thrice pinnated with the leaflets adhering either by their whole base or by the centre only; the midrib running through to the point. *Neuropteris* (fig. 48) has leaves divided like *Pecopteris*, but the midrib does not reach the apex of the leaflets, but divides right and left into veins. *Odontopteris* (fig. 49) has pinnatifid leaves like the last, but its leaflets adhere by their whole base to the stalk. *Lonchop-*

teris (fig. 50) has the leaves several times pinnatifid, the leaflets more or less united to one another, and the veins reticulated. Among the numerous

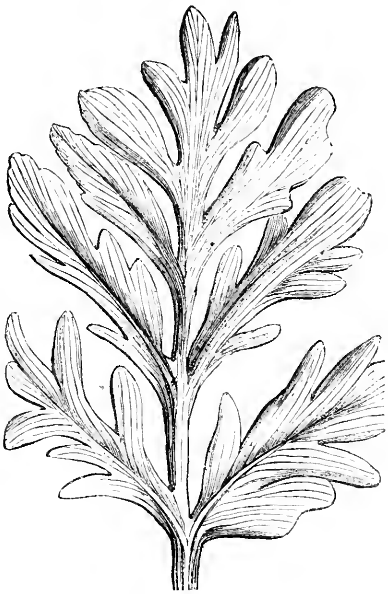


Fig. 51. *Sphenopteris artemisiæfolia.*

species of the period was *Sphenopteris artemisiæfolia* (fig. 51). *Sphenopteris* has twice or thrice pinnatifid leaves, the leaflets narrow at the base, and the veins generally arranged as if they radiated from the base: the leaflets frequently wedge-shaped.

BOTANICAL NOTES OF THE YEAR.

DURING 1865 but few plants new to the British Isles have been observed; at least, as regards the higher orders, though, among the lower, various novelties have been recorded. Perhaps the sole example of a new flowering plant with which 1865 has presented us, which can be regarded as an undoubted native, is the sharp-leaved Irish Ivy (*Hedera Canariensis*), which, first announced as an Irish species by Dr. Seemann, is confirmed as such by Professor Babington, in the December number of the *Journal of Botany*, that gentleman having observed it, "on old whitethorn trees, in the western part of the Phœnix Park, near Dublin." It appears to have been subsequently recorded from county Wicklow, and more definitely from "Walls, near Merrion," but its origin here seems to be doubtful. The Professor also suggests that, "in all probability, the ivy of Killarney will be found to be *H. Canariensis*." Another plant, discovered in 1864, but first made public in 1865, is *Erucastrum Pollichii* (*E. inodorum* of Reichenbach), observed by Mr. Joshua Clarke, growing in small quantity on a heap of sand near Saffron Walden, Essex, and retaining its ground during the past year. It is, however, a questionable native. A new rose (*Rosa collina*, Jacq.) has been discovered, near Plymouth, by that accurate observer, Mr. T. R. A. Briggs, to whom we were last year indebted for *Hypericum undulatum*.

In the *Popular Science Review* for January, those botanists who love to compare the plants of past ages with those of more recent formations will find an interesting article by Dr. Seemann, entitled "Australia and Europe formerly one Continent." The Rev. G. Henslow furnishes a paper on climbing plants, being a *résumé* of Mr. Darwin's admirable treatise on the same subject.

The *Journal of Botany* has a valuable article by Mr. Ralph Tate, on the Flora of the Shetland Isles, in which he gives as complete a list as possible of the plants of those islands, collected from other authors, and verified and augmented by his own observations. An editorial note informs us that the supposed *Plantago alpina* is not really that species, but merely "a broad-leaved variety of *P. maritima*." Some new British Lichens receive attention in this number.

Now is the season for "Seed-Catalogues," the authors of which appear to have generally some rather loose ideas regarding the extent of the British Flora: a list of the "plants new to Britain," which are given as natives of that favoured country, would take up considerable space. Our Crowfoot tribe is increased by a new Columbine (*Aquilegia glandulosa*); our Candytuft receives a companion, under the name of *Iberis coronaria*; *Dianthus punctatus* is ranked with our British pinks; *Impatiens noli-me-tangere* finds a brother in *I. glandulifera*; and many other examples might be added. The name *Lythrum Salicaria* is not, we may suppose, sufficiently grand for our Purple Loosestrife, as this plant is rechristened *Lythrum roseum superbum!* More than one firm offer for sale a mixture of flower-seeds for woodland walks, shrubberies, railway embankments, &c.; but as botanists we may hope that their customers in this department are few; for does not Nature herself supply an abundant and beautiful "mixture" of flowers, and grasses, and ferns, in far better taste than we can hope to emulate, or attempt to improve upon? There are those who would endeavour to "paint the lily and add perfume to the rose," but no lover of nature will wish to be ranked among them. B.

MALFORMATION IN THE DAISY.—On the 9th ult., I gathered, near Wycombe, a specimen of the daisy (*Bellis perennis*), in which the involucral bracts were transformed into small, curled leaves.—B.

ZOOLOGY.

A January Butterfly.—In proof of the extreme mildness of the season, I captured yesterday (Jan. 8th), at Falkington, Lincolnshire, two small tortoise-shell butterflies (*Urtica Vanessa*), which I have alive at this time. I may also mention that I have several carnations in full bloom in the open air—a circumstance almost unprecedented in these parts in the month of January.—*J. Bennett, Vicar of Walcot.*

Pussy Predilections.—Our "puss" has a litter of seven, occupied solely at present in search of nourishment and daylight, being but a few days old. Their mamma found them a "big brother" in a young *rat*, who very contentedly shared their bed. On his removal to some distance, the foster-mother followed, and carefully lifting him in her mouth, returned with him to her blood relations, and when again deprived of him for the common good, parted with him with great reluctance. This, together with her having quite recently given birth to a litter strongly illustrative of the Darwinian theory—one being *without* a tail, another with that appendage of its ordinary proportions, whilst those of the intervening members of the family were of intermediate sizes—will probably induce you to immortalize her in your pages as "the wonderful cat."—*T. J. B.*

Du Chaillu's Little Men.—M. du Chaillu has returned from his expedition to Western Equatorial Africa, and on the 8th of January gave an account of his journey at the meeting of the Geographical Society, on which occasion he stated that he had met with a singular diminutive wandering tribe—a kind of negro-gipsies, of lighter colour than the negroes, and having shorter hair on the head, and hairy bodies. The average height of the women, a few individuals of whom he measured, was only 4ft. 4in. to 4ft. 5in.

Zoological Gardens.—We regret to learn that the late snow-storm did considerable damage at the Zoological Gardens, Regent's Park, by breaking down some of the aviaries, and permitting the valuable pheasants to escape. Unfortunately some of these birds perished, and a collection, believed to be the most unique in Europe, in this particular group, has suffered greatly.

Sparrows Roosting.—Two sycamore-trees in front of the Asylum for the Deaf and Dumb, in the Old Kent Road, are the nightly resort of an immense number of sparrows. When passing the trees at sunset, it is well worth stopping to watch the birds chattering and fighting for places, and then one by one tucking their little heads under their wings, until at length the noisy assemblage becomes quite still and quiet. At this season, as the trees are bare of leaves, the whole scene is visible to those passing below.—*W. R. Tate.*

Woodcocks in North Europe.—In Science Gossip, vol. i., page 47, we are told that in the "dwarf birch scrub" of Lapland and Finland nests of woodcocks are to be found "in thousands." My own knowledge of those countries extends, in point of time, over a long two years, spent with gun in hand; and, in point of range, from the "Naze of Norway" to North Cape, and thence eastward to the frontier districts of Russia. In the many hundred miles of "birch scrub," which I have carefully hunted for willow grouse (*Tet. Saliceti*), I never so much as once found a woodcock's nest. Throughout the whole of Scandinavia proper, and the regions conterminous, woodcocks are decidedly scarce; and whenever I have found them it has been in tall, boggy pine forests, but very rarely even there. I have seen perhaps two in a day, but much more frequently none. It is my belief that by very far the larger portion migrate from and to the regions to the eastward of the Bothnian Gulf. Throughout the whole of Lapland it never occurred to me to flush a common snipe. "Solitary snipe" I have found in some places abundantly. In the Morea, in 1843, in about five weeks of January and February, with very little aid, I shot 540 woodcocks, and Colonel C. Fitzhardinge Berkeley, Scots Fusilier Guards, who was travelling with me, shot over 300 in the same time. I have occasionally found woodcocks' nests in the large forests near Canterbury.—*N. Chichester Oxenden.*

Visitation of Spiders.—I again venture to trouble you with a few notes on the visitation of spiders, referred to by W. H. H. in the January Gossip, and introduced by me in the December number. It may not be uninteresting to state that a colony of spiders visited Newcastle-on-Tyne on the 15th of October, and another colony of spiders, of apparently the same species, visited Bilston, in Staffordshire, on the same day in numbers that a correspondent describes as incalculable. Another correspondent, residing at Blackburn, states, that on a Sunday afternoon, to the best of his remembrance, the 15th of October, he saw immense numbers of a similar spider in that locality; and now we are informed by W. H. H. that on the 12th of November he saw swarms of small black aërial spiders in and near Victoria Park, London. With the exception of myself, none of the gentlemen referred to seem to have collected and preserved specimens, and this is the more unfortunate as microscopic investigations alone would enable a naturalist to determine whether or not the spiders seen in distant places were of the same species, the number of species being very great, and there being a close resemblance between them. The only notice of this particular species of spider with which I am acquainted, published prior to that in the December Science Gossip, is written by Mr. Blackwell in the "Annals of Natural History," vol. xii., page 266, 1863, and which is purely technical—interesting only to those devoted to the subject, or I would quote it. —*T. P. Barkas, Newcastle-on-Tyne.*

Woodpeckers Storing Acorns.—F. G. writes in the last Science Gossip some interesting notes on the "great spotted woodpecker's" habit of storing acorns. The only woodpecker that I know of, said to be an acorn-storer is *Melanerpes formicivorus* (Swainson), "the Californian woodpecker;" perhaps F. G. alludes to this bird. First of all, let me distinctly say, I do not intend to cast the slightest doubt upon any one's statement. Travelling through the Klamath country, in Oregon, a few years ago, my attention was particularly attracted to the acorns sticking like nails in an old door, jammed, as F. G. describes, in the bark of the *Pinus ponderosa*. This was in June, and the acorns stored must have been those of the previous fall. The most rigid investigation failed to discover a *single* acorn touched or hollowed as if eaten by the birds. The winter had gone, and yet the store was untouched. This induced me to shoot the woodpeckers, that were plentiful in all directions, and examine their stomachs—not one or two, but numbers of them,—but in no one instance did I discover anything but the remains of insects. Thinking the matter over, I doubted the possibility of the woodpeckers' eating hard nuts, its prehensile wonderfully-barbed tongue being ill-adapted to such diet. More than this, the winters in Oregon are very cold (at least in this part of it), and when the nipping frost sends the insects into torpidity, the rodents and bears to sleep, then the winged tribes all leave and go southward. No woodpecker would be stupid enough to remain and stand a chance of being frozen to death, for the sake of acorns. I read in Cassin's "Birds" a quotation from Kelly's "Excursion to California:"—"With the acorns in their bills, half clawing half flying, I have admired the adroitness with which they tried it at different holes, then tapped it home most artistically with the beak." Dr. Harman (Nat. Sc. Phild., vol. ii., page 270) also speaks of this singular habit. F. G. does not say he saw the birds put the acorns into the holes, "but the trees stuffed with acorns." I do not say the birds never put the acorns into the holes; they may for aught I know; but I do say it is singular that not an acorn was eaten, and not a particle of *vegetable* food discernible in the stomach. And, further, I disbelieve in the birds *ever* feeding on the seed of the oak. If they do really bore holes, and into them hammer large acorns—and as many writers bear evidence to having seen them at it, we must believe it is so—that they never eat the stores in Oregon (the only place I have seen them), I am quite positive; and why they indulge in such idle industry is a mystery to my mind yet to be explained. I have sent these hasty remarks, hoping they may lead to a discussion in the pages of Science Gossip on this most interesting topic.—*J. K. Lord, F.Z.S.*

Muscular Force of Insects.—A paper has been read, at the French Academy of Sciences, by M. Plateau, on this subject. The principal results at which he arrives are these:—1. Except in flying, insects have much greater power of traction than vertebratæ. Thus, while the draught-horse can only exercise a force of traction equal to two-thirds of its weight, the cockchafer can draw 14 times its own weight. 2. In the same groups of insects the smallest and lightest have the greatest power of traction. And those results M. Plateau considers as not proceeding from muscles of a comparatively larger size, but from greater muscular activity.—*The Standard.*

Plague of Rats.—Braemar has lately been visited by an unlooked-for invasion of a very annoying kind, as a colony, or rather an army, of rats has recently migrated into the mountain land, and are literally swarming in myriads over the length and breadth of the district, causing utter dismay to many. Every homestead, farm-yard, and barn is teeming with them, and the destruction done to property in many cases is tremendous. The shopkeepers suffer most—whole webs of cloth cut through and through, and sweets and fruit disappearing at fabulous rates. One man living in a bothy in the wilds of Glencallater has been actually under the necessity of leaving the domicile. The voracious wretches, having disposed of all the eatables, attacked the bed and cut up the blankets and bedding piecemeal. At Invercauld a number of sheepskins were eaten; while, to crown their savage ferocity, a few days ago the farm manager at Allanvoich was beaten out of the stackyard and obliged to take shelter. At Auldowrie, they have several times rung the bells at untimely hours.

Chirping Beetles.—One day during last autumn, while exploring the muddy bed of a "dry pond," I met with a colony of the beetle *Pelobius Hermanii*, which were chirping about in a very disconsolate manner. Never having before met with musical examples of this species, or, in fact, of any other species of this order, I naturally felt much astonished. The sound emitted was a good clear chirp, repeated at short regular intervals, and continued during their transfer, at the point of a stick, from the mud to the collecting bottle, into which they went chirping most lustily. Mr. Gosse, I think in the *Zoologist*, graphically describes the noise made by some of the tropical beetles, but I cannot recall to memory any allusions in natural history works to sounds produced by our British Coleoptera, except the ticking sound produced by the *Anobium*, popularly known as the "death-watch." Perhaps the experience of some of your correspondents will enable them to verify the above-recorded facts.—*F. N. Broderick.*

BOTANY.

The Feast of Cherries.—There is a feast celebrated at Naumburg, called the "Feast of Cherries," in which troops of children parade the streets with green boughs, ornamented with cherries, to commemorate a triumph obtained in the following manner. In 1432 the Hussites threatened the city of Naumburg with immediate destruction, when one of the citizens, named Wolf, proposed that all the children in the city, from seven to fourteen years of age, should be clad in mourning, and sent as supplicants to the enemy. Procopius Nasus, chief of the Hussites, was so touched with this spectacle, that he received the young supplicants, regaled them with fruits, and promised them to spare the city. The children returned crowned with leaves, holding cherries, and crying, "*Victory!*"—*Phillips's* "*Fruits of Great Britain.*"

Plants Within Plants.—In one of the recent numbers of the *Comptes Rendus*, M. Trécul gives an account of some curious observations showing that plants sometimes are formed within the cells of existing ones. He considers that the organic matter of certain vegetable cells can, when undergoing putrefaction, transform itself into new species, which differ entirely from the species in which they are produced. In the bark of the elder, and in plants of the potato and stone-crop order, he found vesicles full of small tetrahedral bodies containing starchy matter, and he has seen them gradually transformed into minute plants by the elongation of one *of their* angles.—*Popular Science Review.*

Dr. Camille Montagne.—We regret to hear of the death of this eminent French botanist, at the age of 82. How he deserves to be remembered by the botanical world may be gathered from the fact that his "Sylloge," which contains the results of his labours to within ten years of his death, includes 1,684 species of cryptogamic plants first described and introduced by himself.

Reaction of Iodine in Lichens and Fungi.—Dr. W. Nylander has shown that the application of an aqueous solution of Iodine affords a very useful aid in the examination and determination of Lichens, especially the inferior ones. By a chemical reaction the solution produces a change of colour either in the *gelatina hymenea*, or the spores, or the thecæ, or the thallus. This reaction is a colouration of these parts, either of a blue colour, or of a vinous red (as in *Agyrium rufum*, Fr.); or, if at first a blue is produced, it almost immediately changes in some instances into a vinous red. If the reaction does not take place, the parts remain simply colourless or become of a yellow tinge, similar to the colour of the solution itself. This reaction is constant; and although no reliance can be placed on it in the way of an isolated character, still it is highly useful as a valuable and unfailing confirmatory one, when combined with others, either external or internal. Such a chemical difference, however, indicates an organic difference worthy of investigation, and which might otherwise be overlooked. This chemical reaction occurs just the same, whether the specimen of the Lichen be recently or long since gathered. But the same is not always the case in Fungi; for Dr. Nylander gathered near Helsingfors, in Finland, a specimen of *Peziza Polytrichii*, Schum., which perfectly agreed with the figure in "Flora Danica" (t. 1,916, fig. 1), in which the *gelatina hymenea* in a living state became intensely blue with the solution of Iodine. But on examining the same specimen two years afterwards, the Iodine produced no reaction, the *gelatina hymenea* remaining colourless, or only becoming yellowish. Such a singular difference arising from desiccation Dr. Nylander has never observed before or elsewhere, nor can he assign any reason why, in a dried and aged state, the chemical nature of the thalamium should become changed. In many species of the genus *Peziza*, the *gelatina hymenea* becomes blue with Iodine. In *P. cochleata*, Huds., and *P. violacea*, Pers., it does so, and the thecæ more intensely so at their extreme apices. In other species the thecæ alone, especially at the apices, are turned blue, as in *P. firma*, Pers., *P. plumbea*, Fr., *P. juncigena*, Nyl., *P. undella*, Fr., *P. cerea*, Sow., *P. repanda*, Wahlenb., and in many others, thus manifesting that the nature of Fungi differs from that of Lichens. In a letter recently received from Dr. Nylander, he has kindly furnished the proper formula for the solution, viz.:—1 grain of Iodine and 3 grains of Iodide of Potash. Dissolve these in 6 oz. of distilled water, and filter for use. The solution should be kept from the light in a black glass-bottle, or in one covered with paper. In using it, it is sufficient to apply a drop to the edge of the thin glass covering the dissection, under which it will diffuse itself in the water containing the object.—*Rev. W. A. Leighton, in Ann. Nat. History.*

Uses of the Nipa Palm.—Malay and Dyak houses are raised on piles, varying in height from three to six feet. The walls are of wood, or more frequently of ataps, a species of thatch made from the leaves of the Nipa Palm. This tree supplies half the necessaries of life to the natives of the Far East. It grows in large fields upon the water's edge, and thrusts out its leaves or branches twenty feet in length, like a huge fern, from the root. These leaves, when young, are an excellent vegetable; and when old, are woven into thatch. Dried, they make cigarettes, matting, and hats; from the root, sugar or salt is extracted, according to the process—for the Malays use their magnificent sugar-canes solely as a sweetmeat. In addition to the other uses of this noble palm, I have seen a native boat's crew hoist Nippa leaves as sails.—*The Household.*

GEOLOGY.

The Dodo.—About last September, M. Gaston de Bissy caused to be dug from a marsh on his property, known as "La Mare aux Songes," in the Mauritius, the alluvium contained in it, to use as manure. After digging two or three feet the men came in contact with bones of tortoises and deer, the former in vast numbers. As soon as Mr. Clark heard of this he went to M. De Bissy, and stated to him what had long been his opinion as to the position in which Dodoes' bones might be found, requesting him to give orders to the diggers to lay by carefully whatever bones they might turn up. M. De Bissy was much pleased with the chance of making so interesting a discovery, and at once ordered that Mr. Clark's request should be fulfilled. Mr. Clark visited the estate many times, but without obtaining any satisfactory intelligence. He at length engaged two men to enter the dark-coloured water about three feet deep, and feel in the soft mud at the bottom with their feet. In a short time he had the inexpressible satisfaction of finding a broken tarsus, an entire tibia and part of another. He at once commenced operations in earnest, and has been fortunate enough to find every important bone of that remarkable bird, including cranium, upper and lower mandibles of bill, cervical and dorsal vertebræ, ribs, coraeoid bones, scapulæ and clavicle, sternum, humerus, ulna, pelvis, femur, tibia, and tarsometatarsus, so that an experienced person can well build a Dodo from these remains, the toes being the only part wanting. The skull of this bird is of amazing thickness, and the cerebral cavity very small; the beak of great strength and solidity, as are the condyles of the lower mandible. Some of the cervical vertebræ are more than two inches in diameter, and of very elaborate structure. The sternum, of which the form shows a strong resemblance to that of the pigeon tribe, in some specimens is more than five inches wide and seven long. The keel is a quarter of an inch thick, and about an inch deep in the deepest part, which is at the centre; and the sternum is there three quarters of an inch in thickness. Some femurs are nearly seven inches long, and more than an inch in diameter, the tibiæ nine inches long, and the upper condyles two inches in diameter. The tarsometatarsi are of very solid bone, and have been found in greater numbers than any others. They are about the length of those of a good-sized turkey, but more than twice the thickness. Only two or three craniums have been found, with a few fragments. The paucity of these remains, as compared with other parts of the frame, may very possibly arise from the numerous apertures in the head, into which roots insinuate themselves, thus disintegrating the structure. The upper mandible of the bill has suffered from the same cause, and only two tolerably perfect specimens of that organ have been obtained, while the under mandibles are numerous; but only three or four have been found in which both rami remained attached. The tip of one upper mandible is two inches in depth, and an inch in thickness. The vertebræ are very strong, and show that the spinal cord was fully double the size of that of the turkey. These bones present a great diversity of colours. Those which were found near the springs in the marsh are nearly of their original hue. Some found alongside of a large bois-de-natte tree were nearly of the colour of that wood, and many others are nearly as black as ebony. Mr. Clark deposited the first specimens of Dodoes' bones he obtained in the museum at the Royal College, as well as those of the Flamingo, the existence of which in Mauritius was remembered by the parents of persons now living. He has also sent a complete set of Dodo's bones to Professor Owen for the British Museum.—*Commercial Gazette.*

New Labyrinthodont-Reptiles in Ireland.—Robert Etheridge, Esq., announces the discovery of no less than four, if not five, *new genera* of amphibian labyrinthodont-reptiles from the true coal-beds of Jarrow colliery, Kilkenny, Ireland. Three, out of the five forms, of these amphibians are *undoubtedly new* to science, and, in all probability, the remaining two also. The first, and most remarkable genus, Professor Huxley has named "*Ophiderpeton*," having reference to its elongated, snake-like form, rudimentary limbs, peculiar head, and compressed tail. In outward form *Ophiderpeton* somewhat resembles *Siren lacertina* and *Amphiuma*, but the ventral surface appears covered with an armature of minute spindle-shaped plates, obliquely adjusted together, as in *Archægosaurus* and *Pholidogaster*. The second new form, which he names *Lepterpeton*, possesses an eel-like body, with slender and pointed head, and singularly-constructed hour-glass-shaped centra, as in *Thecodontosaurus*. The third genus, which Professor Huxley names *Icthyerpeton*, has also ventral armour, composed of delicate rod-like ossicles; the hind limbs have three short toes, and the tail was covered with small quadrate scales, or apparently horny scales. The fourth new amphibian labyrinthodont he appropriately names *Keraterpeton*, a singular salamandroid-looking form, but minute, as compared with the other associated genera. Its highly ossified veretebral column, prolonged epiotic bones, and armour of overlapping scales, determines its character in a remarkable manner. These remains were collected by Mr. Galton, of the Geological Survey of Ireland. The remaining genus is represented by portions of the posterior half of an animal nearly seven feet in length, which Mr. Huxley is inclined to believe may belong to the genus *Anthracosaurus*, or one closely allied to it.—*Geological Magazine.*

MICROSCOPY.

Clips.—I have tried various methods of pressing the thin glass upon the slides for the microscope, so to remain *in situ* during the time required to dry or harden, and none to give more satisfactory results than the following. A, a piece of wood

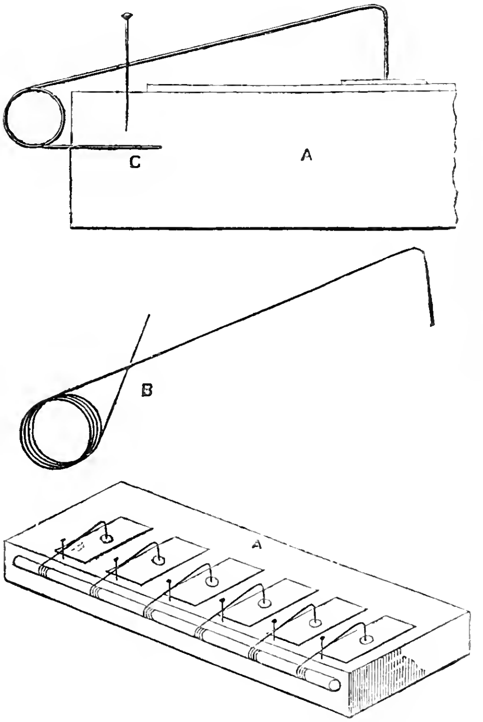


Fig. 52. Wire Clip.

8 in. long and ¾ in. thick. B, a spring made with thin iron-wire. The end of the spring is driven into the table, as at C. A piece of ¼ in. iron-wire is then run through the springs, which forms an axis to work upon, and also keeps them in their places. I place a pin at the side of the spring, so that it will fall on a given spot, and not rub the cover from side to side. The springs are made by binding the thin wire round the ¼ rod about four or five times.—*William Goode.*

How to view Live Animalcules.—Animalcules begin now to abound. It often is difficult to obtain a fair look at them on account of their quick movements. Perhaps it may be pleasant to some to know how to remedy this in a considerable degree. This I do by keeping some clear thick gum-water, and putting a small quantity on the slide. It mixes with the water, and its thickness prevents such quick motion on the part of the animals.—*E. T. Scott.*

Clips.—Having used a clip of my own construction for some years, I venture to send you one that may appear to have the advantage of not being easily disarranged, and yet easily applied and removed, giving at the same time more equable pressure (a matter of some moment when *very thin* covers are used), and allowing the slide to be placed under the microscope. It is formed of thin sheet-steel (obtainable in Foster Lane, Cheapside, of any

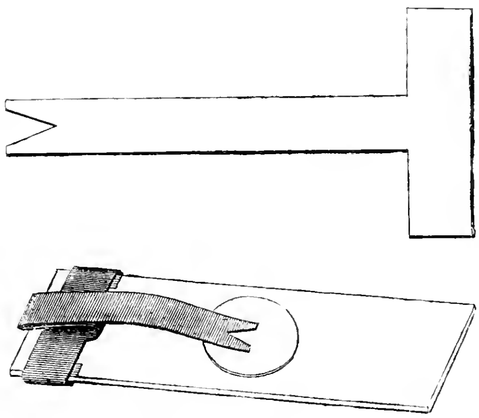


Fig. 53. Steel Clip.

thickness), and cut out in one piece, of the form above, with a stout pair of scissors, and then bent the required shape with a pair of pliers. When used, the fore and middle fingers are applied on the under side, and the thumb on the spring. If *great* pressure is required, two clips may be used, one at each end of the slide, and for any delicate work the *width* of the steel can be reduced.—*J. B. Spencer.*

A Beautiful Object.—While on a visit recently to Cumberland lead mine, I was informed that in one part of the mine, 600 fathoms from the entrance, and 60 fathoms from the surface, there was a recess about 80 yards long, in which there is total darkness, and where the miners do not work. In the recess there are thousands of flies, a few of which I induced one of the miners to catch and bring to me in a bottle which I supplied for the purpose. The flies, when mounted and examined under a microscope, are seen to be possessed of great beauty. They are best mounted as opaque objects, and when the wings are seen under condensed light, thrown on them in the direction from the tips to the roots, they exhibit the most beautiful iridescent colours. The antennæ, the eyes, and indeed the whole body, amply repay careful examination. They also form beautiful objects when mounted in balsam, after having undergone 36 hours' saturation in liquid potash. As many readers of the Science Gossip may not have access to lead mines, it may be desirable to mention that the same species of fly may be obtained in abundance from drains and enclosed places. It is known by the common name of

Gnat, and by the technical name of *Psychoda phalænoides;* order *Diptera;* family *Phlebotomidæ;* and although common, it is, nevertheless, like many common objects, well worthy of careful scrutiny.—*T. P. Barkas.*

AQUARIA.

STICKLEBACKS.—Some three years ago I determined to keep "sticklebacks" for the purpose of watching their habits. Accordingly I procured five or six—two males, the rest females. My aquarium soon assumed a very lively appearance; its inhabitants seemed to form anything but a "happy family." After a while I removed all save one male and one female, the latter about to spawn; and looking (as sticklebacks would say, if they could speak) very interesting; but still there was no peace, the gentleman never ceased chasing the lady about from one place to another; for a few moments, at times, she would manage to hide beneath a piece of rock-work, but the moment the savage green-eyed monster of a husband saw her, he resumed the chase; perhaps it was caused by incompatibility of temper. However, I found her one morning floating on the top of the aquarium, all but dead; she expired shortly afterwards. I then gently pressed out the "ovæ," and let it fall into the aquarium; the male followed it till it reached the bottom, and then and there he began to form a nest; for days he worked at it. I often assisted him by giving him little pieces of broken twigs, saturated with water and then pressed firmly, so that they would not float again so readily to the surface; he was unremitting in his attentions, opened his mouth in the most frightful way at me if I dared to look at him, and seized my finger most viciously if I put it near the top of the water. After a time the young fish appeared, and proud indeed he looked as he sailed about the aquarium in the midst of his youthful progeny. Just then I had to leave my aquarium, and my landlord emptied it out, thinking he was doing me a great favour. However, when I returned, I found only three small fish with their father, and these three he devoured as I looked at them. I suppose, during my absence they had had nothing given them to eat, and this dreadful act of the once tender parent was perhaps the last resource to satisfy the cravings of the inner fish; or, perhaps, seeing there was nothing before the little fishes but hunger and a wretched death, he compassionately relieved them of all anxiety about the future by receiving them into the paternal mouth and digesting them in the parental stomach.—*W. R. T.*

STICKLEBACKS' NESTS.—In an article on this subject, in the last number of SCIENCE GOSSIP, it is stated, as the result of some experiments, that after the eggs were hatched and the young fish had become large enough to look after themselves, the parent, in each case, "himself died." I have for years been in the habit of taking the 15-spined stickleback "*Gasterosteus Spinachia,*" and am of opinion that the utmost duration of its life is only twelve months, as I never, under any circumstance, found an old fish in the usual haunts after the appearance of the young, about the beginning of July. —*E. E.* (*M. B.*)

SCILLY ANEMONES.—I must somewhat qualify my statement in your last number. Two of the four anemones there mentioned have turned out to be specimens *not* of *Ægeon Alfordi*, but of *Bunodes Ballii*, variety *Funesta*. Mr. Gosse has settled this for me in reference to one which I sent him, and another of the four must be classed with it as being like it in all respects. However, the remaining two I still hold to be Ægeons, for in one the tentacles, though grey, were very long, and flexuous like those of *Anthea Cereus;* and in the other the tentacles were green throughout, as in the first specimen of Ægeon which I found here last March, and which was described by Mr. Gosse in "The Annals of Natural History," July 1865. I am sorry to say both the green and the grey perished on their journey to the wonderful tanks at Hamburg. I found another Ægeon at Porth Crassa, on January 3rd. Its tentacles were of a bright, satiny green. Besides the more common species, the following Anemones are abundant in these islands between tide-marks:—*Sagartia miniata,* both varieties; *S. rosea; S. venusta; S. nivea; S. sphyrodeta;* besides endless varieties of *Corynactis viridis.*—D. P. ALFORD, *St. Mary's Parsonage, Isles of Scilly.*

EFFECTS OF FREEZING ANIMALS.—M. Pouchet has sent a paper to the French Academy on the effects of freezing animals. He finds that no animal really frozen is susceptible of revivification, as freezing disorganizes the blood. The temperature at which the death of insects, grubs, and snails becomes inevitable is far below the freezing point (from 7° F. to − 2° F.). Animals may be surrounded by ice without themselves being frozen, unless the temperature is very low. M. Pouchet states that when an animal is frozen, the capillaries contract, so as to prevent the passage of the blood, and the nuclei of the blood corpuscles escape from the envelopes, and become more opaque than in a normal state.—*Intellectual Observer.*

BUGONG.—At a recent meeting of the Entomological Society of London, Mr. F. Smith exhibited specimens of a moth used for food by the aborigines of New South Wales, received from Dr. Bennett. These moths, which are termed "Bugong" by the natives, are found in large numbers, in November and December, congregated on the face of granite rocks, and their bodies contain a large quantity of oil. They were considered to be the *Agrotis spini* of Guenée.—*Entomol. Mon. Magazine.*

NOTES AND QUERIES.

Cement for Aquaria.—H. J. B. inquires for a good cement for aquaria. If he wants cement for joining rockwork, the best is Portland; if, however, he requires a cement for rendering the joints of the tank water tight, let him try the following:—White sand, one part; litharge, one part; rosin, one-third part; mixed into a paste with boiled linseed-oil.—*T. Clift.*

In answer to H. J. B., I would recommend, as a good cement for aquaria, ordinary white-lead, stiffened to the consistency of common glazier's putty by the addition of dry red lead and litharge, in equal proportions. I have used this cement in the construction of aquaria, some of which have been in use about five years without the slightest trace of leakage yet.—*T. M.*

A Winter Martin.—During the afternoon of Monday (the 15th of January) two of my little boys and one of my female servants saw either a swallow or a martin (most probably a martin, but I cannot determine which from their description) flying about in the court-yard of my house.—*W. N., Uckfield.*

Grub of Cockchafer.—In this part of the world (Sussex) the fleshy grub of the cockchafer (*Melolontha vulgaris*) is called by the lower class of people a "Job-hassett." What is the derivation of this extraordinary name?—*W. N.*

Growing Ferns from Spores.—I have just had several specimens of the "Rustyback" (*Ceterach officinarum*) given to me by a friend, and, as it is unknown here, wish to raise more from seed. As their roots were carelessly dug out from the wall, most of the radicles were severed, and the plants in consequence are dying. Will the spores germinate, if collected by putting these plants between paper (that is to say, will they be ripe and mature)? I should feel much obliged by your answer, as I cannot find it stated in any book, and know no fern-grower. Owing to the very mild weather we have had, the white butterbur (*Petasites alba*) has been in flower since the middle of December, here.—*Daydon Jackson, Hastings.*

Snipe-Ground.—I have frequently observed in boggy snipe-ground a sort of blue glaze, or scum, upon the water, and it has always appeared to me that in such spots the birds were more numerous than elsewhere. What is the cause of such scum? Does the experience of any of your correspondents point to the same conclusions relative to the number of birds in such places?—*H. G., Bangalore.*

The War-bird.—In a little work, published a good many years ago, and entitled "Backwoods of Canada," there is the following passage:—". . . American war-bird; a very beautiful creature, something like our British bullfinch, only far more lively in plumage; the breast and under-feathers of the wings being a tint of the most brilliant carmine shaded black and white. This bird has been called the 'war-bird' from its having first made its appearance in this province during the late American war; a fact that I believe is well authenticated, or at any rate has obtained general credence." Can you say what bird is meant in the above extract? A friend of mine—an eminent naturalist—thinks the pine-bullfinch (*Loxia enucleator*) must be referred to, though it will be seen that its description does not quite accord with that of the "war-bird," so called. Some person who has resided in Canada may possibly be able to settle the question. I myself have had the summer red-bird (*Pyranga æstiva*) pointed out to me as the "war-bird."—*H. G., Bangalore.*

Fleas.—On referring to my rough sketch of the larva of the cat-flea, at page 278, vol. i., I find I have been led into a ridiculous blunder, which I hope you will give me the opportunity of correcting. The body of the larva has only thirteen segments, while in one of my figures I have drawn fourteen. I mounted several in glycerine and Deane's gelatine medium, and I really cannot say which mode of preservation is the worst, sorry representations are they of their former interesting appearance. The specimens mounted in the latter material exhibit the gizzard, and many other points of internal structure, when oblique light is thrown on them by the mirror. I have by me a preserved female mouse-flea, which contains seven eggs similar to those described by E. T. Scott, at page 16, vol. ii., of Science Gossip.—*S. J. M'Intire.*

Removing Cuticles from Leaves.—In reply to W. W. R., the fresh leaves of the *Deutzia scabra* must be soaked for a long time in dilute nitric acid (equal parts acid and water), then washed gently, floated on a slip of glass, and mounted, after drying in balsam. There is a straw-yellow colour left by the acid, which is not noticeable in the finished slide under polarized light, but may be got rid off entirely, if objected to, by boiling the selected specimen in stronger acid for a few seconds before finally washing it. I never tried to separate the upper and under cuticles from each other: this operation seemed to me to be so delicate as to promise small chance of success. The stellate hairs are apt to refuse to be saturated with balsam, but prolonged boiling in that medium, or in turpentine, is the remedy. In this state they look well, illuminated obliquely by the mirror. The Dutch rush and grasses may be treated in the same way. Carpenter gives full directions, and the "Micrographic Dictionary" treats of the subject at some length, saying respecting grasses, &c.:—"Preparations of this structure are obtained by treating little pieces of the wall of the fistular stem with strong nitric acid, to remove alkalies, and then burning them until quite white on a slip of platinum or thin glass. These should be mounted in Canada balsam." Many cuticles are only to be obtained by peeling them off, but not in a "slovenly" manner; so far from this, the greatest care and patience, aided by a sharp knife, are absolutely necessary. The petal of the geranium yields a splendid epidermis for opaque examination. The under side of the thick part of the petal should be raised with a sharp knife, and then seized with the forceps, to facilitate the separation of the upper and under surfaces. After this process the upper cuticle will remain in the left hand, and may be attached to a glass-slip by simple contact. On drying, it will be found to be a splendid object, needing no further preparation, if intended to be viewed opaque. It may be mounted in balsam, however, and then is well suited for viewing by transmitted light under medium power, say 1 inch to $\frac{4}{10}$ inch. Many other flowers, doubtless, would yield equally beautiful cuticles, if the thinness of the leaves did not present great difficulties to this treatment.—*S. J. M'Intire.*

The method which I practise with success is:—Put pieces of the leaf into a test-tube with dilute nitric acid, and heat the whole. This soon loosens the intermediate tissues, and the cuticles, either upper or under, can be easily removed and washed. It may then be mounted in fluid (glycerine, I prefer), or dried and mounted in balsam, or dry. Siliceous cuticles, such as *Deutzia scabra*, *Eleagnus*, *Hippophae*, &c., being good under the polariscope, I mount in balsam; others, such as iris, opuntia, box, oleander, yucca, aloe, pineapple, fig, *Ruscus aculeatus*, &c., are, I think, better in glycerine. Delicate cuticles, such as pelargonium, &c., are, I believe, peeled off, and, while moist, stretched across the cover glass, and when dry, mounted.—*J. Slade.*

A good plan is to press the leaf tight on the hard, smooth surface of a pestle, raise the cuticle with a knife, and peel it off with forceps; or, moisten the leaf, press it on the pestle, as before, and with a sharp knife scrape off the cuticle and matter of the leaf down to the other cuticle, which will remain adhering to the pestle.—*J. Brown, Menstrie.*

The plan I have found to answer in removing the cuticle from leaves is the following:—Take a leaf, or part of a leaf, and put it into a wide-mouthed test-tube, with an equal bulk of chlorate of potass, and as much nitric acid as will cover the whole. Then boil it over a spirit-lamp for a minute or two, until you see the cuticle separate from the rest of the leaf. Let the tube cool for a minute, then wash the acid away with distilled water. I then lay the cuticle in spirit and water (1 to 5) for a few hours, after which it is quite ready for mounting. In this way I have succeeded in obtaining the cuticles from the *Deutzia*, sea-buckthorn (*Hippophae rhamnoides*), and several other interesting cuticles, suited for microscopic observation.—*H. G. G.*

Atmospheric Phenomenon.—I have often observed the phenomenon mentioned by W. S. in the January number. It seems very curious when the sunbeams do not reach far above the horizon—almost as if another sun were about to rise; but when the beams extend completely across the sky, it is at once evident that, as they are parallel, and are seen in perspective, they must appear to diverge from the sun, and to converge towards a point beneath the opposite horizon. For the phenomenon to be produced it is necessary that the sky should be hazy, so as to show the sun's rays; that there should be a few small clouds to intercept these rays, and break them up into beams; and that the sky opposite the sun should be tolerably free from clouds.—*F. W. M.*

To Kill Slugs.—In answer to E. C. Y., page 22, slugs may be killed by *corrosive sublimate* or *benzoine*. For details see pp. 90, 91, in Tate's "British Slugs and Snails," published by Mr. Hardwicke. —*R. T.*

Objects in Tumuli.—J. S., page 18, makes an error with regard to the name and zoological position of the so-called fossil beads. The fossil is a sponge, *Amorphospongia globularis*, Goldfuss (*Coscinopora*). It is very common in the upper chalk, and is rarely found naturally perforated; such is my experience, and I have collected the species in great numbers.—*Ralph Tate, F.R.S., &c.*

Jerusalem Artichoke (v. S. G., vol. i., p. 118).—The name of "artichoke" proceeds from the analogy in taste. The *Journal d'Agriculture Pratique*, of Professor Chas. Morren, gives (1848) a monograph, from which I extract the following particulars:—A Belgian botanist (Hondius) made the Jerusalem artichoke known to Europe. He gave an accurate description of it under the name of "subterranean artichoke." The continuator of Dodoneus, Van Raevelingen, says (Cruydoboeck, edit. 1644, page 1476), that in 1613 these plants were yet cultivated in great quantity in France and in Belgium; in some parts of the latter country they were called "batatas of Canada," or "Canadas," because it was thought they came from that country; in other parts, "artichoke-apples of Terneuse." I remark the denomination of "Jerusalem" is not used in this country.—*B., Melle, near Ghent.*

Impressions of Leaves.—Can any of your readers inform me how to take *clear* impressions of leaves with printing ink? I have tried many times, but cannot succeed; there are always patches of ink left here and there. I take mine in a wooden copying-press, of my own manufacture.—*S. J. B.*

Ancient Toads and Frogs.—Monthly we have reports of living toads and frogs being found in strata of great depths below the surface of the earth, and yet the *élite* of the scientific world persistently ignore the evidence adduced. Is it a fact that living toads and frogs are found embedded at great depths, and have any of the readers of Science Gossip personal knowledge of the fact, founded on careful personal observation? I have not.—*T. P. Barkas.*

The Chigoe.—We occasionally read of the ravages of the chigoe (*Pulex penetrans*) of the West Indies. Will somebody tell us what it is like? Kirby and Spence give some account of it. (Popular edition, page 53, "Wood's Natural History," article "Flea," and "Micrographic Dictionary.")—*S. J. M.*

Mounting Desmids.—How can I mount rare Desmids? I have received a number from Germany, dried on glass, but put up too thickly to be of any service.—*W. W. S.*

Bees.—Would any classical bee-master kindly favour me with answers to these queries from Virgil's 'Georgic on Bees' (lib. iv.):—1. Is it a fact that swallows devour bees, according to the lines 15–17—

> "Et manibus Procne pectus signata cruentis. . . .
> Ore ferunt, dulcem nidis immitibus escam"?

2. Have any modern observers noticed bees carrying small stones for ballast in a heavy wind (line 195), as Aristotle and Pliny state? 3. Do bees live to their seventh year (line 207)? 4. Do cockroaches devour honey in the hives (line 243)? 5. When there is a pestilence among bees, do they hang together in a mass like a bunch of grapes (line 257)? 6. Is any modern instance known of a swarm of bees inhabiting a dead animal, as Virgil tells us in the story of Aristæus, which is corroborated by what Holy Writ relates of Samson?—*M. G. W.*

Ziricote and Ronron.—Could you tell me the scientific name of the Mexican woods called *Ziricote*, or thiricote, and *Ronron?*—*B.*

The Giant of Lucerne.—In 1577, a storm having uprooted an oak near the cloisters of Reyden, in the canton of Lucerne, some large bones were exposed to view. Seven years after, a physician and professor of Basle, Felix Plater, being at Lucerne, examined these bones, and declared they could only proceed from a giant. The Council of Lucerne consented to send the bones to Basle for more minute examination, and Plater thought himself justified in attributing to the giant a height of nineteen feet. He designed a human skeleton on this scale, and returned the bones with the drawing to Lucerne. In 1706 there only remained of these bones a portion of the *scapula* and a fragment of the wrist-bone. The anatomist Blumenbach, who saw them at the beginning of the century, easily recognized them for the bones of an elephant. Let us not omit to add, as a compliment to this bit of history, that the inhabitants of Lucerne adopted the image of this pretended giant as the supporters of the city arms.—*The World before the Deluge.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. No notice whatever can be taken of communications which do not contain the name and address of the writer, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargemant indicated in diameters (thus—X 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. Address No. 192, Piccadilly, London, W.

J. S. M.—No. 1. On oak-leaf are the spangles mentioned, vol. i., p. 240 of Science Gossip. No. 2. The red fungus on stick is *Tubercularia vulgaris*. No. 3. The black spots on maple-leaf are those of a fungus, *Rhytisma acerinum*.

W. H. R.—As there are so many subjects to which no available guide is published, it appears to us good reason for not entering upon the "Adulterations of Food," especially as Dr. Hassell has treated the subject so completely, and, after all, his works are not dear.

W. T. P.—For obtaining and preparing crystals from the human breath, we refer you to our reply to J. C. M., at page 264 of vol. i.

Diatom Wanted.—If specimen of *Coscinodiscus radiatus* is sent, postage will be repaid by J. Green, Jun., 19, Pump-street, Londonderry.

J. A.—It is very unsatisfactory to attempt to name gums from such small samples. No. 1. Gum Sandrach. No. 2. African Animé. No. 3. Copal Resin, or probably East Indian Dammar.

British Land and Freshwater Shells.—Exchange desired. List of duplicates and desiderata to be sent to T. M., 14, Union-place, Lower Broughton, Manchester. Also to Aperta, 10, Mornington-place, Halifax.

Harvey P.—No name or address enclosed.

J. W. R.—Which do you refer to, the *Red Peziza* or the *Red Cup Moss*?—for they are not the same thing.

E. A. C. wishes to know where he can find a *Triceratium*, which is said to be found in Thames mud, as he has been looking for it two years unsuccessfully in the mud from the river at Chiswick and Hammersmith.

H. R. W. will find all the information he seeks in Davies on "Preparing and Mounting Objects." Price half-a-crown. Published by Robert Hardwicke, 192, Piccadilly.

G. F. S. (Durham)—We should be glad to receive a copy of the paper you name.

L. A., E. B., and H. S.—Next month.

W. B. M.—Try a hot-water plate. It is considered by many preferable to a lamp for mounting; or a tinman would construct a water-tight box for hot water, of any size. A simple paraffin lamp answers very well for the microscope.

A. H. W.—Because one spider did *not* eat its web is no evidence that spiders never perform such an act. We think it has never been asserted that they always devour their webs.

H. S. B.—You will observe that mounting crystals receives attention in the present number. We must repeat that mosses abound on all old walls, trees, stumps, &c., if you desire no particular species.

C. H. recommends soaking in vinegar for some days the leaves from which it is intended to remove the cuticle. His communication was received too late for insertion.

E. G. advises soaking leaves in water for a few days for the same purpose.

Carboniferous Fossils in exchange for other fossils.—Address W. W., 29, Heaton Terrace, Bolton.

S. J. M.—English gnats are quite different insects from tropical mosquitoes, at least from any species of mosquito which we have seen, notwithstanding the quotation to which you refer.

J. C. W. offers bog-material rich in diatoms, &c., in exchange. Address, Montpelier House, Budleigh Salterton, South Devon.

E. G. W.—Next month we shall give several illustrations of the scales of insects.

H. G. E.—The binocular dissecting microscope may be used in the dissection of *any* objects.

J. H. Ashford, *Scarboro'*, will be glad to exchange British land and fresh-water shells.

G. H. B.—The caterpillar of more than one small species of moth.

E. S.—Wherever the information is supplied with the figures, your suggestion will be carried out.

Diatomaceous Earth.—If any one having a duplicate specimen will forward it, stamps will be returned by W. C., 62, Kirkgate Street, Leeds.

J. B.—A modification of your suggestion is under consideration.

Zoophytes.—Unmounted specimens offered in exchange for earth or sand containing Foraminifera, by J. R. E., Westfield Cottage, 9, the Mall, Newport, Isle of Wight.

A. L.—Your Fly from Iceland is also common in England; it is the Sand-fly (*Simulia reptans*, L.), and swarms in Lapland and other Arctic regions; it is very pertinacious in sucking blood.—*F. W.*

Dissecting Mollusca.—Consult "Tulk and Henfrey's Anatomical Manipulation;" the articles Articulata and Mollusca in Todd's "Cyclopædia of Anatomy;" "Papers on the Anatomy of Gasteropods," by Dr. Lawson, in "Intellectual Observer" for 1863; Rymer Jones's "Animal Kingdom;" Lacaze-Duthier's Papers in the "Annales des Sciences Naturelles" for the past five or six years. The subject is one of vast proportions. Let Frank dissect the nervous system of the common slug, following Dr. Lawson's directions. This alone will occupy some time.—*H. L.*

Aquarium Animals.—Mr. W. A. Lloyd would be glad to place himself in communication with any one willing to supply living aquarium animals on liberal terms. Payment and delivery to be made near London.—Address, Zoological Gardens, Hamburg, Germany.

R. M. B.—The Gray Plover, Turnstone, and Peewit, have all a hind toe, whilst the Golden Plover, Thicknee, and Dotterel, have not.

H. S.—We cannot venture to name a spider from brief description only. It can only be done satisfactorily from specimens.

Communications Received.—H. G. E.—T. P. B.—S. J. B.—J. B.—M. G. W.—W. N.—H. G. K.—J. B. S.—S. C.—E. G. W.—W. W. S.—T. C.—H. G. G.—A. W.—J. B.—H. H.—S. J. M.—G. C. O.—T. J. B.—T. P. B.—Prof. Bernardin.—R. T.—J. C. W.—J. S.—W. W.—G. H. B.—J. H. A.—P. S. B.—J. W. P.—J. S M.—L. A.—E. T. S.—F. W. M.—W. H. R.—J. S.—Y. D.—W. T. S.—J. G.—W. R. T.—H. H. K.—C. A.—J. B.—J. A.—W. G.—E. E.—D. J.—T. M.—A. H. W.—F. N. B.—S. D.—R. M. B.—W. C.—B.—E. J. S. C.—J. R. E.—E. G.—Y. D.—W. A. L.—E. B.—W. B. M.—H. R. W.—A. R.—E. A.—W. R. T.—J. W. R.—A. H.—H. P.—C. H.—Frank (Sheffield).—A. J. R.—H. J. B.—W. C.—J. B. (Newcastle).—J. S. M.—E. S.—J. S.—D. R.—J. H. A.—A. L.

Local Names.—T. F. W.—Huddersfield.

BOOKS RECEIVED.

"Report of the Proceedings at the Birmingham Meeting of the British Association." London, Robert Hardwicke, 1865.

"The Household;" a magazine of domestic economy and home enjoyment. No. 1, January, 1866. London, Groombridge.

"The Action of Fungi in the Production of Measles," &c. By Tilbury Fox, M.D. Reprinted from Dr. Lankester's "Journal of Social Science."

"The Popular Science Review." Edited by Henry Lawson, M.D. January, 1866. London, Robert Hardwicke.

"The Geological and Natural History Repertory." Edited by S. J. Mackie, F.G.S., &c. January, 1866. London, Kent & Co.

Hooper & Co.'s "General Spring Catalogue for 1866."

Barr & Sugden's "Descriptive List of Seeds," &c. 1866.

"Cholera Prospects." By Tilbury Fox, M.D. London, Hardwicke.

"The Structure of Animal Life:" six lectures by Louis Agassiz. London, Sampson Low, Son, & Marston. 1866.

PERIODIC PHENOMENA.

When a man has learnt to take an interest in the varied operations of Nature which are everywhere being carried on about him, and has acquired the habit of directing his attention to such matters, and keeping his senses always alive to any new information thereby afforded him, he has made himself almost independent of outward circumstances. He has opened to himself a source of occupation and mental enjoyment, but little affected by the ordinary vicissitudes of life.—Rev. Leonard Jenyns.

CONSIDERABLE interest attaches to what may be termed the "periodic phenomena" of nature. Of such a character are the appearance and disappearance of animals, as bats and badgers, which conceal themselves during the winter, and pass through a period of hibernation; the change of dress at different seasons by the ermine, the stoat, and their allies; the coming and going of the regular winter or summer migratory birds; the retirement and hibernation of reptiles; the movements of certain fish up and down stream for the purpose of spawning; the appearance, transformations, and disappearance of insects; the leafing of trees; the flowering of plants; the ripening of seeds; the fall of leaves;—all these, and more, are worthy of the attention of the lover of nature, and not beneath the dignity of man. Linnæus constructed for himself a floral clock, in which the periods of time were indicated by the opening or closing of certain flowers. Gilbert White, and others since his time, not disdaining to be his disciples in such a work, constructed a calendar of which periodic phenomena presented themselves to their notice. Humboldt observes of the insects of the tropics, that they everywhere follow a certain standard in the periods at which they alternately arrive and disappear. At fixed and invariable hours, in the same season, and the same latitude, the air is peopled with new inhabitants; and in a zone where the barometer becomes a clock (by the extreme regularity of the horary variations of the atmospheric pressure), where everything proceeds with such admirable regularity, we might guess blindfold the hour of the day or night by the hum of the insects, and by their stings, the pain of which differs according to the nature of the poison that each insect deposits in the wound. And the naturalist, whose quotation heads this chapter, remarks,—"If an observant naturalist, who had been long shut up in darkness and solitude, without any measure of time, were suddenly brought blindfolded into the open fields and woods, he might gather with considerable accuracy from the various notes and noises which struck his ears, what the exact period of the year might be."

All such observations as we have alluded to are easily made and as easily recorded, and of all, none are of more interest than the migratory movements of birds. We know that some visit us in the spring and abide during the summer; others direct their flight hither late in the autumn, and spend with us their winter. But *why* this change, *whence* do they come, and *whither* do they go? We can partly answer this question, but only partially, as the queries of our correspondent H.E.A. (vol. I. pp. 71, 143), still unanswered, testify. We may declare, in general terms, that self-preservation, and the perpetuation of the species, is the great moving cause. That the journey is undertaken in search of food, or a milder climate, or both, as a consequence the former of the latter, or in search of suitable conditions for rearing their young; yet there are many special circumstances in which this answer is inapplicable or insufficient.

Knapp, in his "Journal of a Naturalist," a fitting companion to White's "Selborne," remarks of the Willow-wren:—"It is a difficult matter satisfactorily to comprehend the object of these birds in quitting another region, and passing into our island These little creatures, the food of which is solely insects, could assuredly find a sufficient supply of such diet during the summer months in the woods and thickets of those mild regions where they passed the season of winter, and every bank and unfrequented wild would furnish a secure asylum for them and their offspring during the period of incubation. The passage to our shores is a long and dangerous one, and some imperative motive for it must exist; and, until facts manifest the reason, we may, perhaps, without injury to the cause of research, conjecture for what object these perilous transits are made."

The record of periodic phenomena made in the same district over a series of years is always of interest; but contemporaneous records made at numerous stations, distant from each other, and in which the same kind of observations are made, would be of more interest still. Take, for instance, the first appearance of a swift for ten successive years in twenty stations between the Isle of Wight and Caithness; or the last note of the cuckoo heard between the Land's End and the Tweed. Many such trifles, apparently insignificant in themselves, become of importance when carefully and faithfully recorded, and such a work may be accomplished by those who make no pretensions to be men of science, but are content to call themselves "lovers of nature."

ODD FISHES.

There are quiet, steady-going, stay-at-home fishes, quite content with the rocky shores of our "tight little island;" as a rule, arrayed in sober-coloured garments, like well-dressed English folk are wont to be, all the world over: there are "dandies" in Eastern seas, more like fragments of the Aurora, or rainbows bathing, than real fish, so brightly are they robed, in pinks, blues, yellows, purples, greens, gold, and orange: there are disagreeably greedy fishes, blessed with keen appetites, good digestion, and sharp teeth,—dangerous neighbours, deservedly shunned and disliked: there are "gentlemen" fishes, famous for their domestic virtues, that build nests like birds, and, in the matter of wives, boast harems that would beat a Mussulman or a Mormon into fits: there are "ocean swells," that most of us love, and look at simply, and only, as things to be devoured: and, lastly, there are "odd fishes," peculiar in everything; some, round as a globe, are covered with spines like a porcupine; some, armed with horns, are like marine bulls. There are "insect-fish," "bird-fish," and others, according to old writers, that "feedeth on herbs, and cheweth the cud like to the beasts." We find ugly monsters, like antediluvian leviathans revivified, half salmon, half shark, with a strong admixture of conger eel,—flabby, scaleless giants. The *Silurus Glanis* (*Sly Silurus*), one of the clique, has been brought from the Danube, and turned into our quiet streams, and should it live and flourish, will prove a "caution to anglers." Of what avail the trolling-rod and Jack-tackle, to a beast that bolts a baby, and rather likes it, as we should an acid-drop. The enthusiastic follower of the gentle art will be obliged to bait with a sheep, and use a cable and steam-power lifting-engine, to land his prize.

I am induced to select for description a few of the oddest of odd fishes, in the hope of stirring up in my young friends a desire to know more of Nature's wonders. Should you visit the sea-side during the coming summer, or, still better, if you live near it, devote a little leisure to investigating rock-pools, fishers' nets, and crab-pots, where you can fish out more wonders than Colonel Stodare or Professor Anderson ever dreamed of. Peep into any little rock-basin or dark weedy cleft, or, turning up the bladder-wrack, hunt the hollows it hides, and you will discover hosts of oddities;—spotted gobies, resembling flowers more than fishes; pugnacious crabs, that square their fighting arms at the shortest notice, and sidle off, twirling their hard eyes defiantly; irritable star-fish, with arms like serpents, whose custom is to break themselves into bits, and die in fragments if you touch them; chitons, that roll up like armadilloes; hermit-crabs, that live rent-free in the houses of others:—but, enough, look for yourselves. As we cannot very well enjoy a rock-ramble in these wet and windy days, the next best thing is to visit the "oceans in glass" at the aquarium house at the Zoological Gardens, where we can quietly observe several odd fish, with one of which I shall begin my story.

In the fish-tanks opposite the door, you may see a number of stiff, taper, horny-looking creatures, with long snout-like noses, certainly not ornamenting their wizened, shrivelled, ugly faces. They never appear to be enjoying life, or exercising their fins in submarine frolics, but float listlessly and lazily, as if, having nothing to do, they felt proud of doing it thoroughly. On reference to the illustration at the base of the sea in glass, we learn these odd fish belong to the family *Syngnathidæ*, or pipe-fishes, the generic name, *Syngnathus* (Gr. *sun*, together, *gnathos*, a jaw), is in allusion to the mouth, which is stretched out into a horn-like tube; through it, minute mollusks, crustaceans of tender age, and even tiny fishes, are sucked in and swallowed. The action of this queer mouth is precisely on the principle of the common water-squirt; the throat dilates, and the water flows through the tube-mouth, carrying in with the current, anything sufficiently small to enter, just as you suck water from a pool or saucer with a syringe, by drawing up the piston and causing a partial vacuum,—the water is forced into the nozzle, together with any material floating in it.

Perhaps it may be as well to select the species (*Syngnathus ocus*) most usually found, for description, as, in habit, all the family are very alike. I have often found them lurking under seaweed at low water on the coasts of Devon and Cornwall, but in vast abundance in the snug bays round Vancouver Island.

Next to the mouth, an important structural difference to ordinary fishes will be found in the arrangement of the gills. If you lift the gill-cover, and examine any of the edible fish usually sold, you will see the gills are pectinated, or arranged like the teeth in a comb, whereas in our friends the pipe-fishes the breathing apparatus assumes a tufted form; hence the sub-order, including only this single family, is named *Lophobranchia* (Gr. *lophos*, a tuft; *branchia*, gills). The body is encased in a kind of laminated armour, permitting great freedom of motion; each plate, if examined closely, will be seen to radiate in striæ from the centre. The fins are small, and the tail rounded.

The male differs in a most remarkable manner from the female. Mr. Walcott tells us, in his "Manuscript of British Fishes," that in the male, the belly has for about two-thirds of its length two soft flaps, which fold together and form a pouch. Now the oddity of the pipe-fish consists in the male receiving the eggs of the female as they are laid, packing them safely away in this skin-bag, and taking the entire charge of them until they are hatched. Quoting from Yarrell's "British Fishes," "The sub-caudal pouch is peculiar to the males only, and is closed by two elongated lateral flaps: on separating these flaps and expanding the inside, the ova, large and yellow, were seen lining the pouch. In each of these, the opened abdomen exhibited true male organs." Mr. Walcott also further writes, "They breed in summer, the females casting their roe into the false belly of the male."

The way this singular transfer of a numerous family to the unlucky papa takes place (the mamma being at liberty to flirt or enjoy herself in any way she deems best befitting her tastes and inclinations, utterly reckless of all maternal duties), has been described by Mr. Andrews:—

"In shoal water, or at a low tide, these fish may sometimes be seen in pairs, side by side, apparently stationary on some rocky stone. At this time the ova—the capsules but imperfectly matured—are liberated from the female and received into the abdominal sac of the male, the male fish having the power of expanding the lappings of the sac, and attaching the ova by a highly viscid or glutinous secretion; in time, as the process of maturation advances, the capsules of the ova enlarge, forming hemispherical depressions in the sac, and eventually the pouch is forced open by the full development of the ova and extrication of the young."*

* *Nat. Hist. Review*, vol. vii. 1860, p. 397.

At Vancouver Island there are several species of pipe-fish very nearly allied to those of our own seas, but much larger in size. In the hot summer days, when tired of scrambling over slippery rocks, searching pools, picking shells, and capturing captives that ought to have "gone out with the tide," I have laid on a smooth rock, overhanging some sandy sheltered little bay, and gazed into the clear salt water to watch the strange assemblage of living curios that elbow—perhaps fin is the better word—each other in these sea gardens, seldom did I fail to see a pair or two of pipe-fishes busy at the family transference.

A kind of sea-wrack grows everywhere along the north-west coast like a sub-marine forest; a straight stalk rising through the water spreads out two long plantain-shaped leaves, that float like ribbons on the surface: apparently hooked on by their tails, that seem to be bent round the sea-trees, side by side, are Mr. and Mrs. Pipe-fish. How the eggs are conveyed into the false pouch of the male, without being dropped into the water, I am unable to say, except by absolute contact, the eggs are glued, so to speak, to the inside of the receiving sac; the slightest disturbance puts an end to the work, even a breeze of wind rippling the water sends husband and wife to some secure hiding-place. I feel quite sure the lady pipe-fishes are not the least particular in the choice of a papa; if he has an empty quiver, they are quite ready to yield all or any part of their family to his paternal guardianship; thus it happens, if frequently disturbed, the ova of a female often gets distributed amongst four or five males.

The accommodating papa pipe-fish does not get quit of his numerous children as soon as they are hatched, according to the usages of fish society in higher circles, where both parents, without a pang of regret, march off, leaving their eggs to take care of themselves; but it is positively affirmed by many able observers, that the young, when hatched, quit the pouch to make pleasant little excursions round their "daddy," and on the slightest danger, dash with all speed into their sac shelter, huddle together, and, I dare say, play all manner of infantile pranks. Mr. Yarrell says, if you shake the tiny fellows out of the pouch into the water, they do not swim away, but return again, if the parent fish is held in a favourable position. To the truth of this I can bear testimony; you can perform the feat any day in a sea-pool at Vancouver Island. The exact time they remain with the parent fish I do not know, as they return into deep water prior to the young leaving them. Neither, as far as I am aware, is it known how long the ova are hatching in the male sac.

This singular appendage varies greatly in its structural form in different species. In the *Hippocampus*, or Sea-horse as it is usually styled (which has been—nay, I believe is, alive in our "glass seas"), the pouch is immediately under the tail; in *Doryrhamphus*, the pouch is on the breast; in *Nerophis*, the eggs are placed in rows on the under surface of the body, and not encased in pouches at all. But space bids me close. In my next I shall have more to say about these pipe and other "odd fishes" that play similar eccentric pranks in the management of their families.

J. K. Lord, F.Z.S.

THE SPECTRUM MICROSCOPE.

Mr. H. C. Sorby has contributed an interesting article on this subject to the *Popular Science Review*, from which we make the following extracts:—

"Every one is in the constant habit of distinguishing different objects by their colour. In many cases this is sufficient to characterize various small bodies seen with the microscope. Now, strictly speaking, spectrum analysis is nothing more than a refined and scientific method of applying the same principle, and the spectrum microscope is simply an instrument which enables us to employ it in the case of very small objects. It is a more refined method, because we may have a number of different substances so nearly of the same colour, that it would not enable us to tell one from another; and yet, when examined with a spectroscope, their spectra might be entirely different and quite characteristic. On the contrary, we may have cases where the presence of foreign colouring matter so entirely disguises the natural colour of a substance, that its presence would scarcely be expected: and yet, when examined with a spectroscope, the spectrum may be so characteristic, that its presence is perfectly well established. In these remarks I refer to coloured solids or liquids. The spectroscope has been so commonly restricted to the examination of coloured flames—*i.e.* to the study of the light given off from incandescent vapours—that I have found many persons who believed, that in order to obtain the spectrum of such substances as blood it is requisite to burn it. There can be no doubt whatever that, on the whole, the facts to be learned from the study of mineral matter in the state of incandescent vapour are far more important and decided, because the spectra are far more characteristic; but still we may learn a number of valuable facts in studying the light transmitted or reflected from solid or liquid coloured substances."

After describing the apparatus, he directs attention to the objects which may be examined. "The objects most easily obtained, and which furnish us with the greatest variety of spectra, are coloured crystals, coloured solutions, and coloured glasses. The spectrum microscope enables us to examine the spectra of very minute crystals, of very small quantities of material in solution, and of small blowpipe beads. As previously named, the thickness of the object makes a very great difference in the spectrum. For example, an extremely thin crystal of ferridcyanide of potassium cuts off all the blue rays, and leaves merely red, orange, yellow, and more or less green; but on increasing the thickness, the green and yellow disappear; and when very much thicker, little else but bright red light is transmitted. In all such cases, the apparent magnitude of the effect of an increase in thickness is far greater when the object is thin than when thick, and past a certain thickness the change is comparatively very slight. If only small crystals can be obtained, it is well to mount a number of different thickness; but when it is possible to obtain crystals of sufficient size, it is far better to make them into wedge-shaped objects, since then the effect of gradual change in thickness can easily be observed. Different kinds of crystals require different treatment, but, as a general rule, I find that it is best to grind them on moderately soft Water-of-Ayr stone with a small quantity of water, which soon becomes a saturated solution, and then to polish them with a little rouge spread on paper laid over a flat surface; or else, in some cases, to dissolve off a thin layer by carefully rubbing the crystal on moist blotting-paper until the scratches are removed. Then, whenever it is admissible, I mount the crystal on a glass, and also cover it with a piece of thin glass with Canada balsam. Strongly coloured solutions may be examined in test-tubes, or may be kept sealed up in small bottles made out of glass tubes, the light then examined being that which passes through the centre of the tube from side to side. Such tubes may be laid on the ordinary stage, or held on the stage attached to the eye-piece. Smaller quantities may be examined in cells cut out of thick glass tubes, one side being fixed on the ordinary glass with Canada balsam, like a microscopic object, and the other covered with thin glass, which readily holds on by capillary attraction, or may be cemented fast with gold size or Canada balsam, if it be desirable to keep it as a permanent object. Such tubes may be made of any length that may be required for very slightly-coloured solutions. Cells made out of spirit thermometer tubes, so as to be about one-tenth of an inch in diameter, and half an inch long, are very suitable for the examination of very small quantities; but where plenty of material can be obtained, it is far better to use cells cut out of strong tube, having an interior diameter of about three-fourths of an inch, cut wedge-shape, so that the thickness of the solution may be one-fourth of an inch, or more, on one side, and not above one-fortieth on the other; and then the effect of different thicknesses can easily be ascertained."

We can only quote one other paragraph, which relates to the detection of blood-stains. "Fortunately, the various modifications of the colouring matter of blood yield such well-marked and characteristic spectra, that there are few subjects to which the spectrum microscope can be applied with greater advantage than the detection of blood-stains. I have already, in my paper in the *Quarterly Journal of Science* (April, 1865, II. 205), entered at so great length into this question, that I need not say much about it on the present occasion. The form of apparatus I have described enables us, however, to examine the objects in a different manner: surface illumination may be used, provided a sufficiently bright light be thrown on the object by means of a parabolic reflector or bull's-eye condenser. A speck of blood on white paper shows the spectrum very well, provided it be fresh, and the colour be neither too dark nor too light, and the thickness of the colouring matter neither too great nor too little. A mere atom, invisible to the naked eye, which would not weigh above the millionth of a grain, is then sufficient to show the characteristic absorption bands. They are, however, far better seen in solution. About $\frac{1}{100}$ of a grain of liquid blood, in a cell of $\frac{1}{10}$ of an inch in diameter, and $\frac{1}{2}$ inch long, gives a spectrum as well marked as could be desired. In exhibiting the instrument to a number of persons at a meeting, I have found that no object is more convenient, or excites more attention, than one in which a number of cells are fixed in a line, side by side, containing a solution of various red-colouring matters. In one I mount blood, which gives two well-marked absorption bands in the green; in another magenta, which gives only one distinct band in the green; and in another I place the juice of some red-coloured fruit, which shows no well-defined absorption band. Keeping a larger cell containing blood on the stage attached to the eye-piece, these three objects can be passed one after another in front of the object-glass, and the total difference between the spectrum of blood and that of either fruit-juice or magenta, and the perfect identity of the spectra when both are blood, can be seen at a glance. By holding coloured glasses, which cut off the red, but allow the green rays to pass, we can readily show how the presence of any foreign colouring matter, which entirely alters the general colour, might not in any degree disguise the characteristic part of the spectrum; and by changing the cell held on the eye-piece for a tube containing an ammoniacal solution of cochineal, it is easy to show that, though it yields a spectrum with two absorption bands, more like those due to blood than I have seen in any other substance, they differ so much in relation, size, and position, that there is no chance of their being confounded when compared together side by side."

Any of our readers specially interested in the subject are recommended to peruse the article from which the above extracts have been made.

A BOUQUET OF GRASSES.

"The green grass on the streamlet's brim,
A blade of grass it is to him,
And it is nothing more."

FEW people are aware of the beauty to be found in many members of the Grass family. Even our agricultural grasses are very ornamental when properly dried and arranged. I believe about a hundred and sixteen species of grasses are found in Great Britain, and from this number I shall select a few of the most desirable, leaving what are called the "Ornamental grasses" for another gossip.

I would first state that in order to preserve grasses for winter bouquets it is requisite to cut them when they are just coming into flower, before any seeds are formed, when the pollen first becomes visible, and dry them by sticking the stems into boxes of sand.

The Meadow Bucetum or Fescue, which has puzzled botanists a good deal in determining its character, presents a very graceful, wavy appearance. It is generally found in meadow ground, and flowers about the middle of June. The rough-stalk Meadow-grass, better known, perhaps, as the famous Orchistore grass, from being found of extraordinary size in a meadow near Salisbury, called Orchistore, is also very pretty. Its flowers may be looked for about the second week in June in well-irrigated land. The Fiorin grass, which some farmers anathematize as a weed, is another elegant addition to the dried bouquet; and the crested Dog's-tail, known in Ireland by the name of Trahneen, looks remarkably well; its flowering stems are very wiry, and often used in the manufacture of imitation Leghorn bonnets. The sweet Vernal grass, the only British grass that is odoriferous, so like in scent to that charming little plant the wood-ruff, blossoms early in May, and is to be met with in thickets and on poor up-land pastures. Then we have the perennial Rye-grass, which village girls are so fond of trying their fortunes with, to the measure of "Tinker, tailor, soldier, sailor, &c.;" and the rough Cock's-foot grass, found so common in Norfolk. The Fox-tail, which only occurs in deep, rich, moist, and sheltered ground; together with the Cat's-tail, found on clayey soil; and last, though not least, the Sea-lime grass, which, I believe, is rather rare except on chalky soil. It grows nearly two feet high, is of a sort of greyish-blue colour, and decidedly worthy of being classed among our most ornamental grasses. Ferns have been the rage for some time, even the most common kinds of British; and mosses, too, have their admirers: why should we not have a *grassery*, or mix some of our native grasses with our ferns? I believe the effect would be better than when grown in a formal way by themselves.

H. E. Watney.

ON SOME PESTS AND THEIR CHECKS.

THERE is a subtle relation between the health of plants and the attacks they suffer from insects. One may watch an apparently healthy, vigorous shoot on a favourite rose-bush and expect it to be presently crowned with roses. Has a current of cold air breathed unkindly upon it? Has an Aphis in its perfectly-developed winged state halted there a moment, and unseen deposited some eggs?

Quien sabe (who knows)?—but there comes first an uncomfortable roughness, as if the plant were perspiring through the pores of its epidermis. These small beads of moisture soon show themselves to be living six-legged creatures, with bodies of bright green jelly, and they grow and increase, both in size and numbers, with the most marvellous rapidity, till they jostle and tumble over each other, coating the stem and leaves with their bodies, as thickly piled together as a swarm of bees round the branch where their queen has settled. Alas! poor plant, how your life-juices will now be sucked and drained! But help is at hand when least expected. Gardeners in general do not like ants: they accuse them of disturbing the soil from the roots of plants, and of various mischief. Yet now they come as allies to help the beleaguered fortress. In serried file they issue from their citadel, march in straight line across gravel-paths or smooth-raked border, climb up the stem, and quickly settle themselves where the Aphides are thickest and busiest, and greedily drink the honey-dew which they excrete. There have been various meanings given to the oft-quoted remark of M. P. Huber, the younger, that "the plant-lice serve instead of cows and goats to the ants"—pastured through the winter they could not be; and Gould, Latreille, and others have found that the ants become dormant, and do not require stored-up food for that time. In this little episode of the raid of the emmets on the rose-bush, there could be no such commissariat-providing prevision as that by which the respectable Dr. Watts would have us think "they foresee all the frosts and the storms, and so bring their food within doors;" on the contrary, judging by the dried, empty skins, and the altogether defeated and discomfited state of the Aphides, one may suspect that the ants, God Bacchus-like, mounted on and tapped their barrels of liquor, and gorged themselves with the sweet inebriating juice fresh from the heart of the distillery, till heavy and stupefied, the ants roll helplessly on the stem, and possibly, by the formic acid exuding from them, might do more harm to the plant than their soft green predecessors. But help comes again: amongst the dark mass of the now lazy ants, move some red coral beads prettily speckled with black; these are *Coccinellæ*, equally greedy after the Aphides and the honey-dew, they soon dislodge those who would debar them from their feast, and the ants helplessly tumble about and nearly disappear, as the Aphides had done before. Ah, then, "lady-birds, lady-birds, fly away home," stretch out your pretty gauze winglets—begone; shelter yourselves in the dahlias or under the broad sycamore leaves, and lick up what remnants of honey-dew you can find, for here come numerous feathered flutterers to pick you up like grains of wheat. Your friends the hop-growers will willingly help to hide and protect you for the sake of the great services you render them against the Hop-aphis. In confirmation of my suspicions against the sobriety of the ants, Dr. J. E. Gray has just written to me, "I know that ants do get drunk." They pass up the stem of the laurel, the broad-leaved evergreen (*Prunus Laurus-cerasus*), drink the secretion from the gland on the petiole, and get so mugged they cannot find their way down again, and some seem to die on the spot.

Dr. Kirk told me he caught the Galagos (a small Lemur) when they had been up in the palm-trees drinking the juice which the negroes brew into palm-wine, and they would come staggering into the house, and were easily caught. On mentioning this to a friend, a distiller, he told me he had a Skye terrier given to him which got the habit of going to the end of the worm and sipping the spirit as it dropped out, and got so intoxicated it could not walk, and nothing could cure it, so it was obliged to be sent away where spirits were not made. The Aphides we have spoken of have soft green luscious-looking bodies, which offer an easy and tempting prey to their enemies; others have curious means of defence. For instance, the little green insect which involves itself in a wet frothy spume, and either from its making its appearance when the cuckoo calls, or because it is more frequently found on the cuckoo-flowers (*Cardamine pratensis*) than on any other plant, has the popular name of Cuckoo-spit.

The *Aphis lanigera*, commonly called American blight, which so deforms our apple-trees with great white scabs, is rolled in webs of cotton-wool, which not only preserve the inclosed insects, but serve them as flying chariots; small flakes of the web being wafted by the wind from tree to tree spread the pest. If you take hold of these flakes, your fingers become bloody with the insects, whose covering you thus crush. This sort was particularly abundant in this last hot, dry summer; but after the heavy autumn rains the apple-trees appeared to be washed quite clean, and the woolly patches had disappeared. On searching closely in November, however, I found in cracks, in the axils of branches here and there, a very small soft grub inclosed in a smooth silky cocoon, which, I think, was the chrysalis state of the perfect Aphis; and which, in spring, would produce the wool-spinning stage of the Aphis. In the cocoon state, however, they are accessible to the bills of such small birds as may be industrious enough to seek them out. Let us hope the Black-cap, or some of his relations, may make many a feast on them, and by thus clearing the trees give us fair reason to sing the olden charm said to have been formerly constantly practised in the great orchard districts, such as I saw this autumn in many of our south-western counties glowing with loads of richer and ruddier gold than the fabled gardens of the Hesperides. On the eve of Twelfth-night, it was the custom for the farmer and his work-people to go out into the orchard after supper with a large milk-pan full of cider, having roasted apples pressed into it Out of this each person in company took an earthenware cup full of liquor; and, standing under each of the most fruitful of the apple-trees, addressed it thus:—

> Health to thee, good apple-tree,
> Well to bear pockets full, hats full,
> Pecks full, bushel-bags full—

and then, drinking part of the contents, threw the rest, with the remnants of the roasted apples, at the tree, and at each cup the company set up a great shout. There are many curious old customs and legends about the apple-tree recorded in Hone's "Everyday Book." P. S. B.

THE SCALES OF INSECTS.

No more apt illustration could be given of the truth of the proverb, "All is not gold that glitters," than these minute structures. The illusion in many cases is complete: the scales of the various sorts of Diamond Beetle, for instance, resemble the polished surface of the precious metal so closely, that no description, without reference to gold and jewels, can convey an idea of the splendour which enwraps many of them; and it requires an effort to certify the mind that the brilliant reflections are, in reality, not metallic.

Many observers have vainly endeavoured to satisfy themselves as to the precise cause of the phenomenon. Theories have been put forward on the subject, but we are yet in ignorance why certain scales, presenting under transmitted light a uniform semi-transparent appearance, and similar markings, should, under reflected light, differ widely from each other—some reflecting green, others blue, others red, and others again yellow. Even in the same scale great contrasts are observable.

It is to be noticed, that in all cases, when colour appears to be really present, the scales are to a great degree opaque when viewed by transmitted light. This is especially the case with those more deeply coloured, such as brown, black, and dark red.

Another point is, that a great similarity obtains in the tracery of these opaque scales of lepidoptera, which may be well observed in those coloured light red, yellow, and white, even although they vary in outline, and be procured from different insects. The darker scales cannot be examined with so much facility.

In the earlier days of microscopical inquiry, certain selections from these objects were used to test the glasses of high magnifying power; but such great progress has been made in this manufacture, that nowadays their employment for this purpose is almost abandoned. Nevertheless, some of them still decline to reveal their beauties, except through the medium of the most exquisite specimens of the optician's skill.

The intention in this chapter is, to bring forward such examples for special description as are notable for their departure from the general type, or are interesting to the microscopist for various reasons, beauty in particular.

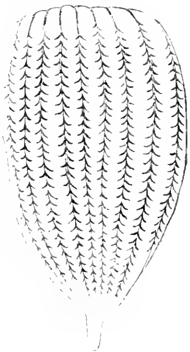


Fig. 54. Scale of *Papilio Paris* × 350.

The gorgeous scales of the *Papilio Paris*, a relative of our Swallow-tail Butterfly, are remarkable, not only for their brilliancy by reflected light, out also for the curious branched pattern to be seen when they are viewed as transparent objects. On

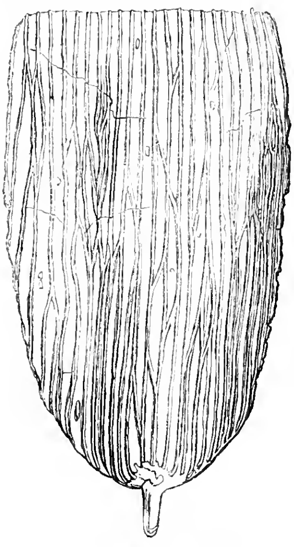
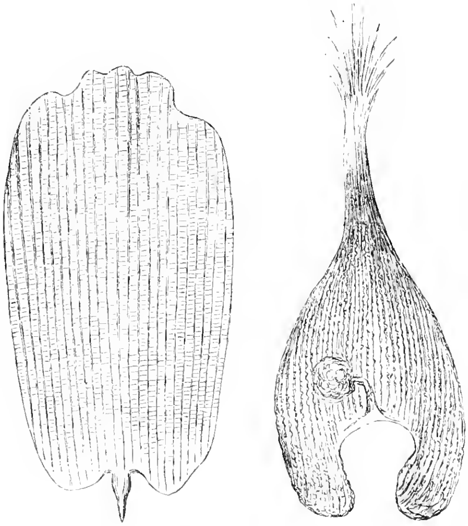


Fig. 55. Scale of *Morpho Menelaus* × 450.

the wing may be found green and blue scales vying with each other in lustre, yet they are identical in appearance when transmitted light is used in their



Figs. 56, 57. Scales of *Pieris Brassicæ* × 450.

examination. Under these circumstances they appear of a light-brown colour.

The scales of the *Morpho Menelaus*, a splendid insect, measuring some 3½ inches across the wings, which are of the deepest sky-blue colour on the upper surface, differ considerably from those of the Paris Butterfly. Formerly they were considered a severe test for an ⅛ objective.

From the wing of the male of the Cabbage Butterfly (*Pieris Brassicæ*) are obtained two descriptions of scales; one somewhat resembles those from the *Morpho Menelaus*, but the other

Fig. 58. Scale of *Hipparchia Janira* × 450.

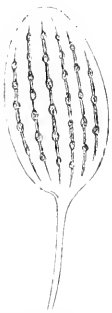


Fig. 59. Battledore Scale of *Polyommatus Alexis* × 450.

is altogether different, and requires a good quarter to exhibit the markings satisfactorily; indeed, neither of the two is easy of resolution.

The Meadow Brown Butterfly (*Hipparchia Janira*) furnishes a test of considerable difficulty. The outline resembles the scale from *Pieris Brassicæ*, but the markings are much finer.

The battledore scales from the Azure-blue Butterfly (*Polyommatus*) have always been favourites, owing to their unique shape and peculiar surface markings. Being very minute, considerable magnifying power must be employed.

The scale of the Gnat (*Culex pipiens*) is also very curious; the longitudinal striæ look more like the folds in a lady's fan than anything else.

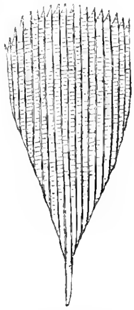


Fig. 60. Scale of Gnat (*Culex pipiens*) × 450.

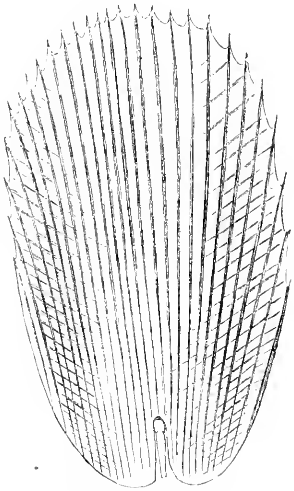


Fig. 61. Scale of *Lepisma saccharina* × 450.

The *Lepisma saccharina*, a little spindle-shaped creature of a dull leaden hue, with three filaments or bristles pointing outwards at the tail, inhabiting the old decayed woodwork of houses, is covered with very beautiful scales.

The name implies the connection of the creature with sugar-casks. I used to be able to procure a specimen whenever I wanted from the kitchen hearth, which was somewhat out of repair; but

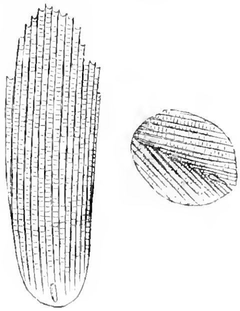


Fig. 62. Scales of Sea-side *Lepisma* × 450.

since it has been mended I have not caught one. Perhaps they were out on foraging expeditions among the bits dropped near the fire-place, and the repairs done have effectually barred their exit from the woodwork of the floor. The Micrographic Dictionary says, "This active little insect, which runs, but does not jump, is found (in the country) upon the shelves of cupboards, where sweets and other eatables are kept, in window cracks, &c. Its habits are nocturnal."

A relative of the *Lepisma saccharina*, frequenting the rocks at the sea-side, and very like it in appearance, gives a very different scale.

The Podura scale still holds its ground as a genuine test for penetration in a good $\frac{1}{4}$ or $\frac{1}{8}$ object glass. The insect from which it is obtained is about the size of a flea, and is to be found in cellars. There are many species inhabiting various localities. I have found one sort under damp stones and flowerpots at various times, which gives tests of extreme difficulty. This species glows with iridescent colours, and is very small. Another kind, and perhaps the most suitable for the purpose of display or trial, inhabits drier places, and often, in the summer time, makes its appearance in the house, under unexpected circumstances; such as hopping on the book you are reading. It is either silvery-white or dark-grey. Dr. Carpenter says, "Its scales are of different sizes, and of different degrees of strength of marking, and are by no means of uniform value as tests. The general appearance of their surface under a power not sufficient to resolve their markings is that of watered silk, light and dark bands passing across with wavy irregularity; but a well-corrected lens of very moderate angular aperture now suffices to resolve every dark band into a row of short lines, each of them being thick at one end and coming to a point at the other, so that the impression conveyed is that of a set of spines projecting obliquely from the surface of the scale like the teeth of a 'hackle.' A more careful examination of the scales, however, of which the superficial layers have been removed, serves to show that these dark lines are but the spaces between the minute wedge-like particles arranged side by side, and end to end, of which those layers are made up."

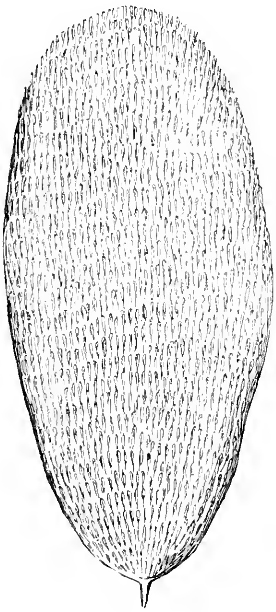


Fig. 63. Scale of *Podura* × 450.

The directions copied from one book into another about catching these insects with oatmeal or flour, I fear, are not of much value; at least, I never succeeded myself in that manner. I believe they may be found in every cellar or damp cupboard, and I have never experienced any difficulty in finding them.

When obtained, they must not be touched by the hand, or the scales will be rubbed off. Having induced them to enter a pill-box, the insertion into it of a little piece of blotting-paper saturated with chloroform will effectually kill them. If chloroform be not at hand, the sulphurous vapour from a lighted lucifer-match will do as well.

The writer's humble opinion with respect to the scales of insects, as tests, is, that they are invaluable, inasmuch as they show the penetrative power of the object-glass while the markings on the more difficult Diatomaceæ test its definition. In high-power object-glasses of inferior quality one or other of these requisites fails.

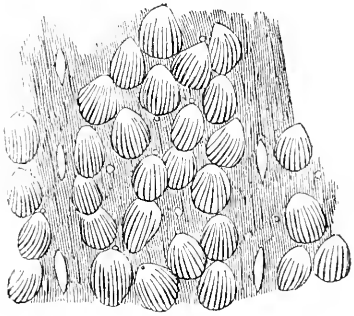


Fig. 64. Scales of *Curculio* of the Beech × 350.

The elytra of many Curculios, British as well as foreign, are worthy of being mounted. I, like many others, have endeavoured to discover the cause of their splendour, but am unable to throw much light on the subject. The scales of both British and foreign beetles were examined, first in the dry state, both by transmitted and reflected light, and also by dark-ground illumination. With the two former modes of display the colours were strongly marked. Under a $\frac{1}{8}$ objective by Ross, and with transmitted light, rainbow tints were present in each scale, rendering it very beautiful; something like the phenomena of polarized light. This was particularly the case with the scales from the Diamond Beetle of Brazil, which resembled a piece of selenite of varied thickness under the polariscope; the different colours being quite as bright, and bounded apparently by either cracks in the surface or breaks in the laminæ composing the scale, just like that mineral, or like the pieces of stained glass in a church window. When dark-ground illumination was adopted by means of the parabolic condenser, or when fluid was admitted to the object, the colours vanished, and nought but the indistinct striæ of the scale, and the cracks or breaks in the laminæ, remained visible to give a clue to the

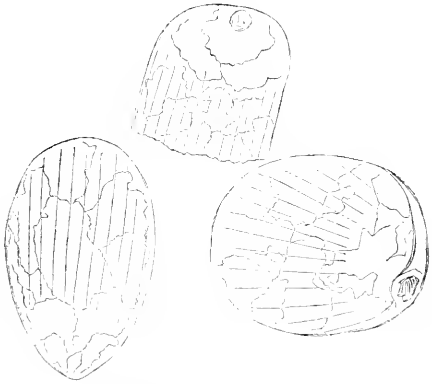


Fig. 65. Scales of Diamond Beetle × 450.

possible cause of the resplendent glories adorning the insects in question.

I have tried the new illuminator for opaque objects under high powers (Smith & Beck's pattern) on the wings and scales of insects, and find the results are important. Surface-markings

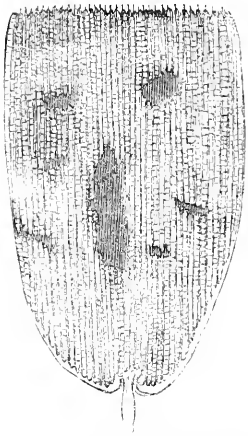


Fig. 66. Damaged Scale of *Morpho Menelaus*, $\frac{1}{5}$ objective, with Smith & Beck's patent illuminator.

are rendered much more distinct, and appearances are presented which are quite novel. The best light is a narrow flame, obtainable by turning the lamp round, a small condenser at the proper distance between it and the aperture in the side of the illuminator, being interposed, to modify it. The objects should be mounted on dead-black paper and uncovered, and the object-glass accurately adjusted to suit this condition. The performance of the objectives is not at all impaired, but there is a certain amount of flare, due perhaps to superabundance of light, or reflections, which it would be desirable to get rid of. This, I understand, is also the case with the similar appliance made by Powell and Lealand. These instruments may yet be improved in this point; but it is probable that, as they are

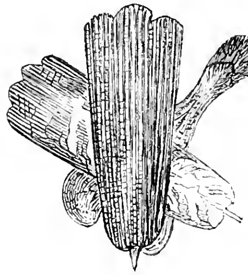


Fig. 67. Scales of *Pieris Brassicæ* $\frac{1}{5}$ objective, with same illuminator.

made more complex, the price, which is now so reasonable, will be greatly increased.

Surely, none can contemplate the minute specimens of Divine handiwork, referred to in this paper, without a feeling of awe at the infinite skill of the Creator. The elaborate ornamentation of the scales on a butterfly's wing, which are numbered by hundreds of thousands, and in some even by millions, on a single insect, cannot be adequately copied by the pencil, and we have to be content with a general approximation.

Compared with the richness of the dress worn by these humble creatures in the scale of life, what are the tawdry gewgaws with which human beings delight to deck themselves? Look at one scale from the Diamond Beetle, and say to what jewel it can be likened; so many colours of brightest hue does it transmit to the eye.

S. J. M'Intire.

SIMPLE OBJECTS.—XI.

SPHÆRIA HERBARUM.

At this season of the year, and for two or three months to come, the dead stems of herbaceous plants, and small twigs from trees, will be found sprinkled with little pustules, or black dots, in many cases not so large as a pin's head, and which are exceedingly interesting microscopic objects. The majority of these little dots are minute fungi, belonging to the group known as the *Sphæriacei*, the structure of which we can best illustrate by a definite species, and have, therefore, selected one which is very common on herbaceous stems; whence it is named *Sphæria herbarum*.

First of all let us examine our object with an inch objective *in situ*. The little black spot is perhaps covered still by the epidermis. Later in the season the cuticle will be thrown off; now it may be necessary to remove it. The black body is nearly spherical, slightly flattened at the base, and surmounted at the apex by a teat-like projection (fig. 68, *a*), the centre of which is ultimately perforated, so that its contents may escape. If a section

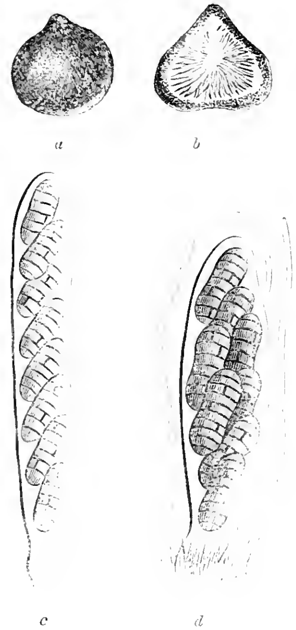


Fig. 68. *Sphæria herbarum.*

a. Perithecium. *b.* Section of ditto, magnified slightly. *c.* Ascus, with uniseriate spores. *d.* Ascus, with biseriate spores and paraphyses × 320.

be made of this little black bottle (fig. 68, *b*), or the top sliced off with a sharp knife, the interior will be found occupied by a minute drop of jelly—this is the *nucleus*. Dig it out with a needle, or a sharp-pointed penknife, and place it in a drop of water on your glass-slide, cover it with thin glass, then press gently, at the same time moving the cover a little, so as to separate the nucleus sufficiently for the light to pass through it. Now examine your little drop of jelly with a quarter-inch power, and you will find that it is not the mere gelatine which you may have supposed. There will be seen cylindrical transparent bags, or *asci*, each containing eight beautiful amber-coloured *spores* (figs. *c*, *d*). Earlier stages of the *asci* will show merely a granular mass. Beside these bodies long hyaline threads will accompany the *asci*, which are the *paraphyses* (fig. *d*.) The *asci* are themselves delicate and easily ruptured, when the spores will appear scattered over the field, mixed, probably, with some perfect *asci*. The arrangement of spores is very variable in this species, as well as the form. In most instances they are oblong, a little narrowed in the middle, with the endochrome, or internal substance, curiously divided in a muriform manner. At first they are colourless, but, as they approach to maturity, assume a bright amber-colour, and escape from the ascus and the *perithecium*, or little black bottle, through the minute orifice at its apex, in order to fulfil their mission to "increase and multiply, and replenish the earth."

Having examined this object, and being desirous of preserving the little stick with its remaining spots for examination, five or ten years hence, if need be, let it become quite dry, and put it in a drawer till you require it. When about to examine a specimen which has thus been preserved for an indefinite period, all that is requisite is to soak it in water for an hour or two (all night will do it no harm). This will render the nucleus, which had dried up, as gelatinous as ever; or, if not, then remove one of the perithecia entire, but without any adherent tissue, place it in your drop of water, break it with the point of your knife, cover, and examine as before.

To mount such a specimen is easy enough. Let the water be replaced by a drop of spirit; when this has evaporated, add your drop of diluted glycerine, or balsam, dissolved in chloroform, and cover. No cells are requisite. Generally the balsam renders the asci too transparent. Glycerine, or Deane's gelatine, though not used with equal facility, is preferable in the majority of instances.

We have two hundred species of this group in Great Britain, some with exceedingly beautiful spores; and they have the advantage of being found everywhere during the dullest season in the year, and may be picked up and put in the pocket with no other apparatus than an earnest mind and a willing hand. M. C. C.

N.B. Specimen of the above will be forwarded on receipt of stamped and directed envelope, to be sent *during the current month*, to the office of this Journal.

Correct Written Descriptions equalling Pictorial Representations.—"Sir Walter Scott tells us, that Nature having denied Mr. Croftangry a pencil, he endeavoured to make words answer the purpose of delineation. I almost think, though fancy may be equally expansive in both cases, that if one has any general knowledge of the subject, a particular description of any of the variously-formed objects of nature would ensure as good a distinctive resemblance as if drawn pictorially from life. The only exception is the human race, in which nature, having arrived at the extreme limits of animal composition, illustrated by there being absolutely the same number and quality of the external organs in every tribe, the *chef-d'œuvre* of her works may, *perhaps*, be better expressed by portrait than by description; but all the other objects of animated nature, even in the same division, differ so exceedingly from each other—for example, in the present case, the *Mollusca*,—that descriptive notes may possibly be preferable to artistical representation."—*Clark's "British Marine Testaceous Mollusca."*

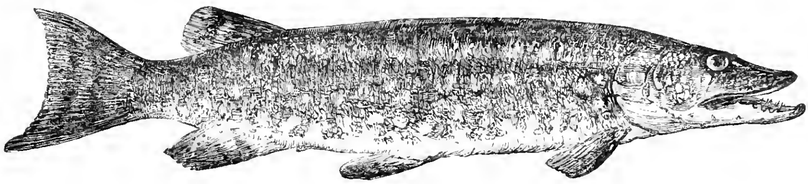


Fig. 69. THE PIKE. — (*Esox lucius.*)

THIS well-known tyrant of our rippling waters needs no specific description. Not only in Great Britain, but also in most of the countries of Europe, it is far from uncommon; from Norway and Sweden in the North, to Spain and Italy in the South. It is said, moreover, to extend through the temperate regions of Asia, as far as China, and even to find a home in the rivers of North America.

Many stories have been told of its longevity and rapacity, but none more clearly indicates its ferocity when pressed by hunger, than that narrated by Mr. Cholmondeley Pennell:—

"A young gentleman of fifteen years of age went with three other boys to bathe in Inglemere Pond, near Ascot, in June, 1856. He walked gently into the water to about the depth of four feet, when he spread out his hands to attempt to swim: instantly a large fish came up and took his hand into his mouth as far as the wrist, but finding he could not swallow it, relinquished his hold, and the boy, turning round, prepared for a hasty retreat out of the pond; his companions, who saw it, also scrambled out as fast as possible. He had scarcely turned himself round, when the fish came up behind him, and immediately seized his other hand crosswise, inflicting some very deep wounds on the back of it: the boy raised his first-bitten and still bleeding arm, and struck the monster a hard blow on the head, when the fish disappeared. Seven wounds were dressed on one hand, and so great was the pain the next day, that the lad fainted twice; the little finger was bitten through the nail, and it was more than six weeks before it was well. The nail came off, and the scar remains to this day. A few days after this occurrence, one of the woodmen was walking by the side of the pond, when he saw something white floating. It was found to be a large pike in a dying state, and he brought it to the shore, and the boy at once recognized his antagonist. The fish appeared to have been a long time in the agonies of death, and the body was very lean, and curved like a bow. It measured forty-one inches. There can be no doubt the fish was in a state of complete starvation. If well fed, it would probably have weighed from thirty to forty pounds."

The maximum size and weight to which a pike will attain has not been satisfactorily determined. Mr. Pennell states that he can easily refer to many attested examples of pike having been taken in the British islands, up to the weight of 70, 80, and 90 lbs. Colonel Thornton refers to one taken from a sheet of water at Lochaber of 146 lbs.; and Sir John Hawkins mentions one taken in 1765, which weighed 170 lbs. Block states that he once examined a portion of the skeleton of a specimen which measured 8 feet.

What is the duration of the life of a pike, is still an "open question." That it will attain a great age is certain, but whether it will live, as is narrated of the Kaiserwag pike, for 267 years, is not so readily assented to. It will most probably vie with man in the duration of its existence, for Pennant alludes to one which was 90 years old.

A curious little creature may be seen roaming at will over the body of a pike, even when confined in an aquarium; and if this parasite is only as troublesome as some which delight in the human body, then the life of a pike is not altogether one of unmixed serenity.

Argulus foliaceus, for so the parasite is named, is

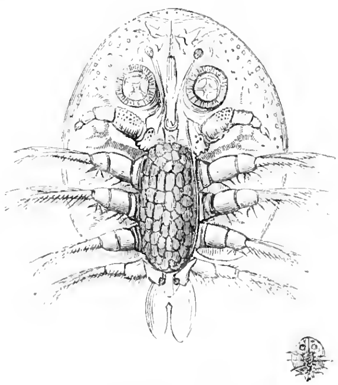


Fig. 70. Parasite of Pike, *Argulus foliaceus*, natural size, and magnified.

figured for the benefit of those who have not before had the opportunity of making its acquaintance.

It has been found also on the stickleback, carp, roach, trout, perch, and even upon the tadpole of the common frog. Not having space to enter upon the description of this crustacean here, we must refer the curious to a very interesting account in Dr. Baird's "British Entomostraca," pages 242—256. The microscopical student will find good employment for his instrument, not only in the examination of the *Argulus*, but also in the scales of the pike, which, although not so attractive as those of the sole and the perch, are yet well worthy of being secured and mounted for the cabinet. The structure

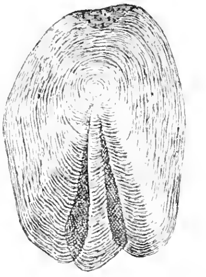


Fig. 71. Scale of Pike.

is entirely different in its character, and whether viewed by ordinary illumination or by means of polarized light, is far more beautiful than any simple woodcut, be it ever so truthful, can represent. We must now bid adieu to the august individual whose portrait surmounts this notice, hoping, that when next we meet, it may, for us, be under happier auspices; that, instead of the shadow, the substance, smoking and garnished, may appear on the table which now supports the record of his name.

FALLS OF THE ZAMBESI.

At the meeting of the British Association, Dr. Kirk gave the following general account of these falls. Compared with Niagara, the falls are twice as deep, and, being a mile wide, are perhaps grander even than those falls, but the mass of water is much less. At the low season he had seen natives wade from the northern side to the first bank, but the remainder is always very deep. The river rose 16 feet in the rainy season; and seen at that time, the cataract must equal in volume the great Niagara falls, all the little rocks on the edge being then wholly submerged. As the length of the falling sheet of water in one place alone would be more than a quarter of a mile, tumbling in one unbroken mass, the sight must be of a most sublime character. In the central island Dr. Livingstone planted a garden; there were some peach and other trees; but he could not find any remains of them when he went to the spot, as the place had been visited by a hippopotamus.—*Hardwicke's Report of British Association.*

FERNS OF THE OOLITE.

In our last number (p. 37) we presented our readers with the characters and illustrations of five genera of Ferns from the Carboniferous Limestone. Through the kindness of Messrs. Chapman & Hall, we are enabled to add thereto figures of

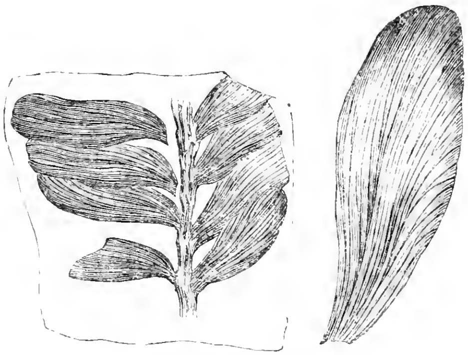


Fig. 72. *Otopteris dubia.*

four species of ferns from the Lower Oolite, derived from their excellently-illustrated edition of Figuier's "World before the Deluge." Although all the

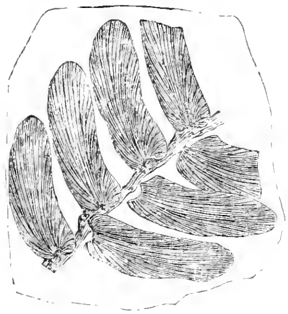


Fig. 73. *Otopteris obtusa.*

present sketches are confined to one genus, several others are found in the same formation. The Ferns of this period are, however, inferior to those of the

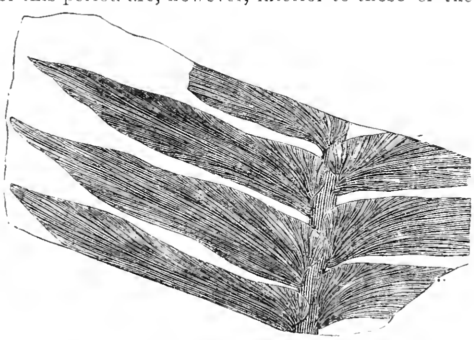


Fig. 74. *Otopteris acuminata.*

preceding, but the genus *Otopteris* is well represented. This genus is "distinguished for its simply pinnated leaves, whose leaflets are auriculate at the base." In addition thereto we may mention *Coniopteris, Pachypteris,* and *Phlebopteris,* three other

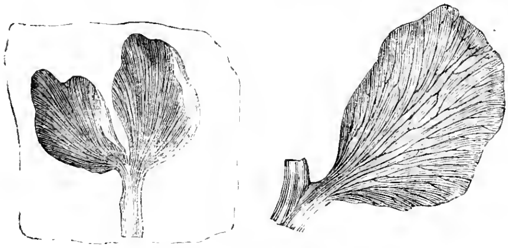


Fig. 75. *Otopteris cuneata.*

genera of Ferns not illustrated in this or the preceding notice; and *Pecopteris*, the figure of one species of which will be found at page 37. The species found in the Lower Oolite is *Pecopteris Desnoyersii.*

BRITISH DIATOMS.

Yielding to the request of some of our subscribers we have made arrangements to supply, from time to time, illustrations of the genera of British Diatoms. More than this we can scarcely promise at present, because we do not wish that Diatoms should become an important feature to the exclusion of other topics, and the annoyance of

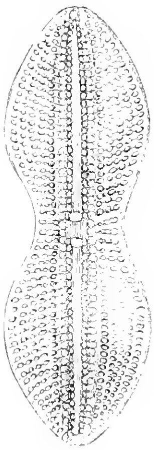


Fig. 76. *Navicula didyma.*

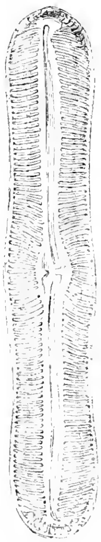


Fig. 77. *Pinnularia major.*

those who do not care, or do not need, to be troubled with them; and because the subject is an expensive one, as well as a difficult one, to illustrate satisfactorily.

There is already a handy-book in existence which will supply what is necessary in classification and furnish the names of the species. This is Dr. Gray's "Handbook of British Algæ, with the Diatomaceæ," by Mr. W. Carruthers. Hence there will be less necessity for us to adhere to a strict systematic order in publication, because it will be easy to refer the genera illustrated to their place in the system adopted in the handbook.

The species now figured, if not really typical, will serve to illustrate four genera of the group called *Naviculeæ.* The characters of this group are described as "valve with similar ends, and a median longitudinal line; front view, linear or quadrangular; frustules free, concatenate, or included in a gelatinous frond."

Navicula is a very large genus, containing not less than eighty-four British species. The valve is furnished with delicate *moniliform striæ*, and has central and terminal nodules (fig. 76).

Pinnularia is also an extensive genus, including fifty-three British species. The valve has distinct ribs, or costæ, with central and terminal nodules (fig. 77).

Stauroneis is a much smaller genus, of which we have but sixteen British representatives. The valve in this genus is striated, and the central

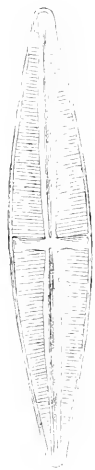


Fig. 78. *Stauroneis Phœnicenteron.*

Fig. 79. *Pleurosigma formosum.*

nodule is transversely dilated into a band, which is free from striæ (fig. 78).

Pleurosigma has thirty-seven species which are found in Great Britain, and is distinguished from its allies by the following characteristics: "Valve sigmoid, rarely straight, with sigmoid median line, and fine decussating striæ, which are resolvable into dots: the front view is linear or lanceolate, and narrower than the lateral view" (fig. 79).

Four other genera complete the first section of the group which includes the foregoing species, in which the frustules are *not* included in a gelatinous frond. For further particulars of which, with references to figures and descriptions of the species, we must commend our readers to the "Handbook" already alluded to.

ZOOLOGY.

The Kingfisher.—Mr. Lord asks the question, "Has any one observed the English kingfisher feeding on the rocks, as does his American brother?" Although I have never seen our English bird thus employed, I think it is not improbable that it occasionally resorts to the sea-shore for a change of diet. The kingfisher is not uncommon in this neighbourhood; a very favourite haunt are the "cloughs," or outlets to the drains and streams, where they enter the Humber. These "cloughs," as they are called, are constructed with self-acting doors, during low water permitting the efflux of fresh water, and closing again by the pressure of the rising tide. The surface of these "cloughs" is frequently visited by kingfishers, and there they will sit for hours together on the beams which span the outfall. As a general rule, the water running below is far too much discoloured by mud for even this most sharp-sighted bird to discern any small fish which may occasionally be washed through. I have often wondered why kingfishers should so persistingly frequent these spots. If they are partial to salt-water fare they would have no difficulty in procuring small crabs, and other marine animals, in the small pools and runlets left on the muddy foreshore by the receding tide, or even a more abundant supply amongst the seaweed-draped stones forming the Humber embankment. I have so often seen kingfishers in the immediate neighbourhood of these places, that it is more than probable they sometimes resort thither for some favourite food.—*John Cordeaux, Great Cotts, Ulceby, Lincolnshire.*

Age of the Cat.—According to J. Timbs, the domestic Cat rarely reaches the age of 15 years, but I can bear personal testimony to a cat which is still alive and brisk at the age of 16!—*Z.*

Sparrow-Hawk.—On the 13th January, a sparrow-hawk flew with such force against my drawing-room window as to break the pane of plate glass, ¼ inch thick, and 4 feet long by 2 feet wide, into numerous pieces, the bird falling dead upon the spot.—*J. M. H.*

Snipes without a Toe.—Some snipes that I have recently shot have been minus a toe; I wondered how it was, at last I got enlightened. One rose and seemed to fly very lazily; when I picked him up (after shooting him) I found he had a large cockle attached to his foot. Now, had his foot got by accident into the cockle and been seized by it; or do snipes feed upon cockles, and get at them by letting them catch hold of their toe, then flying off let them fall and break, and so eat them?—*J. B.*

The Diadem Spider (*Epeira diadema*).—Early in last September two Diadem Spiders took up their abode outside the window of my *sanctum*. Having a very *un-naturalist* dislike of spiders of all shapes and sizes, I threw a handful of foolscap paper, torn up into small pieces, into the web of the smaller of the two, in hopes that the shock would bring both spider and web to the ground; it did not, however, but a number of pieces adhered to the web. The owner of it did not seem much discomposed, but, after a short interval, he ran rapidly down the web, and seizing hold of a fragment of paper by its edge with his claws, he commenced cutting away the cross lines to which it adhered, in consequence of the cross lines of the web being covered with glutinous drops, which are plainly visible with the naked eye. He cut two pieces out and let them fall, but a third piece he caught hold of by itself, without retaining his hold on the surrounding web, but previously attaching a line from his abdomen to the web. He then cut away the cross lines as before, and fell down some distance with the piece of paper. After this he returned to the middle of his web, and stayed there, either frightened by his fall—not unexpected, or he would not have prepared so carefully for it—or discouraged by the damage caused by cutting out the pieces.

The larger spider I served in the same manner as the other, but the effect was different. Although larger than his brother, his courage was smaller: for directly the fragments came into his web, he rushed in precipitate flight into his private office in the window-frame, and there remained for some time, poisoning the tips of his claws with his palpi. He cut one or two pieces away in a similar manner to the other one, but finally came to the same conclusions, and quietly left the pieces in the web.—*H. G.*

Wren's Nest.—Having seen in your number for last October some instances of curiously-placed birds' nests, perhaps you will allow me to add one to the number. One of my schoolfellows walking in Barby Wood, near Rugby, last year, found that a wren had chosen as a place for its nest the body of a crow, which, with many other birds, had been hung up by the keeper on a bar between two trees. The crow was in a perfectly dried-up state, and the wren's nest was built in its breast.—*G. Sharp.*

A Monkey's Artifice.—Every one knows that the monkey tribe in general are noted for their habitual practice of artful and dexterous artifices. A friend of mine possesses a member of the tribe, whose cunning and mischievous propensities are developed in an extraordinary degree. To make casual notes of even half of his mischievous tricks, which he practises daily, would fill a good-sized book; I shall therefore merely give a brief account of the skilful method by which he obtains food from a porcine neighbour, whose obese form inhabits the same yard, as being without an exact parallel in the annals of monkeydom. This monkey is usually secured by a chain fastened to a wall, and by going the full length of the chain across the yard, he can get within about four feet (but no farther) of his neighbour's trough, which is placed in a small shed against the opposite wall. At certain times in the day, a savoury mixture, of which barley-meal forms the chief constituent, is poured into the trough for Mr. Pig, who, of course, without reluctance, waddles up to commence what is to pigs, and, it is to be feared, some human beings, their principal enjoyment, viz., *feeding*. Mr. Pig has scarcely swallowed a mouthful, before the monkey, who has been watching the operation of filling the trough with elevated eyebrows and evident satisfaction, comes to the extreme length of his chain, and seizing the pig's curly tail, pulls it with a sharp jerk or two; the pig turns round, snaps his jaws at the monkey, and tries to bite him, and in so doing, drops some of the precious barley-meal from his mouth, which the monkey eats up, and repeats the operation until his appetite is appeased, or the pig, having emptied his trough, retires.—*E. P., Luton.*

Gyr-Falcon.—At the meeting of the Zoological Society, held on the 9th January last, a letter was read from Sir C. W. Dilke, Bart., F.Z.S., announcing the occurrence of a Gyr-Falcon (*Falco gyrfalco*) in the Holt Forest, near Farnham.

Novel Mode of Capturing a Heron.—Whilst visiting, in the autumn of 1865, at a small Northamptonshire market-town, situated intermediately in the flat district called the Nene Valley, which stretches from Northampton to Peterborough on each side of the river Nene, an incident of rather a ludicrous character, and which may interest some of your readers, came under my notice. A boy, having one night set some eel lines in a shallow part of the river, a short distance from the town, and fastened them to pegs, which he stuck over the bank among the lofty bulrushes which skirt and add such beauty to the river, was surprised and somewhat alarmed on approaching the place next morning, for the purpose of examining his lines, by hearing the water in a state of violent commotion; advancing carefully, and parting the bulrushes with his hands, he peered cautiously through into the river, and discovered to his terror, that the cause of the splashing and dashing was an unlucky heron, who had gobbled up one of the baits, and the hook sticking in his throat, he now found himself held a prisoner by the line; the boy, still frightened, warily drew up the peg, and dragging the unfortunate and reluctant bird the full length of the line in his rear, marched towards home. He experienced considerable difficulty when crossing the meadows which lay between the river and the town, in persuading the heron to get over the stiles; but at last they reached the town, and I need scarcely say that in marching up the street the pair created quite a sensation; the boy walking sideways, staring in an excited manner alternately at the people at the doors, from which the sight elicited so much merriment and laughter, and at the heron, who, averse to being drawn in such a manner from his favourite haunts, with beak wide open, screaming, as only herons know how to scream, with body drawn back, and legs planted forward in a determined manner, slid, rather than walked, after his captor. —*E. Parkins, Luton.*

The Swift (*Cypselus apus*).—By watching the swift enter the tunnel leading to its nest, the object of the oddly-formed feet is clearly ascertained. The legs are very short, but strongly made; and the toes are all furnished with strong curved claws, and directed forward, so that the bird is unable to clasp a branch with its feet. This structure enables it to scramble through its tunnel with great rapidity; and it is most interesting to see the swift wheel round in the air with a piercing cry, answered by a little complacent chirrup from its mate within the nest, then dart into the hole as if shot from a bow, closing its wings as it enters the tunnel, and then scramble away with a quick and certain gait that never fails to excite admiration.—"*Homes without Hands.*"

Bartram's Sandpiper (*Totanus Bartramii*).—On the 9th of November I obtained a beautiful specimen, which was killed within a short distance of Falmouth. It appears to have suffered but little from its lengthened migration across the Atlantic, for it was at the time of its capture, to all appearances, in perfect health and in capital condition. The bird in my possession is a faithful representative of that figured in the supplement to the late lamented William Yarrell's work on "British Birds," which I believe, was killed in Cambridgeshire many years ago, and communicated to the *Illustrated London News* by the Rev. F. Tearle, of Trinity Hall. I shall be happy to furnish any one desirous of further information on the subject with a minute description of the bird in question, or to afford any one visiting this locality an ample opportunity of examining my specimen for himself. —*W. K. Bullmore, M.D., in the "Times."*

MICROSCOPY.

Object Mounter.—Annexed is a sketch of a contrivance which I made some years ago, in consequence of having been very much annoyed by reason of objects, not quite flat nor in a cell, *purging*, or sliding away from their central position on the glass-slide, as soon as any pressure was applied to the thin glass-cover. This matter is referred to in Wood's "Common Objects of the Microscope," p. 62, and every practical microscopist has experienced the difficulty of applying the requisite pressure to the cover without *tilting* it more or less, and so driving the object towards one side or the other, and no contrivance described in the handbooks, be they American clip, wire spring, whalebone, or spring steel, appears to be of any use in preventing this frequent calamity. This contrivance of mine, however, which was made for me by a country carpenter, and cost 10*d.*, quite meets the necessities of the case, as ensuring a pressure perfectly *steady*, *parallel*, and *graduated*, the three principal desiderata in mounting. A is a solid piece of mahogany, of the size drawn; B, a small rod (or lead pencil), passing easily, but without lateral shake, through a hole in A, and having its lower end cut off perfectly flat and fitting the platform C so truly that, on holding the mounter up to the light, no interstice nor unevenness of fit may appear; D is a small hole, through which and through E an indiarubber band is passed, and so over the notch in the upper end of the rod or pencil B, which is also sometimes made much longer than in the sketch, and notched on one side as at H, so that by altering the position of, or adding an additional indiarubber band, any required pressure may be obtained. The position of the glass slide is indicated by the dotted outline.—*W. L. Sear.*

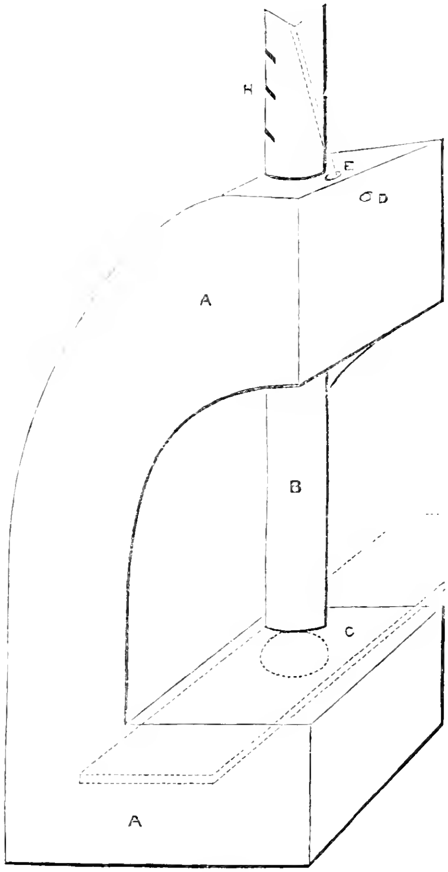


Fig. 80.

Spring Clip.—Allow me to suggest an improvement in the spring clips described by your correspondent William Goode, in last month's Gossip. It is this—that underneath the point where the centre of the glass slide would come, a hole should be drilled with a centre-bit; five-eighths of an inch in diameter would be a useful size. The advantage of this would be, that the slide could be examined whilst under pressure, and the presence of air bubbles, or the shifting of an object, detected before the balsam had set. If these holes were made to taper slightly from below upwards, light could be more easily admitted to the under surface of the slide.—*E. M.*

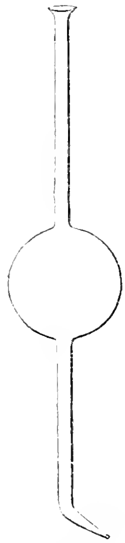


Fig. 81.

Pipette.—The figure represents a very convenient form of pipette for washing minute objects after immersion in caustic potass; it consists of a bulbous pipette tube, one end of which is drawn out in a gas flame and bent nearly at right angles, and having a very small aperture left therein, the other end being slightly *trumpeted* for convenience of holding it in the lips; if, now, the bulb be partly filled with water, a fine stream of greater or less force, as may be required, can be propelled by the breath of the operator upon any portion of an object as it is held in a forceps or on a slide; and, what is of greater importance, it leaves both his hands at liberty for any necessary manipulative process during the operation.—*W. L. Sear.*

Illuminators.—Will you allow me to point out an error in the description of "New Illuminators for High Powers" in your last number. It is said that the "principle of reflection employed in the transit instrument has been modified and brought to bear upon the microscope." If it is merely meant that internal reflection is used for a purpose in the transit instrument, it is true; but, in fact, the circumstances are different. In the transit telescope a reflector is placed at an angle of 45° with the axis of the instrument, which receives a ray of light and transmits it *to the eye-piece* for the purpose of illuminating the views, across which the passage of the star has to be noted. Further, this reflector is of *metal*, and has a hole through its centre. It is, in fact, annular or ring-shaped in form, so that it does not at all interfere with the definition of the rays passing through the object-glass. The forms of internal reflectors, applied to the microscope described in your Journal, are open to the very grave objection that, by interposing, at an angle, a refractive medium of greater or less thickness, they destroy to a certain extent the corrections of the objective. If the form employed in the transit were really used (namely, an annular reflector), far more satisfactory views would probably be obtained.—*W. Hislop.*

Miniature Aquaria.—Those fond of the microscope will find a large amount of entertainment and opportunity for study in keeping a small aquarium of salt water, made in the spring or summer. I have two,—one in a large tumbler, the other in a small glass jar. I stocked them at first from the salt ditches near Yarmouth, and put in two or three pieces of rock, with different sea-weeds growing on them, with a few small snails. As the sea water evaporates I fill up with fresh, and I am never in want of abundant interesting objects, animal, vegetable, diatomaceous, etc. In a drop I have often counted some twenty or thirty interesting objects. I keep them in a pretty good light, and sometimes run the water from one to another by means of a small glass-syphon, which only allows the water to fall in drops.—*E. T. Scott.*

Illuminator for High Power.—Since jotting down the remarks in last number, I find it possible, with a pair of Ross's "C" Kelner eye-pieces and Powell & Lealand's Illuminator, to use a $\frac{1}{12}$ with the Binocular upon the *Morpho Menelaus* satisfactorily. Sure it is that a small portion of the field is obscured; but a casual observer would certainly not find it obtrusive, and it should be borne in mind that with very high powers we must not expect any very great depth of focus, and that a mere point is all that can be reasonably expected to be sharp at one time: still, I was somewhat surprised in obtaining the results I did. One other improvement I would mention: it consists in having another stop fitted to the back of the illuminator, limiting the rays to, say, $\frac{1}{8}$ of an inch; this seems to reduce the haze considerably: indeed, I cannot help thinking that, if small back stops were fitted to the object-glasses, we should hear little about "fog;" but microscopists generally are not satisfied unless they hold the power of a large angular aperture in their hands, the same being quite under control by the use of back stops. Before concluding, it should be stated that the merit of first bringing this principle of illumination to bear upon the microscope is mainly due to Professor Smith, of Kenyon College, in America.—*J. Bockett.*

Influence of Study of Nature.—I have seen the cultivated man, craving for travel and for success in life, pent up in the drudgery of London work, and yet keeping his spirit calm, and perhaps his morals all the more righteous, by spending over his microscope evenings which would too probably have gradually been wasted at the theatre. I have seen the young London beauty, amid all the excitement and temptation of luxury and flattery, with her heart pure and her mind occupied in a boudoir full of shells and fossils, flowers and sea-weeds; keeping herself unspotted from the world, by considering the lilies of the field how they grow; and therefore it is that I hail with thankfulness every fresh book of Natural History, as a fresh boon to the young, a fresh help to those who have to educate them.—*Kingsley's "Glaucus."*

The Honey Guide is an extraordinary bird. How is it that every member of its family has learned that all men, white or black, are fond of honey? The instant the little fellow gets a glimpse of a man he hastens to greet him with the hearty invitation to come—as Mbia translated it—to a bee's hive and take some honey. He flies on in the proper direction, perches on a tree, and looks back to see if you are following him; then on to another and another, until he guides you to the spot. If you do not accept his first invitation, he follows you with pressing importunities, quite as anxious to lure the stranger to the bees' hive as other birds are to draw him away from their own nests. Except while on the march, our men were sure to accept the invitation, and manifested the same by a peculiar responsive whistle, meaning, as they said, "All right, go a-head, we are coming." The bird never deceived them, but always guided them to a hive of bees, though some had but little honey in store. Has this peculiar habit of the honey guide its origin, as the attachment of dogs, in friendship for man, or in love for the sweet pickings of the plunder left on the ground?—*Livingstone's "Zambesi."*

British Lichens.—The Rev. W. A. Leighton, F.L.S., of Shrewsbury, has yielded to the repeated solicitations of Dr. Wm. Nylander, of Paris, the *facile princeps* of European Lichenologists, and is engaged in preparing for publication a "Synopsis of British Lichens." He will feel obliged by the communications of notes of the localities of the rarer species, and for specimens or intelligence of new and undescribed lichens.

BOTANY.

HEARTSEASE, OR PANSY (*Viola tricolor.* LINN.).—"This little Western flower" Shakespeare also calls "Cupid's Flower,"—

> Yet mark'd I where the Bolt of Cupid fell,
> It fell upon a little Western flower,
> Before milk white, now purple with Love's wound,
> And maidens call it "Love in Idleness."

and Spenser "The pretty Pawncee." It has received many provincial names, such as "Three-coloured Violet," "Herb of Trinity," "Three Faces in a Hood," "Cuddle me to you," "Kitty run the Streets," "Jump up and kiss me," "Pinkeney John," "Kiss behind the Garden Wall," "Step-mother." In Italy, "Mother and Daughter." In Germany, "Je länger je leiber"—The longer the better; also, "Dayfaltig keits blume"—Three-foldenness Flower. In fact, every country in Europe has given this favourite flower a *pet* name, with the exception of Scotland. It was called "Heartsease" long ago; by that name it was given as a love token in the Court of Henry VIII. Bullein's "Bulwarke" was written in 1562, and where he alludes to this flower, he says, "some call it 'Heartsease.'" His account of it is curious: "Pansies, or Three Faces in a Hodde.—This herb is called 'Herba Trinitatis,' but I read in an old monkish Herbal, wherein the author writteth that this herb signifyethe the Holy Trinitye, and thus he made his allegorie:—'This flower is but one, in which,' said he, 'be three sundrye colours, and yet but one sweete savour. To God is three distinct persons in one undivided Trinitye, united together in one eternal glory and divine majestie, &c.' It is called 'Herba Trinitatis' because it has three colours, yet the old Pagan writers did call it 'Jupiter's Herbe,' because of the beauty of its colours." Our Pansy is obviously a corruption from the French *pensée*. Ophelia says, "There's pansies, that's for *thoughts*." In "Flowers and their Associations," see the following remarks:—"The name of *pensée* is retained in France, and to the French this flower conveys a far different meaning than that which it conveys to us. Its familiar name of Heartsease renders it a pleasing emblem; to our neighbours, its name of *Thought* presents a sad one. 'May they be far from thee' is a motto affixed to the little painted group of *Pensée* flowers mingled with Marygolds (*Souci*) sometimes given as an offering to friends by a French lady." Agnes Strickland relates that Francis I. brought into fashion an enigmatical allusion to the Pansy. In Hall's account of the Field of the Cloth of Gold, the French king and his band were appareled in purple satin branched with gold and purple velvet embroidered with "Friers' knotts, and in every knott were pansy flowers, which together signified 'Think on Francis.'" Walpole says, the Heartsease grows profusely on the plains round Mount Lebanon; why did he not add the name there given to it?—*S. C.*

THE APRICOT-TREE was first brought to England from Italy, in the year 1524, by Woolf, gardener of Henry VIII., who, it appears, introduced several valuable fruits about the same period.—*Gough's British Topography.*

THE HORSE-CHESTNUT was first brought from the northern parts of Asia into Europe, about the year 1550, according to Martin's edition of "Miller," and was sent to Vienna about the year 1558; but of this statement we are doubtful, as it was certainly not introduced into French Flanders before the year 1576, when C. Clusius, a celebrated botanist of Arras, received it from the Imperial Ambassador at the Porte, together with a considerable variety of trees new to Europe; but the horse-chestnut and the cherry-laurel were the only two he succeeded in rearing.—*Phillips's Fruits of Great Britain.*

IODINE AS A RE-AGENT.—The Rev. W. A. Leighton calls our attention to an error in our last (p. 42), in which, instead of six ounces of distilled water, the quantity should have been stated as half an ounce. We copied the error from the same source as the communication.

LINNÆUS' SYSTEM.—It is stated that the Academy of Sciences at Stockholm are about to publish a photo-lithographic fac-simile of the first edition of Linnæus' "Systema Naturæ."

CURIOUS GROWTH OF AN OAK.—At the village of Soothill, about seven miles from Leeds, there now stands an old oak, which is quite a curiosity in the surrounding district, on account of the fantastic manner in which two of the boughs have grown together; thus, the lower bough is perforated by the upper, which projects through it at least a foot, and as they both have their point of bifurcation at the same place, and the topmost branch is in the form of a bow, the result of this conformation is the figure of a harp, with only one string, which is called by the country people "David's Harp." Can any correspondent inform me whether any such peculiar manner of growth has been noticed in other parts of the country, and by what means one thick branch should be able to grow through the centre of another?—*H. A. A.*

BOTANICAL CONGRESS.—An International Horticultural Exhibition and Botanical Congress is announced to be held in London, in May, 1866. The Congress will be restricted to two morning meetings, when papers, previously printed and accompanied by translations, will be read and discussed. The chair will be taken by M. Alphonse de Candolle, who will deliver an opening address. Dr. Berthold Seemann is honorary secretary to the Congress, to whom any communications should be addressed.

GEOLOGY.

Limited Atmospheric Denudation in the Chalk Districts.—The influence of rain in the chalk as well as oolitic districts of England must be very considerable. But it acts more as a solvent than as a transporting agent. The matter dissolved is re-deposited. It becomes covered with grass, and not one-hundredth part of it ever finds its way beyond the nearest valley or depression. That rain has not altered the general contour of the chalk districts since their rise above the sea, can be proved by the fact that thousands of raised beaches, many of them only a few feet in height, may be found in Wiltshire, Dorset, and other counties. These beaches generally conform in inclination to the surface of the neighbouring ground. In valleys they often descend very near to the bottom, thus proving that these valleys have not been excavated since the beaches were formed. One of the most remarkable assemblages of these terraces may be seen undulating along the side of a valley to the east of Mere. On the south-eastern escarpment of the vale of Blackmore, they may be seen curving round headlands in successive tiers. *These terraces are so intimately associated with the valleys, combes, and escarpments, as to render it evident that all have had a common origin.—D. Mackintosh, in Geol. Mag.*

Eozoon Canadense.—Professor King and Dr. Rowney communicated a paper on this subject to the Geological Society, on the 10th of January last. Taking the Grenville Rock as its type, "Eozoönal Serpentine" was defined by the authors to consist essentially of variously-formed granules of chrysotile, or some other allied mineral imbedded in, or intermixed with, calcite. Although differing from the type in some respects, the varieties of serpentine which they have examined from Connemara, Donegal, the Isle of Skye, India, Bavaria, and the state of Delaware, are considered as belonging to the same section. The serpentine from Cornwall, the Isle of Anglesea, and Saxony, which appears to be devoid of "Eozoönal" structure, they were disposed to look upon, but with considerable doubt, as an eruptive rock. The authors stated their conviction that every one of the presumed organic structures of "Eozoönal" serpentine is purely and primarily, mineral or crystalline. The skeleton they hold to be identical with the calcareous matrix of certain minerals, notably chondodrite, pargasite, &c. They adduced various considerations and evidence to show that the "proper wall" cannot have resulted from pseudopodial tubulation; and instead of being an independent structure, in their opinion, it is no more than the surface-portion of the granules of chrysotile, crystallized into an asbestiform layer. The dendritic and other forms, considered to represent the "canal system," were shown to be tufts of metaxite, or some other allied variety of chrysotile; while the resemblance they bear to some which are common in crystalline limestones, also their identity to the imbedded crystallizations of native silver, moss agates, &c., and the total dissimilarity between them and the foraminiferal structures with which they have been homologued, are points which the authors held to be conclusively fatal to the view which contends for such forms being of organic origin; in their opinion, they are no more than imbedded "imitative" crystallizations. What have been taken for "Stolons," they were convinced, are for the most part, crystals of Pyrosclerite. The "chamber casts" were considered to be identically represented among both minerals and rocks—in the former by the grains of chondodrite, pyrallolite, pargasite, &c., and the latter by the segmented kernels of native copper, zeolites, &c., in eruptive rocks; also by the remarkable botryodal and other shapes which occur in the Permian limestone of Durham. The authors concluded by offering it as their opinion that "Eozoönal" serpentine is a metamorphic rock; and they throw out the suggestion that it may in many cases have also undergone a pseudo-morphic change; that is, it may have been converted from a gneissoid calcareous diorite by chemical introductions or eliminations.—*The Reader.*

Lake Deposits.—For the purpose of obtaining information relative to the Great Irish Elk, or *Megaceros Hibernicus*, I have visited several localities where remains have been found; and although it is commonly believed that the bones, &c., are found in the *peat*, as they are reported to have been found in the *bog*, I have ascertained that this is not the case, upon inquiry and a close investigation into every instance that came under my own observation. I find that the remains of the megaceros are not found in the *peat*, but in the deposit *below* the peat. The nature of this lower deposit of course varies with the localities, and may contain either gravel, clay, shell-marl, or diatomaceous earth. As yet, I have not found the remains in either of the first-named deposits; but I have known of several instances of this occurrence in the shell-marl and diatomaceous earth. The nature of the shell-marl is probably well known to the readers of Science Gossip. It contains a great quantity of beautifully-preserved shells, such as *Paludina, Limnæa, Planorbis*, &c., all having lost their natural colour, and are now of a chalky white. The diatomaceous earth I have collected from several different localities, and some of the deposits, are very rich in diatoms: when prepared and mounted, they form very valuable slides for the microscope. Should any of the readers of Science Gossip require a specimen of the shell-marl, or the diatomaceous earth, I shall be most happy to supply all applicants who send me the postage, or, what would be better still, a specimen of diatomaceous deposits from other localities.—*W. Gray, Mount Charles, Belfast.*

NOTES AND QUERIES.

Growing Ferns from Spores.—The Scaly Spleenwort (*Ceterach officinarum*) ought to grow well at Hastings. It likes a mild climate. I found several fine specimens of this fern at Hidevelly, in South Wales, a few years ago, growing on the walls of the old castle. Fern-seeds retain their germinating power for a long period. I have heard of some which produced strong, healthy plants after having been kept *ten* years on fronds preserved in an herbarium; therefore, I am inclined to think your correspondent, Mr. Daydon Jackson, will succeed in raising the ceterach from spores if he is careful in drying the fronds sufficiently to *ripen* the seeds. April will be the best time for sowing. Get a shallow pan, with a bell-glass to fit it; see that the drainage is good, fill the pan with sandy heath mould (a *little* lime rubbish thoroughly mixed with the mould will improve it), and then put some well-burnt cinders and *very* small pieces of broken bricks on the surface, sprinkle the seeds over the whole, and cover with the glass. Some persons place moss round the rim of the glass, to keep in the moisture; I believe it is a good plan, and water, when given, should always be poured on this moss. The little ferns will make their appearance in a short time, the stones and soil will become covered with green scales, and little tiny ferns will spring up. Great care must be taken in potting off these small specimens: every stone that has a fern on it should be lifted out, fern and all, and placed in a rose-pot in proper soil. These pots must be put in a cool frame for a few weeks, in order to harden the ferns before they are placed in the open air. I have, in a previous note on ferns, alluded to the good effect produced by baking all the soil used in the cultivation of ferns from spores. It destroys the germ of any weeds or fungi that may be in it.—*Helen E. Watney.*

Tealia Crassicornis.—I cannot succeed in keeping this anemone, nor can I find any one who has succeeded in doing so. I should be glad of any hints which might assist me.—*K. D.*

Ailanticulture.—Fertile eggs of *Bombyx Cynthia*, the new silkworm, may be obtained at one shilling per score, of Dr. Wallace, Colchester, Essex, during and after May. The plants on which they feed (*Ailanthus glandulosa*) may be had of Mr. Caut, Nurseryman, St. John Street, Colchester. English-bred moths are supplied at 513, New Oxford Street, from sixpence each.

Aquaria Animals.—Mr. W. A. Lloyd would be glad to place himself in communication with any one willing to supply living aquarium animals, for which liberal terms can be offered. Payment and delivery to be made near London. Address, in the first instance, Zoological Gardens, Hamburg, North Germany.

Naturalists' Club for North London.—It is proposed to form a club for the pursuit of Natural History Studies among gentlemen resident in the north of London. Any such who feel interested in the movement may communicate with *W. H. Groser*, 19, *Claremont Square, N.*

Ancient Toads and Frogs.—The evidence of such occurrences generally dwindles away, on searching inquiry, into some "cock and a bull" story, and this is why the reports receive little attention. But M. Gosse, in his "Romance of Natural History," enumerates certain extraordinary facts, supported by trustworthy evidence (Dean Buckland's experiments), which show that any one who will unravel the mystery and settle the question — "Is it a fact?" will do service.—*S. J. M.*

Skipjack.—What is the scientific name of the fish known to sailors as the "skipjack?"—*H. G.*

Cutting Glass Cells.—How shall I best succeed in cutting glass tubes into cells?—*W. W. S.*

Purple-winged Sultana.—What bird is alluded to as a "purple-winged Sultana," in Moore's "Lalla Rookh,"—"Paradise and the Peri"?—*H. G.*

Triceratium Favus.—Your correspondent is quite correct in supposing that *Triceratium favus* is found in the Thames; but, since it is a marine form, he ought scarcely to expect to find it where he seems to have been looking for it. If he will get a quantity of sand from the neighbourhood of Sheerness, about the middle of the estuary, dry it well, and then float as if for Foraminifera, he will obtain a mixture of shells, forams, &c., in which there will be *Triceratium favus*, *Eupodiscus Argus*, and other diatoms. In order to obtain these comparatively clean, he will have to boil in acids and wash as his ingenuity may suggest. A few pounds of sand will yield enough for many slides. I have this year found *Triceratium* in sand as far north as Yarmouth, but not in great quantities; southward I have not examined. I have seen this diatom in sand from the Ribble, quite on the opposite coast to the Thames, and I doubt not it is to be found in many of our larger estuaries.—*D.*

Trichina spiralis.—Will the salting or smoking of pork for the purpose of curing it, as in the case of hams, bacon, &c., kill the *trichina*, or not? If it lives through this process, would its presence be shown in such dried meat after some months' keeping, by any signs easily visible, such as vacancies or discolourations?—*P. V.*

Quick smoking (two or three weeks) does *not* kill them; slow smoking (three or four months) does kill them. Salting for five or seven days does *not* kill them; salting for twenty-one days does. In order to be sure about the presence of *trichina*, you must always use the microscope.—*Tilbury Fox, M.D.*

"Bois immortel."—Which species of *Erythrina* is known to the inhabitants of Demerara as the "bois immortel"?—*H. G.*

Stinging Power of Sea-Anemones.—A few years ago a lady friend of mine got up an aquarium (as aquariums were all the fashion here then), in which she had a very good collection of sea-anemones. One evening, noticing that the water had evaporated a good deal, she wished to know if what was in the tank was too salt, so she touched her tongue to the water; it was dusk at the time, and just in the spot where she put her tongue, there was sticking to the glass a fine specimen of the Opelet (*Anthea cereus*); it instantly seized her tongue and lips with its tentacula. She did not mind it much at the time, but by degrees her mouth, throat, and jaws became swollen, and gave her great pain. She sent for the doctor, fearing she was getting lock-jaw: he used some common remedies, but it was ate that night before she got relief.—*W. S. Green.*

Atlantic Ooze.—I have been fortunate enough to have presented to me two gatherings of ooze, or mud, from the depths of the Atlantic; one portion is from soundings taken on board of H.M.S. *Porcupine*, on the 7th July, 1862, in lat. 52° 40′ N., long. 12° 35′ W., in 290 fathoms of water, and the other is a part of the mud which came up on the grappling-irons of the *Great Eastern* when search was being made for the lost Atlantic cable, on 11th August, 1865, lat. 51° 25′ 15″ N., long. 38° 59′ W., in 2,100 fathoms water. Each of these gatherings contains similar microscopic forms, the leading specimens being complete shells of foraminiferæ, fragments of *Polycystinæ*, very minute fragments of *Diatomaceæ*, and a considerable portion of pretty silicious-looking inorganic particles. It appears to me, judging from the fact that entire forms of diatomaceous frustules are not found in the deeper gathering, that the extreme depths of the ocean are probably not the natural habitats of *diatomaceæ*, and that they are of *foraminiferæ*, as entire shells of *foraminiferæ* present themselves in the mud in considerable numbers; and although I have examined several slides of my own mounting, I have not yet met with a single complete diatomaceous frustule. I have in possession sufficient material to enable me to prepare several scores of slides of Atlantic ooze from the depths and localities enumerated, and shall be glad to exchange them for rare forms of marine or fresh-water diatoms, especially marine shore gathering, as I am at present engaged in preparing an illustrative catalogue of British marine forms.—*T. B. Barkas, Newcastle-on-Tyne.*

Impressions of Leaves.—In reply to S. J. B., who wishes to know how to take clear impressions of leaves with printing-ink:—first, carefully ink the surface of a piece of tolerably soft paper—say printing in preference to writing paper; lay the leaf upon this, face downwards, and take an even im pression. This inks the surface of the leaf, which can then be carefully laid upon the card or paper which is to receive the impression, and printed. Take care that the leaf is not wet; if it is, it won't "take" the ink. If there is a thick stalk, pare it down from the back with a penknife. Prepare the cards for printing by placing them between *damp* sheets of paper, and don't crush the leaf by too much pressure. I enclose two or three impressions, taken a year or two back.—*John T. Young.*

P.S.—A very handsome result is obtained by taking an exceedingly faint print, and carefully colouring it afterwards.

In answer to S. J. B., I beg to say that I have found the following plan to answer very well for taking impressions of leaves, &c., with printer's ink: I make myself two pads by tacking soft leather on two small pieces of board, say four inches square, and stuffing the inside with cotton; on these pads I put a little ink, rubbing the two well together to get it equally over all parts of the pads; I then place the leaves between the pads, pressing them lightly, so as not to injure the leaves; I then remove them carefully, and place them between a sheet of clean note-paper, placing it then in any large book, and put a few more books upon the top and let them remain for a few minutes, when I generally find I have a *clear* impression of both sides of the leaves.—*John Chester.*

Your correspondent S. J. B. asks for directions to take clear impressions of leaves with printing ink. I have no recipes for taking impressions of leaves in *printing ink*, but perhaps the following may serve S. J. B.'s purpose quite as well. I am sorry I cannot speak from experience as to the value of any of the methods. 1. Take clean note-paper, rather thick, and oil it well with sweet oil; after it has stood till the oil has soaked through, rub off the superfluous oil with a piece of paper, and hang it in the air to dry. After the oil is well dried in, take a lighted candle, and move the paper over it, so as to touch the flame, till it is perfectly black. When you wish to take off impressions of plants, lay your plants carefully on the oiled paper, and lay a piece of clean paper over it, and rub with your finger equally in all parts for about a minute; then take up your plant, taking care not to disturb the order of the leaves, and place it on the book or piece of paper on which you wish to take the impression; then cover it with a piece of blotting-paper, and rub it with your finger for a short time, and you will have an impression superior to the finest engraving. The impressions may afterwards be coloured according to nature. (The above is copied from *Young England*, vol. i., p. 188.) 2. Over common writing-paper spread with a brush 20 grains of bichromate of potash, 10 grains of sulphate of copper, 1 oz. distilled water. Let the paper dry, then place your leaf on the prepared side; place a piece of plate glass over it, and expose to the sun. In about half an hour a faint copy will be produced in yellow, this must be washed over with a solution of 20 grains nitrate of silver, 1 oz. distilled water; fix by washing in pure water. 3. Make a dabber of cotton wool, tied tightly in fine soft muslin, and with a little oil colour (sap green or burnt sienna) dab the leaf all over on both sides, being careful to leave no part untouched; then place it on one side of an open sheet of writing-paper, securing it in the position you wish by a stitch or two with very fine cotton; close the paper, and holding it firmly on the table with one hand, rub it all over repeatedly and evenly with a clean dabber. Open the paper and remove the fern, and you will find it indelibly printed.—*T. Frank Wright.*

We have also received similar communications from A. F. W. B., E. T. S., J. Chuter, J. F. Young, and T. F. Wright, who are respectively thanked for the same, although we cannot avail ourselves of them, as the above will probably serve our correspondent's purpose.—*Ed.*

Bees.—I fancy that the Great Mantuan Bee-Master's Fourth Georgic does not contain much of what Apiarians in the present day would term "reliable matter;" but I am able to inform "M. G. W." that house-sparrows do indulge in a breakfast of bees occasionally. They will watch the hive, and carry off an industrious member or two, as an especial treat for their young family. Therefore, all nests in the vicinity of an apiary ought to be destroyed. *Swallows*, the king-bird, and martins, are dreaded by bee-keepers in America, on account of their weakness for bees; and as to that vexed question, the *age* of bees, why, Huber himself (though he mentions a royal acquaintance of two years' duration) never answered it. Lord Bacon, I believe, said that he heard of a bee living seven years.—*Helen E. Watney.*

Virgil on Bees.—Some years ago, the statements in the Fourth Georgic drew my attention to some of the queries proposed by M. G. W., in the February number of Science Gossip. I have been a bee-master for some six years; and as the overhanging roof of my vicarage affords ample shelter for house-martins and swallows, I have had a limited opportunity of observing more particularly the conduct of the bird towards the insect. Assuming that "procne" is used in the limited sense of "*swallow*," as known at the present day, and that it does not refer to some other bird of wheeling flight and bloodstained plumage, I am led to conclude that this bird does not feed upon bees. At all events, I have given special attention to this very point, and not a single probable instance has come within my personal knowledge. It is worthy of note, however, that the Rev. J. G. Wood points out, as a remarkable fact in Natural History, that the swallow (*Hirundo rustica*) devours the *stingless* bees, whilst it allows the others to go unharmed; and he thinks this fact may possibly be a proof of the instructive knowledge of the bird. If this be true, it would lead us to qualify, at least, the poet's words. Whilst, however, one should be mindful of the difficulty of observing correctly, and of the weight of such authorities, I should be disposed to question both statements, or, at all events, to require evidence in support of them. *Honey*-bees, I should say, never carry "lapillos" in high winds; but there are other species, it is well known, which build nests with stones and other hard materials, and which, while carrying them for this purpose, were probably mistaken for the honey-bee. The statement of the writer in the *Encyclopædia Britannica*, who says, that the "*bee seldom dies a natural death*" must be received with caution. Judging from analogy, the limitation of life is highly probable; for whilst it may be conceived that no individual insect of any species lives a month longer than the others of the same species, one can hardly suppose an exception in the case of the bee. Of one of my own hives, it may be said *septima ducitur æstas;* and though I believe that some of the very individuals which occupied it more than six years ago still form part of the population, there are, nevertheless, strong proofs of the truth of the poet's words, and that the first generation is rapidly passing away as its seventh summer approaches. The subjects of the other queries have not come within the limit of my experience and observation.—*Ben. Snow, Burton Vicarage, Sleaford.*

Feeding the Bees.—I usually give my bees a little food in February, if the weather is mild enough for them to take it in, which is not generally the case before the last week in the month. Before doing so, I ascertain the weight of each stock, and any hive that does not contain 10 lbs., I give them sufficient food to make them up that weight. I consider a little food to those stocks that are of the above weight, or heavier, is an advantage to them in the early spring months. After feeding, I stop up all ventilation, and keep them as warm as I can. Last year we had a deal of snow in February, and the small birds were very destructive to the poor bees. As soon as I was aware of the ravages they were making, I closed up all the entrances to the hives, and kept them so as long as the snow continued. The Tom Tits were the most audacious, and even succeeded in unstopping several hives, and, no doubt, had a rich feast. On sunny days, when the snow is on the ground, unless the bees are stopped in, very many will perish by venturing out.—*P. P.*

Plaster Casts.—First, the plaster should be new and kept from the air, and "*superfine*." There are two methods of mixing it. One is to put sufficient into a basin, cover it with water, let the air-bubbles ascend, pour off the excess of fluid, and then stir the remainder, which is then to be poured on the mould. The other plan I prefer:—add sufficient water, to the dry plaster, continually stirring, until it is of the consistence of thick cream. The "mould," or object of which a "cast" is to be made, must be oiled with a camel's-hair pencil, and worked *well* into the fine lines, &c., the superfluity wiped off with cotton wool. Here care and judgment are required—too much oil left on will choke up fine lines; on the other hand, if the mould is wiped *dry*, the plaster will adhere to those parts, and will very likely be left behind when the cast is removed. Surround the object with a cardboard rim, oiled, pour on the plaster gently, work the plaster into depressions with a small brush, tap the mould gently on the table, to urge the plaster into depressions, and bring the air-bubbles to the surface. Put by for an hour or so; it will "set" in a few minutes if the plaster is good, but must not be removed until it is quite hard. Thus far I have described the process; there is much to be learnt, but experience teaches. When any difficulty arises with any particular object, I will gladly explain it away. I could have said much more, but he will learn as he goes on. He should try a flat surface first; say a half-crown or medal.—*H. J. B.*

Sparrows Roosting.—Is there anything remarkable in sparrows roosting? I ask the question, because Mr. Tate mentions the circumstance in Science Gossip; and I am able to confirm his account, having seen them roost in England and Wales, though I did not at the time think it extraordinary. There used to be a long walk, shaded on one side by trees, leading from the house to the dairy, and these trees (sycamore) were the nightly roosting-place of a number of sparrows. The cook, in going to fetch cream after dark with a lighted candle, always caused a great commotion among them; and I remember how pleased I used to be, if I accompanied her, at witnessing the flutter. Here, at Hambledon, there is a large old holly-tree close to my bedroom window, where all the house-sparrows congregate; and a precious noise they make of an evening before settling themselves to their satisfaction.—*H. E. Watney.*

Chirping Beetles.—When collecting aquatic insects for microscopical purposes, I have often caught a small beetle, the popular name of which I was told is the *screech beetle*, and always knew by its chirp, long before I found it in the net, that it was there. It is a small insect, about half an inch in length, very active, and merry enough in an aquarium, where it may often be heard if alarmed by a fish, or touched by a stick. I think it is predatory, but do not know its scientific name. The elytra, when soaked in potash, and mounted in balsam, are very beautiful polariscope objects. Kirby & Spence treat the fact of beetles making noises as a common occurrence.—*S. J. M.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. No notice whatever can be taken of communications which do not contain the name and address of the writer, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement indicated in diameters (thus—X 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. Address No. 192, Piccadilly, London, W.

A. B. M.—"Atlas of British Seaweeds," price three guineas, published by Reeve & Co., Henrietta Street, Covent Garden.

J. B. H.—M. P.—Forwarded to the Publisher, for whom they were designed.

Circulating Cabinet.—Any microscopist in the neighbourhood of Manchester wishing to join should communicate with Mr. T. Armstrong, Deansgate, Manchester.

W. B. (Hadleigh).—See our notice respecting assumed names, &c. "The Cream of Scientific Knowledge" is published by Tegg, price three shillings. The "Year Book of Facts" is published annually.

Bats.—Several correspondents have called our attention to the fact of bats being seen on the wing during January and February this year.

J. E. T.—The cheapest book is Stark's "British Mosses," published by Routledge; but it does not include all the British species.

E. C. J.—Tate's "British Slugs and Snails," is published by Robert Hardwicke, 192, Piccadilly, London.

A. D. M.—You had better communicate with the Secretary of the Society of Amateur Botanists, 192, Piccadilly.

C. A. J.—Any number of instances of small tortoise-shell butterflies during the present winter.

I. M.—We really cannot furnish you with any reference to directions for constructing a shell cabinet.

J. S. M.—Your conferva appears to be *Cladophora glomerata.*

G. J. P.—The larva of a beetle, probably. If you catch one and rear it, then send us the beetle, perhaps we could tell you the name.

G. S. B.—We have advisedly discontinued giving notices of Field Clubs. When we inserted them, very few local secretaries availed themselves of the opportunity; and now we think that we can supply matter of more general interest to our readers. At least, we hope so.

J. C. and S. J. M.—With thanks. We think that one answer will satisfy our querist; and space is precious.

J. W. R.—Yes. It is red when in fruit.

G. E. B.—Your specimen is *Nostoc commune.—Vauch.*

F. R. S.—Your plants were not numbered; but, according to the order in which they were placed,—No. 2, *Anacharis alsinastrum;* No. 3, *Callitriche autumnalis;* No. 4, *Ranunculus aquatilis*—No. 1 not in a condition to be correctly determined.—*W. C.*

G. E. A.—Most probably you can obtain Theine of Mr. Squire, operative chemist, Oxford Street, London.

A Constant Reader.—We regret to have occasion again to call attention to the announcement, so often made, that we can take no notice whatever of anonymous communications.

E. S.—It is imposible to identify a fern from a rough sketch, without any details of fructification.

J. H., E. A.—Unavoidably postponed for want of space. Will appear in No. 16.

A. F. (Roundhay).—Not uncommon for *Vorticellæ* to attach themselves to *Cyclops*, which the latter strive to rid themselves of in vain. We have often observed it.—*T. K.*

M. P.—*Chlorococcum* and *Diatomaceæ* are Algæ, though belonging to different sections.

H. G. G.—Your flower belongs to *Aronicum scorpioides.*

A. R.—We have not yet been able to obtain a satisfactory explanation of the dendritic spots on paper.

L. N. R.—See Tate's "British Slugs and Snails," pp. 90-91. We do not remember such a list as you desire.

Y. Y.—Beyond our province.

E. B.—We have met with no one able to identify the *Rotifer* from your sketch.

R. B.—Such monstrosities in roses are common.

EXCHANGES.

Foraminiferous Sand.—Address A. T., 52, Bury New Road, Manchester.

Foreign Marine Shells offered in exchange for land or freshwater species.—E. C. J., Eldon Villa, Redland, Bristol.

Fossil Ferns for other fossils.—R. J. J., Howard House, Harrow-on-the-Hill.

Diatomaceous Earth from Algiers and Barbadoes.—J. W. Leakey, 3, Prince of Wales's Avenue, Malden-road, Haverstock-hill.

Buffalo Horn (sections) for objects of interest.—W. H. R., Post Office, Aberdeen.

Chlorops *tarsata* and its parasite.—Discipulus, School House, Mulbarton, Norwich.

Echinus Spines wanted in exchange.—T. H. M., 78, Week-street, Maidstone.

Communications Received.—M. H. P.—S. S.—H. G.—R. G.—J. C.—B. B. B.—T. P. B.—W. J. K.—T. K. M.—W. H. G.—G. F. S.—J. E. T.—J. A.—S. J. M. I.—S. W.—H. E. W.—K. D.—A. M.—J. C. (Uleeby).—I. M.—C. A. J.—B. S.—A. F. W. B.—J. M. H.—W. L. S.—E. C. J.—D.—G. S. B.—E. T. S.—W. S. G.—M. P.—J. B. H.—W. G.—G. T. P.—J. W. L.—J. S.—C. N.—J. W. R.—H. A. A.—G. W. G.—E. P. (Luton).—W. N.—J. S. (West Cramlington).—J. R.—R. G. M.—H. H.—J. B.—T. F. W.—E. J. S. C.—J. E. T.—P. P.—G. S.—J. F. Y.—J. A.—W. A. L.—W. H.—A. J. N. M.—W. F. P.—R. B.—Y. Y.—P. S. B.—G. E. Q.—W. R. T.—H. J. B.—F. W.—L. N. R.—C. D.—A. B. M.—E. M.—A. T.—B.—J. S. M.—M. P.—L. N.—J. H.—E. L.—P. V.—E. A. (Norwich).—R. S.—T. W. W.—R. E. D.—J. B. (Langhorne).—G. H.

Local Names.—A. M.—R. E. D.

BOOKS RECEIVED.

"The Popular Magazine of Anthropology." January, 1866. London, Trübner & Co.

"A Plain and Easy Account of the British Slugs and Snails." By Ralph Tate, F.G.S., &c. London, Robert Hardwicke.

A THING OF BEAUTY.

"A thing of beauty is a joy for ever."—KEATS.

AYE! and before winter has quite passed away, we repeat the line, so oft repeated, that it would long since have been worn threadbare, had it not recorded a *truth* which never grows old, and thus proves its own veracity. It has been said, that if one should repeat ever such an absurdity to a man every morning before breakfast, he would come to believe in it at last. Yet there is no absurdity in the creed, that the beautiful is a never-failing source of pleasure, which Keats has told in a line as terse and beautiful as the sentiment it conveys, whilst many act as though they believed it not. Inquire of your own heart what is its greatest joy, what gives it the most unmistakable thrill of pleasure, what vibrates most deeply to its core, and it will be confessed that the power dwells in some small deed or thought which verifies the maxim, that "a thing of beauty is a joy for ever."

If in some deed done or accepted, in some kind word heard or spoken, the power is felt, or the echo recognized, through the long vista of years, how much more is the mind affected through the medium of the eye with the influences of beauty. It matters not that taste varies, and that the standard is not one of weight and measure; to him who recognizes beauty it becomes the joy which is unknown to those who fail to see or appreciate it. We will but advert to the scenes of boyhood, or even of maturity, that have left their impress photographed upon the memory, though not revisited since—scenes which are always recalled with delight, and associated with friendships and affections, not unmingled, perhaps, with a sigh; yet deeper than that lurks the truism, that "a thing of beauty is a joy for ever."

The song of the nightingale, the lark, and the linnet, has doubtless been the same for thousands of years.

> The swan that on St. Mary's lake
> Floats double,—swan and shadow,

glides as gracefully as on the rivers that ran through the garden of Eden. The wagtail bobbing about the puddle by the road-side still jerks his caudal appendage as vigorously as of yore. The swallow skims the surface of the brook, or sails mid-air with the same fairy-like motion as when Solomon ruled and Homer sang. Yet these have all the same charm for the lover of Nature now as they had thousands of years ago. Whether in the poetry of motion or melody, the influence is unimpaired, and prince or peasant still pauses at the sight or sound, and acknowledges by silence that "a thing of beauty is a joy for ever."

If we descend in the scale of existence, and recall to mind the notable things of insect life, those only which are known to every schoolboy need be cited on our behalf. The peacock butterfly, with his gorgeous wings expanded in the sun; the more modestly-tinted fritillaries, or the little "chalk blue," are beauties which the untutored mind recognizes, and the uncouth boor admires; dragonflies with their gauzy wings, and beetles with their drowsy hum; those favourites of childhood, the ladybird and the grasshopper; the spider, imitating in tints the flower in which it conceals itself; the lace-wing, iridescent in the sun-light; the myriads of ephemera that flit like phantoms into the dusk;—these are all eloquent preachers from the same text:—"A thing of beauty is a joy for ever."

When Mungo Park gathered his little tuft of moss in Africa, far away from home and friends; when a "roving Englishman" in America clapped his hands with delight to see a daisy cherished in a conservatory; when Dr. Hooker in India welcomed the shepherd's purse;—it was the association of these plants with British soil and home affections that caused the thrill of delight. But, if not so much in these, yet in many others, there are beauties which linger about the tender petals, and which communicate sensations of pleasure to those who gaze upon them. Whence comes the love for flowers if not from the pleasure of looking at them and inhaling their odours? The poor city weaver, with his primrose in a broken teapot, cherishes it as he would a sickly child, and loves it because it babbles to him of green fields, and because of its own green leaves, and modest flowers, and sweet odours. There may be some who find a joy in gazing on birds, or butterflies, or beetles, but far more universal than all is the love for flowers. The little blue forget-me-not, the scarlet pimpernel, the yellow buttercup, the fairy-like harebell, the silver stitchwort, the golden tormentil, the fragrant woodruff, the purple loosestrife, the virgin lily,—"They toil not, neither do they spin, yet Solomon in all his glory was not arrayed like one of these." Whether the wanderer passes through woodland or over moor, scrambles along the mountain side, or saunters by the brook in the valley, at every step he will encounter some floral apostle, that even when brushed aside or trodden upon, will whisper to his listless ear,—"A thing of beauty is a joy for ever."

There is another world of beauty as yet but half revealed. It is a paradise to which man has but lately possessed the key, and into which thousands have never yet glanced an eye. If the visible world has such beauties which enchant the unaided eye and entrance the senses, how much more is there which had never entered into the mind of man to conceive, in that invisible region to which the eye alone could never penetrate, but which the microscope has revealed. The thousand forms of delicate tracery on the frustules of Diatoms, the elegant variety of garniture in Desmids, the mysteries and marvels of insect structure,—feet, antennæ, scales: everywhere, everything—even a drop of stagnant water, re-echo the truism which trembles in every leaf, and nestles in every flower, that "a thing of beauty is a joy for ever."

If we would derive from such sources all the wealth of pleasure which they are capable of yielding, we must be content to relinquish our own individuality, to forget all that relates to "self," and become absorbed into Nature as part of her, to pursue the investigation of her riches without a feeling of cupidity, to catch her spirit, to inquire of her concerning the hidden mysteries of life, not out of mere curiosity, but as a means of understanding her better, and then we shall find ourselves meekly and submissively receiving the lessons which she has to impart, gathering her riches, and bending in homage beneath the hand of Him

That sets a sun amidst the firmament,
Or moulds a dewdrop, and lights up its gem.

AQUARIUM HISTORY.

THE early editions of Mr. N. B. Ward's book on the growth of (terrestrial) plants in closely-glazed cases, contain a supplement treating on aquarium matters; and it is there stated that in a work on the Microscope and Microscopic Objects, written and published in German by Martin Frobenius Ledermüller, a hundred years ago, there is a representation of an aquarium with plants and animals in it, and with the vegetation shown in the act of developing visible bubbles of oxygen under the stimulus of light, the animals being thereby maintained in a state of health. I am obliged to quote from memory, as I cannot procure an early edition of Mr. Ward's book, and later editions do not contain the supplement in question; but I believe I am substantially correct in thus reproducing the statement. However, there is nothing of the kind named or hinted at in Ledermüller's work, a copy of which, in three volumes, quarto, dated 1760-61-62, is now before me.

The representation alluded to is no doubt the one contained in plate 87, vol. ii., and described at length in pages 170 to 174 of the same volume. The vase-shaped glass vessel is shown about three inches high, being about one-third of its real size; it is half full of clear water, with some plants of *Equisetum* (Water Horse-tail); some *Lemna* (Duck-weed); and some fresh-water Polyzoa—most likely *Alcyonella stagnorum*,—with their tentacles expanded. The whole thing looks marvellously like a small aquarium of our day, and it is made to seem still more so from the plate being coloured; but the text does not give one word, nor yet anything which may be construed into the most remote implication that Ledermüller knew anything about making the plants do the service of maintaining the water in a respirable state for the animals. Indeed, it is distinctly stated that the plants were introduced for the sake of the animals found upon them. And on looking at the plate with care, it may be observed that certain small, round, and other shaped bodies are not air-bubbles, but minute plants and animals, which a hand above the vase is dipping out by means of a glass tube immersed in the water. The same volume contains plate 67 (described at pages 129 to 132), and this plate contains a coloured picture of a cylindrical glass jar, nearly full of water containing some Duck-weed (*Lemna*) and some living Hydras (*Hydra viridis* most probably); but neither in the plate nor in the text can anything be discovered leading to the supposition that the plants were put into the jar for any other purpose than because the Hydras were attached to them. If it had been known that the water could have been preserved clear and unchanged by the chemical action of the vegetation, such a fact would most certainly have been told as one of great interest. Neither is any mention made of the reciprocating influence of plants and animals upon each other (*much less of the principle being turned to practical account in vessels containing creatures and plants*) in Trembley's elaborate work in French on the Hydra, published at the Hague in quarto, in 1744, and which book Ledermüller quotes.

I may be excused for remarking, incidentally, that to me, here, in Hamburg, surrounded with every known aquarium improvement and luxury, there is produced by contrast a very curious feeling on looking at some of Trembley's beautifully executed copper-plates, representing the collecting of Hydras in the straight-lined canals, bordered by prim avenues of trees, in trim ancient Dutch gardens, and the conservation of the living animals in cylindrical glass jars in the simple fashion of those days. All is quaint, old-world-looking, and geometrical, even to the square cut of the coat-tails of the imperturbable collectors themselves.

Neither was Baker (who wrote an English book on the Hydra at about the same time), aware of the compensating principle referred to, for he, as well as his contemporaries, in giving directions for keeping the Hydra in confinement, instruct that the water shall be changed, either by emptying what is in the vessels, or else by pouring in fresh quantities and displacing the old water. Clearly, therefore, these early manipulators knew nothing of aquaria as we now understand them. And yet one finds occasionally, in the course of one's reading, statements to the effect that such-and-such a person kept aquatic animals in confinement at a named date, and that, therefore, the invention of aquaria should date from that time. The first thing to be done in such cases is to correctly define what an aquarium is; and according to my judgment it is any arrangement by means of which certain animals are maintained in health in water which is never changed, but which is permanently kept in a pure and respirable condition for the animals by vegetation growing in it and decomposing the carbonic acid gas given out by the breathing of the animals, the result of such decomposition being the production of the oxygen gas which the animals require, and the carbon which the plants need. Thus a balance is kept up, and this may or may not be made more certain and easy by giving the water a large surface so as to enable it, in addition, to absorb still more oxygen from the atmosphere; or it may or may not be made still more safe by circulating the same water from one vessel to another. The essential points are, *the same animals kept a reasonably long time in the same water preserved pure for an indefinitely long time by the action of growing plants.* The animals must not be lung-breathers, that is to say, they must not take in air *direct* from the atmosphere, but *indirectly* from it, through the medium of the water in which they live; and the animals which do this are aquatic creatures, both fresh-water and marine, from sponges to fishes, both inclusive, and including also a few reptiles, of which an example may be found in the Proteus (*Proteus anguinus*), which can breathe by both lungs and otherwise, *i.e.*, by gills, and which is occasionally kept in aquaria. If this rigid definition be applied, it will prevent the creeping in of many errors. For example, according to the rule laid down, a globe of gold fishes with the water changed at intervals cannot be termed an aquarium; neither can any vessel in which any animals are temporarily kept; nor can a duck or seal pond be called an aquarium, even if the water were to be preserved unchanged, because the animals are lung-breathers, and do not breathe through the water. Nor can a fish-pond, whether it be out or in-doors, be termed an aquarium if any but the same water is allowed to flow in and out of it, even though the fish are not lung-breathers.

Madame Jeannette Power has deservedly obtained much celebrity by her persevering and ingeniously made studies of living marine Mollusks—chiefly the Paper Nautilus (*Argonauta argo*) on the coast of Sicily about 35 years ago, and these researches are given to the world in a pamphlet (p. 76), published in Paris, in 1860, and at page 2 and elsewhere Madame Power says that in the year 1832 *she invented aquaria*, wherein she studied the animals referred to. But these aquaria, so called, were large cages or open-work boxes, made so as to contain the animals *in the sea*, and to prevent their escaping. I have seen the drawings of these cages in Paris, with their chains and anchors affixed to prevent them from being washed away. Clearly, therefore, these cages thus anchored off the shore at Messina were not aquaria. But Madame Power had at that period other vessels with animals, not in the sea, but indoors; yet, as the water was changed periodically, and plant life was not avowedly and of aforethought depended upon to keep it pure, these vessels could not be called aquaria.

Then, as to Sir J. G. Dalyell. He kept living aquatic animals in vessels in his house at Edinburgh from before the close of the last century till nearly the middle of the present one, but he continually changed the water and cleaned out his receptacles; and yet, though he in this way amassed much valuable knowledge, his not using the same water and his knowing nothing of the influence of plants to keep it pure, destroyed all claim to his having kept aquaria in the strict sense of the word.

In the year 1842, the late Dr. George Johnston, in his "History of British Sponges and Lithophytes," p. 215, tells how he at some period previous to this date (1842), constructed a small marine aquarium in a six-ounce glass jar, in which was placed some plants of *Corallina*, *Ulva*, and *Conferva*, together with some small animals, such as Mollusks, Annelides, and a Starfish. The whole continued to thrive during the eight weeks through which the experiment was made (and how much longer we are not told) with the sea-water unchanged, and Dr. Johnston points out these facts clearly. But the proportionate measurements of the vessel are not given, nor the amount of light permitted to fall on it, nor the temperature of the water; and it may safely be assumed that if the glass was not deep in proportion to its width, the large surface exposure to the atmosphere thereby obtained would have enabled the animals to live for a time without any vegetation visibly introduced in a grown state, as the Doctor describes; so that such plants were not necessary, and in a short period—a few days or a week or so—other plants would have made their appearance, under the influence of light, from spores invisibly contained in the water. Yet these considerations must not be allowed to interfere with the merit of Dr. Johnston; but still, for all that, the object he had in view was to prove the vegetability of *Corallina officinalis*, and the animals associated with that plant were only incidental.

The next step onwards—that of introducing plants *for the avowed purpose, stated beforehand*, of preserving the purity of the sea-water and of sustaining the animals in health—is due to Mrs. Thynne, who experimented in London in the autumn of 1846, on living madrepores. This lady caused her animals to be the *principal* things considered, the plants being secondary or incidental; whereas with Dr. Johnston the contrary was the case, and I think that much importance should be attached to this fact, and to *a specific intention, previously laid down, and designedly carried out, for the first time*, by Mrs. Thynne.

Mr. Ward, in 1841, made an aquarium of fresh water in a twenty-gallon earthenware vessel containing plants and gold and silver fish, but whether he did this with the *intention* of carrying out the compensating principle, or whether he introduced it only as a green-house ornament, I cannot say; but Mr. Robert Warington's first fresh-water aquarium, set up in the summer of 1849, and his earliest marine aquarium, made in the beginning of 1852, and Mr. P. H. Gosse's first sea-water arrangements, also begun in January, 1852, were all set going with the balancing principle distinctly in view, as was also a small fresh-water aquarium of Dr. Bowerbank's at about the same period. But the greatest first effort at aquarium-keeping was the public one in the Zoological Gardens, Regent's Park, London, commenced in May, 1853 (the introductory experiments and trials in connection with it having been carried on since the previous autumn), and to that is certainly due nearly all the popular interest in the subject which has since been manifested. It was in the commencement of 1854 that the Society's then Secretary, the late Mr. D. W. Mitchell, first pointed out to me a tank which he said disproved the necessity of vegetation in aquaria, as the vessel in question had been standing for a long time with healthy animals in unchanged sea-water, and, *by accident, no plants had ever been put in*. In this, Mr. Mitchell was both right and wrong, for there had been no occasion to introduce plants, and a great quantity of microscopic vegetation had everywhere made its appearance in the tank; but because it was microscopic, it was by him erroneously not regarded as the useful form of plant-life it proved itself to be; and this observation of Mitchell's led me gradually to avoid the introduction of ready-grown vegetation (save in a few instances), but to depend on the action of light to develop plants on the rock-work of aquaria in course of time. This also led to many changes of form and proportions of tanks, and to the dependence for picturesque effect on the form of the rock-work itself (thus covered with vegetation *in situ*) rather than on the groupings of introduced plants according to the rule which obtained when aquaria first became general. I believe that such introduced plants do harm rather than good in nine cases out of ten, because at present we do not know how to keep them alive, and their decaying remains do mischief. It is far better to employ self-grown plants which may be exactly regulated by admitting or excluding light, instead of endeavouring to control their too luxuriant growth by the use of scavengering snails which do their office very incompletely. I am much amused when I remember that just before this period of reform, 1857, when customers of mine purchased some additional animals for aquaria, *a lot of plants were also bought at the same time to balance the newly-introduced creatures!*

It is singular to reflect that the early observers—Trembley, Baker, Ledermüller, Ellis, Dalyell, Power, and all others who kept aquatic animals for considerable periods in glass vessels, must at some time or other have exposed such vessels to light for periods sufficiently long to cause plants to appear in the water and keep it pure; yet it never came across their minds to turn such accidents to good account, but they went on, as before, changing the water and cleaning out the vessels. To do otherwise never occurred to Mons. Lucaze-Duthiers, even, when he kept Corals (*Corallium rubrum*) in confinement on the coast of the Mediterranean during the last four or five years. Connected with this is a curious statement made by M. Lucaze-Duthiers, to the effect that he had a branch of coral which flourished in captivity very well, till, being removed to Algiers, it remained contracted, because, as the experimenter thought, the water supplied to it was taken from the *outside* of the harbour, but when dipped from the *inside*, where it was less aërated by the action of the waves, the polyps of the coral soon expanded. There must be some error in this, for if two samples of water, one from the inside and one from the outside of the harbour, were to be preserved at the same temperature and examined a few minutes later, in vessels of the same size and proportions, no difference that I can think of could possibly be perceived in them as far as the mere quantity present of free air is concerned. No coral or sea anemone known to me is injured or inconvenienced by any amount of aëration of the water. They may, and do, certainly close temporarily while the water is in the act of being violently agitated, and it is possible that they may be annoyed thereby, but as soon as the agitation is over, they expand more than before, and it is difficult to conceive that *Corallium rubrum*—which, however, I have never seen alive—should behave otherwise. I quote from the "Natural History Review" (Williams & Norgate) for July, 1865.

Jan. 20th, 1866. W. Alford Lloyd.

P.S.—Feb. 1st. Since writing the foregoing I have read in the "Annals and Mag. Nat. Hist." for September, 1858, a translation from the "Comptes Rendus" of the July preceding, containing an interesting account of a large observatory for studying living marine animals on the Quay of Concarneau, in the Bay of Biscay, but as this arrangement (of Professor Coste's) is in communication with the sea, and the same water is not continually used, and as no mention is made of vegetation, the establishment cannot be termed an aquarium according to the definition laid down.

And when visiting Professor Coste's most interesting fish-breeding place in the College de France, in Paris, in 1861, I observed with what assiduity the assistant scraped away the vegetation—conferva—which had formed on the cement-covered sides of the reservoirs, as it was held to be injurious to the fish (salmon and trout), and chiefly to their eggs, by growing over them. Efforts to eradicate it were all in vain, however, as it *would* grow in spite of all scraping and scrubbing wherever there was any light; and if it were not present, the fish would certainly not have presented so healthy an appearance as they did, although copious streams of water were provided in addition. W. A. L.

DEATH-WATCH.

In the February number of Science Gossip there appears an abstract of a paper read by Mr. Smith before the Entomological Society, in which he throws doubt upon the production of a watch-ticking sound by the *Atropos pulsatorius*. Inasmuch as I am, I believe, in a position to set this question at rest, I am induced to crave a little space in your columns to relate the result of my experience. On the night of Sunday, the 23rd of last July, I was sitting reading in my drawing-room, after the rest of the family, and some visitors, had retired to their rooms, when my attention was attracted by what sounded like the loud ticking of a watch near to me. My first impression was, that my own watch, from some occult cause, was making much more noise than usual; but, on pulling it out, I at once ascertained that it was not thence that the sound proceeded. Ultimately, I traced it to the mantel-piece, though scarcely (on this occasion) to any specific part of it. So remarkable was the imitation of the tick of a watch, so perfect the metallic ring, and so utterly unlike any thing which could conceivably be produced by an insect, that I fetched down one lady, who had not commenced undressing, to come and hear it. After this we used to amuse ourselves every night by listening to the ticking, until eventually, in October, I determined to find out by what means it was produced. Upon careful examination I traced it to one of the lustres, which, by way of experiment, I removed to a distant table. The first disturbance silenced the insect, but a few minutes' quiet reassured it, and on it went again. Finally, I tracked it to a French paper rose surrounding the base of the candle; and upon striking this sharply upon the table, there fell out a specimen of the *Atropos pulsatorius*. This I examined under the microscope, and I must say that I was quite as much astonished as Mr. Smith could possibly be to see the extraordinary minuteness and delicacy of the creature which had so perfectly simulated the hard metallic ring of a chronometer balance. Unfortunately, I squeezed my captive to death in trying to confine him in a live-box, and so put an end to him and the ticking by one operation.

After this, for a month or two, all was silent; when one night, towards the end of the year, while sitting over the fire, my ears were saluted by the well-remembered sound. *Experientia docet:* so I straightway removed the lustre from the chimney-piece, and, after listening to satisfy myself that I had my friend safe, removed the rose from the base of the candle, and, as before, by a sharp tap on the table, knocked the *Atropos* out of it. I killed him, or her, at once, intending to have mounted the specimen as a microscopic object; but, from the extreme softness of the body it squeezed up into an amorphous mass when I attempted to flatten it.

From that time up to the present date (Feb. 5) I have heard no more "ticking," and so infer that I must have destroyed a pair which had taken up their abode in the candle ornament, and whose untimely decease has cut off a possible generation of the *Atropos pulsatorius*.

William Noble, F.R.A.S., &c.

THE PROGRESS OF A WASP'S NEST.

Queen wasps were very numerous during the months of April and May last year. As soon as the spring weather tempted them out from their winter hiding-places, they began building their wonderful paper dwellings, hanging them under the eaves of houses, taking possession of empty or abandoned bee-hives, and fixing them in various other places. I obtained a good many specimens; one only just begun, attached to the edge of a honeycomb in a bee-hive; others as big as walnuts; some a little larger. It was a most interesting sight to watch the little architects collecting their materials, or, having brought them home, spreading them out into thin sheets of paper for the walls of their houses.

The old door of the tool-house in the garden was a favourite place, as the wood, being poplar, was of a soft fibrous texture. The wasps would alight, sometimes two or three at a time, on this door, and would immediately begin tearing off small fibres with their hard jaws, moistening them with saliva, and every now and then rolling the mass into a convenient shape with their feet,—making, in fact, what the paper-makers call "half stuff." A very

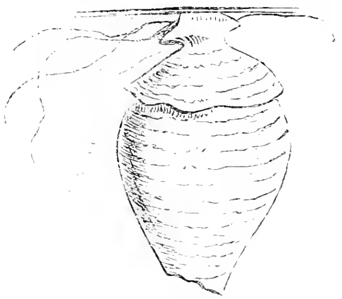


Fig. 82. Nest—April 25th, at noon.

short time, a minute or less, sufficed for the collection of a burden, which might be about the size of

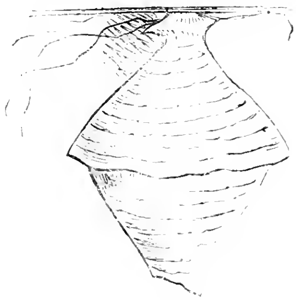


Fig. 83. Nest—April 25th, at 8 p.m.

a linseed. The wasp would then manage to tuck it under its chin and fly off with it.

Wasps invariably work backwards, removing fibres from a space about three-quarters of an inch long, and an eighth of an inch wide, leaving a wet mark on the wood.

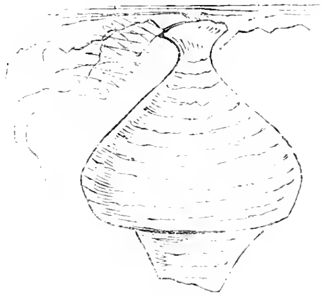


Fig. 84. Nest—April 26th, at 8 a.m.

A wren began building her nest in a small hole in a wall where a piece of brick had been pulled out. After watching her for some days, we found that the

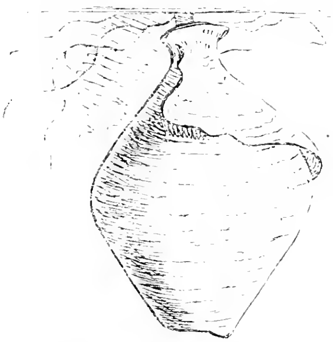


Fig. 85. Nest—April 26th, at 8 p.m.

work came to a standstill, and at the end of a week, when no further progress was apparent, one of our children pulled out the nest to see what was the

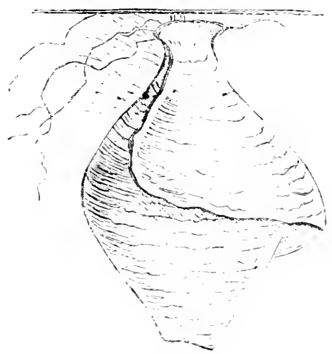


Fig. 86. Nest—April 27th, at 8 a.m.

matter. The cause of the wren having forsaken its nest was soon apparent, for there, attached to some of the fibres of grass, was a beautiful little wasp's nest about the size and shape of a nutmeg. It consisted of only one layer of paper surrounding the comb with a second layer just begun at the top. The wasp worked so industriously during the day, that in the evening the second layer reached fully half-way down; so I determined to watch her closely, and make a sketch of her progress from day to day. We watched her labours with much interest for three days, but at the end of that time our observations came to a close, for the work proceeded no further; the wasp, either disliking so much prying

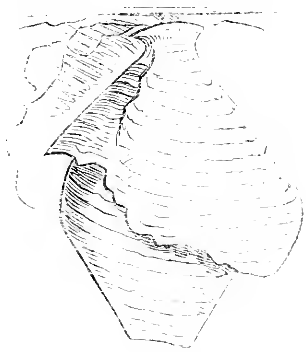


Fig. 87. Nest—April 27th, at 8 p.m.

into her movements, forsook her nest, or, what is more probable, got killed on one of her foraging expeditions; but the accompanying figures, which are the exact size of the original, show the amount of work done each day by the unaided efforts of one small but indefatigable builder.

Robert Holland.

THE COMMON LIZARD.

As I have kept these reptiles in confinement with some success, and as very few persons are at all acquainted with their habits, I venture to offer a short account of them to the readers of Science-Gossip.

The lizard (*Zootoca vivipara*) is exceedingly common on heaths, and, indeed, on any piece of uncultivated ground on which furze grows; as on the bit of furzy land facing Craven Terrace, Upper Holloway, where they abound. But though so common, the lizard is seldom seen, as it darts off, quick as lightning, into the nearest bush on hearing any one approach, so that in order to get a chance of catching one, perfect quiet is necessary.

It is really extraordinary that this harmless little reptile should be such an object of dread as it is. I was once hunting after reptiles on Wimbledon Common, when a sturdy-looking rifleman came up and asked me what I was looking for. I told him, and at the same time opened a tin canister, in which was my only capture—a lizard. At this sight he started back with fright, and almost let his rifle fall. I know not how brave he would have been before an enemy, but he certainly couldn't stand before a lizard. Country people also dread the lizard, or "land-effet," as they call it, even more than the adder. I must therefore premise that it is *perfectly harmless*, and cannot even draw blood.

If caught by the tail, these reptiles snap that appendage off, deeming it better to lose their tail than their life. Many other species do the same. If broken off, the tail begins to grow again in exactly two months, and is complete in another month, unless broken off very late in the season, in which case it does not grow again until the spring. One with two tails was some time since caught on Hampstead Heath.

The skin is changed about once in three weeks; it does not come off whole, but peels off bit by bit. I have often caught them, looking very ragged, with pieces of old skin hanging loosely about them.

Their food consists of small insects of any kind, such as flies, gnats, spiders, earwigs, moths, &c., which they soon get tame enough to take from the hand. They do not (as the Batrachia do) wait for their prey to move, but will eat it alive or dead. They chew their food well before it is swallowed, and lick their lips after it, like cats. The eye of the lizard is charmingly bright and expressive.

The young are born alive, whence their scientific name, about the middle of July. The period of gestation is three months. In 1864 I had two litters born in my vivarium. The first, consisting of five, was born on July the 16th, and the other, consisting of six, on the 17th. The little creatures at once began running and climbing all about the box, with pieces of the leathery shell sticking to their backs. Many of the eggs were laid full twenty minutes before the young broke out of them, so that they are not quite strictly viviparous. The little-ones for the first ten days or a fortnight ate and drank heartily, but then gradually sunk and died. I cannot imagine why.

The male and female are readily distinguishable by the belly of the former being of a reddish-orange colour, occasionally quite red, spotted with black, while that of the latter is of a very pale yellow, without spots.

In winter, if not allowed to torpify, they support life by drinking an immense amount of water. When torpid, it proves fatal to awaken them.

In common with all other reptiles, they love to bask in the sunshine; and, in order to expose as much of the body as possible to its warmth, they make themselves almost as flat as boards, and hold up their little fore-feet to catch its rays.

I keep them in small wooden boxes, covered on the top with black gauze, through which they can be easily watched. They only require a little blanket, a small saucer of water for drinking, and some moss. Their box should be put in the sun when practicable.

As their movements are excessively graceful, and as they soon become tame enough to feed from the hand, they are most interesting little creatures to keep; and all lovers of nature who will try the experiment, will find that a reptile can be not only not repulsive, but even an elegant, pretty, and amusing pet. W. R. Tate.

INSECT VIVARIUM.

'Twas the Creator,
He sought in every volume open to Him,
From the small leaf that holds an insect's web,
From which e'er long a colony shall issue,
With limbs and wings as perfect as an eagle's,
To the stupendous ocean, that gives birth
And nourishment to everlasting millions
Of creatures, great and small, beyond the power
Of man to comprehend how they exist.

J. Montgomery.

I HAVE seen several accounts in your journal of aquaria, both fresh and salt water, but I do not remember reading much about vivaria. It therefore struck me that a short account of an insect home I saw the other day may be interesting.

The one I allude to was manufactured by Messrs. Sanders, and is not, I think, a very recent introduction; but it is particularly well adapted for the purpose intended, and exceedingly ornamental in appearance. It is arranged for rearing water as well as land insects. A watertight compartment, forming a pretty little bay, and constructed of sheet-zinc, is firmly fixed by means of cement in the interior of the glass vivarium, which by the way somewhat resembles a fern-case in shape. I ought perhaps to mention that the sides and back of the vivarium are made of zinc up to the height of the water-level, and that at this point there is a division in the vivarium, the upper part, or glass cover, being made to lift off; but the whole of this front is of glass. Some framework of perforated zinc affords due ventilation, but my object in writing this paper is not so much to describe a vivarium as the inhabitants of one; for I would advise all who wish to possess an insect-home not to attempt to construct one for themselves, when one, properly built, can be purchased at so little expense.

In arranging a vivarium for the reception of insects, it is well to make the land part rise all round, from the level of the water in little miniature hillocks, varying the sameness by introducing a few moss-covered stones. A little rockwork is also a great improvement in the water portion of the vivarium, especially if it be so constructed as to conceal the small flower-pots which water-plants requiring earth have to be grown in, and the bottom of the lake should be covered with small pebbles and a little sand. I may here remark that it will be requisite to have some fresh-water snails as scavengers; they keep the water clean, as sea snails do marine aquaria.

I am a great advocate for drainage, and think that some pieces of broken bricks, well-burnt cinders, &c., ought to be put in the land portion of the vivarium before the earth is arranged. Now, to say a few words respecting the planting.

First of all, zinc tubes should be sunk in the earth for the purpose of holding small bottles of water, in which the branches of various kinds of plants required by the caterpillar for food may be inserted. Many caterpillars feed upon the foliage of large trees, and, as it would be impossible to *grow* them in a vivarium, it is very necessary to have some contrivance for preserving small sprigs nice and fresh.

The Purple Emperor butterfly, though generally found upon the oak, and stated by some writers to feed in its caterpillar state on the leaves of this tree, more usually affects the goat-willow, or "sallow." The larva of the "Elm," or "large tortoiseshell butterfly," likes the willow; the "death's head moth" prefers the spindle tree; the "Camberwell Beauty" butterfly the poplar; and the "Purple Hair Streak" the oak; hence, to suit their various tastes, the little zinc tubes and glass bottles must be put into requisition.

Dragon-flies are very interesting objects in a vivarium, their transformation being so singular. The first portion of their existence is passed in water, while in their perfected state they become aërial. The larva of the dragon-fly is decidedly ugly; I expect a lecture for this expression, and perchance some lines of my own beginning with

Oh, call not insects ugly,

may be quoted. Nevertheless I maintain that dragon flies in early life are not pretty objects, though I think the matured insect splendidly beautiful. I saw some magnificent ones, sweeping along on silvery wings, in the grounds of Alderney Manor (the pretty, picturesque residence of the Hon. Grantley F. Berkeley) this summer; and I cannot imagine a more graceful picture in insect form than the dragon fly exhibiting his skill in the art of flying.

Dragon-fly larvæ are very voracious; they will eat all insects smaller than themselves while they are in a growing state; but immediately they cease to increase in size they give over feeding, and climb out of the water, clinging, or rather sticking on, in an apparently motionless form, to some twig or branch which is quite removed from the influence of their former element. Here they remain, drying, as it were, and after a time their skins split down their backs; they have become too big for their jackets, like the boy in buttons who was perpetually (to the dismay of his mistress) out-growing his clothes, and a pair of bright eyes, a body, and short semi-transparent wings, which grow visibly, under one's own eyes, appear.

The expert way in which these young dragon-flies use their neurated wings is really astonishing; they lift them gently, then spread them, and partially shut them again, going over this process several times, so as to allow of their becoming sufficiently hardened for flight, when they suddenly rise into a new element, evidently taught by a higher power the purpose for which the exquisitely tinted fan-like appendages had been given them. To return to the planting of the vivarium, for it strikes me that, seduced by the beauty of the dragon-fly, I have made a step in advance of my subject. Some hardy dwarf ferns, a few pretty grasses, and a pot or two of flowers in bloom are the proper things for the land department. A sprinkling of watercress seed on the sand in the lake is a great improvement to the water portion; but the plants must not be allowed to grow too large. A few fresh-water algæ are very necessary articles in a vivarium, where water insects are reared. The Oscillatoriæ are useful; they aërate the water, and consequently keep it pure. They are interesting objects as well. I have already mentioned water snails—the one commonly known as the "Trumpet Snail" is the best.

There are some large water-beetles in my friend's vivarium—the *Hydrophilus Piscius*. They are a harmless and exceedingly handsome sort, very different to their cousin, *Dytiscus marginalis*, who is the most voracious, impudent, aldermanic-looking beetle living. I was much amused in watching the *Hydrophilus*. Their eggs (sometimes sixty in number) are held together by a gummy substance, and fastened on by Mrs. *Hydrophilus* to a branch of some aquatic plant. I like the caddis-worm in an aquarium and was rather disappointed at not finding him in M——'s vivarium. He is such a quaint object, moving along with his domicile, formed of sticks and stones, like a man in armour; and it is particularly interesting to observe him emerging from his prison-house. He turns his former abode into a kind of raft, on which he rests till ready to take wing in his moth-like character. It is sad that his winged life should be of such short duration—a few hours only; but probably hours to one of the Ephemera reckon like years.

The Water Boatman is a very curious insect. He lies upon his back, which is ridged exactly like the keel of a boat, and rows himself about by the use of his middle pair of legs. But leaving the water portion of the vivarium and its aquatic inhabitants, let us turn to those who occupy the land arrangement of it.

The Purple Emperor butterfly is a glorious insect; but, although you can rear him in a vivarium, you will not be able to keep him there; he would die in a day or two in so confined a space; for he loves to fly high, and may be seen disporting himself in the sun upon the oak; but his caterpillar feeds upon the goat-willow or sallow tree, and can be easily kept if you provide him with fresh branches of his favourite food, which should be placed in the little bottles before mentioned. When about to pass into the chrysalis state the larva suspends himself by a kind of web to the under surface of some carefully-selected leaf, and remains in what we should term a very uncomfortable position, head downwards, till his transformation is effected. The Peacock butterfly is another beauty (*his* larva feeds upon the common stinging nettle), and the pretty little blue butterflies—the Clifden or Adonis, for instance—and the large white, and the clouded yellow (*Colias Edusa*) are all very suitable for a butterfly vivarium. I need hardly say that flowers must be introduced during the short period of their perfect insect existence. The larvæ of a few moths may be placed in with advantage. The Privet-hawk moth is a very handsome insect, and its caterpillar is prettily marked.

I must not forget to mention a few land-beetles, such as the dear old Lady-bird, and the Rose beetle. The eggs of the first mentioned, such tiny, yellow-looking little things, are often found in summer on the leaves of plants, always those on which they are likely to find their future food (the Aphides). Their larvæ are not very attractive; they are almost black. The little Lady-bird, in its perfect state, still affects the Aphides, and therefore does good service in a greenhouse, or wherever there are plants infected by these destructive pests. A dazzling little sun-beetle or two, in their glittering coats of bronze, and the rose-beetle, in his golden armour, are likewise very amusing, and add considerably to the beauty of any vivarium. Helen E. Watney.

BATH OR SCOURING BRICKS.

Perhaps a few remarks on this valuable substance may prove interesting to some of our readers, it being one of those articles of every-day use, concerning which but few have any definite idea. In the first place, it does not come from or near Bath, as its name seems to imply; but is manufactured solely at Bridgewater, in Somersetshire, from the scouring-brick clay found on the banks of the River Parrot for about a mile above and below the town.

This apparently strange freak of nature is easily accounted for, as will be presently seen. The substance thus yielded by the river for a distance of two miles is at once practically unique, and forms the principal source of wealth to the town; being exported to all parts of the world for polishing steel and other metals. The clay from which the scouring bricks are made is composed of an immense number of silicious shells of Infusoria, only to be distinguished by the aid of a powerful microscope. Now, silex or flint is much harder than steel, and, it being an elementary rule in mineralogy that the harder minerals are capable of cutting the softer, the roughness of the steel is easily removed, or, in other words, a fine polish is produced.

If you place a piece of steel under a microscope the polish will be found to consist of minute, equal scratches, produced by the hardness of the broken shell. These shells lie probably at the mouth of the river, between high and low water-mark, mixed with mud, sand, &c., forming a species of "Delta," and are washed up and carried on by the rising tide and deposited at the reflux. That this mud, impregnated with Infusoria, exists near the mouth of the river, and above low water-mark, is obvious. Firstly, because the deposit, being specifically heavier than water, could not have been carried far without falling to the bottom unless a much greater mechanical force were exerted on it than the sea under ordinary circumstances would be capable of exercising. Secondly, because it is a well-known fact, that the sea is never disturbed by any external force, such as wind, tide, &c., more than twelve feet below its surface—the deep sea being always perfectly calm except where undercurrents exist; and yet at the lowest tide, with the surface of the sea unruffled, the deposit is steadily brought in. Still further, in support of this view of the case, there are extensive mud flats at the entrance of the river, many of which are laid bare at low water; whereas a little further on each side the coast consists of sand and rocks.

The fact of the clay being unfit for scouring purposes a mile or so below the town, and the same distance above it, is easily explained. The Parrot is one of those rivers into which the tide rushes with considerable force, and, passing over the mud flats in question, takes up mechanically, not only the so-called clay, but also coarse sand, small stones, and a variety of other things; but, having a winding course of sixteen miles to pass over, before arriving at Bridgewater, these last, together with the heavier refuse, are for the most part deposited lower down; the lighter shells, together with the mud and some of the sand, are carried up further, and deposited in the immediate neighbourhood of the town. Hence it is evident that it can only be collected from a limited space along the river's bank, as the coarser substances being mixed with it, its use for giving a high polish is destroyed.

This scouring-brick clay is not, however, entirely peculiar to Bridgewater. It is, for instance, also found on the banks of the Vistula, near Dantzig, in Prussia, where, when the river overflows, as it does about once in twelve months, it leaves a deposit very similar to our own; but, though extending over a space of several miles, the deposit (being only two and a half inches in depth) is quite useless for commercial purposes. The long intervals between the periods at which the river overflows is also an insurmountable difficulty. At Bridgewater the clay is obtained in the following manner: the bank is cut away perpendicularly, so that a horizontal bed is left on which the clay is deposited at the rate of six feet in twelve months. Much more is deposited in dry weather than in wet, in consequence of the large amount of fresh water which finds its way into the river in a rainy season, and which is, of course, specifically lighter than salt. The clay is afterwards dug up, well mixed and ground, the object of which is thoroughly to unite all the constituent parts, and to make it a uniform quality. It is then moulded into bricks, dried, and burned.

There is another substance essentially the same as Bath-brick, namely, tripoli, in speaking of which Sir Charles Lyell says:—"There are a variety of stony deposits in the earth's crust now proved to have been derived from plants and animals of which the organic origin was not suspected until of late years even by naturalists. Great surprise was therefore created by the discovery of Professor Ehrenberg, of Berlin, that a certain kind of silicious stone, called 'Tripoli,' contained *millions of remains of organic beings*, which the Prussian naturalist refers to microscope infusoria." Ehrenberg estimates that in the Bilin Tripoli there are 41,000 millions of individuals of the *Gaillonella distans* in every cubic inch, which weighs 220 grains, or about 187 millions in a single grain. It is but fair to state that there are those who believe the fossil remains of the tripoli to be of vegetable origin, and by them they are called *Diatomaceæ*. Tripoli is obtained in large quantities from Bilin, in Bohemia.

In conclusion, it may be interesting to remark that during a short stay at Madrid, curiosity having prompted me to inquire the price of a "Bath-brick," I found it no less than fifteen pence of our money.

Martin Henry Payne.

The specimen of clay furnished by our correspondent was divided between two expert manipulators, who report that they can detect no organisms present therein, and although their observations were conducted independently of each other, their conclusions are identical. The question is still an open one, and worthy of further investigation:—Does the scouring-brick clay of the River Parrot contain organisms, and if so, of what kind?—Ed.

"No scientific truth can possibly be too trifling or unimportant to be worthy of preservation."—*Sir James Edward Smith.*

RURAL NATURAL HISTORY.

THE "march of intellect" is a very good thing in its way, but it is a thing which, when much talked about, becomes a positive nuisance. The steam-engine and the electric telegraph are useful, though not by any means ornamental; but it unfortunately happens, that as these novelties become recognized, old manners and customs fall into disuse, and are looked upon with a contempt which they certainly do not deserve. The floral games with which the "merrie month of May" was wont to be ushered in, are now things of the past; Saint Valentine even, in rustic districts, is put on the shelf, and, in towns, is commemorated by hideosities which must make the worthy gentleman very much ashamed of his devotees. In short, nothing remains as it used to be; no, not even the weather. It is, however, somewhat comforting to reflect that the progress of education has not quite banished from the popular mind the traditions which have been handed down from bygone ages. Many quaint old customs, curious legends, and more curious practices, still exist in out-of-the-way places, and before these are all swept away by the advancement of learning, it may be well to record a few of them for the benefit of a future generation.

In Essex, or at least in some parts of it, there exists a superstitious belief, that if the blossoms of the hawthorn (*Cratægus oxyacantha*) are brought into the house, death, or, at any rate, serious illness, will ensue in some member of the household; and well do I remember the indignation which I, in more youthful days, excited in a worthy relative, by conveying, unconscious of the results to be expected, a splendid hawthorn bough, one mass of blossom, within her portals.

In a village in Buckinghamshire a case of epilepsy recently occurred. Medical aid was employed, but, after a short time, abandoned, and a travelling packman was consulted. He suggested two methods of cure, both of which were faithfully tried. The first was, that the afflicted person should procure a jay: every morning fasting she was to chew a piece of bread, and then give it the bird to eat, and on the death of the poor creature, the fits would cease. To make assurance doubly sure, another remedy was also tried, viz., a silver ring to be worn on the ring-finger as an "amberlet" (amulet?), to be subscribed for and presented to the patient, without her previous knowledge! The point of the joke lies in the fact, that this mode of treatment was announced *by the invalid herself!*

In the same county, Tutsan (*Hypericum Androsæmum*) is called "Touch-and-Heal," and is said to be a "capital thing to put to cuts." By the way, can any one tell me the meaning or derivation of the name "Park leaves" formerly applied to this plant? Here, too, the Great Mullein (*Verbascum Thapsus*) is vaguely said to be "good for colds," and bears the names "Rag-paper" and "Poor-man's Flannel." There is also an idea that Mezereon, or "Mazalum" (*Daphne Mezereum*), can be budded from wood-laurel (*D. Laureola*) "by them as knows how." In Essex, dock leaves are applied to the blisters raised by the sting of the nettle, and are believed to be efficacious in removing the smart.

A gentleman of my acquaintance had killed, near Wycombe, a slowworm (*Anguis fragilis*), and was carrying it home on a stick. A sagacious peasant, however, warned him to be careful, for the thing couldn't die till the sun set, "no, not if you was to cut it in pieces"!

Of course the popular errors regarding snakes are in full force here; though, to his honour be it recorded, one man confided to me his belief, that "common snakes wasn't poisonous, only adders and vipers," which seem to be regarded as two different things.

Occasionally there seems to be an exercise of poetical imagination which one could hardly expect in the rustic mind. Thus, a poor woman, lamenting to me over some misfortune, said,—"Well, sir, you know the sparrows say, 'Cheer-up, cheer-up,' and I must try and 'cheer up' too."

One more remedy, and I have done. The following was communicated to me by a medical man, a native of Lincolnshire, who received it from a farmer in that county, who had tried it, and had found it efficacious when medical aid had failed:—"A cure for ague.—Get up at sunrise on the first day of the month and go into a field, having first emptied all your pockets; take with you the carving-knife which you have bought and used yourself. Search for an ant-hill, and when found, plunge the knife into it, and stir round as many times as you have had ague-fits; then lay yourself flat on your stomach, with your face towards the sun, and having placed your mouth over the hole which you have made with the knife, breathe into it as many times as you have had the fits. You may then go home, taking care to speak no word until you have breakfasted, and the cure is complete." This last injunction, of silence, is by no means unimportant, as the cure is known to have entirely failed when this has been broken. Pills made of spiders' webs are also given for the same complaint.

Here I will, for the present, close my selection from "Oldwivesfabledom;" assuring such of my readers as fail to appreciate my choice, that if Science be absent from the narration, there is no lack of genuine Gossip to flavour it withal. B.

"Might not the very admiration of nature have been an act of worship," continued Lancelot. "How can we better glorify the worker than by delighting in his work?"—*Yeast.*

Fig. 88. JUTE.—(*Corchorus capsularis.*)

a. Capsule. *b*. Flower.

WHAT IS JUTE?

AFTER such an event as a great and devastating fire, during which the public journals announce that a great many bales of Jute were totally destroyed, we hear in many directions the inquiry—"What is Jute?" A remote notion seems to be entertained by some, that it is a kind of vegetable fibre resembling hemp, which is used as a substitute for that valuable material in the manufacture of ropes and cordage. Others possess an idea that it is fraudulently mixed with silk in the manufacture of silken fabrics; and not a few, that its sole use is for the fabrication of paper.

Jute is a name given first in India to a fibre comprising the inner bark, or liber, of two species of plants, called respectively *Corchorus olitorius* and *Corchorus capsularis*, belonging to the same natural order as the lime tree, from the inner bark of which the bast is derived, so well known to horticulturists as the material of "bast matting." The fibre as prepared for the market might easily be mistaken by the novice for hemp, but it is softer, more glossy, weaker, and, under the microscope, more transparent, more slender, and apparently with thinner cell-walls.

The Jute plant is an annual, varying in height from four to twelve feet, the stems being from three-quarters to an inch and a half in circumference. Its leaves are alternate, elongated, and serrated at the edges, the two lower serratures being lengthened out into a slender thread. The flowers are small, and have five yellow petals. The fruit consists of a capsule, containing numerous seeds. It is sown in April or May, and flowers in July or August, when it is ready to be cut, if its fibres are to be obtained. Jute is largely cultivated, especially throughout the Bengal Presidency, where its domestic manufacture occupies almost all classes of Hindoos. It has been estimated that the annual weight of Jute manufactured in India is not less than 118,000 tons. Not less than 50,000 or 60,000 tons of Jute fibre are annually exported to Great Britain, and the total production in India is estimated by Dr. Forbes Watson at not less than 300,000 tons. This is, therefore, a very important staple in the commerce of India.

The great trade and principal employ of Jute in India is for the manufacture of gunny chuts, or chuttees, for making bags. These gunny bags are the common coarse bags in which Indian produce is brought to the English market, and are even more familiar to us than the fact, that they are called "gunny-bags," and are made of Jute. This industry pervades all classes in Lower Bengal, and penetrates into every household. Men, women, and children, find occupation therein. Boatmen in their spare moments, husbandmen, palankeen-carriers, and domestic servants; everybody, in fact, being Hindoos —for Mussulmen spin cotton only—pass their leisure moments, distaff in hand, spinning gunny twist. Its preparation, together with the weaving into lengths, forms the never-failing resource of that humble, patient, and despised of created beings— the Hindoo widow—saved by law from the pile, but condemned by opinion and custom for the remainder of her days literally to sackcloth and ashes and the lowest domestic drudgery, in the very household where once, perhaps, her will was law. This manufacture spares her from being a charge on her family—she can always earn her bread.

There is scarcely any other article so universally diffused over the globe as the Indian gunny-bag. All the finer and long-stapled Jute is reserved for the export trade, in which it bears a comparatively high price. The short staple serves for the local manufactures, and, it may be remarked, that a given weight of gunny-bags may be purchased at about the same price as a similar weight of raw material, leaving no apparent margin for spinning and weaving. The stems or stalks of the Jute crop are of almost equal value with the fibrous portion. They are beautiful white and straight stems, of a light brittle wood, somewhat like willow switches, and have a multitude of uses amongst the natives, such as for the manufacture of charcoal for gunpowder and fireworks, for the formation of fences and enclosures, for pea and similar cultivation, and for the construction of those acres of basket work which the traveller remarks near every native village.

That portion of the hank of fibre next the root, or where it has been held in the hand during preparation, being always more or less contaminated with bark and other impurities, is cut off for about nine inches. These ends are sold to paper makers, and wrought up into thick coarse fabrics. The manufacture of Jute whisky from them was tried experimentally, by subjecting them to the process of conversion into sugar with sulphuric acid, and afterwards fermenting. The produce greatly resembled grain whisky. Old and worn-out gunny bags, both in India and Great Britain, are torn up and converted into most excellent white paper. Rauwolf states that one of the Jute plants, called the Jew's mallow (*Corchorus olitorius*), is sown in great quantities in the neighbourhood of Aleppo as a pot-herb, the Jews boiling the leaves to eat with their meat. In India, the leaves and tender shoots are also eaten by the natives. Occasionally, also, the dried plant is employed by the native doctors in medicine. There is one little branch of industry connected with Jute which was not long since mentioned in the "Technologist," and is confined, doubtless, to a little knot of British speculators:— "There are some people who make a good trade even by buying up the bags that have held sugar, and selling them again to the ginger-beer or 'pop' manufacturers, who first boil them to get out all the saccharine matter to sweeten this popular beverage, and then dispose of the bags to the mat makers." Hence we may reasonably conclude that it is no trifling matter which is alluded to in the inquiry,— "What is Jute?"

"It is all very well to laugh at book-students of nature, but they carry that about with them which gives an interest to every flower, cloud, and stone they see. They see the object, and then, by the magic of association, the true beauty, fitness, history, which surround and accompany it, reveal themselves. A leaf or a bird is but a letter in the great book, which is read only by those who can put letters together; that is, who have the faculty of association."—*Jones's Holiday Papers.*

PHOTOGRAPHIC GOSSIP.

SEVERAL valuable novelties are now on the eve of coming into practical use by which photography may attain popularity as a book-illustrating medium. Hitherto the processes have all been more or less imperfect, because they were too complicated, troublesome, or incapable of rendering the gradations of tone, or were only adapted for reproducing works executed in lines, or because, requiring considerable assistance from the engraver, they were too costly. Mr. Woodbury's new "Photo-Relief Printing Process" is exceedingly simple, renders the delicate gradations of a "negative" from nature, and requires no aid from either artist or engraver.

You will readily perceive that white paper, visible through layers of semi-opaque material, appears lighter or darker according to the thicknesses of these layers. Thus, for instance, a mixture of gelatine and lamp-black, placed on a white surface, so that it increased gradually in thickness, would range from the white of the paper through deepening gradations of gray into black. On this simple principle the "Photo-Relief" process is based.

To a sheet of glass a piece of polished talc is made to adhere with moisture. Four ounces of Nelson's opaque gelatine, dissolved in twenty ounces of water, clarified with white of egg, and filtered through muslin, is mixed with sixty grains of bichromate of ammonia, dissolved in half an ounce of warm water, to which a bluish tint has been given with a little transparent pigment. The mounted talc is coated with a smooth uniform film of the above mixture, and, when set, it is removed from the glass, and placed, face downward, on a piece of blotting-paper, to enable the operator to carefully clean the uncoated side. The talc is then laid upon a negative in the usual way; on it is placed another sheet of glass, and the three are fastened together with elastic bands. It is next exposed to light falling upon it through a condenser until the requisite effect is produced on the film, when it is taken from between the two glasses and placed in hot water. Where the negative was most opaque, and the light consequently acted least, the bichromated gelatine dissolves away. Where the negative was most transparent, and the light, consequently, acted most, the gelatine is unaffected by the hot water; and so, in the same degrees in which the light acted, parts of the gelatine surface are more or less dissolved, and parts remain more or less unaffected. You at once see that when taken from the hot water there must be upon the talc an impression from the negative in which what should be the darkest parts are represented by being highest in relief, and what should be the lightest parts by not being in relief at all. To get an intaglio from this, a sheet of soft metal (a mixture of type metal with lead) is placed over the talc, the two are put between two perfectly true planes of steel, and hydraulic pressure is applied at the rate of about four tons to each square inch of surface. In less than a minute we get the required intaglio, sharp, clean, and perfect; while the gelatine relief is uninjured, and may be frequently used again.

The intaglio is now placed in our printing-press, which, in appearance, is a little shallow box with a hinged lid. In the lid of this box there is a sheet of plate-glass, and at the bottom of it there is another, which can be raised or lowered by screws working through the bottom of the box. On the lower glass we place our metal impression, close the lid, and turn the screws until every part of the intaglio is in close contact with the upper glass in the lid, which is straightway opened and turned back. We now take our "ink," which is the aforesaid gelatine and lamp-black, or any other suitable pigment, fill up the intaglio to one level surface with it, place our paper on it, shut down the lid, wait about half a minute, open the box, and take out what appears to be an ordinary photograph, the only apparent difference being a slight effect of relief in the darkest parts, which decreases and almost disappears as the image dries. To render prints so obtained permanent, they may be immersed in a solution of alum, and afterwards rinsed in water.

A method of printing photographs precisely similar to the above in its main features, but in which the intaglio is obtained by the electrotype process while the print in relief is wet, has been published by Mr. Swan, of Newcastle, and we have seen very beautiful photographs produced by this gentleman's invention.

In each of the above cases the prints are obtained separately, and to use type with them is clearly out of the question; but another new process of hardly less value is now being introduced by Mr. Hancock, of Lewisham, by which photography produces electrotypes to be used as ordinary wood engravings are used. The specimens we have examined of this process, printed with type by Mr. Watson, of Hatton Garden, are extremely beautiful. Although it is only applied to the reproduction of drawings or engravings in lines, Mr. Hancock's process has all the value claimed for the glyphographic, graphotype, and other similar substitutes for wood-engraving, combined with much greater simplicity, certainty, and ease of working. We can easily conceive how an artist's drawing or a line engraving may be photographed, and from the negative a print obtained with degrees of relief by the use of bichromated gelatine as in the process used by Mr. Woodbury. After this it is not less easy to understand how an electrotype may be obtained in the way Mr. Swan adopts, and so we get at a process which, if not Mr. Hancock's, would at least serve the same purposes.

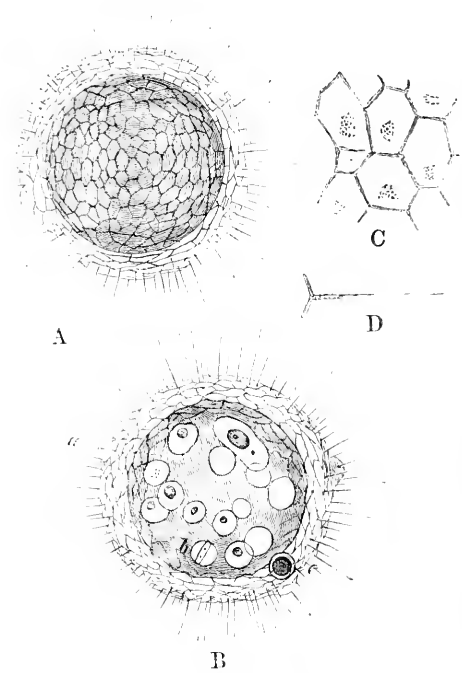
J. W. W.

SIMPLE OBJECTS.—No. XII.

ACTINOPHRYS EICHORNII.

THE figures below represent an *Actinophrys*, most resembling the *Actinophrys Eichornii*, as given in the "Micrographic Dictionary;" * only in the present instance the animal seems larger, whilst the tentacles are much smaller in proportion. The body of the animal is spherical and opaque, and surrounded with a transparent cellular network; from every angle of which springs a delicate hair-like tentacle, the length of which is about one-quarter of the diameter of the body. Within each

Fig. 89.



Figs. A and B, magnified 100 diameters.
Figs. C and D, magnified 248 diameters.

cell, and apparently near the surface, are small black granules (fig. C), which are in continual motion. The surface also shows occasional protuberances (figs. A, B *a*), which perhaps perform the office of mouths. The members of this family are said to draw into themselves, by means of their tentacles, any small organism, as a diatom, which may become entangled in them; and gradually to press it through the external covering, until it enters the body, where its nutritive parts are extracted, and the rest ejected by a reverse process to that by which it was drawn in (fig. B *c*).

In some individuals numerous vacuoles occur (fig. B), some of which contain dark-coloured matter, which is possibly the creature's food in various stages of digestion, as the occurrence of a diatom in one of these would seem to indicate (fig. B, *b*).

J. S. Tute.

* Plate 23, fig. 7a.

GENERA OF DIATOMS.

AT page 62 we illustrated four genera of *Diatoms*. The four remaining genera of the Navicular group, with free frustules, contain but comparatively few species.

Toxonidea has the valve elongated, convex, with the sides unsymmetrical, oblique striæ, and a longitudinal curved (or arcuate) line, the ends and terminal nodules of which curve towards the *same* side of the valve. We have only about two species (fig. 90, *Toxonidea Gregoriana* × 400).

Donkinia.—So called in honour of Mr. Donkin, the discoverer of several new species. Has the convex valve keeled with sigmoid median line, and fine decussating striæ. The front view is fiddle-shaped, and as broad as the side view. There are about six British species (fig. 91, *Donkinia carinata*, front and side view, × 400).

Fig. 90. *Toxonidea Gregoriana.*

Fig. 91. *Donkinia carinata.*

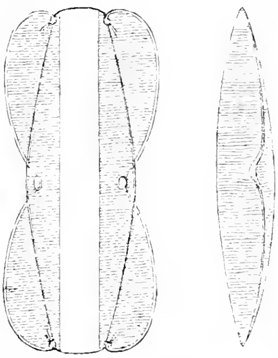


Fig. 92. *Amphiprora maxima.*

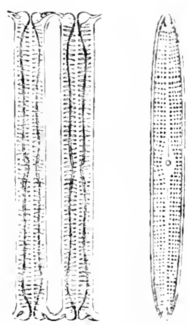


Fig. 93. *Diadesmis Williamsonii.*

Amphiprora.—The valve is convex, with a longitudinal sigmoid wing; the front view constricted at the middle. Of this genus we have about a dozen species (fig. 92, *Amphiprora maxima*, front and side view, × 320).

Diadesmis.—The valve is linear, the front view linear, dilated at the centre and each extremity. The frustules are united in a linear filament. At present only one British species is recorded (fig. 93, *Diadesmis Williamsoni*, front and side view, × 400). This is a marine species, dredged by Mr. Barlee off the Isle of Skye, and by Prof. Gregory at Loch Fine.

ZOOLOGY.

Sound-producing Beetles.—In answer to your correspondent, Mr. Brodrick, I may state that many of our British Coleoptera, beside the *Anobia*, are capable of producing sounds. Thus, the *Cerambycidæ* are a noisy family, producing a "stridulation" by rubbing together the edges of the front and middle rings of the thorax. So is *Lomia textor*, another long-horned beetle. *Cychrus rostratus*, the beaked ground-beetle, makes a low hissing noise when disturbed. The common dung-beetle hums, as does its relative, *Copris lunaris;* and the rose-beetle, *Atonia aurata*, utters a similar sound. Nor are instances wanting in the family of water-beetles, to which *Pelobius Hermanni*, the species mentioned by your correspondent, belongs. The males of *Acilius* produce a croaking sound, even when in their native element. That emitted by *Pelobius* is caused by the friction of the abdomen against the elytra, or wing-cases, as in *Cychrus* and the dung-beetles.—*W. H. Groser.*

Audacity of the Wasp.—In the farm department at Walton Hall, I have seen the pigs lying in the warm sunshine, the flies clustering thickly on their bodies, and the wasps pouncing on the flies and carrying them off. It was a curious sight to watch the total indifference of the pigs, the busy clustering of the flies, with which the skin was absolutely blackened in some places, and then to see the yellow-bodied wasp just clear the wall, dart into the dark mass, and retreat again with a fly in its fatal grasp. On the average, one wasp arrived every ten seconds, so that the pigsty must have been a well-known storehouse for these insects.—*Wood's "Homes without Hands."*

The Cat.—The following quaint description of the domestic pussy occurs in an old heraldic book, John Bossewell's "Workes of Armorie," published in 1597:—

"The field is of the Saphire, on a chief Pearle, a Masion ermines. This beaste is called a Masion for that he is enimie to Myse and Rattes. * * * He is slye and wittie and * * seeth so sharpely that he overcommeth darknes of the nighte by the shyninge lyghte of his eyne. In shape of body he is like unto a Leoparde, and hathe a great mouth. He doth delighte that he enioyeth his libertie; and in his youthe he is swifte, plyante, and merye. He maketh a rufull noyse and a gastefull when he profereth to fight with an other. He is a cruell beaste when he is wilde, and falleth on his owne feete from moste highe places: and uneth is hurt therewith. When he hathe a fayre skinne, he is, as it were, prowde thereof, and then he goethe faste aboute to be seene."

A Word about the Robin.—So great is the pugnacity of the robin after his prelude of song, that we have ere now rescued one from certain death, its victor having already broken its wing, and being ready to give the *coup de grâce* when disturbed by our approach. The trustful manner, however, in which it draws nigh our dwellings in winter, and its cheerful song, will quite atone for this bad habit in most people's opinion. While treating of the robin's song, the beautiful legend may be mentioned which accounts for its red breast, by stating that one of them bore away a thorn from the Lord's crown at the Crucifixion.—*Once a Week.*

The Cuckoo.—Last year I had a cuckoo brought me out of a redbreast's nest. I kept it for several weeks, but finding that it began to pine and seem unhappy, I allowed it to fly away. A few weeks later, I myself found one in a pied wagtail's nest. For several days I noticed the wagtails busy from morning to night, and constantly flying to the nest. On looking up to the nest one day, I saw a cuckoo, full-grown and quite strong on the wing, as it proved to me when I attempted to lay hands upon it. A few years ago, I had one from a linnet's nest. If any of your young readers should ever fall in with a young cuckoo, they may like to know what food to give it. I have fed two now with success upon chopped raw meat, mixed with soaked bread.—*R. Blight.*

The Magpie.—In the early part of last December, from the window I saw, at a little distance, a bird carefully examining a sheep's back in a most ludicrous manner. By the aid of a powerful telescope I could watch its movements carefully. It was a magpie. The sheep took not the slightest notice of the bird, but unconcernedly permitted it to walk from head to tail, from side to side, in every direction. I have often before seen jackdaws, and occasionally a rook, doing the same thing, but I never before saw a magpie. As far as I have been able to make observations for myself, I cannot discover that any family besides the Corvidæ do this.—*R. Blight.*

Newts.—In addition to the numerous incidents all indicating a remarkable season, I may add another which came under my notice on January 16. As I was examining a pond, I was surprised to see a pair of the Palmated newt swimming along in company.

This to me is remarkable, for during three years in which I have watched their habits here, I have never seen them so early. In 1864 I did not see them till March 25; in 1865 I saw them first on February 27.—*R. Blight.*

Silver-striped Hawk Moth.—(*Chærocampa celerio.*)—Mr. Henry Laurence, of Coggeshall, Essex, succeeded in capturing a single specimen of the above insect on July 18, 1865. Mr. Edward Newman, in his work on British Moths, says the perfect insect has occurred now and then in England, but can scarcely be regarded as a British insect.—*C. Denny, Kelvedon.*

Woodcocks' Breeding.—In an article on woodcocks, your correspondent states that he has occasionally found their nests in the woods near Canterbury. I believe, on investigation, more of those birds would be found to breed in England than is generally supposed. In proof of which opinion there were last year at Attlebridge, about seven miles from Norwich, on the estate of the Rev. J. N. Micklethwaite, five or six nests, and that was not an exceptional case, as the keeper for several years past was aware some were to be found, and even captured a young one. I feel inclined to think, from a peculiar adaptability of the soil, some of the birds return to the same spot for the purpose of incubation.—*E. A., Norwich.*

The Great Ribbon Fish.—(*Trachypterus bogmarus*—Vaagmar of the Norwegians.)—A fine specimen of this rare and beautiful fish was taken by a pilot at the Tees' Mouth, on March 2nd. It had been thrown ashore by the violence of the storm, and was not quite dead when found. After having been exhibited for a few days in Leeds, it was brought back to West Hartlepool, and the writer had the pleasure of seeing it while there. The name of ribbon-fish is particularly appropriate, for though this specimen measured fourteen feet six inches in extreme length, its greatest diameter from the dorsal fin to the belly was only thirteen inches. Like all the Tœnioids, it was clothed with very small pearly scales, and had a beautiful silvery appearance. The ventral fins (near the throat) had each consisted of but one ray of great length. These, however, had got broken, owing to their fragility. The dorsal, as in all the members of this family, extended the whole length of the back, and had expanded, on the nape and head, to an elegant crest a foot high. This entire fin was of a bright red colour, and highly ornamental; but, owing to its excessive delicacy, and the brittleness of the spurs, it had been sadly injured before I saw it. It is but the ninth instance on record of the capture of the noble vaagmar, and I am therefore particularly pleased to hear that this one is to find its way to the British Museum. One was taken at Whitby, January 22nd, 1759; two at the Fern Islands, some seventy years ago; one at Newbiggen, in Northumberland, March 27th, 1794; another small one at the same place, January 18th, 1844; one at Corvie, near Macduff, March, 1844; one at Alnmouth, January, 1845; and one at Cullercoats, March 26th, 1849. The last named is in the Newcastle Museum, and is the *only* preserved specimen in the country. It is probable that this fish inhabits very deep water, where a perpetual calm prevails; as, from the delicacy of its structure, it seems quite unfit to encounter a rough sea. It is thought by ichthyologists that the ribbon-fishes may have given rise to some of the strange stories respecting the "great sea-serpent." I think this is quite probable. —*Robert Morton Middleton, Jun.*

Beetles and Ants.—Among the strange localities in which Coleopterous insects are found, ant-hills supply the collector with several which are not met with in other situations, and to the list of foreigners who take up their abode in the Formic Republic, I beg now to add another; its scientific name is *Helops striatus*, Olivier. This beetle is stated by Stephens, in his "Manual," to be found under roots and bark of trees, and last year in April I found several in the nests of the yellow ant (*Formica flava*) in company with hosts of plant-lice (*Aphides*).—*E. L. R.*

"The Pike."—In a work entitled "Civitates, Orbis, Terrarum (avctt. Georgio Bravnio seu Brvin, F. Hogenburg, G. Hoefnagle, &c.) Colon. 1572-1606," there are "a series of English costumes, with description and view of the English manner of selling the Pike alive in the fish-markets, cutting it open to demonstrate its fatness to the customer, and, if not satisfactory, sewing it up again, and returning it alive to the vivarium."—*W. T. Iliff.*

Song-Thrush.—A somewhat similar occurrence to that related by "J. M. H." (p. 63) came under my own observation. In October, 1864, whilst staying in Monmouthshire, I was one morning startled by hearing a sound as of breaking glass, and on proceeding to ascertain the cause, I found that a song-thrush had flown with such force against the kitchen-window as to break one of the panes into numerous pieces, the bird falling down in the middle of the room. This is the more remarkable from the fact that the bird was *not in full flight* at the time, but had (as seen by some of the servants) simply launched itself from the boughs of a small tree, which was situated *within a yard* of the window in question. Upon picking up the thrush, I found to my surprise that it was more frightened than hurt, bleeding a little only about the wings and breast. I opened the window, and after the lapse of a few minutes the bird rose from my hand and flew away apparently but little the worse for its mishap.—*Roger J. Wright.*

GEOLOGY.

The Lower Lias of Somerset.—In a paper read before the Geological Society (Dec. 6th), the Rev. P. B. Brodie described a section recently exposed at Milton Lane, one mile and a half north of Wells, which exhibited the lima beds passing into and overlying the white lias and *Avicula-contorta* zone. The author described the section (which was constructed by Mr. J. Barker and himself) in detail, and showed that the limas series attained here a thickness of 10 feet 4 inches, and the rhætic beds, including the grey marls, of 18 feet 6 inches; he was not able to discover any trace of *Ammonites planorbis*, nor of any of the peculiar limestones indicating the "Insect" and "Saurian" zones. He found one fragment of bone-bed lying loose at the end of the lane, and containing characteristic fish-remains; but though he searched carefully, he could not find *in situ* the bed from which it had been detached.—Vide *The Reader*, December.

Drift.—Rounded pebbles are not a necessary indication of the former presence of the sea. The degree of roundness or angularity will depend upon the nature of the stones, the distance they have rolled, and the length of time the area they occupy remains at a stationary level. In the Midland Counties, drift composed of rounded pebbles, and drift composed of angular flints, graduate into each other on the same horizon. There, also, drift, interstratified with beds of sand containing sea-shells, may be seen on the same horizon with, and graduating into, drift, in which no sea-shells have yet been discovered.—*D. Mackintosh, in Geol. Mag.*

Objects in Tumuli.—I believe Mr. Tate is incorrect in his correction of the name (*Orbitolina globularis*) and zoological position given by me, in your January number, to the so-called fossil beads. These little fossils were at one time considered as sponges, but they are now placed with the *Foraminifera*. In the "Annals of Natural History" for 1860 there is a complete nomenclature of the Foraminifera by Messrs. W. K. Parker and T. Rupert Jones, the July number containing the following synonymy of the *Orbitolina*, with references to the works of the several authors from which the synonyms are taken, but which need not be mentioned here:—"*Millepora? globularis*, Phillips and Woodward, *Tragos globularis*, Reuss, *Coscinopora globularis*, D'Orb and Morris, is our *Orbitolina globularis*." From this it would appear that *Coscinopora* and *Orbitolina* are now considered as identical. That Messrs. Parker and Jones are here writing of the true fossil beads is apparent from the next paragraph. "In some of the figured specimens of *O. globularis* the not unusual hole in the base is indicated. Occasionally individuals are perforated by a more or less irregular tubular cavity. The roundness of the specimens, and their holes and tubular cavities, appear to have suggested to the old 'flint folk' of the Valley of the Somme that they might be used for beads; for such perforated *Orbitolinæ* are frequent in the gravel that yields the flint axes." In the "Geologist" (April 22nd, 1860) Mr. T. R. Jones published a letter on the same subject, in which he says: "These little fossils have had several names given to them, and they have usually been regarded as sponges; but in 1860 my friend Mr. W. K. Parker and myself were led to study them in the course of our researches on Foraminifera on account of one curious little form after another coming under our notice from different sea-sands and fossil deposits, all of which were related to Williamson's *Patellina* on one hand and to D'Orbigny's *Orbitolina* on the other." He then continues, after stating that they had more fully worked out the subject with Dr. Carpenter, "but we still are fully convinced that, however spongioid it may appear, the *Orbitolina globularis* is a *foraminifer* and a variety of *O. concava*, Lamarck." Orbitolinæ are common in the upper chalk about here; they are also found in chalk flints, whence they naturally appear in the drift gravel. Perforated specimens are by no means uncommon. I have met with them in various stages of perforation from a small pit to a complete hole; and the Salisbury Museum contains neatly perforated specimens.—*J. S., St. Mary Bourne, Hants.*

The Uses of Petroleum.—Besides its utility for light, petroleum has several other uses. In Germany it is employed by the tanners; in England and America it has been experimented upon as fuel for steam engines; it is employed also for keeping the clay or paste plastic in the fabrication of hard china; for dissolving chloride of sulphur in the vulcanization of india-rubber; for cleaning copper or iron, when added to rotten-stone or to blacklead; for driving away several insects; for the cure of itch, &c. &c.—*Bernardin, Melle, near Ghent.*

Fauna of the Eocene Period.—Mammifera, birds, reptiles, fishes, insects, and mollusks form the terrestrial fauna of the eoceneperiod. In the waters of the lakes, their surfaces deeply furrowed by the passage of large pelicans, lived mollusks of varied forms, and turtles floated about. Snipes made their retreat among the reeds which grew on the shore; sea-gulls skimmed the surface of the waters, or ran upon the sands; owls hid themselves in the cavernous trunks of old trees; gigantic buzzards hovered in the air, watching for their prey; while heavy crocodiles slowly dragged their unwieldy bodies through the high marshy grasses. All these terrestrial animals have been discovered in England or in France, alongside the overthrown trunks of palm-trees. The mammifera which lived under the latitudes of Paris and London are only found now in the warm countries of the globe.—*The World Before the Flood.*

MICROSCOPY.

Podura Scale.—The scale figured in last month's Science Gossip is not from *Podura plumbea* but from a species of *Podura* which I have only occasionally met with. It is much more easily resolved than the scale which is esteemed as a test, and displays its beauty to great advantage under Powell and Lealand's $\frac{1}{16}$ obj. Different appearances are presented according to the manner in which it is illuminated; thus, with the central rays only of the achromatic condenser, the markings which I have figured are shown, while with the peripheral rays (one of the stops being interposed as for diatom illumination), the wedge-shaped particles of the outer laminæ are clearly seen, and each seems to be slightly striated. The "Micrographic Dictionary" says:—"The scales of *P. plumbea*, the so-called common spring-tail, are usually recommended; but we believe that the most common *Podura* is not this species. This is, however, a matter of little importance, because the scales of several species belonging to even different genera, are exactly similar both in form and markings." It appears that the procuring of *test* scales is somewhat difficult. A celebrated optician showed me the other evening several bottles containing, I should say at a guess, *millions* of scales, and told me he has spent whole evenings endeavouring to obtain from them a single scale or two exactly equal to his wishes. I have some of the *reputed* test scales, but prefer the others for display. The last time I found the *Podura* which is figured, several specimens were caught, and a few more slides made than I want. I shall therefore be glad to exchange with any one for other well-mounted objects of value.—*S. J. M'Intire, Bessborough Gardens.*

Magnifying without either Lens or Reflector.—After all is said that can be, in explanation of the effects of lenses, whether single or combined in the compound microscope or the telescope, our wonder at their marvellous effects is but little diminished. We have come to know much as to how these wondrous effects are brought about, and we have thus ceased, perhaps, to regard them as more mysterious than ordinary natural phenomena. But in this knowledge acquired we find fresh matter for astonishment and admiration, in the exceeding simplicity of the means by which results so varied and complex are accomplished. We are now, however, going to say nothing about the optical phenomena produced by lenses, or those by mirrors, and so need not concern ourselves as to how they act. Without calling in the aid of these contrivances, we are going to show how to produce two of the phenomena which are commonly considered to be the peculiar property of these optical contrivances — to show how to *magnify* minute objects, and how to get *inverted images* of them. Nay, more than this, our apparatus works with complete independence of the laws of *refraction* and *reflexion*.

Take a thin, opaque card (black or dark-coloured, by preference), and make a hole in it with a fine needle, and the apparatus is ready. Do not despise it for its simplicity. A lens is only a piece of glass; a reflector is only a polished piece of metal; yet in these lie all the vast powers of the microscope and telescope. Our perforated plate of card or metal plate can, like these, be suitably mounted with advantage. But let us not mind this mounting now. Proceed we to use our easily-acquired instrument.

Stand facing a bright window or lamp, in a room where there is but one. Hold the card about two inches from the eye so that the light of the window or lamp enters the eye through the hole in it. The hole will then appear as a small circular illuminated field. Now take some small object—the end of a hair or the point of a needle will do—and bring it into this field by holding it *between the hole in the card and the eye*, say an inch or inch and a half from the latter. There will then be seen, apparently *beyond* the plane of the card, a magnified image of the object, with a position in the field and a motion across it the reverse of that of the object.

If the perforated card or thin metallic plate be fastened over one end of an eye-tube, about two inches long, the effect will be more satisfactory, because side-light will be prevented from entering the eye. And if this tube is made of two parts, so as to slide one on the other, it will enable the perforated plate to be placed at the best distance from the eye. Whatever tube is used must of course have a lateral hole for the introduction of objects. The objects may be supported by forceps, or fastened to a glass slide. If a slide is used with a dark tube there must be two slits made in the latter to allow of the introduction of the slide.

This interesting fact was communicated to us by the Rev. E. Caswell, of Birmingham. There is no likelihood, we believe, of its receiving any practical application beyond that of a useful illustration of the laws of light. E. D.

Cleaning Thin Glass.—The usual method is as follows:—Two discs of wood, about two inches in diameter, are procured, one side of each being perfectly flat and covered with clean wash-leather. To the other side of these a small knob is firmly affixed as a handle, or, where practicable, the whole may be made out of a solid piece. In cleaning thin glass, it should be placed betwixt the covered sides of the discs, and may then be safely rubbed with a sufficient pressure, and so cleaned on both sides by the leather. If greasy, it must be first washed with a strong solution of potash, infusion of nutgalls, or any of the common removing liquids.—*Davies on Mounting.*

BOTANY.

The Coral-root. — The coral-root (*Dentaria bulbifera*) is one of the rarer British plants, being found in but few of the English counties, and in but one Scottish locality—in the county of Ayr. It is a very elegant species, growing, usually in patches, in woods, and blossoming at the end of April and beginning of May. Though a tall plant, and having large bright-coloured blossoms, it is extremely liable to be overlooked, except in the flowering season, as the stems and leaves soon wither, and the latter, in a young state, bear considerable resemblance to those of the Gout-weed (*Ægopodium Podagraria*). The method in which the coral-root is propagated is somewhat remarkable: its elegant flowers seldom, if ever, produce seed; nor is this necessary, for in the axils of the leaves are small buds or bulbs, which are described by Parkinson (a voluminous writer of the seventeenth century) as being "of a sad purplish-green colour, which being ripe and put into the ground will grow to be a roote, and beare leaves like as the bulbes of a red-bulbed lillie." These bulbs easily fall off, and are with difficulty retained upon dried specimens; to them the plant owes its specific name, *bulbifera*, or bulb-bearing. The flowers are of a delicate purplish-lilac colour, not easily imitated, and all the pictures of coral-root which we have seen fail to represent it correctly, but this colour fades away during, or shortly after, the process of drying. The blossoms have usually a faint sweet scent, and their shape at once places them in the order of Crossbearers, or *Cruciferæ*. Mr. Syme, in the new edition of "English Botany" now publishing, ranks the coral-root among the species of *Cardamine*, or Bitter-cress, which genus it certainly resembles in many important characters. The English name, coral-root, and the Latin, *Dentaria*, or Tooth-wort, are founded on the curious appearance presented by the root, which is long, thick, brittle, and very white, running along horizontally at a short distance beneath the ground, and appearing somewhat like branches of white coral. It is covered with large white scales, which are supposed to resemble teeth; when the root is dried, however, it shrivels up, and these peculiarities are no longer observable. In the olden times, coral-root, like every other plant, had its "vertues." Parkinson, in his "Theatrum Botanicum" (a quarto work of about 2,000 pages), informs us that "a dram of the powder of the roote taken for many days together in red wine is exceeding good for inward wounds that are made in the breast and longs;" and it is also "very beneficial to be drunke in the distilled water of the herbe called Horsetail." A representation of the plant is also given, under the English name of "Toothed Violet," which exhibits many features of interest. This author appears to have first discovered the *Dentaria* in this country; he mentions it as having been found "at Mayfield, in Sussex, in a wood called Highreede, and in another wood called Foxholes, both of them belonging to Mr. Stephen Perkhurst at the writing hereof." Ray, in his "Synopsis," takes no notice of it, nor does Dillenius, his subsequent editor. Blackstone, in 1737, records it as growing abundantly in the Old Park Wood, at Harefield, in Middlesex, a locality in which, as well as in other neighbouring woods, it may still be found. Turner, in 1801, mentions it in his "Botanist's Guide," on the authority of Mr. Gotobed, as growing in the woods at Loudwater, between Beaconsfield and High Wycombe, Bucks, where it still abounds. It is, indeed, to be seen in almost every wood round Wycombe, as well as near Chesham and Aylesbury; so that the county of Buckingham appears to be the head-quarters of the plant. My own observations lead me to suspect that Oxfordshire will be found to produce it. In addition, the coral-root is found in Kent, Sussex, and Hertfordshire, and the county of Surrey is supposed to lay claim to it also. Many handsome species are cultivated in gardens.—*B.*

Cedar.—A Cedar of Lebanon, in the garden of the Vicarage, Bredwardine, produced its first fertile cone last year. From good authority I make out its age to be 42-45 years.—*R. B.*

Early Flowers.—I have found the following flowers here since the 1st of February:—Primrose on February 2; violet, February 5; wild strawberry, February 5; early orchis (*Orchis mascula*) on the 7th of February; daffodils and snowdrops on the 1st; also wart cress and charlock on the 20th. There is also a horse chestnut nearly out about half a mile from here.—*W. B., Tenby, Pembrokeshire.*

Heartsease (p. 67). — "Stiefmütterchen" is the principal German pet name, "Je länger je lieber" is not, but is applied to the honeysuckle. The German for "Three foldenness flower" is "Dreifaltigkeitsblume," and *not* "Dayfaltigkeitsblume, which has no meaning whatever.—*Justus Eck.*

Heartsease.—The German name of *Viola tricolor* is "Dreifaltigkeitsblume," Trinity flower. The French "Herbe de la Trinité" is the Hepatic anemone (*Anemone hepatica*).—*B., Melle.*

Banyan of India.—Perhaps the following memorandum respecting a large banyan tree (*Ficus Indica*), now standing in the jungle at Margonerly, in Mysore, may be acceptable to you for Science Gossip. The trunk is 71 feet 2 inches in girth, and the greatest horizontal diameter of the head of foliage is 188 feet; the height was not ascertained. —*G. E. Bulger, Bangalore.*

British Fungi.—Seeman's "Journal of Botany" for the present month contains descriptions of seventy species of minute Fungi, new to Britain, by Mr. M. C. Cooke.

NOTES AND QUERIES.

Stormy Petrel.—Can any of your subscribers inform me what foundation exists for the following statement respecting the stormy petrel:—"Their whole bodies are so filled with oil, that the inhabitants of the Hebrides actually make them into candles by merely thrusting a rush through their bodies, and bringing it out at the beak, when it is found to burn brightly"?—*E. F. P.*

Pennant says ("Brit. Zool." vol. ii. p. 553), "Mr. Brunnich tells us that the inhabitants of the Ferroe isles make this bird serve the purposes of a candle, by drawing a wick through the mouth and rump, which, being lighted, the flame is fed by the fat and oil of the body."—*Ed.*

Insects in Winter.—It is generally thought that a hard winter kills a great number of insects in the egg, larva, or chrysalid state; this opinion seems not to be well founded. "The caterpillars and chrysalids do not perish though they be converted into a piece of compact ice," says Professor Larcordaire. Perfect insects can also resist the same cold. De Geer has seen gnats return to life after having been some time inclosed in ice. According to Lyonnet, winter is an inclement season only for a few species of insects; the greater number resist the severest cold, and a rude winter kills less of them than a too mild one.—"Tchan, Harmonies de la Création."—*B.*

Kerria Japonica had its first flower here (Melle, near Ghent) on the 2nd February. It is rather remarkable that this plant, which supports so well the cold of our climates, was first introduced in the hothouses, and later in the orangeries.—*B.*

Guayacol.—Several French papers said lately that the oily nuts of a palm tree, growing on the Pacific coast of Mexico, afford an excellent fuel for the steam vessels; they call the tree *Guayacol*. Would any one have the kindness to tell me its botanical name? Is it perhaps the same as the *Coyol*, or the *Cocoyol*, two Mexican palm-trees? I possess two small round nuts of the latter.—*B., Melle, near Ghent.*

Bois Immortel (p. 69).—The *Erythrina indica*, Lam., *E. corallodendron*, β. L., is called in the Antilles and probably in Demerara also, "Bois immortel, arbre à feu;" at Mauritius it is called in French "Nourouc," and in English "Indian coral tree." This plant is used in Trinidad, Mexico, &c., for protecting the young cacaos or cocoa-trees: thence the Mexican name "madre cacao."—*B., Melle, near Ghent.*

Mode of Cutting Glass Tubes into Cells (p. 69).—Try making at the section a line with turpentine-oil, and then use a file.—*B.*

"Purple-winged Sultana" (p. 69).—*Sultana-hen* is the *Porphyrio hyacinthinus* of Northern Africa, sometimes met with in Southern Europe. According to the "Ornitologo Ticinese, Lugano, 1865," it is domesticated and brought to market by the peasants of Lower Italy.—*B., Melle, near Ghent.*

Proboscis of Hawk-moths.—Among the "Notes and Queries" in the Science Gossip for January is one in which the writer (apparently in reference to my query in the November number as to the use of the double proboscis of the unicorn hawk-moth) questions the fact of its being possessed of a double proboscis. I am sorry to contradict a lady, but if the writer will look in the 30th volume of the "Naturalist's Library," edited by Sir William Jardine, she will find, in plate 6, the *Sphinx convolvuli* pictured with a double proboscis. The name *unicorn*, therefore, which she seems to think settles the question, is simply a misnomer. Further, since writing to Science Gossip in November, I have discovered that all the hawk-moths which I have been able to examine share the peculiarity of the divided or double proboscis. I should be glad to know from any of your correspondents whose opportunities of investigation may have been more extensive than mine, whether the peculiarity be universal as regards the hawk-moths.—*E. M.*

Desmids.—In answer to W. W. S., on treating desmids, when they have dried, the best way is to place them in distilled water until they have swollen to their natural size; then wash them off with a hair-pencil into a watch-glass, or small phial, if many; see that the endocrome or granules are not broken, if so, they are spoiled. Should they require cleaning wash with distilled water, pour off the dirty water gently, and place the desmids' for twenty-four hours in the preserving liquid before mounting; then place a sufficient number to fill a shallow cell, either of glass or cement, fill the cell with the liquid preserve, and cover with thin glass in the usual way. The liquor I use is one-third glycerine and two-thirds distilled water; if stronger, the glycerine will soften the cell and spoil the object. There are several preserves mentioned, but I find the above the *best*. I have specimens mounted ten and twelve years. It is also an excellent preserve for marine algæ. I have at present a specimen of a beautiful green conferver, exceedingly delicate—root and fronds occupying only half an inch diameter cell—as fresh as when put up three years back. I am at present manipulating upon some dried desmids.—*R. S. Boswell, Torquay.*

Dipper Walking under Water.—I was much surprised, on opening my number of Science Gossip for last month, to see that Mr. J. K. Lord, F.Z.S., in his article on "The Belted Kingfisher," still believes in what I thought was an exploded doctrine. I will, however, quote his own words—"They cannot swim or walk under water like the dipper." I will only use one argument which I think will strike most naturalists as a clear proof that the *walking* is impossible, namely, How is it that the water ousel, or dipper, which is specifically lighter than water, can manage, by some inherent power, to walk on the ground at the bottom of a rivulet? The above argument is not my own, but one of the late Charles Waterton's, and I strongly recommend Mr. J. K. Lord, F.Z.S., to read his "Essays on Natural History," and after so doing, he will then, I fancy, not tell amateur naturalists the absurd story that a dipper can walk under water.—*Geo. F. Smith, Durham.*

Preserving Anatomical and Physiological Preparations, &c.—Perhaps some of your readers who have "put up" these preparations in spirits of wine, may not be aware that they have the ingredients for a much cheaper substitute close at hand, namely, chloride of sodium, or common salt and water. I have repeatedly tried a saturated solution for lizards, snakes, &c., and found it answer as well as the far more expensive spirit. The method I pursue is as follows:—Having made a saturated solution—or nearly so—of common salt, by pouring hot water upon it and leaving it until quite cold, it is then to be filtered through blotting-paper into a suitable glass vessel, and the animal to be preserved placed into it; then tie the vessel over with a piece of bladder prepared by soaking it for some time in warm water, which in a few days hardens and drys, when it will be ready to receive a few coatings of black japan varnish, which answers two purposes—it renders the bladder impervious to air and water, and greatly improves its appearance. The specimen is now ready for the cabinet or museum.—*W. Bowen Davies.*

We used this solution for the purpose named ten years ago.—*Ed.*

Tealia Crassicornis.—Your correspondent, K. D., appears to have been unsuccessful in his attempts to keep *Tealia crassicornis*, and asks for instructions. I have at present a magnificent specimen blooming in my aquarium, but as it has only been there two months, it affords but little evidence of the practicability of keeping the species alive for a lengthened period. That evidence, however, is forthcoming in the experience of two friends, one of whom, I know, has kept small specimens upwards of twelve months, and the other moderately large specimens for about two years, and they are yet alive and flourishing beautifully. We have an immense number of "crass" on the Northumberland coast, and the difficulty of getting them without chipping away the hard rock, to which they adhere very tenaciously, is one great reason why they are not more frequently kept in aquaria. In order to succeed in preserving them alive the following conditions are desirable, if not absolutely necessary. First, that the "crass" be obtained without any injury to its base, and that is best accomplished by searching until one is found attached to a small stone, when the anemone, on its natural habitat, may be introduced into the aquarium. The next point is to have a good supply of water of proper density and free from animal impurities; and the third is that the anemones be fed about once a week on oysters cut into small pieces. If these conditions be observed, K. D. will find that *T. crassicornis* will live and flourish as well as ordinarily hardy anemones usually do.—*T. P. Barkas, Newcastle-on-Tyne.*

We have also received communications on the same subject from W. H. Congreve, W. B. (Tenby), M. D. P., and W. M., which want of space compels us reluctantly to postpone.—*Ed.*

Rose of Jericho.—Can you inform me what plant is known by the name of the "Jericho Rose"? I was visiting a friend's house, and he showed me two dried flowers; they possessed the curious property of unfolding when placed in water, but closed again when dry.—*H.*

It is *Anastatica hierochuntina*, a cruciferous plant. See *Gardeners' Chronicle*, 1842, p. 363; "Lindley's Vegetable Kingdom," p. 354, fig. 245.—*Ed.*

Solar Spot.—Did any of your readers notice any unusual appearance in the sun's disk last month? On the 26th and 27th February, a large black "spot," or patch, on the sun was observed at its rising and setting. Several persons saw it on the two consecutive mornings, and compared the appearance, in size and shape, to a rook. Its large size takes it out of the class of "sun-spots." It was seen by many persons here (Wonston, Hants), and also by the passengers in the early morning train from Southampton to London. I am told that all the windows in the train were let down, and the travellers "with one accord" were gazing at the phenomenon. It has been noticed, I hear, in an Irish paper, but I have not seen it explained anywhere.—*G. E. B.*

Ancient Toads and Frogs.—Our correspondents seem to be labouring under an error as to the requisition of T. P. B. One of them sends us an account (W. K.) which he obtained of a friend. Another (J. W.) tells us that he buried a toad in the ground for three months, at the end of which period it was liberated alive and well. This is credible enough, but it does not settle the question. Whilst W. M. sends us a paragraph from a newspaper, and W. J. K. thinks the following incident conclusive:—"I was watching some workmen sinking a draw-well, and at the depth of about 10 feet I saw a young-looking and very lively frog turned out of the *clay*, in which it was embedded, and disport itself in a pool of water near." If the paragraph at page 47 be carefully read again, it will become evident that the above do not fulfil the conditions.—*Ed.*

Crystals of Aloine.—A correspondent complains of want of success in obtaining them by the method described at p. 33, to which Mr. Roberts replies—"With regard to the aloine, your correspondent did not follow my directions. I said proof spirit should be used to dissolve the aloes, whereas he used chloroform in one instance and strong alcohol in the other."—*Albinus John Roberts.*

Aphides.—Your correspondent P. S. B. (p. 54) appears to labour under a mistake which might mislead. She states that she observed a very small soft grub enclosed in a smooth silky cocoon, which she thinks was the *chrysalis state of the perfect aphis!* What she saw was most likely the larva of some fly or moth, as it is well known that the aphides are viviparous, bringing forth their young alive, perfect in all respects but in size, and therefore these can never assume the pupal nor even the larval form. The so-called eggs, which are laid by the female towards the close of autumn, are, it is conjectured, but a case sheltering the inclosed aphis from the severity of the winter season, and for the furtherance of this object the female of the *A. lanigera* covers each case with down from her own body.—*Emile L. Ragonot.*

Salicine.—Can any reader of Science Gossip kindly tell me how the circular expansions of salicine upon a slide are to be obtained? With me upon evaporation salicine always forms silky hair-like crystals, which do not produce so good an effect under polarized light.—*J. H.*

Place small fragments of salicine on a glass slide; *fuse* carefully by the heat of a spirit-lamp; when cold, touch the glasslike fused masses with a piece of moistened blotting-paper or a moistened finger; the smaller portions will then show the discoid, crystalline structure, which is so much admired.—*A. J. Roberts.*

Mounting Rotifers, &c.—Would you kindly tell me if *Volvox globator*, *Rotifer vulgaris*, *Amœba*, &c., &c., can be mounted as slides, and how? And whether *Flustra foliacea* and *Scrupocellaria scruposa* can be kept alive for two or three weeks, and how? Also how they can be mounted as slides?—*Fanny L. S.*

Has Fanny consulted "Davies on Preparing and Mounting Microscopic Objects?"—*Ed.*

Nest of Kingfisher.—In Science Gossip (p. 27) Mr. Lord says: "The Belted Kingfisher never has a nest, neither has its British relative, but digs an ugly hole into a mud-bank, or, taking forcible possession of one already excavated, lays its eggs on the bare earth at the end of the burrow." The Rev. J. G. Wood, in his "Homes without Hands," says: "The nest is composed wholly of fish-bones, minnows furnishing the greater portion" (page 61). Also at page 60 he says: "That the eggs are laid upon dry fish-bones is a fact that has long been known; but for an accurate account of the nest we are indebted to Mr. Gould, the eminent ornithologist." An explanation of these apparent contradictions would oblige.—*R. P. Ellis.*

Woodpeckers storing Acorns.—The acorns being in the bark is admitted; but, are they put in quite tight, or loosely? If loosely, would insects collect around them, and if so, would not the bird devour them, leaving the acorns to do further duty. —*G. W. G.*

A New Insulator.—Mr. W. A. Marshall, of Leadenhall Street, London, has invented an insulating material for telegraphic and other purposes. It consists in the employment of asbestos or amiantus (amiante) for insulating purposes. The invention also consists in protecting and completing the insulation of telegraphic wire, especially for submarine and subterranean purposes, previously covered with the asbestos or amiantus by surrounding or inclosing it in a metal tube, by preference of tin.—*Popular Science Review.*

Atlantic Ooze.—Mr. T. Barkas says in Science Gossip (p. 70), that at the depth of 2,100 fathoms he has been unable to meet with a single complete diatomaceous frustule; and, therefore, that the extreme depths of the ocean are probably not the natural habitats of the *Diatomaceæ*. I have in my possession a slide of "Atlantic Soundings" obtained at the depth of 2,070 fathoms, and was, I believe, part of the ooze taken up by the United States Atlantic Expedition, under the command of Lieut. Maury, containing a quantity of complete frustules of the genera *Coscinodiscus, Triceratium, Stauroneis*, and *Navicula* with *Polycystina*, including a very pretty colony of sponge spicula, consisting of sphero-stellate, spicula of *Tethea*, Tricuspid anchorate spicula, Triradiate spicula from *Grantia*, &c., &c. I have also had an opportunity of seeing three other slides from precisely the same locality and depth, and their characteristics are almost similar.—*J. W. Leakey.*

Middlesex Flora.—Dr. Henry Trimen and Mr. W. T. Dyer, of Christ Church, Oxford, are collecting materials for a Flora of the county of Middlesex, on the plan of the Cambridgeshire and Essex Floras. They will feel indebted to botanists for local lists, notes of localities, or information of any kind connected with the subject, and in the case of rare, critical, or doubtful species the loan of specimens will be very acceptable.

Evergreen Bouquets.—I dare say it has not occurred to many people who have few flowers in their greenhouses in the winter, to make up bouquets of evergreens of various shades (camellias, if they can be got, look very well amongst them, with a few ferns). I have made up several of these evergreen bouquets this winter. The centre-piece is 11½ inches in diameter, and 3 feet in circumference. One bouquet consisted of the following circles raised in moss, viz., fern (*Pteris serrulata*), to hang down; burberis, red and green leaves, alternate; *Adiantum cuneatum* (fern); red and white camellias, alternate; ivy leaves and berries, the latter coloured blue; *Gymnogramma sulphurea* (fern); a white camellia in the centre. I have also used the following evergreens:—*Cupressus Lawsoniana;* box, green and variegated; *Taxodium;* yew; holly, green and variegated, with berries; aucuba; arbor vitæ; *Abies Canadensis;* fir, &c. Also, ivy leaves, with the berries coloured red, blue, and white. An account of evergreen bouquets was given in the *Gardener's Chronicle* about a fortnight ago, but the person who wrote it objected to flowers being placed amongst them. But I have tried both, and find that evergreens by themselves do not light up, but require some colour amongst them, particularly if they are for the dining-room.—*A. W.*

The Veined White Butterflies.—I do not know if it has been satisfactorily determined if "the dusky-veined white butterfly, *Pontia Sabellicæ*," is a distinct species from "the green-veined white, *P. Napi*." If it is not, the following may be of interest:—I took a male and female of the *P. Sabellicæ* at Cromer, Norfolk, *together*, in the summer of 1864. The male as well as the female had the two dusky-black spots on the upper wings, which are absent on the male of *P. Napi*, but it was a good deal smaller than the female. The other day I looked at the scales of both species under the microscope. Those of *P. Napi* were generally much larger than those of *P. Sabellicæ*, and I found some scales which I could not find on *P. Sabellicæ;* they had a fringe something like the scales of *P Cardamines* (orange-tip). Does not this seem as if they were a distinct species? The scales I have taken from the *males* of all three species. Perhaps some more competent entomologist and microscopist than myself will study the matter.—*E. G. W.*

Aquaria Animals.—Mr. W. A. Lloyd would be glad to place himself in communication with any one willing to supply living aquarium animals, for which liberal terms can be offered. Payment and delivery to be made near London. Address, in the first instance, Zoological Gardens, Hamburg, North Germany.

Graphite near the Sea of Azof.—A French journal states that a vein of graphite has been discovered in the above locality, and of a quality equal to that of Siberia. The same authority alleges that a source of petroleum has been found in the state of Archangel, near the course of a stream which falls into the Betchora.—*Popular Science Review.*

The Caddis Larva is an incorrigible kidnapper, seizing on any shell that may suit its purpose, without troubling itself about the inhabitant. It is quite a common occurrence to find four or five living specimens of the *Planorbis* or *Limnæa* affixed to the case of a caddis larva, and to see the inhabitants adhering to the plants and endeavouring to proceed in one direction, whilst the caddis is trying to walk in another, thus recalling the well-known episode of the Tartar and his captor. In these cases the cylindrical body is made of sand and small fragments of shells bound together with a waterproof cement, and the shells are attached by their flat sides to the exterior.—*Homes Without Hands.*

Filberts were originally brought out of Pontus into Natolia and Greece, and were therefore called Pontic nuts. From thence they were procured by the Romans, and brought into Italy, where they acquired the name of Abellan or Avellan nuts, from Abella or Avella, a town of Campania, where the best were cultivated (Pliny, b. xv., c. 22), and from thence arose the French name, Aveline. When first known in this country they were called nuts with full beards, to distinguish them from the common hazel nut, as it will be observed that the husk or covering of this nut resembles a man's full beard; this was first corrupted into "filbeard" and "filberd," and from thence into filbert.—*Phillips's Fruits of Great Britain.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. No notice whatever can be taken of communications which do not contain the name and address of the writer, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement indicated in diameters (thus—X 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. Address No. 192, Piccadilly, London, W.

E. B.—For mounting hairs, see "Davies on Preparing and Mounting," pp. 79 and 105.

Triceratium.—E. A. C. will, with the exercise of much patience and after frequent disappointment, find *Triceratium favus* in the Thames mud of the river at Limehouse.—*C. F. W.*

F. W. C.—It is not likely to be ready for two months.

F. A.—The moth enclosed is *Dasychira pudibunda.—F. M.*

Crystals from the Human Breath, see p. 264, vol. i.

T. W. W.—Many instances of hermaphroditism in insects are recorded in the "Journal of the Entomological Society," and a special paper by Mr. Wing was published in their "Transactions" a few years since.—*F. M.*

C. S. B.—Have you tried the plan which you condemn?

W. F. Rogers is requested to furnish his address to *C. B.*

Errata.—At page 66, col. 1, l. 6, for "views" read "wires;" line 19 for "views" read "results."—*W. Hislop.*

M. should state more explicitly what he requires.

F. W. C.—Too old; nothing is left but stains.

J. W. (Manchester).—Your shells are—1. *Helicella nitidula* (young). 2. *Planorbis imbricatus.* 3. *Pisidium sp.—R. T.*

J. F. C.—It will evaporate unless completely hermetically sealed. 2. The Geological Map of England and Wales in the series published by the S. D. U. K. may be had of Stanford, Charing Cross, London.

J. M. H.—The three-spined and ten-spined sticklebacks are both freshwater species; the fifteen-spined is marine. See Couch's "British Fishes," vol. i., pp. 167-184; also "Zoologist," p. 5,124. Yarrell's "British Fishes," vol. i., p. 99.

R. A.—Loudon's "Encyclopædia of Plants," last edition, 1855, with *two* supplements, price 73s. 6d. We do not know of a third supplement. Your lichen is *Ramalina calicaris.*

Platino-cyanide of Magnesium.—There appears to have been some mistake. Examination of the salt forwarded wil be made, and the result recorded in our next.

M. D. P.—If two different qualities of plaster are used, or the same plaster after exposure to the air, the results will differ. New and good plaster may have been used at one time, and old or inferior at another. We do not imagine that Mr. Lloyd is a likely person to mistake appearances in the manner you suggest.

C. F. Y.—Read the paragraph at p. 189 again, and you will discover your mistake. E. T. Scott does *not* write of the working part of a "microscope," but of a "diaphragm."

W. L.—Your plants are—1. *Salvia verbenacea.* 2. *Lycopus Europæus.* 3. *Bartsia odontites.*

J. E. T. will find it better to purchase "dead black" paper than attempt to make it. It is cheap enough, and may be had of any respectable stationers.

F. W.—Your moss is *Phascum nitidum* apparently, mixed with *P. muticum.* If you enclose directed envelope you may receive the specimens separated.

F. A. A.—We have received no communication from you except your letter of the 20th, alluding to one.

M.D.—(1.) The platino-cyanide of magnesium may be obtained from Messrs. J. Robbins & Co., 372, Oxford Street, at eight shillings per drachm, or one shilling for six grains (the smallest quantity supplied).—*A. J. R.* (2.) Cinchonidine, we think, may be obtained of T. and H. Smith, manufacturing chemists, Coleman-street, London, E.C.—*A.J.R.* (3.) The injected microscopical preparations, to which we imagine you allude, were shown at the International Exhibition of 1862. The manufacturers were M. Burgogne Brothers, of Paris. (4.) We believe that thin glass in sheets may be procured of Claudet & Houghton, High Holborn, London.

B. T.—Your moss is *Sphagnum cymbifolium*, a very common species. Zoophytes postponed for examination.

Quekett Microscopical Club.—The monthly meetings will be held for the future (by permission of the Council) at University College, Gower Street.

G.L.L.—A species of *Echeveria*, but not being a British plant, and belonging to a group not very easily determined; we have been unable to identify the species in time. It is allied to the stonecrops.

EXCHANGES.

Mounted Diatoms.—Twelve slides for an equal number of entomological slides. B. Taylor, 57, Lowther Street, Whitehaven.

Silicified Wood from Tasmania.—J. W. Leakey, 3, Prince of Wales's Avenue, Malden Road, Haverstock Hill.

Mosses.—J. A. Bowness; also R. G., 42, William Street, Ashton-under-Lyne.

Land and Freshwater Shells.—List on application to C. A., Grove House, Tottenham, London.

Foreign Shells for English Shells, or Birds' Eggs.—Beta, Post-office, South Shields.

Diatomaceous Guano for other objects.—W. C., 62, Kirkgate, Leeds.

Communications Received.—R. J. W.—W. H.—E. J. S. C.—J. W. L.—W. H. C.—B.—H. U.—H. J. W.—S. B.—P. S. B.—J. M. H.—G. E. B.—F. A. A.—J. C. W.—W. K. B.—C. S. B.—N. E. C.—W. B. D.—C. B.—S. A. J.—E.—E. G. W.—W. M.—C. A.—J. W.—T. W. W.—J. F. C.—A. W.—R. S. B.—E. F. P.—W. W.—G. M.—M. P.—S. J. M.—J. S. T.—E. L. R.—W. T. I.—J. W. (Belgravia)—W. H. G.—R. A.—J. B.—G. T. P.—S. C.—W. B.—Fanny L. S.—F. A.—E. D. M.—J. S. C. D.—T. P. B.—J. S.—W. M.—C. F. W.—T. S. B.—W. L.—R. M. M.—G. E. B.—J. L.—G. F. S.—F. W.—J. E. T.—F. W C.—J.—W. C.—R. Q.—W. A. L.—T. A. C.—F. T.

Sphæria Herbarum.—Sent to C. A.—F. B.—J. B.—R. H. B—W. C. (Leeds)—W. C. (Bromsgrove)—W. C. (Canonbury)—F. W. C.—J. H. D.—G. E.—W. G.—M. J.—Dr. M.—C. T. N.—J. J. R.—F. J. R.—M. R.—D. R.—Mrs. S.—A. S.—F. W.—E. W.—J. H. W.—W. J. E.—R. R. A.—G. G.—D. E. M.—G. E. Q.—H. W.—Mr. B.—Miss D.—H. H. M.—W. E. R.—F. S.—J. A.—J. B.—A. B.—R. B.—T. D. M.—J. H. S.—H. W.—J. D. W.—H. S.—Dr. W.—Capt. W.—E G. W.—W. W.—C. D. H.—J. A.—Mr. B.—J. C. M.—R. H. M.—J. R.—W. J. F.

SPRING.

How pleasant is the opening year!
The clouds of winter melt away,
The flowers in beauty reappear,
The songster carols from the spray.
In darkness, through the dreary length
Of winter, slept both bud and bloom;
But Nature now puts forth her strength,
And starts renew'd as from the tomb.—Dr. Moir.

FROM the earliest ages concerning which we have any reliable records, the motions of the heavenly bodies have been a source of interest and an object of contemplation to the members of the human family. Wherever man has emerged from a condition in which his thoughts and desires have been limited to the bare supply of his immediate wants, there the phenomena of the starry vault above him have awakened reflection, and stimulated inquiry, impressing him by their grandeur and exciting his curiosity by the mystery surrounding them. Thus the cradle of civilization seems also to have been the cradle of astronomical science:—

Chaldean shepherds, ranging trackless fields,
Beneath a concave of unclouded skies,
Look'd on the Polar Star, as on a guide
And guardian of their course, that never closed
His steadfast eye. The planetary five
With a submissive reverence they beheld;
Watch'd from the centre of their sleeping flocks
Those radiant Mercuries, that seem'd to move,
Carrying through ether, in perpetual round,
Decrees and resolutions of the gods.

Not so, however, with the periodic phenomena of the world below. The weather, it is true, has been the subject of many popular observations, which have been embalmed in proverbs and predictions of all degrees of accuracy. But the atmospheric changes, and the phenomena of the vegetable and animal kingdoms, which mark the course of each successive year, have received but little attention that is deserving of the name, even from those under whose immediate notice they have been constantly taking place. This is not difficult to account for. The objects and events of which we speak are less conspicuous and impressive in the eyes of a casual observer than the radiant glories of the solar and stellar systems; and the succession of changes is less marked in its progress and effects. In most cases they do not force themselves upon the attention, and in very many they entirely escape the notice of the untrained observer. For observation *is* an art, and one of the worthiest contributions to popular education would be a series of works such as was commenced some years back, and to which the late Sir H. De La Beche contributed a manual, entitled "How to observe—Geology." "The great majority of mankind," said Dr. George Wilson, of Edinburgh, "do not and cannot see one fraction of what they were intended to see." The habit of careful observation is invaluable, and will well repay any pains spent in its acquisition. What delight and solace did White of Selborne find in noting the never-ending series of phenomena, of whose existence nine out of every ten men would have been entirely unconscious; and how must this rare faculty have reconciled him to a lifelong residence in an obscure village, where many would have died of *ennui!*

Gilbert White's record of his observations exerts even now an influence upon not a few thoughtful minds, and there is ample evidence that a goodly number of amateur students of nature are educating their powers of vision to some practical purpose. In the hope of interesting such, to some small extent, the present notes are written.

Every one is aware that the temperature of any given spot is a constantly varying amount, and that this is the case whether *daily* or *yearly* changes be the subject of consideration. Each morning the thermometer rises, and falls again as evening comes on; in like manner, the opening year brings a sensible increase of heat, which declines when the brightness of summer passes away.

By observing the thermometrical changes which occur during the successive *hours* of each day in any given locality, the *curves of daily temperature* for that place are constructed, which curves will, of course, differ according to the season. Then by taking the *mean* temperature of each *day* of the year, the *curve of annual temperature* is formed, and it is with this that the observer of seasonal phenomena has chiefly to do. Nevertheless, the influence of temperature upon living organisms is strikingly illustrated in the effects of the *daily* curve. For instance, the opening and closing of flowers, which mostly depends on temperature, is in many cases so regular and precise, that it becomes possible to tell the hour of the day or night with considerable accuracy by this means alone. The operations connected with the annual curve are, of course, much more complex, yet every child is aware of the general effects of summer's heat and winter's cold upon both the vegetable and the animal kingdom. Temperature, however, is not an isolated agency; other meteorological influences, more or less obvious, are associated with it; and it is the study of these agencies in their relations to the periodic changes visible in organic nature, which constitutes the investigation of seasonal phenomena.

For many reasons, the extensive range of the subjects involved being among the most cogent, we must look to the individual efforts of numerous observers for the successful prosecution of this interesting branch of study. In days so busy as ours a division of labour is absolutely necessary, at least among amateurs. Leaving, therefore, the meteorological influences which combine to bring about the course of the seasons, let us look at a few of our native seasonal phenomena, restricting our observations, at present, to the noteworthy facts of spring-time.

Every true lover of nature watches with interest the gradual departure of winter, and hails the approach of the vernal months, preparing himself to sing, with the poet Moir, the lines above quoted.

And here arises a question or two, well worth considering. All winters are not alike. They differ now-a-days, old folks tell us, from those of *lang syne*; and our modern winters differ from each other. Do these differences produce corresponding effects upon the vegetable and animal life of the ensuing season? or is it of no appreciable importance whether the winter be wet or dry, cold or warm?

In respect to *insects*, an able naturalist (the Rev. L. Jenyns) is of opinion that a wet winter must seriously affect those which pass the colder months in a torpid state, heavy rains drowning them in their retreats. Severe cold, he considers, would have little or no effect. Now, here is a point to be determined by continued and multiplied observations. We have just passed through a winter of a very definite character; there has been abundance of *rain*, with little or no *frost*. It remains to be seen what effects have been produced. Will there be a sensible diminution in the numbers of those kinds of insects which are known to hybernate? Is a difference observable between those which pass the winter underground, as compared with such as seek a higher level? For example, the caterpillar of the common cabbage butterfly (*Pieris brassicæ*), when hatched late in the summer, spends the winter months in a crevice of some wall or hollow tree, where rain could hardly reach it; but the larvæ of the saw-fly (*Nematus ribesii*), like many other insects, burrows into the ground, and consequently, would be much more exposed to the influence of a heavy rainfall. If rains can produce any diminution in the insects of a given year, certainly the floods which have laid so many parts of England under water ought to bring about that result at the present time. Hence the need for careful and extended observation, undertaken in different localities, affected in a greater or a less degree by excessive rains.

On the other hand, the writer cannot help thinking that a winter of unusual severity will be found destructive to some extent of hybernating animals. With regard to *reptiles*, it would seem that they become torpid when the thermometer sinks below 50°, and their own temperature then falls to freezing point. If reduced below this, life often becomes extinct. Would not similar influences be likely to affect the insect race, whose circulation is so much more energetic than that of the sluggish reptilia?

In respect to those phenomena which may be regarded as prognostic of an early spring, or as heralding the vernal season, we may be excused if we mention one or two classes of facts which, however interesting in themselves, are *not* noteworthy in this respect.

We find, for example, in the botanical department of a late serial, a communication recording the gathering of the *dandelion*, *groundsel*, and *chickweed* in December; on which the editor quietly observes that he believes the said plants may be found in flower at *most* of the seasons of the year. Let it be remembered, therefore, that there are flowers and insects which appear all the year round, and the discovery of which has, consequently, no *seasonal* value whatever. It is pleasant to find that, though—

> The rose has but a summer's reign,
> The *daisy* never dies;

but let a distinction be drawn between the star-like shining of the "wee, modest, crimson-tipp'd flower," and the yellow bloom of its associate, the buttercup, —a true plant of spring, opening its petals at the end of April or the beginning of May.

Let a distinction be also drawn between local and more general phenomena. Sheltered spots encourage early flowering, while bleak situations produce a corresponding retardation. Considering the backwardness of the present season, are not the facts recorded by a Tenby correspondent in the April number of Science Gossip, due to local peculiarities? At any rate, the finder of primroses, violets, snowdrops, daffodils, and wild strawberries, in flower before the end of the first week in February, would have been sadly out in his reckoning had he predicted therefrom an unusually early spring. We were forcibly reminded of this when, on April 3rd, small hailstones rattled on our hat like a shower of sugar-plums.

Care must also be taken not to attach undue importance to isolated occurrences which are simply dependent on a *temporary* rise of temperature. Such, for example, as the appearances of butterflies, &c., in the early spring months, are often recorded. But these phenomena have no seasonal value. Whenever a fine, warm day occurs, as it often does in February, or even January, the Brimstone butterfly (*Gonepteryx rhamni*), the Small Tortoiseshell (*Vanessa urticæ*), the hive-bee, and humble-bee, and various species of small beetles, may be met with on the wing. But they disappear with the sunshine, and when the cold returns they hide once more in the snug retreats in which they have dozed the winter away.

Turning now to points which seem worthy of being classed among periodic spring phenomena, the writer ventures to think that special notice should be taken of the period at which trees are seen to be in leaf, as indicative of the course of the season. Among these, M. Quetelet, who has taken a prominent part in the science of periodic observation, suggests that particular attention be paid to the leafing of the following common trees of spring:—hazel, elder, alder, yew, aspen, lilac, weeping willow, common elm, plum, blackthorn, beech, walnut, fig, vine, oak.

Among the plants whose *mean* time of *flowering* is assigned to the month of May in the Rev. L. Jenyns's valuable "Periodic Calendar"—we name only these on account of space,—the following are recommended by Quetelet: — Bugle, herb Robert, field chickweed (*C. arvense*), whitethorn, woodruff, red clover, common fumitory, white jasmine, walnut, celandine (*Chelidonium majus*), columbine, fly orchis, upright crow-foot (*R. acris*), raspberry, guelder-rose, and Jacob's ladder.

The correspondence of these vegetable phenomena with the arrival of migratory birds should also be noted. The nidification of some birds appears to be subject to strange eccentricities. Quetelet sets down the nest-building of rooks as worthy of special observation; yet some of these creatures were so employed in the month of January in this year, according to the testimony of a writer in the *Zoologist*, while last season a pair or more were absurd enough to build in the month of November, and in the following month a thrush was actually found sitting on three eggs!

These and many like facts indicate the importance of *not* drawing general conclusions from isolated phenomena. It is only by combining a vast number of observations that we can hope to succeed in placing this department of inquiry upon a thoroughly scientific basis. Meanwhile, let each of us do his own work—observe, compare, reflect, record; and then, mayhap, in years to come, the employment which now affords us so much pleasure and instruction, will be found to possess a value and importance which we had but dimly realized.

W. H. Groser, B. Sc.

MORE ODD-FISHES.

"THE six species of British Syngnathi require to be ranged in two divisions; the first of which includes two Marsupial pipe-fish (*S. acus* and *S. typha*) having true caudal fins; four ophidial pipe-fish, which may be again divided into two sections, the first of which contains two species (*S. æquoreus* and *S. anguineus*), having each a rudimentary caudal fin; the second section, also containing two species (*S. ophidion* and *S. lumbriciformis*) in which there is no rudimentary caudal fin, the round tail ending in a fine point." *

Syngnathus typhle (the deep-nosed pipe-fish) differs a little from its near relative (*S. acus*). The face is more weazened and pinched, the little vertical mouth more compressed, which, together with the general flattened character of the tubular jaws, the upper and under edges of which are nearly parallel with the lines of the head and throat), gives a crabbed, miserly expression to the ugly, hard face.

Its usual adult size appears to be about thirteen inches, and the ova are transferred from the abdomen of the female to the marsupial sub-caudal pouch of the male, and there hatched, in the same odd fashion as we have already glanced at in *S. acus*, in a preceding number. The ophidial pipe-fish are represented, on the one hand, by *S. æquoreus*, æquoreal pipe-fish, and *S. angineus*, snake pipe-fish, having only a solitary fin on the back, the caudal fin being only a rudimentary appendage. The pouch for containing the ova is also absent; instead of which we find a kind of hollow, hemispherical in shape, as though scooped out from the hinder part of the abdomen. This singular depression is found only in the male fish, the females presenting no trace of such a cavity. "All the specimens examined, having these external hemispheric cells, proved to be males; those without external depressions to be all females, internally provided with two lobes of enlarged ova. The males of this species, when taken by me, as late in the season as

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* Yarrell's "British Fishes," vol. ii., p. 34.

August, had one ovum, of the size and colour of a mustard-seed, lodged in each cup-shaped cell." *

There can be very little doubt, the eggs in these pipe-fish without pouches are regularly glued into the depression on the abdomen of the male, by a viscous secretion which has the property of hardening under water. Mr. Andrews, in writing about *Nerophis æquoreus* (one of the species just mentioned, not uncommon along the coasts of Devon and Cornwall, recorded also from the coasts of Berwick and Northumberland), says,† "Under favourable opportunities of calmness of tides, these fish may be seen side by side, clinging with their tails to the tufts of *Zostera marina*, in which position the male is enabled to attach to the abdomen the ova by the same influence of viscid secretion alluded to in the marsupial species."

In the last section, on the other hand, we find even the rudiment of a caudal fin has entirely vanished, a single dorsal fin, containing about forty slender rays, being the only vestige of the propelling agents.

These pipe-fish are represented in *S. ophidion* (straight-nosed pipe-fish) and *S. lumbriciformis* (worm pipe-fish), frequently taken on the coasts of Dorset, Devon, Cornwall, and other fishing-places. They are more slender than are other species; the body being nearly cylindrical, tapers regularly from head to tail, the latter terminating in quite a sharp point. Between the head and posterior third of the body are about thirty sculptured plates, sixty smaller ones filling the space betwixt these, and the long tapering tail. The jaws, instead of being long and tubular, are, together with the head, much shortened. The nose, turned sharply up, gives a pert expression to the face, much more prepossessing than the long, shrivelled, horny jaws of the preceding groups. The colour in some of them is the exact shade of olive green peculiar to the sea plants amidst which they live; in others, the green is relieved with stripes of yellowish brown. The adult size is about nine inches.

These fragile-looking fish offer additional interesting modifications in the arrangement of the apparatus for carrying the eggs. The depressions on the abdomen of the male are disposed in three, and sometimes four, rows; as in the others, hemispheric.

Professor Fries, of Stockholm, made some singular and valuable discoveries bearing on the metamorphosis which takes place in the worm pipe-fish (*S. lumbriciformis*).

"The young of this species, at their escape from the egg, have the entire tail covered with a fin-like membrane, which extends partly up the back, and also along the under surface of the body, as far as the anal aperture: the little fish at this stage possesses also pectoral fins." Except the portion needed to form the permanent dorsal fin, all these, at a subsequent unknown period, are thrown off, in a way similar to that of the larvæ of frogs rejecting their tails.

Of the pipe-fish family, the *hippocampus* (sea-horse) is not by any means the least odd; only one species, as far as I am aware, has hitherto been taken on our coasts (*S. hippocampus*, Linn.; *Hippocampus brevirostris*, Cuvier — short-nosed hippocampus). Its general length varies from six to twelve inches; the body, very much flattened, is short and deep; its entire length divided by longitudinal and transverse ridges, the angles of intersection marked with tubercular points. Snout constructed, as in the other pipe-fishes, with a tiny mouth at the end. Pectoral and dorsal fins existent in both sexes; the females having, in addition, an anal fin, neither ventral or caudal fins being discoverable in either sex. The hippocampus is best known in its dried, mummy-like form, exhibited in cabinets of *curios* as a "wonderful sea-horse," the head bearing a remote fancied resemblance to the horse's head usually sculptured on a chess-knight; but affixed to a tail, such as dragons are supposed to wear. Seen alive in its native element the horse-like appearance vanishes, and the "dragon's" tail we find to be an admirable contrivance with which the hippocampus moores itself to any passing object.

When swimming, the body is always maintained in a vertical position, and the quaint little armour-clad creatures seem, as it were, to be walking rather than rowing themselves through the water; the prehensile tail, like that of a spider-monkey, twists and turns about, ready at any instant to coil round the sea plants, or seizing on a bit of floating wood, thus lashing itself, as it were, to a spar, the sea-horse drifts idly, as breeze or current directs its course.

Mr. Lukis gives an interesting account of two female specimens of *Hippocampus*, which he had living in a glass vessel twelve days:—"An appearance of search for a resting-place induced me to consult their wishes by placing straws and sea-weed in the vessel; the desired effect was obtained. They now exhibit many of their peculiarities, and few subjects of the deep have displayed *in prison* more sport or intelligence." When two approach each other, they are observed to link their tails together, and go in for a game of "French and English," as children do, by joining hands; but the hippocampi hook their chins as well as their tails to the stalks of marine plants, or any other available object and, thus firmly moored fore and aft, tug at one another viciously until the weaker looses its hold. We once had four specimens of this curious fish presented to our collection in the Aquarium House of the Zoological Gardens by J. F. Pinto, Esq., brought from the mouth of the river Tagus, where they are said to be tolerably common. Amongst other

* Yarrell.

† *Nat. Hist. Review*, vol. vii. (1860), p. 397.

oddities, the hippocampus possesses the power of moving each straw-coloured eye independently of the other. Watching their comic faces, it is hard to divest one's self of the idea that they are "making eyes" at you, so constantly do they roll and twist them about in opposite directions. If fish had pantomimes, the hippocampus as clown, if he could only wink, would make a certain fortune. The male, as in the marsupial pipe-fish, has a regular egg-pouch placed under the tail, formed by a doubling of thick skin, with an opening at the commencement only. The female has no pouch. The ova are contained in the abdomen of the female, similar to ordinary fishes. The mode of transferring the ova from female to male is unknown (I believe). Most probably it is accomplished as in other Syngnathi.

The worm pipe-fish, as previously observed, exhibit in their embryonic condition a remarkable similitude to the *Batrachia* (Gr. *batrachos*, a frog) in throwing off a portion of their bodies, on attaining a more advanced stage of development. But what shall we say to the extraordinary system for egg-carrying and hatching, found to exist in the females of *Aspredo batrachus?* This genus, the genus *Aspredo*, contains several "odd fishes," belonging to the Siluroids which also take care of their progeny, that we shall refer to more at length in a future chapter.

The *Pipa Americana*, or Surinam Toad, has been long known as a most remarkable example of reproduction. If the female is carefully examined at the breeding season, an immense number of singular pits are discoverable, completely covering her back. The habit of the female is to deposit her spawn on the margin of some pool or stream; but the male, after his paternal visit to the ova, instead of aloning, collects the whole mass, and manages, by some means, to get them upon the back of the female. When this is accomplished, a single egg is pressed into every cell, which closes with a kind of lid. In these cells the development of the embryo takes place, in the same manner as the free larvæ of Batrachians generally. The tadpole is a familiar example.

Dr. Gunther* says:—"If the pouches on the back of the pipa were shallowed to mere impressions, and the walls between them severed into flaps, we should have the same arrangement as in *Aspredo*." This extraordinarily anomalous system of fish-hatching I shall endeavour to more fully explain in my next communication.

J. K. Lord, F.Z.S.

"When, amidst the solemn stillness of the woods, the singing of joyous birds falls upon the ear, it is certain that water is close at hand."—*Livingstone's "Zambesi."*

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* Cat. B. M. Fishes.

DESMIDIACEÆ.

After the slides purchased with a microscope have been looked at, and such novelties as are to be found in the house, which beginners invariably make their first inquiries about, viz., a human hair, the edge of a razor, cheese mites, &c., have likewise passed in review, the buyer comes to a stand-still. How the objects are prepared he has not the least idea; he admires their beauty when mounted, but comes to the conclusion that a good collection is too expensive for him to indulge in. The resources of the instrument, and the mysteries of Canada balsam, that *pons asinorum* of young microscopists, are as yet unknown; so he carefully puts his purchase away, and there it remains, till some energetic friend gives his microscopical curiosity a new stimulus.

The first suggestion some one who sees his position makes, is that some of the water out of a pond be procured, and he perhaps offers company and experience in getting it. Accordingly, away they go together, and bring home sundry bottles of a most uninviting-looking mixture of mud and water, on which none but the initiated would set any value whatsoever.

A quarter of a minute's instruction in the use of the dipping-tube makes our young microscopist quite expert in depositing a small drop of the lighter sediment on the animalcule cage, and submitting it to inspection.

Conspicuous among the numerous objects passing under notice will be certain green bodies, of various sizes and shapes, sometimes symmetrical, sometimes fantastic, but always beautiful; and these he will be told are *Desmidiaceæ*, or, for shortness, desmids. We suppose the gathering to be made anywhere in the country, either from rivulets, ponds, clean ditches, or footprints of cattle in bogs.

For the benefit of beginners, we offer a few remarks from our own experience with these minute organisms, corrected, so far as we are able, by reference to the authorities on the subject.

They may be gathered in great profusion at Keston, and also, so Mr. Hogg says, near Tunbridge Wells. We mention these places only, because, being near London, they are convenient collecting grounds for our town students—the habitat of desmids being, in fact, everywhere.

They all consist of a transparent envelope or case (sometimes filamentous and attached, but often free), containing green colouring matter called *endochrome* or *chlorophyll;* are beyond a doubt vegetable in their nature, though very low in organization; are useful and important agents in the conversion of the septic conditions in stagnant waters into healthy ones; and furnish food to myriads of animalcules and small aquatic larvæ, whose wants Divine Providence has not overlooked. Their affinities in nature are with the diatoms and certain species of algæ.

We only intend speaking of the commoner forms, which, fortunately for our friends, are inferior to none in beauty, and afford to all microscopists, young and old, the greatest pleasure, and ample scope for the use of the highest and most perfect powers in their examination.

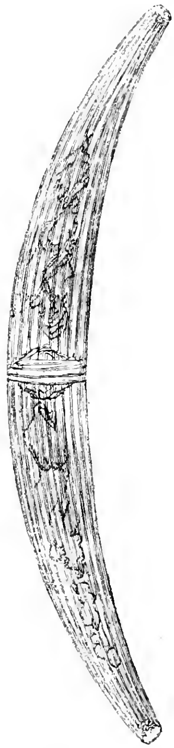

Fig. 95. *Closterium striolatum* × 250.

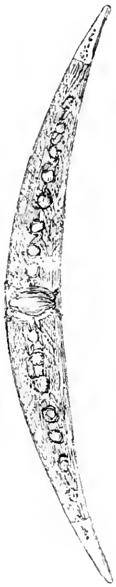

Fig. 94. *Closterium Leibleinii* × 250.

One of the most common bears the name of *Closterium*. The various species, of which Pritchard mentions some thirty-six, or thereabouts, are more or less crescent-shaped—some being nearly straight, and others curved like the new moon. The surface in general is smooth, but there are many examples of its being delicately striated. At each end of the frond there is a "terminal clear space, in which are active granules." These require a ¼-glass to show their extraordinary dancing movements, as if each had an independent, merry existence.

With bright illumination (and ⅛ obj.) one may see, just beneath the surface, that the particles of *endochrome* are seldom stationary, but in general move steadily up or down the frond, and no difficulty will be experienced in following with the eye the course of the circulation at the edges, where some have asserted they have seen *cilia*. We have never seen this, but our examinations have not been careful to the degree which the observers referred to insist upon. Pritchard seems to think there is a possibility of an optical delusion.* While looking at these organisms, they will be observed to move slightly, but the means by which this is effected have, as yet, eluded detection.

The other evening I saw the end of a bright-green *Closterium* seized by a large animalcule, *Notommata myrmeleo* (?) and subjected to the action of the teeth. Soon, I found that the particles of chlorophyll were leaving the desmid, and passing down the gullet of the animalcule, evidently by suction, and I watched them with great interest; firstly, because I never before saw a *rotifer* taking a salad in so civilized a manner (for they generally transfer their vegetable diet into their crops by a rapid jerk, particularly when it is small enough to go down whole); and, secondly, because apertures at the ends of the frond are not generally believed in. When the animalcule had finished its supper, that is to say, when every particle of nutriment was extracted, it cast the empty frond among others that were strewed about, and I could not detect the slightest *rupture* in the delicate transparent case which a few moments before was so full of green contents. There may have been one nevertheless.

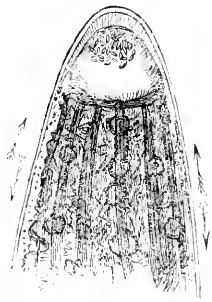

Fig. 96. End of frond of *Closterium lunula* (showing active granules in chamber at the end; the arrows indicate the directions of the surface circulation) × 500.

The mode of reproduction in *Closteria* is twofold (?), by self-division and by conjugation. In every frond of *Closterium* will be noticed a central clear space, dividing it into two segments. Here a gradual separation takes place, occupying some hours before it is completed. The separated halves then each commence to grow independently, till ultimately a copy of the parent form is assumed. This is an outline of self-division. Conjugation is a different process; two individuals approach each other and come into contact. They then intermingle their green contents and a curious globular † body

* Other authors deny the existence of cilia in the desmids altogether.

† Not globular in *all* desmids.

is formed, called a sporangium, which is believed in due time to produce a multitude of individual spores, ultimately growing to *Closteria*. The operation of forming a sporangium is said to be very rapid, only occupying a few minutes. We have never been fortunate enough to witness it. A third mode of reproduction (in *Cosmarium*) is suspected, and mentioned in Pritchard. To this book, embodying the observations of a host of inquirers, we refer the reader for the fullest information, up to the present time, attainable. At most, however, very little is known of the desmids, and if the readers of Science Gossip will set to work, providing themselves with the home-made growing-slides invented by Professor Smith, of Kenyon College, U.S., or with Mr. Beck's improvement, the results attained will repay them; provided they diligently search after truth, rather than advance speculations. The "Micrographic Dictionary" says, "No less than four modes (of reproduction in desmids) have been observed, and many points connected with the subject still remain to be cleared up."

While we write we have under examination several species of *Closterium*, which were gathered at Keston, on the 18th December last, and have been kept in a bottle ever since (two months), without detriment.* We think the reader will readily identify the forms figured. One of the largest and most beautiful is *C. lunula*, the end only of which we have drawn, because, on the same scale, it would have filled our page entirely.

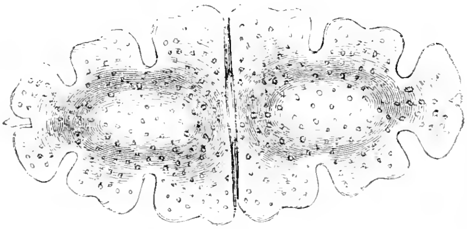

Fig. 97. *Euastrum oblongum* (front view) × 250.

Another kind of desmid introduces itself under the name of *Euastrum*. This is somewhat lozenge-shaped (in front view), with rounded protuberances or inflations, and thicker near the middle than at the edges. The central division is strongly marked. We figure examples of *E. oblongum* in different positions, that some notion of the shape may be obtained. The endochrome is of a beautiful herbaceous green, but then this colour is common to all desmids, so we need hardly notice it. Occasionally circulation may be seen in the interior, but not often. There are many species of *Euastrum*, differing greatly from each other, both in size and form. Once or twice I found a frond exhibiting the swarming motion of the contained atoms to which we shall refer presently, and which appears to appertain to many other sorts as well

* Except such as have been eaten by various animalcules and crustacea; by no means an inconsiderable number.

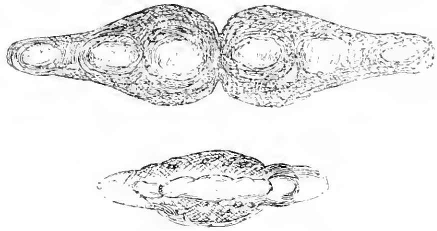

Fig. 98. *Euastrum oblongum* (side view and end view) × 250.

The *Micrasterias* is a large and beautiful representative of the group. It is disc-shaped and flat, like a pan-cake. The edges are nicked regularly all round, as if with scissors, and the green contents

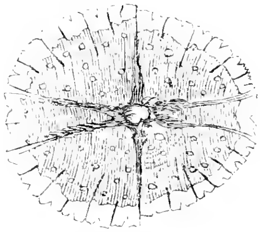

Fig. 99. *Micrasterias rotata* × 250.

cease at a little distance from the margin, giving the whole a most delicate appearance. We have seen circulation in some specimens. The different species of *Micrasterias* are numerous.

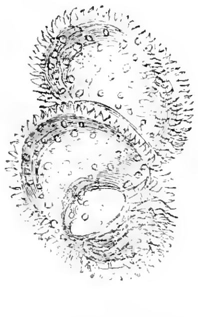

Fig. 100. *Cosmarium margaritiferum* × 250.

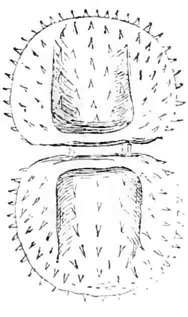

Fig. 101. *Cosmarium margaritiferum* (empty frond) × 250.

The Cosmarium is a singularly pretty organism of dumb-bell shape, having the surface covered with warts, which in profile look like spines. When the frond is empty, and many examples will be found, the sides collapse slightly, and the warts appear as spines.* We have never observed circulation so as to be certain about it, but have often seen the swarming motion of the particles of endochrome, believed by many to be connected with some mode of reproduction only partially described, and not understood. Since last December up to the present time (Feb. 21) we have hardly examined one Cosmarium without noticing this peculiarity. At page 201 in SCIENCE GOSSIP, Vol. I., will be found a very good account of the mode of reproduction in *Cosmarium Botrytis* both by cell division and by conjugation.

Some desmids are very minute—*Ankistrodesmus*, for example, which is described as like a tiny bundle of faggots. Others appear as jointed chains enclosed in a glassy tube. Many, also, are so curious that no description without a figure would be intelligible; but we cannot at the present time enter more minutely into their characteristics.

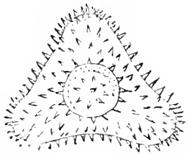

Fig. 102. End view of *Cosmarium margaritiferum* × 250.

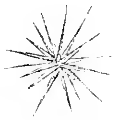

Fig. 103. *Ankistrodesmus?* × 250.

The name Desmidiaceæ is derived from a word signifying a chain, and is descriptive of the appearance of many members of the family.

A pleasant writer in "Recreative Science" suggests that our jewellers might copy these microsopical plants with advantage to themselves. The idea appear to us to be a remarkably good one, and could they only imitate, in suitable materials, the display of beauteous forms, and delicate colours, so suitable for brooches, clasps, chains, bracelets, &c., which offer themselves in the Desmidiaceæ, the public would not be slow to appreciate their efforts.

Before we conclude we will say one word as to the collecting. When in large quantities, they give a green tinge to the surface mud where they lie, and in this case the bottle must be filled with water as nearly as possible at the bottom. Invert it, and when it reaches them turn it on one side, and the contained air will escape while the light mud, with the desmids, will rush in. Another simple plan is to squeeze handfuls of the moss containing them into a large bottle. When the bottle is full of water the light sediment will be found rich in them. Sometimes the hand alone will have to be brought into requisition, to convey such as are known to be attached to the stems and leaves of aquatic plants to the surface. The most elaborate plan of all, however, is to strain the water containing them through linen, and, when sufficient quantities are obtained, to remove them from the linen to the stock-bottle.

We must not dismiss the subject without alluding to the power of motion which the Desmidiaceæ possess. Under the microscope several species may be seen to move slightly, and they are believed to retire in dry weather below the surface of the mud, where they dwell while it is soft, and when it is overflowed with water again, to reappear in the light of day, which they seem to love. If kept in a window, the greater part will make their way to the side of the bottle next the light, and numbers will attach themselves in some mysterious way to the glass, at various distances, from whence they cannot be dislodged without a smart jolt. Their small specific gravity, and the mucus in which they are enveloped, perhaps render them important aid in effecting this object.

Having seen, at a recent meeting of the Microscopical Society, Messrs. Powell and Lealand's marvellous exhibition of the circulation in *Vallisneria spiralis* under their new binocular and 1-16th object glass, we were tempted to ask them to permit us to see more of the arrangement. With the courtesy which these gentlemen always display, they invited us to their manufactory, and to our astonishment showed the Amician test (*Navicula rhomboides*) stereoscopically, the markings being resolved into checks in such a manner as we never saw before.

We then took from our pocket a small bottle containing some of the desmids we are describing, and with the help of Mr. Powell commenced an examination of them under conditions which a month or two ago would have been considered incredible, viz., an amplification of 600 diameters and upwards, and the binocular relief as satisfactory as the most fastidious examiner could wish.

S. J. M'INTIRE.

ANIMALS IN AQUARIA.

MR. P. H. GOSSE, in his "Aquarium," 2nd ed. 1856, p. 224, tells his readers that if they procure "a few bits of weed-covered rock from the level of low water," and place them in a glass vessel of sea-water, many very interesting creatures will creep out of the interstices of the stones and plants growing on them. I have been in the habit of thus procuring and observing small animals for some years, but I do not find anything so productive of such things as *Serpulæ* masses, and the various substances upon which *Serpulæ* grow, when dredged from the Bay of Weymouth, in Dorsetshire. No

* We may be under a misapprehension in this, and the specimen of an empty frond we have drawn, may be either a variety, or a totally different species.

other locality known to me is so rich as this in the particular objects under notice. The substances to which the *Serpulæ* adhere are stones; old shells, both bivalves and univalves; broken or whole wine or beer bottles,—these bottles, especially, are very full of various things, both inside and out,—and broken crockery. Not merely *Serpulæ* of two or three species are on these masses, but several species of *Sabellæ*, and other tubiculous worms, such as *Spio*, *Terebellæ*, and others; and adhering to them, in considerable abundance, are small sea-cucumbers (*Ocnus*), and within the empty univalve shells, such as those of *Buccinum*, are frequently found specimens of a somewhat rare vermiform echinoderm, *Syrinx Harveii*. But the great value of these dredged masses does not consist merely in what is found upon them when first got, but also in the highly-interesting things which will grow upon them, from germs not at first seen, when they are properly treated in an aquarium. Here I have one large tank, of 300 gallons capacity, with a stream of sea-water running through it day and night, at the rate of 100 to 500 gallons per 24 hours, according to circumstances, and which is stocked mainly with Weymouth *Serpulæ*, and other creatures naturally associated with them, or grown here on the same masses: I even grow *Alcyonium* on them. The animals, however, which spring up with greatest vigour in confinement, attached to the same stones, shells, and broken glass and crockery, are Tunicated Mollusks, of various sizes. These are without any shell, but are covered with a leathery tunic,—hence their name. Some of those I grow are of the simple or solitary kinds, *i. e.* which are not organically connected in masses, like the compound species, and look, as they stand up, permanently fixed to foreign bodies by their base, like miniature semi-transparent double-necked bottles. (See Hardwicke's Science Gossip for February, 1866, pp. 30—32.) These are *Ascidians*, and in the *Serpula* tank No. 6 of this establishment, and in all other tanks where *Serpulæ* are contained, they swarm by hundreds, nearly all of them having made their appearance *in situ*; and these specimens are much cleaner, and are therefore better for examination, than those obtained grown in the ocean. The simple kinds I mostly grow are,—*Ascidia virginea*, *A. mentula*, *Molgula tubulosa*, *Cynthia quadrangularis*, *C. grossularia*, and others; and the compound kinds which spring up are of two species, namely, *Botryllus polycyclus* and *Clavelina lepadiformis*. The *Botryllus* comes in patches, in twenty or more places at once; and it looks like groups of brilliantly-coloured violet stars set in firm jelly of a darker hue, and after a time it goes away. I have reason to suppose that excess of light is one great cause of their disappearance, for the only colony I now (February 1st, 1866) possess (and which I have preserved all last summer, after all the rest went away in the spring) covers a surface of Portland cement in a corner of a tank which has been purposely, for another purpose,* closely covered by a board. I have often obtained *Botryllus* from the sea, but have never been able to keep it long; and I remember that, about twelve years ago, after many attempts were made to acclimatise it in the Regent's Park aquarium, London, a great patch, larger than one's hand, and containing several hundreds of individuals, made its appearance, unbidden, on the slate end of one of the tanks.

Clavelina comes similarly in great colonies, chiefly in spring and early summer, standing up like groups of little clear vases, much less opaque than when I obtain them from the sea ready grown, and less liable to die. But, whether grown or introduced as adults, they disappear after a time, being killed off, as I believe, by the great enemy of most of these beings, *light*. *Clavelina* is small enough to be placed in a zoophyte trough on the stage of the compound microscope, and the circulation of its fluids produces a beautiful spectacle, which is figured in one of the plates to Mr. Gosse's book, "Tenby; a Seaside Holiday." 1856. I should mention that the two compound *Ascidians* named do not commonly grow *upon* the *Serpulæ* masses, like the simple kinds, but rather through their influence; not only because of the germs introduced with or upon them, but because, as well, of the healthy influences of the numerous forms of *algæ* also growing upon them; and their roughness of surface, or some other conditions, seems peculiarly adapted for encouraging the growth of other kinds of seaweeds, so that our *Serpula* tank is eminently a very healthy one, not easily put out of order, and with its water ever brilliantly clear. Sponges, too, like the *Ascidians*, are things which are not easily kept when introduced in aquaria when ready grown; but they may be maintained for long periods when they grow up by chance; and upon the *Serpulæ* masses here, or in the *Serpula* tank, I have now growing (and bred here) five or six species in a state of great vigour, as, *e.g.*, *Sycon ciliatum*, *Cliona celata*, *Grantia botryoides*, *Halichondria panicea*, *Leuconia nivea*, and two others which I cannot name from any books in my possession. Some one, in Hardwicke's Science-Gossip, a little time ago, asked how to keep the Freshwater Sponge (*Spongilla fluviatilis*). I do not know, as I have often tried, and always failed; but here, at any rate, is evidence that the dredged masses I am writing of, will, if placed under favourable conditions, produce many things, and, among others, marine Sponges. At the Birmingham meeting of the British Association, last summer, I saw reported in the *Athenæum*, that Mr. W. R. Hughes

* February 25th. I have just discovered another small colony, on the under part of the shell, of a large living spider-crab—*Maia Squinado*.

had succeeded in keeping a living marine sponge, but the species and the circumstances were not mentioned.

I should name that it is not always safe to place these dredged masses, when got fresh from the sea, into ordinary aquaria without preparation, as there are almost sure to be upon them some animals more delicate than others; and if these are below the mass, between it and the floor of the aquarium, they probably will die, and their death spreads destruction to other things around; and so, a small streamless tank, with an amount of aeration barely sufficient for its ordinary wants, is thus apt to become quickly and injuriously affected throughout. Accordingly, when in trade in London, I used, as a means of safety, to be obliged, with much regret, to carefully scrape and wash away all matters, however interesting, from these masses except the *Serpulæ* themselves; and in no other state could I sell them to my customers without chance of disaster.

Here, however, I am only too glad to get such masses just as they are dredged, no matter how large, or how rough, dirty-looking, and scabrous; and I place them first, and for some time, in great shallow probationary troughs, with a strong stream of sea-water running through them day and night, and I turn over the masses occasionally, so as to present all their sides equally to the oxygenating influences of the current, and to check the tendency to decomposition which exists when the underlying parts of the masses are in close contact with the sand and shingle forming the bed of the troughs. When this is done, and all is healthy, and there seems nothing else likely to die, the masses are transferred to the show-tanks, and when anything grows up upon them in the manner described, I am very particular in keeping it in exactly the same spot as that in which it made its appearance, as often a removal of but a few inches disturbs some delicately-balanced conditions, and a sudden disappearance is the result.

The mention of sand and shingle in aquaria reminds me that some early writers on the subject—the Rev. Messrs. Kingsley and Tugwell, for example—advise that no sand or shingle should be in aquaria, as they encourage the formation of the blackness which is a sign of the presence of sulphuretted and carburetted hydrogen gas, resulting from the decay of organic substances. *Fine* sand is even worse than coarse, as the particles lie so closely together, and around any object resting upon or in it, that water cannot freely circulate around. But the discomfort to the animals, and the unsightliness of a bare slate or glass bottom in a tank, by far outweigh any advantages to be derived from the absence of sand and shingle; and, indeed, no blackness will form unless some decomposing substance is carelessly suffered to remain in the aquarium; and when that is the case, its removal, and the gentle stirring up of the sand at the spot affected, will cure the evil in a short time. And as to the black layer which *will* always in time accumulate at the bottom of the layer of the gravel, below its surface, and which cannot be prevented by any amount of good management, and which it is probably not desirable to prevent, as many animals seem not to dislike it by the manner in which they burrow in it, —*that* is harmless, so long as it does not crop through the surface.

I have to remark, that Mr. Shirley Hibberd, in last November's number of *Recreative Science*, advises aquaria to be built up internally with old oyster-shells which have for a long time previously been exposed to wind, rain, and drought, to destroy any germs of animal life happening to be upon them, and which, by decaying, would prove hurtful to other things. But this killing of all germs would deprive the shells of the only value they can possess, as they then would have no more worth than any other rough substances for the growth of *algæ* upon them; and it is contrary to good taste to introduce dead shells in an aquarium merely because they are shells, or because they are rough. Rough *stones* would be much better, and more natural-looking.

W. Alford Lloyd,
Zoological Gardens, Hamburg.

PIN CENTRES AND ROSE CENTRES.

If any one will take the trouble to examine a bank of primroses, it will be seen that the flowers are by no means all alike. There is a great variety of colour: here and there one almost pure white; a few almost lemon-yellow, with every possible shade between. They differ, too, in their form: some having a starry appearance, because the segments of the flower are narrow; others looking solid and round, on account of the segments being broad and lapping well over each other, and these last are by far the handsomest flowers; so that, if one wished to transplant primrose roots into a garden, the trouble of selecting plants would be well repaid in the effect produced.

But there is, physiologically, a much more important difference in primrose flowers than either the colour or the form. On some roots the flowers have the pistil much longer than the stamens; on other roots the stamens are much longer than the pistil. In the first case there will be seen the pistil, resembling a pin's head just within, or even protruding from the throat of the flower, no stamens being visible, because they are situated low down in the tube of the corolla. In the second case, the stamens are seen forming a pretty coronet, which closes up the throat of the flower, entirely hiding the pistil, which, indeed, does not reach more than half way up the tube of the corolla.

A reference to the accompanying figures will, perhaps, best explain these peculiarities.

Exactly these same differences are found in other primroses besides the wild ones, and polyanthus growers have, I believe, given to the two kinds of flowers the names of "pin centres" and "rose centres," and because the rose-centred flowers have

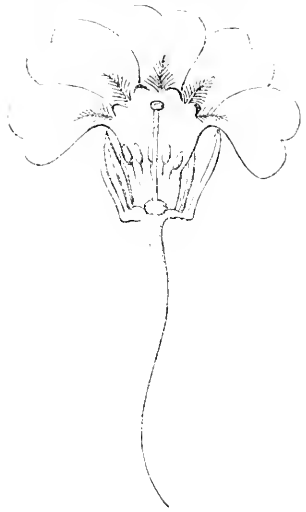

Fig. 106. Pin Centre.

undoubtedly a richer appearance, a polyanthus is not considered by the florists to be worth growing if it have a pin centre.

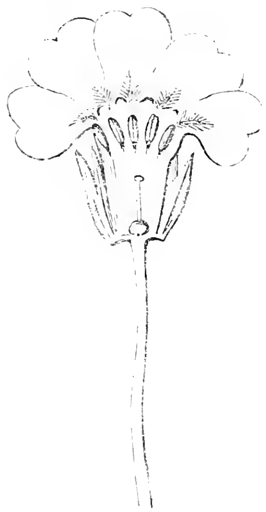

Fig. 107. Rose Centre.

But, for the botanist, there arise some rather curious speculations with regard to rose centres and pin centres. Thus, the primrose is apparently branching off into two distinct varieties; will the gulf widen, and there be at last two species? Or, do the pin-centred flowers show a tendency to lose their stamens, and the rose centres their pistils, and the primrose become eventually diœcious?

Again, referring to the figures, it will be evident that in the rose-centred flower the pollen will naturally fall from the stamens on to the pistil, and it will thus be self-impregnated. In the pin-centred flower, the pistil is in such a position that it cannot be fertilized by pollen from its own stamens, and it must depend upon insects bringing pollen to it from other flowers. Darwin says that the seeds of self-impregnated flowers do not produce such robust plants as seed that has been fertilized by pollen from another individual. If this be the case, and if "a struggle for life" is going on amongst species or varieties, will there not come a time when the rose centres will have been "elbowed out" and become extinct, and when florists must admire the pin-centred flowers or none at all? But *are* the rose-centred flowers always self-impregnated, or do the little black fellows that one finds so often in primroses carry pollen from one to another? Are the pin-centred flowers *never* self-impregnated, or does the pollen work its way up the pistil by means of moisture and capillary attraction? Are rose centres less robust than pin centres? Are they more or less plentiful? Do the seeds of rose centres and pin centres always produce plants like the parent?

Here is work for field naturalists—questions to be solved, the answers to which will not be uninteresting or unimportant. The hedgebanks are covered with primroses, and investigation will not only be a profitable, but a pleasant task.

Robert Holland.

FRENCH MARYGOLD (*Calendula officinalis*).

THIS plant is dedicated to the Virgin Mary, and named in France *Souci de Jardin;* in Germany, *Goedblume*. Loudon says, "The Marygold was introduced into England in 1572, from the south of Europe, and named *Calendula*, because it may be found in flower during the calends of every month." According to Linnæus, these flowers are open from nine in the morning until three in the afternoon. Bullein, who wrote in 1562, mentions, "The Marygold with golden yellow flowers, named *Caltha* or *Calendula*, because it flowereth in the kalends of the year, and is named *Solsequinum* because it openeth his flower and turneth at day after the sun, and closeth in his golden beams at night. The flowers will change the hair and make it yellow." It is the corolla that yields a fine orange colour. In the olden time, good housewifes extracted this juice to colour cheese. It seems evident the French Marygold was a new and interesting flower in the reign of Queen Elizabeth. In Bacon's "Essay on Gardens," the French Marygold is included in his list of flowers for May or June. May we not, then, conclude it flourished in Shakespeare's garden at New Place, where, doubtless, he observed the habits he has so truthfully and poetically described? For instance:—

> The Marygold that goes to bed with the sun, and with him rises weeping.

This beautiful allusion to the sleep of plants Shakespeare elsewhere completes, when he describes the Marygold waking at morning:—

> And winking Marybuds begin
> To ope their golden eyes.

Again he sings:—

> Her eyes like Marygolds hath sheathed their light,
> And canopied in darkness sweetly lay,
> Till they might open to adorn the day.

The name of *French* Marygold was probably given to this flower in consequence of its having reached England from the South of Europe through France. It would be curious to know why our lively neighbours gave the melancholy name of "*Souci de Jardin*" to this bright-looking flower! The Marygold is now superseded by the numerous new flowers introduced into our gardens. Yet its banishment may be regretted; the French Marygold is rich in colour, regular in form, and its scent particularly refreshing when the morning dew is on the leaves. In addition to these attractions, methinks, we should cherish a flower that our great Shakespeare admired, and sang of so poetically. S. C.

FRONDOSE DIATOMS.

THE section of Navicular Diatoms in which the frustules are enclosed in a gelatinous frond contains six genera, of which illustrations are furnished in the present chapter.

MASTOGLOIA has the valve oblong and striated, with costæ on the connecting membrane, rectangular in the front view. The frustules are permanently surrounded with mucus, forming a gelatinous layer

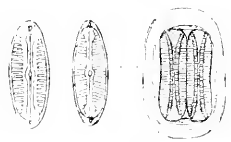

Fig. 108. *Mastogloia Danseii.*

on moist rocks and aquatic plants, each frustule being separately involved. The illustration (fig. 108) is *Mastogloia Danseii* × 400 diameters, one of the five British species.

DICKIEIA has the valve elliptic and striated, *without* costæ in the connecting membrane, also rectangular in the front view. The frustules are imperfectly siliceous, scattered in a membranaceous leaf-like frond. Both British species are figured. *Dickieia ulvoides* (fig. 109) × 400 diameters, and

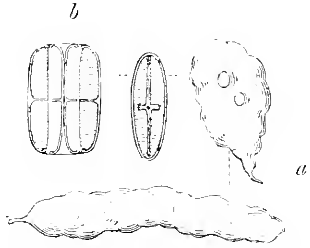

Fig. 109. *Dickieia ulvoides.* *a* Nat. size. *b* × 400.

Dickieia pinnata (fig. 110) × 400 diameters. The figures of the fronds are natural size.

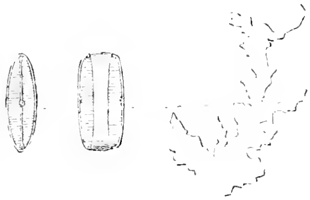

Fig. 110. *Dickieia pinnata.*

COLLETONEMA has the valve oblong or sigmoid and striated, of a truncated ovate form in the front view. The frustules are rather irregularly arranged in one or more rows, in a frond which is either

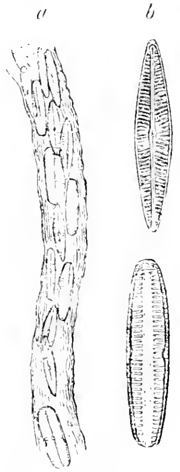

Fig. 111. *Colletonema neglectum.* *a* × 200. *b* × 400.

simple or divided, thread-like or globose. *Colletonema neglectum* (fig. 111) is given in illustration, and we possess two or three other species.

Berkeleya has the valve in both side and front view linear-lanceolate, obtuse at the tips. The frustules are included in definite gelatinous filaments,

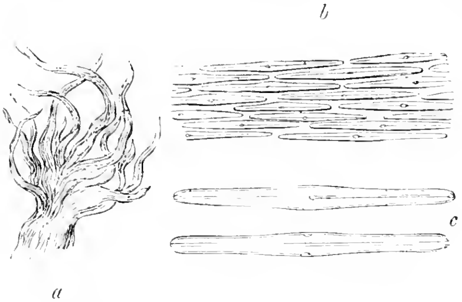

Fig. 112. *Berkeleya fragilis.* a × 10. b × 200. c × 400.

which unite at the base in a tubercle. The only British species is *Berkeleya fragilis* (fig. 112).

Schizonema has the valves boat-shaped (naviculoid). The frustules are in lines within a thread-like, branched tube, of nearly equal diameter through-

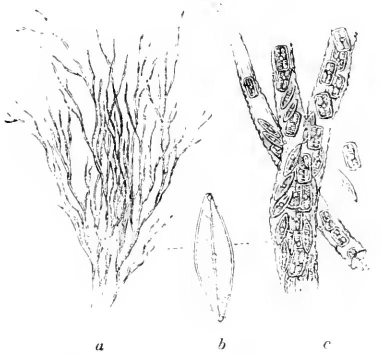

Fig. 113. *Schizonema Grevillei.* a × 5. b × 400. c × 100.

out. *Schizonema Grevillei* (fig. 113) is one of eleven British species.

Micromega has the valves also boat-shaped, with the valves arranged in the same manner as in

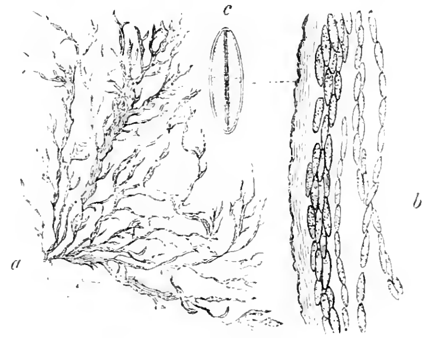

Fig. 114. *Micromega helminthosum.*
a Nat. size. b × 100. c × 400.

Schizonema, but the thread-like tubes are united into a flat, membranaceous, leaf-like frond. We have upwards of twenty British species, of which the one selected for illustration is *Micromega helminthosum* (fig. 114).

The genera which we have illustrated in the present and two preceding numbers, constitute the group of Navicular Diatoms in which the valves have similar ends and a median longitudinal line, and are either linear or quadrangular in the front view. This group is called Naviculeæ. The British species are enumerated in Gray & Carruthers' "Handbook of British Algæ," page 104 to page 116.

CADDIS-WORMS.

About this time last year I derived so much pleasure from a few caddis larvæ, that I should like to induce any who have never tried such experiments to do so, promising them a lasting fund of enjoyment. In the "Scientific Summary" of *Popular Science Review* for January, 1864, was an account of experiments made by Miss Smee in regard to the building capabilities of the caddis-worm. Afterwards I read an article by the same lady in the *Intellectual Observer*, in which she gave a most interesting history of her experiments. If Miss Smee could force these little creatures to build of such a variety of things, why should not I? Already I had dozens of the larvæ in my aquarium, and, following Miss Smee's directions, I broke different coloured glasses into tiny bits, also pearl and gold beads, fragments of coral and shell comb, placing them in saucers of water; then the larva had to be turned off its case. This can only be done by gently irritating the tail with a needle or pin, as no force will induce it to leave its home with life, the last segment being provided with two strong hooks, with which they cling so tenaciously to the case, that they will suffer themselves to be pulled in two rather than release their hold. These hooks can be easily seen with a pocket lens. Very soon after the homeless larva has been placed among the bits of glass, &c., it will commence to construct a new case. I never remember experiencing greater delight than I did in watching the "water-maggots" adapting substances so novel to their own requirements, cementing each fragment firmly and no matter how diverse the size and shape of the materials used, always keeping the inner surface perfectly smooth and even. The caddises are not long in building, and the addition of a few purple, green, or blue glass cases, with here and there a shining bit of gold or pearl bead, makes a pleasing variety in the aquarium. I had one fine larva last spring, which built entirely of thin white glass, through which every movement of its body could be plainly seen. The first day it was placed in the aquarium it occasioned quite a commotion amongst the pugnacious sticklebacks, which, by the way, are scarcely more pugnacious than caddises themselves. The deception was so perfect that they mistook it for an uncased grub, and, with mouths watering in anticipation of the delicious morsel "so near and yet so far," dashed against the transparent armour in dire indignation. After a little while they ceased all attacks, I suppose I must say from *instinct*, though I am far more inclined to call it *reason*. Caddis-worms can be obtained from almost every river and stream, and as they always build in accordance with the specific gravity of the water, the larger cases will be found in the bed of a deep or swiftly flowing river. These are generally constructed of small pebbles and *Planorbis* shells (not unfrequently with living inmates), while in shallow streams, or crawling among the river-weeds, may be found those which construct their homes entirely of vegetable substances. I think the caddises might be classed into vegetarians and carnivorians, homœopaths and allopaths, for some live entirely on a vegetable diet, others prefer meat in large quantities, while some build for days, and, as far as I can see, never eat at all. The carnivorians are decidedly preferable for architectural purposes; they seem stronger and more active; while the vegetarians use the weeds given them to allay their hunger in building a fresh case. When dredging for caddises, I sometimes transfer from the net to the can the closed-up cases which are everywhere to be met with. These contain the pupæ, which pass some time in a quiescent state. From April to June some of these are sure to emerge, and swim freely about the water for an hour or two. The pupa much resembles the larva, though the colour is brighter, and the eyes distinctly visible. They swim with great rapidity, as far as I could observe, only using the anterior pairs of legs, the hinder ones, which are very long, being folded together along the under side of the abdomen. In a few hours the pupa casts its skin, and the perfect insect (*Phryganea grandis*) will be seen drying its wings on the rock-work or weed. Should it be wished to save the insect, it will be better to cover the aquarium with net as soon as the pupa emerges, in order to secure it before it tries its wings. The eye and wing are both beautiful objects for the microscope.

M. Pope.

OBSERVATIONS ON VENUS.

The dazzling brilliancy of this planet makes the daytime preferable for observing it; but under the best of circumstances its light is far too glaring to permit physical observations being conveniently made. J. D. Cassini attacked it in 1667, and some ill-defined dusky spots, seen on various occasions during April, May, and June, enabled him to assign 23h. 16m. for its axial rotation. Bianchini in 1726 and 1727, favoured by an Italian sky, observed spots with greater facility. He inferred a rotation performed in 24 *days* 8h. Sir William Herschel, desirous of arriving at a sound conclusion, devoted much care to the inquiry, but he was unable to assign a precise period, or to do more than suspect generally that Bianchini's was largely in excess of the true amount. Schröter, by closely watching certain spots, deduced a period of 23h. 21m. 7·98s., which Di Vico and his colleagues at Rome, in 1840-2, only slightly modified to 23h. 21m. 23·93s. We may thus feel assured that the axial rotation of this planet is known to within a very small fraction of the whole amount.

Sir W. Herschel's opinion of the spots he saw was that they were in an atmosphere, and did not belong to the solid body, an opinion wanting in analogy, and there is now reason to believe altogether groundless, for Di Vico found the spots just as delineated by Bianchini. The Roman observers, six in number, displayed great diligence, and, with one exception, Bianchini's drawings were confirmed. Of the six observers the most successful were those who had most difficulty in detecting very minute comparisons to large stars, the reason of which Webb points out to be obvious enough. A very sensitive eye, which would detect the spots more readily, would be more easily overpowered by the light of a brilliant star, so as to miss a very minute one in its neighbourhood.

Mountains probably exist on Venus, though the testimony on which the statement must rest is not quite so complete as could be desired. In August, 1700, La Hire, observing the planet in the daytime near its inferior conjunction, perceived in the lower region of the crescent inequalities which could only be produced by mountains higher than the moon. To the same effect, Derham writing in 1715. Schröter asserted the existence of several high mountains, in which he was confirmed by Beer and Mädler; but his details as to toises must be accepted with great reserve, amongst other reasons, because it is doubtful whether his micrometers were of sufficient delicacy. Sir W. Herschel disbelieved him on some points, and assailed him in the *Philosophical Transactions* for 1793. His reply was published in the volume for the year but one after. It was calm and dignified, and indicated the mountains, if not the measurements. Di Vico, at Rome, in April and May, 1841, appears to have noticed a surface-configuration akin to that of the moon; a bluntness of the southern horn, referred to by Schröter, was also seen by the Roman astronomers, and often by Breen subsequently, with the Northumberland telescope at Cambridge.

That Venus has an atmosphere is generally admitted; that it is of considerable density is likewise an opinion apparently well founded. During the transits across the sun of 1761 and 1769, the planet was observed by several persons to be surrounded by a faint ring of light, such as an atmosphere would account for. Schröter too discovered what appeared to him to be a faint crepuscular light, extending beyond the cusps of the planet, into the dark hemisphere. From micrometrical measures of the space over which this light was diffused, he considered the horizontal refraction at the surface of the planet to amount to 30′ 34″, or much the same as that of the earth's atmosphere. Sir W. Herschel confirmed this as a whole, and more recently (May 1849) Mädler was able to do the same with the mere modification of making the amount greater by $\frac{1}{6}$th or equal to 43·7′. Considering the difficulty of seeing the planet, it may be said that we know a good deal about our neighbour.

G. F. Chambers, F.R.A.S.

GEOLOGY.

Observations on Fossils.—While engaged with more of my fellow workmen, in pursuing my daily vocation in the mine, I came in contact with a fault (commonly called by miners a trouble). As the seam was broken, we had to return a considerable distance, and cut a passage through several strata, before we could again reach the bed of coal. I intend to give a few particulars of the fossils we met with in the different strata through which we passed, as they may be of interest to readers of S. G. I examined some of them with much care as we moved slowly and carefully along in our dark cavern. A layer of blue stone, about two feet thick, which had spread over the black shale, was the first that we had to cut through. As soon as we commenced operations, I instantly observed the bed of two spines of fish. They were both bent a little to one side, an occurrence which appears to be quite common, but the cause of which may not be so easily explained. Some beautiful specimens of fossil plants, such as Cones, Sigillaria, Calamites, and a variety of ferns, are generally found in this layer; but in this place I was much disappointed in finding nothing more than a small piece of the inner bark of Sigillaria. We passed through a mussel bed, the shells of which were neither so fine nor so neatly formed as some that I have seen from the same layer (or bed) in other parts of the district. I may also say that there is another bed of mussels met with about the same distance *below* our coal bed, as this is above it, both of which contain the same species, although they must have lived and died some thousands of years from each other. We came in contact with another layer, which contained a large quantity of coarse Calamites, stretching along the plane of stratification for several yards; and then we lost sight of them, possibly never to see them again. A layer of thin blue clayey stone next formed our roof for a short way on our journey, which was a complete mass of fern-leaves. These were more clearly impressed, and presented an appearance in the flora line more magnificent than any I had previously witnessed in the mine. What a great amount of pleasure and delight any lover of botanical science would have enjoyed in gazing upon the scene above, as thousands over thousands of the leaves of this fern fell upon the eye, as the rays of our candles shone so brightly upon them. The dark subterranean passage would have flown from his mind, and with it the vague idea of impressions, and he would at once have thought he was taking a ramble along the surface, searching and gathering some interesting species, where nothing but living ones were growing. Again, I might say, what a world of pleasure there was to me to think or reflect upon the time they grew and flourished, and when great unsightly beasts may have wandered among them in search of food, and made the woods echo with their wild and hideous roars! Probably no bird of sweet note cheered them in their wanderings, and no human being sat and watched their unwieldy movements! But, back to my story. The substance on which those leafy impressions were made, was so exceedingly brittle, that, notwithstanding all my caution, I could not procure more than one or two pieces to grace my cabinet. We passed through several other layers containing fossils, that seemed to have flourished in a rich vegetation, and may have borne the cold and chilly winds of autumn and the severe frosts of winter, and adorned and beautified the landscape in summer by their green foliage, and at last have fallen to the earth and left their impressions to be found and described by men of science some thousands of years afterwards. Layers of a hard and stubborn nature yielded to us, and opened out their long-hidden treasures, and Nature revealed without ink or pen her great and glorious work, and showed with what magnificence she has planted her impressions in the different leaves or layers of her book. A little before we reached the coal-bed, part of a spine of a fish was met with, which may have been pitched from its own bed (black shale) by the eruption that had torn asunder the solid layers of strata. Lyell, speaking of the coal-field in Wales, says,—"It has been observed that in the overlying shales of the beds of coal in Wales, no Stigmaria plants have been found; yet in the underclays which form the floor, on which one hundred seams of coal rest, Stigmaria appears to abound." All the upper shales through which we passed presented no traces of Stigmaria. A few feet below our coal-bed, a blue clayey layer of stone is found, which contains nothing but the leaf-like rootlets of Stigmaria, branching out in all directions, and making it at times a very pleasing and interesting scene.—*John Sim (Miner), West Cramlington.*

Exchanging Fossils.—Collectors of scientific objects might do far more by exchanging their duplicates than is done. Every geological collector has, or should have, very many duplicates of the specimens mounted in his cabinet, any or all of which would be prized by other collectors, who, having duplicates also, would gladly exchange them for species different from their own, a new or different form being always much more valuable than a second specimen of those already mounted. Moreover, we are too much disposed to give up the examination of formations, or beds from which we have procured all the available fossils; but if the system of exchange was properly carried out, it would be an encouragement to work on at beds *supposed* to be already thoroughly examined; for if we can calculate upon thus disposing of all the fossils we find for species from other formations, the more duplicates we accumulate the better, and we, becoming better acquainted with the formations within our reach, are the more likely to find uncommon or rare forms not always to be procured by hasty examinations. It would be well, therefore, if the readers of S. G. would collect all the duplicate fossils they can from their respective localities, and make out a list of them for the use of those with whom they wish to exchange; then, by first exchanging lists, both parties can select the species they respectively require, and thus secure the greatest variety of species, without the transmission of unnecessary specimens. The characteristic fossils of formations so frequently vary with the locality, the name of the formation from which specimens may be had furnishes no index as to the species available. The suggested list, however, meets the difficulty, and will enable collectors on similar formations to exchange forms from each not common to the two. I shall be happy to forward a list of specimens from this locality to any collector willing to exchange with me.—*W. Gray, Mount Charles, Belfast.*

MICROSCOPY.

Substitute for Clips.—I have adopted a plan for the last three or four years, which answers all the purposes of a "clip," for pressing down the thin cover on a slide, and at the same time getting rid of superfluous balsam. It consists in painting the edge of the thin glass and the adjoining portion of the slide with tolerably thick gum arabic. As the moisture evaporates, the gum itself contracts, thereby pressing down the cover, but so gradually, that not the slightest injury is done to the most delicate object. At the same time all superfluous balsam is forced out at some weak point in the gum, and can be easily removed, as it forms a small globular mass. Of course there is not the slightest fear of the gum forcing its way into the balsam, there not being the remotest affinity between the two. In a day or so the gum can be removed by a wetted handkerchief; indeed the greater part chips off of itself when thoroughly dry. Judging from my own experience, I prefer this method to either clips or weights. It answers as well for cells as for the plane slide.—*W. W. Spicer.*

Insect Scales.—At vol. ii. p. 29, ninth line from top of left-hand column, read *hues* instead of *lines;* and as the scale figured on page 58 is from the small garden white or "cabbage" butterfly, the name should be *P. Rapæ* instead of *P. Brassicæ.* The scales of the latter differ *chiefly* in being more elongated than those of the former insect. Since making the notes on the subject, another scale which I have never seen figured, has turned up, and deserves to have had a place in the chapter. I do not know whether to refer it to a *Leptocircus* or to a *Morpho,* in which genus considerable latitude for variety is suspected. Pieces only of the wings came into my possession, and I did not take the necessary precautions to insure accuracy in time. By reflected light the objects in question are brilliant green and blue respectively; by transmitted light they are crimson-lake shading into purple and yellow, and exhibit beaded markings. The Micrographic Dictionary gives interesting figures of the scales from *Lasiocampa Quercus* and from the larva of *Attagenus Pellio.* I recommend the examination of scales from the Burnet moth the orange-tip butterfly, white plume moth (hair-like scales), and various other Lepidoptera and Curculionidæ. In my figure of the scales of the Pencil-tail (Science Gossip, vol. i. p. 230), I have not done anything like justice to their beauty. The best specimens lie across the back of the creature. I prefer the scales of insects "mounted dry."—*S. J. M'Intire.*

Toxonidea.—With the exception of vol. vi., New Series of the *Quarterly Journal of Microscopical Science*, and Pritchard's "Infusoria," I do not know of any work in which specimens of the beautiful genus *Toxonidea* are figured, and the Editor of Science Gossip has done good service to all who are interested in the study of Diatomaceæ, by introducing to his numerous readers so admirable an illustration of the finest species of the genus as that figured on page 87. There are three species of the genus *Toxonidea;* viz., *Toxonidea Gregoriana*, *T. insignis* and *T. undulata.* The two former are found on the Northumberland coast, the first rather sparely, and the second in great abundance. *Tox. undulata* has been obtained by Mr. Norman, of Hull, from the stomachs of ascidians taken from deep water off the coast of Hull. With the exception of Northumberland, I have only heard of two places in which *Toxonideæ* have been found on the open sea-coast, once in Dublin Bay by the Rev. E. O'Meara, in

1858, and that only on one occasion, all other searchings in the same locality proving fruitless; and also near St. Michael's Mount, Cornwall, from which locality I have had forwarded to me one very inferior frustule of *Tox. insignis*. *Tox. Gregoriana*, the most beautiful species in the genus, has, so far as I know, not been found anywhere except on the Northumberland shore, and I beg to request all the readers of the Gossip who make shore gatherings, to search during the present spring, summer, and autumn, on their respective coasts for the diatom which is so excellently represented on page 87. *Toxonideæ* of the species *Gregoriana* and *insignis* are only found in Northumberland a little above low-tide mark, and they are generally associated with other marine forms. Should any be found, I shall be glad to exchange slides or gatherings.—*T. P. Barkas, Newcastle-on-Tyne.*

Glass Cells.—To make them from glass-tubing, it is necessary to slice them with a slitting-wheel and diamond-dust; this, however, is out of the reach of most microscopists. I have adopted the plan suggested in Carpenter's work on the microscope, viz., cementing a piece of glass to a perforated brass plate with shellac, and knocking out the central portion. I have several plates with holes, ranging from $\frac{1}{8}$ to $\frac{5}{8}$ inch in diameter. The brass plate should be the size of a glass slide, viz. 3 in. by 1 in., and not less than $\frac{1}{16}$ thick; the hole should be perfectly central, in order that the cemented glass may be placed on the turn-table, and a ring or series of rings scratched upon it with a diamond; the centre may then be knocked out with a small steel hammer and finished off with a round file. Cells varying from the $\frac{1}{100}$ to $\frac{1}{4}$ inch in depth can be readily made by this method.—*Fred. Kitton, Norwich.*

MICROMETRIC TABLES.

1. Table for the Conversion of French Millimètres into Decimal Parts of an English Inch.

A millimètre = ·03937 inch.

M. Mètres.	Inch.	M. Mètre.	Inch.	M. Mètre.	Inch.	M. Mètre.	Inch.
10	·3937	1·0	·0393	·10	·0039	·010	·00039
9	·3543	·9	·0354	·09	·0035	·009	·00035
8	·3149	·8	·0314	·08	·0031	·008	·00031
7	·2755	·7	·0275	·07	·0027	·007	·00027
6	·2362	·6	·0236	·06	·0023	·006	·00023
5	·1968	·5	·0196	·05	·0019	·005	·00019
4	·1574	·4	·0157	·04	·0015	·004	·00015
3	·1181	·3	·0118	·03	·0011	·003	·00011
2	·0787	·2	·0078	·02	·0007	·002	·00007
1	·0393	·1	·0039	·01	·0003	·001	·00003

2. Table for the Conversion of Parts of an English Inch into French Millimètres.

A mètre = 39·37079 inches.

Pts. of an Inch.	M. Mètres.	Pts. of an Inch.	M. Mètres.	Pts. of an Inch.	M. Mètres.	Pts. of an Inch.	M. Mètres.
1·0	25·399	·10	2·539	·010	·253	·0010	·0253
·9	22·859	·09	2·285	·009	·228	·0009	·0228
·8	20·321	·08	2·032	·008	·203	·0008	·0203
·7	17·779	·07	1·777	·007	·177	·0007	·0177
·6	15·239	·06	1·523	·006	·152	·0006	·0152
·5	12·700	·05	1·270	·005	·127	·0005	·0127
·4	10·160	·04	1·016	·004	·101	·0004	·0101
·3	7·620	·03	·762	·003	·076	·0003	·0076
·2	5·080	·02	·508	·002	·050	·0002	·0050
·1	2·539	·01	·253	·001	·025	·0001	·0025

E. Swansborough.

On Observing Infusoria.—Those who are in the habit of making observations on Infusoria in the live-box, know how often that, coming across some particular specimen they are anxious to preserve alive for some time, in order to further observe it, and setting it aside for a time, on again examining it, find the fluid evaporated, and of course the specimen spoiled. To prevent this, I beg to suggest a plan which hitherto I have found answer well; viz., add a single drop of glycerine to two or three drops of water containing the infusoria to be examined, before putting the cover of the live-box on. This hinders the infusoria travelling too fast across the "field," prevents the water from evaporating with that rapidity which it otherwise would, and so enables it to be kept for days; it also preserves the colour, and but slightly alters the form of any algæ that may be present. The glycerine should be made to mix with the water by gently stirring it with a bristle. When an observation has been made, raise the cover of the live-box, and allow the fluid to form a single compressed spherical drop; when again to be used, gently press down the cover. Various modifications of the above plan may suggest themselves to other observers.—*J.*

To Obtain Desmids Clean.—Place the sediment in a bottle having a comparatively narrow diameter (say a test-tube), in bright light for two or three days, and do not disturb it meanwhile. The desmids will gradually separate themselves from the mud, adhering together on its surface in clusters which are quite visible to the naked eye. The dipping-tube cleverly managed will do the rest of the business. According to the richness of the gathering, will the results be more or less clean.—*S. J. M.*

"Magnifying without Lens or Reflector."—Your correspondent will find some interesting papers by Mr. Gorham, entitled "On the Magnifying Power of Short Spaces," in the *Journal of Microscopical Science*, vols. 3 and 4, old series.—*Fred. Kitton, Norwich.*

BOTANY.

The Cherry.—It was in the 68th year before the birth of Christ, that Lucullus planted the cherry-tree in Italy, which "was so well stocked," says Pliny, "that in less than twenty-six years after, other lands had cherries, even as far as Britain, beyond the ocean." This would make their introduction to England as early as the 42nd year before Christ, although they are generally stated not to have been brought to this country until the early part of the reign of Nero, A.D. 55.—*Phillips's "Fruits of Great Britain."*

Rose of Jericho (Science Gossip, p. 94).—I fancy that the specimens seen by your correspondent were not the *Anastatica*, but such as are referred to in the following extract from my "British and Garden Botany," p. 236, under the head of the Ice-plant Family. "Some of the species have hygrometric capsules. Those of the *Mesembryanthemum Tripolium* (often miscalled the Rose of Jericho, and still more foolishly, the 'Resurrection-flower') are imported from the Cape of Good Hope as curiosities. When dry, they resemble a round grey button about an inch in diameter; but on being dipped in water, they expand into a beautiful star, the rays consisting of the carpels, which then discharge their small black seeds. As the moisture evaporates, the button form is resumed." The *Anastatica* is a plant, consisting of dried and incurved branches, as well figured in Lindley's "Vegetable Kingdom," cited by you, p. 353. It has very little resemblance to a flower,—none at all when compared with the beautiful similitude found in the capsule above spoken of, and is, relatively, very rare. A third plant, sometimes miscalled the Rose of Jericho, is the *Lycopodium involvens*, a native of Mexico and the adjoining regions. It is of wonderful beauty, and far eclipses the Anastatica. I possess the specimens from which the description in the work I have already cited, was drawn up. (*Vide* Lycopodium family, p. 808.)—*Leo Grindon.*

The Flower-Market.—There are pretty things everywhere in this world, if we will only take the trouble to look for them. But of all pretty things it is universally allowed that none are prettier than flowers. It would seem that French people—particularly women—were sent upon this planet for the purpose of saying, "*Tiens! Que c'est joli!*" The utterance of these words gives an opportunity for raising the eyebrows and the hands, and for dilating the eyes, and otherwise showing that you are a person of refinement, of feeling, perception, and taste. The words "*Tiens! Que c'est joli!*" are always applicable to flowers; therefore, the flower-markets of Paris are favourite spots, and much frequented by ladies, *ces petites dames*, and those wonderful Parisiennes whose rolling black eyes give you the notion that they—the eyes—were originally intended for handsomer faces. The flower-market by the side of the Madeleine is a pleasant lounge—a sort of floral camp, where you walk beneath canvas, and criticise bouquets, ankles, breakfasts, and mutual acquaintances. The odd thing is that the place appears to be a promenade, and not a market. People walk up and down and cry, "*Tiens! Que c'est joli!*" but they don't buy. The very fat, white-capped women who vend the lilies, roses, fuchsias, and all the tender tribes of the garden, look matronly, but they don't sell, at least I never saw them or heard them, and I never knew any fellow who said he had ever seen them or heard them. There is a delightful odour from the flowers. You are the more conscious of their sweetness when a *petite maîtresse*, highly coloured and strongly perfumed, waddles gracefully by you. Psh! how inferior is an essence to a flower! The little dog the *petite maîtresse* carries is painted and perfumed as overpoweringly as his proprietrix. Poor dog! how his proprietrix must love him! And what a wonderful creature is the *gandin* who follows! Where did he find the pattern of that gorgeous waistcoat of which he is so proud? Not among the flowers he passes by so heedlessly! How superior is Nature to a tailor!—"*Fun.*"

SPIKED STAR OF BETHLEHEM (*Ornithogalum Pyrenaicum*).—I have found this plant here only on one spot, and have never met with it elsewhere. It is said to be rare, and the record of a locality may be of interest to your readers.—*B. F. M., Ashwell.*

ZOOLOGY.

PUGNACITY OF THE WREN.—The burrow of the woodpecker is far too comfortable a dwelling to be neglected by the wren, who allows the woodpecker to proceed with its labours until he thinks that the hole is large enough for his purpose, and then assaults the unfortunate burrowers, driving them off to seek another and a less-disturbed locality. In one case a pair of woodpeckers began to make their tunnel in an apple-tree, and were driven from the spot by the house-wren. They then pitched upon a pear-tree, completed their burrow, and had laid one egg, when they were again attacked by the fiery little bird, and obliged to abandon the locality altogether.—"*Homes Without Hands.*"

THE PARASITE OF THE BEE.—M. Duchemin has done good service by pointing out the source of the minute creature which attacks the hive-bee. Form several observations and experiments, he believes he is justified in affirming that the parasite is to be found upon the *Helianthus annuus*, and that the bee takes it from the plant, not the plant from the bee.—*Proc. French Academy of Sciences.*

We have had the opportunity of an inspection of one of these parasites, which was found attached to a living bee by Mr. Woodbury. It is a formidable-looking creature when placed under the lens of a good microscope. It is so formed as to be capable of maintaining a very tenacious hold on the body of its victim. Whether M. Duchemin be correct in the conclusion he has arrived at we cannot say. It seems rather strange that a parasite which derives its nourishment from the juices of an insect should originally find its habitat on a plant.—*Gard. Chron.*

KINGFISHERS.—At page 89, Roger J. Wright mentions an instance of a song-thrush breaking through his kitchen window. Several incidents of a like nature have occurred at my home, two of which may be worth recording. The house stands on a low cliff over a river, and the flower-garden in front of the windows being laid out on the top of the cliff, is some thirty-eight feet above the level of the water. Several years ago I was startled by a violent blow against the plate-glass window of the drawing-room, and on looking out for the cause, saw a kingfisher lying on the gravel walk below, with both mandibles of its bill broken about the middle, and bent upward by the force of the blow. The butler picked up and examined the poor bird, which was alive, and pronounced it a young bird and otherwise uninjured; but as it could not possibly eat with its bill in that condition, he proceeded to pare away with his knife the whole of the broken portion, assuring me that it was only the horny and not sensitive part of the bill which was damaged, The bird certainly showed no sign of suffering during the operation, though it is probable it may have been partially stunned. It was then laid on a soft sod to recover, and I watched it for a few minutes, after which it rose, and walked or fluttered away, amongst the bushes, apparently sufficiently recovered to take care of itself; but whether with its shortened bill it was able to pick up a livelihood, I had of course no means of knowing. The other case was witnessed a long time previously by my father. Two birds, fighting on the wing above the same flower-garden, struck with great force against the dining-room window. One of the combatants, a robin, flew away unhurt; the other fluttered down to the top of a stone pillar, where it sat for some moments panting before it was able again to take flight, and my father perceived it to be a kingfisher. We thought it surprising to meet with these birds at so great a height above the level of the water, and still more so that one should fight with a robin, as it is difficult to imagine what could have brought two birds of such different habits into collision. On another occasion my father found a young kingfisher lying dead on the ground, choked by a fish too large for it to swallow, and which was protruding from its bill. The bird was callow, and had evidently been flung out of a nest, which must have been near. It seems a curious instance of defective instinct in the parent bird, that it should have supplied its offspring with a mouthful so large as to cause its death.—*J. P.*

REPTILES IN NORTH WALES.—In Merionethshire there is a great dread of the whole of our reptiles, but especially of the common snake (so far as I know we have not the viper at all) and of the lizards. The latter are looked upon with dread as most venomous creatures, and are honoured with the epithet of "Crocodeil." The common people would not touch them on any account. The first snake this season appeared the 26th March.—*W. P.*

Dipper Walking under Water.—Greater surprise could not be felt by Geo. F. Smith, Durham, at seeing that Mr. J. K. Lord believed in what he (Mr. Smith) thought was an exploded doctrine, than I did at learning from a paragraph in the "Notes and Queries" of Science Gossip that Mr. Smith thought the doctrine exploded. It never occurred to me that there could be any doubt about a fact with which I have been familiar for years, and which must have come under the frequent observation of anglers in this neighbourhood. I have seen the "Dipper" disappear under water at one place, and, after several seconds had elapsed, reappear at another. I have seen them fly into broken rippling water, and, with the water streaming over them, walk against the current to a projecting stone. A friend and I were once rambling along the banks of the river Irvine, Ayrshire, and we saw a "water-pipet" in the stream, dipping, as its manner is, in search of food. It disappeared under water frequently. My friend shot it, and it floated lightly on the surface of the water. With the branch of a tree I intercepted the dead bird as it floated down stream, and on inspection I found its plumage quite dry. In my opinion its strong, sharp-nailed feet are the not "inherent," but adherent power by means of which it is enabled to walk at the bottom of the water. The bird to which I refer in these remarks is the water-ousel (*Cinclus aquaticus*). — *Will. McIlwraith, Dumfries, N.B.*

Nest of the Mason Wasp.—The article in the April number on the "Progress of a Wasp's Nest," reminded me of the nest of the mason wasp, which in India is a very familiar object at one season of the year, and some account of which may not be uninteresting to some of the readers of this magazine. I do not know much of the insect itself, and shall therefore content myself with a description of its nest. Though I was but young when I left India, some years ago, I can well remember the interest with which I used to watch one of these elegantly-shaped insects while busily employed in building its nest. It usually selected some corner for this purpose, not necessarily secluded, as I have frequently seen these nests in the corner of a window-pane. The nest was composed of moistened earth, which the wasp brought to the spot in balls of about ⅛th of an inch in diameter. I am sorry that I never watched closely enough to find out how the material was prepared and built up. I only know that the wasp was very careful, going over its work again and again, making both the inner and outer surfaces quite smooth and regular. In a few hours the nest was completed, and presented the appearance of a ball of clay rather smaller than a walnut—with a hole left in the middle—perfectly round, and just large enough to admit the body of the insect. The next care of the mother-wasp was to provide for the wants of the future grub, and for this purpose it used to store up in the nest three or four caterpillars, each about three-quarters of an inch in length, which, in all the nests I have examined, were of one species: this may have been owing to the fact that there was in my father's garden a large creeper on which this particular caterpillar abounded. These caterpillars were not killed, for they moved if touched, yet if released they made no attempt to escape, but lay as if benumbed. Can any of the readers of Science Gossip explain this? May it have been the result of a sting in a non-vital part? As soon as the egg was deposited, the wasp closed the entrance to the nest and proceeded to build another; and where she has not been disturbed I have seen three and four of these nests in a row. I can say as little about the young wasp as about the old one, since every nest found in the house was destroyed as soon as discovered; and it never occurred to me then to try if the grub could not be reared without a nest.—*M. T.*

Look to your Corks.—Mr. J. J. Weir exhibited some larvæ at a recent meeting of the Entomological Society, which he believed to be only the common meal-worm (*Tenebrio*), but which had been found in the corks of port wine. Considerable damage had been done, since they ate quite through the cork and allowed the wine to escape. He suggested the use of bran instead of sawdust, as the probable cause of their incursion into the cellar. Mr. W. W. Saunders related an instance of a number of larvæ of *Dermestes lardarius*, which were brought into the docks with a cargo of skins, effecting an entry into an adjoining warehouse, where they perforated and rendered entirely useless a quantity of manufactured corks.—*The Athenæum.*

Summer Migrants.—Two Sand-Martins were seen flying about just below Caversham Bridge, near Reading, on April 1st.—(*C. W. W.*) The Chimney-Swallow was first seen at Linton-on-Ouse, ten miles north of York, on the 12th; two more on the 13th and 14th; and a flock of twenty were flying about the village on the 15th.—(*J. R.*) Sand-Martins were numerous at Devizes on the 14th, and Swallows on the 16th.—(*J. J. F.*) In Merionethshire, North Wales, Swallows were first seen on the 14h.—(*W. P.*) The Cuckoo was heard at High Wycombe on the 7th of April (*B.*); at Lavington, near Devizes, on the 8th (*J. J. F.*); Itchen Abbas, Hants, on the 12th (*W. W.S.*) Enfield Chase, on the 13th (*J. B.*); and Hampstead Heath, Middlesex, on the 14th (*C.*). The Redstart was observed at Linton-on-Ouse, near York, on the 14th, whereas it was not noticed there last year until the 4th of May (*J. R.*); and at Llanderfel, in Merionethshire, also on the 14th.—(*W. P.*) The Stonechat was noted at the latter locality on the 9th of April (*W. P.*); and the Chiff-chaff, near Devizes, on the 15th.—(*J. J. F.*)

NOTES AND QUERIES.

Ancient Toads and Frogs.—Many of your correspondents appear to misapprehend my question respecting toads and frogs, asked on page 47 of the Gossip, and I am glad to observe that you have on page 96 directed their special attention to it. I have heard and read of many cases in which toads or frogs were said to have been found at great depths, and imbedded in solid rock; but I only distinctly remember at the present time two gentlemen, who are yet living and with whom I am well acquainted, who vouch for having seen living frogs taken from solid strata at great depths. One is now residing in Newcastle, and about six years ago he worked in a gold-mine in Australia. He and his companions sank a shaft for the purpose of reaching the gold-stratum, and when at a considerable depth—if I remember rightly, 80 feet—they passed through a thick stratum of blue solidified clay, from the centre of which there leaped out a living frog, and the matrix or residence of the frog was a little larger than the frog, and was lined with a soft mucus-like matter. The frog lived for a short time. The second case is vouched for by a tradesman who now resides in the village of Hedley-on-the Hill, near Newcastle, and who, a few years ago, was a coal-miner. He said that a brother miner, in a pit in which he worked when a young man, on heaving away the solid coal, arrived at a portion in which was a small closed chamber, and that from that chamber a living frog emerged; that he saw it; that it was apparently mouthless, and lived a few hours when exposed to the air.—*T. P. Barkas, Newcastle-on-Tyne.*

Atlantic Ooze.—Mr. J. W. Leakey, on page 95, states experiences respecting deep-sea soundings that differ materially from those I gave in the March number. I shall be glad to exchange slides of soundings taken during the laying of the Atlantic cable, for those in his possession obtained during the preliminary soundings for that unfortunate project. I have slides of soundings from Melville Bay, 82 fathoms, and soundings taken by Capt. McClintock on board her Majesty's ship *Bulldog*, in 1,307 fathoms, lat. 61° 66′; long. 38° 34′, in both of which diatoms abound; but in those referred to in my former paper I cannot say positively that the diatomaceous-looking fragments are really those of diatoms.—*T. P. B.*

Dock *v.* Nettle.—B., in his amusing article on "Rural Natural History," gives the following as a specimen of "old wives' fabledom:"—"In Essex dock leaves are applied to the blisters raised by the sting of the nettle, and are believed to be efficacious in removing the smart." Now, "this is a fact, and no poetic fable," as any of your readers may easily prove if they do not mind the *pain* of the experiment. If the leaf be bruised and applied to the part, the smart will cease almost instantly; at any rate such has often been the experience of—*Alfred Golds.*

N.B.—The poison of the nettle being alkaline, and the juice of the dock acid, it is not unreasonable to suppose that the application of dock leaves is beneficial in neutralizing the effects of nettle-stings.—*Ed.*

"Cuckoo Buds of Yellow Hue."—What flower was this? Possibly Shakespeare may have meant the *Ranunculus ficaria*, pilewort, crowfoot celandine. This was Wordsworth's favourite flower; it blossoms early in the spring. Yet Shakespeare may have alluded to the Ranunculi in general. The country people call them "cuckoo-buds," "butter-cups," "king-cups," and "gold-cups." Bullein mentions "sundry kindes of Crowfoote called Ranunculi, or 'Little Frogges Grass.'"—*S. C.*

The Toad-stone.—Reading a short time since from a work entitled "Ten Thousand Wonderful Things," I chanced to alight upon a paragraph headed "Curious Superstition," in which was given an account of a ring preserved in the Londesborough collection which had a peculiar stone set in it called a toad-stone, said to be extracted from the head of a toad. This jewel, which was popularly believed to be produced in the heads of very old toads, was considered, in the middle ages, to be possessed of the power of giving warning against the presence of poison. Now, though this is doubtless a superstition, yet it is always well to endeavour to sift the truth from error; and, perhaps, in this case there may be some foundation upon which the above idea may rest. Shakespeare alludes to this stone where he says—

> Sweet are the uses of adversity,
> Which, like a toad, ugly and venomous,
> Wears yet a precious jewel in his head.

Perhaps some correspondent can enlighten me.—*H. A. Allbutt.*

Silk Cocoons.—It has been generally thought during two centuries that the *Bombyx Mori* cut its thread at the point where it issues from the cocoon. Some naturalists have supposed the butterfly burned the threads at the same point. This is a double mistake; the threads are not cut or burnt; they are thrown right and left and in front by the movement of the insect; they are only deprived of their gum by the liquid secreted from two small glands the butterfly has on its head. This "ungumming" does nor influence the quality or the strength of the silk, which can be perfectly unwound.—*Documents de l'Exposition d'Insectes. Paris*, 1865.

Food Insects.—In Mexico there is a sugar-producing ant. In the same country a kind of bread called "hautle" is made from the eggs of some hemipteræ (Notonecta, Coryza, &c.).—*B., Melle, near Ghent.*

Nest of Kingfisher (S. G., vol. ii. p. 94).—I find in the work "Les Oiseaux de la Belgique," par C. Dubois, a hint which perhaps may join the two assertions respecting the nest of the kingfisher. "These birds," says Mr. Du B., "nestle ordinarily from the beginning of April; when weather is fair even earlier; they choose for that craggy banks near the water: the female digs with her bill and feet a narrow tube, from 2 to 4 feet deep, broader at the end, where the eggs are laid in May or June, numbering five, seven, to eleven; the male provides for the female in the hatching season; they reject the bones of the fishes, and gather them to make them serve for lower strata to the eggs."—*Bernardin, Melle, near Ghent.*

Insects borne out to Sea.—Reading always with a new pleasure the old pages of Science Gossip, I see in last year's volume, p. 127, that "insects are sometimes borne out to sea by strong winds, especially in tropical islands, and that some fall in situations to be entombed in sand, &c." A remarkable instance of this took place on the Belgian coast four years ago. On the 5th of May, 1862, an immense quantity of insects (Coleoptera, Hymenoptera, and Diptera) were brought on the sand, near Ostend, by the flood. They formed on the shore a black line of 25 centim. (1 foot) broad, and more than 1 mile in length.—*Bernardin.*

Spring Notices.—On the 21st March last, I noticed a solitary martin (*Hirundo urbica*) circling about the surface of the river Tone; and on the 26th, which was a warm spring day here, I saw three or four butterflies on the wing; they were the large white (*Pontia Brassicæ*), and the small tortoiseshell (*Vanessa Urticæ*). The cuckoo (*Cuculus canorus*) was heard here, I am told, on the morning of the 2nd April.—*A. J. N. Macdonald, Taunton.*

Local Name for the Frog.—The common name for the frog in the neighbourhood of St. Austell is "Wilkin."—*W. R. T.*

Birds on Sheep.—In answer to R. Blight, who in your last number (in a note on the magpie), says that he believes the *Corvidæ* to be the only family of birds that perch on the backs of sheep, I beg to say that I have seen starlings (family *Sturnidæ*) do so, and a friend of mine says it is quite a common thing in the country to see them on the backs of sheep.—*J. R. N. M.*

Parasite on the Limpet.—Can any of your readers inform me of the generic and specific name of the small red parasite found on the limpet? It appears to me to resemble a mite, but I cannot find it described in Dugès' "Memoir on the Acarinæ," in the *Annales des Sciences Naturelles*, nor, in fact, in any work I have consulted.—*T. G. P.*

The Dipper, or Water-ousel (Science Gossip, p. 93).—I beg to put in a word in the discussion about the water-ousel walking in the water. This walk can be effected, I think, notwithstanding the specific lightness. When this bird moves its wings like oars, or rather as screws, it gives the great impulsion with them, and with his feet clings to the ground, just as the newly-invented river-tugs or tow-boats cling to a chain immersed in the flood; the resultant of these two forces is stronger than the force which impels the bird to the surface, and it *continues walking*; I believe it has never been seen *standing motionless* in the water.—*Bernardin, Melle, near Ghent.*

Dipper Walking under Water.—That late accurate observer, Charles St. John, in his "Natural History and Sport in Norway," p. 88, writes of this bird:—"It has a peculiar habit, while flying along a stream, of suddenly dropping into the water, where it either swims, or rather floats, on the surface, or dives down at once to the bottom, where it searches actively for its food: the beetles, which form great part of its food, being found on the stones and gravel at the bottom of the water. I never saw the water-ousel feed on any insect which it caught out of the water, or even on the surface: its whole food seems to be found at the bottom. Though the fact has often been doubted, it certainly runs and scratches up the stones while at the bottom in search of food." Furthermore, in Morris's "British Birds," p. 17, it is stated—"That this bird has the power of walking at the bottom of the water, is an established fact. The argument against its being able to do so, is that to the reasoning powers of some persons it does not seem possible. Its feet are admirably adapted for holding on to the stones over which it makes its way, and for stemming, at the same time, the force of the current; for that no effort is required to keep its place below the surface, is what no one has said. On dry land it is by no means an expert walker, being there evidently out of its element." To characterize a well-ascertained fact, corroborated by the experience of trustworthy observers, as "an absurd story" seems rather a hasty and uncalled-for epithet on the part of Geo. F. Smith, Durham. For further information on the subject of the submergence of water-birds, I would refer him and the readers of S. G. to a paper in the *Naturalist*, vol. i. p. 5, by Dr. Morris, "On the Power that certain Water-Birds possess of remaining partially submerged in deep water."—*J. Gifford, Minehead, Somerset.*

Insect Vivaria.—I believe that an insect vivarium, of really efficient dimensions, is not to be purchased for less than three or four guineas. This circumstance militates against the general adoption of these cases, as the majority of amateur naturalists would hesitate to spend so much upon what must as yet be regarded as an experiment. Has anything of a more moderate character been devised, intermediate between these expensive structures and the ugly old-fashioned boxes used for rearing Lepidoptera? We have economy and elegance combined in fern-cases, why not in vivaria?—*W.H.G.*

Hybernation of Swallows.—I recently pointed out in another journal the curious similarity between the opinion of the Chinese on this subject as recorded by M. Huc in his "Chinese Empire," and a narrative of the discovery of a ball of torpid swallows in the sand on the banks of the Ribble, contributed to Kingston's *Magazine for Boys* by an anonymous subscriber. In the next number, Mr. Gould, the celebrated writer on British birds, forwarded an extract from his work, embodying the opinion of Professor Owen, that it is a vulgar error to suppose that any swallows remain torpid in this country during the winter, and that they are physically unable to do so. In reply, I forwarded an interesting letter in support of my statements, written by a gentleman of undoubted veracity, well known in the Channel Islands—the Rev. Daniel Dobree, M.A., rector of the Forest and Torteval, Guernsey. The subject is undoubtedly a difficult one; but when gentlemen assert that they have found swallows in a torpid state in the winter, I cannot see why Professor Owen or Mr. Gould should dispute the truth of their statements. Mr. Dobree says:—"I perfectly coincide in your opinion, and for the following reason. In the winter of 1845 I was engaged in pulling down the rectory of my parish of Torteval, which had certainly stood since the time of Charles the Second. The weather was exceedingly cold, as it was in November or December, but on pulling down the roof I found six swallows in a torpid state under the old rafters, and took them home in my pocket. On arriving at the Forest Rectory, I placed them at a certain distance from the fire at night, to the great amusement of my wife and servants. On the following morning they were all perched upon the kitchen grate, chirping as if in spring. I regret to say that subsequently, for want of flies and other suitable aliment, which I in vain endeavoured to procure them, they all died. I wish to say that they were certainly *not* young birds; many of them having that red throat by which an old cock swallow is always distinguished. I am glad you have given me an opportunity to express an opinion for which I have so often been laughed at." In conclusion, I would observe that I hope the question may be soon definitively settled. In the face of so much evidence, and the solemn affirmations of old writers in support of the theory of the hybernation of at least a portion of the swallow tribe in England, it is foolish for learned professors to treat the affair with concontempt. If the readers of S. G. will try to ascertain the reasons for, and laws of, this hybernation, they will be doing a real service to the cause of scientific accuracy, and of natural history.—*Fras. A. Allen.*

Common Newt.—Mr. R. Blight mentions a pair of newts he saw swimming in company on January 16th. Whilst dredging a pond in this neighbourhood last Saturday, March 31st, I found I had netted a young but fully developed specimen of the common smooth newt; but of course the branchiæ were not yet wholly absorbed. Is not this very early? It is now in my aquarium.—*G. T. Porritt, Huddersfield.*

Early Swarm of Bees.—In one of our hives (common straw ones, with glasses on the top) the bees swarmed yesterday morning, March 26th, about half-past ten, the weather being warm and misty.—*M. B.*

Silvering Glass.—Can any reader tell me how to put quicksilver on glass to make it a convex mirror for a microscope?—*E. F. W.*

Woodpeckers Storing Acorns.—I was called upon by a friend of mine a few days ago, who lived several years in the back woods of California, and to whom, thinking he might throw some light on the subject, I showed the communications of S. G. and Mr. Lord. He tells me that Mr. Lord's assumptions as to the woodpecker *not* eating the acorns it had taken so much trouble to store (if they really do bore holes and into them hammer large acorns) is perfectly correct, and that had he been journeying through any of the mountain woodlands of California in the fall of the year, he would have had abundant opportunities of seeing the bird at work and proving what he almost seems to doubt. The trees selected are invariably of the pine tribe, and several birds are not unfrequently seen at work upon the same tree. They bore several holes, differing slightly in size, and then fly away, in many instances necessarily a long distance, and return with an acorn, which they immediately set about adjusting to one of the holes prepared for its reception, and which will hold it tightly in position. As I before stated, Mr. Lord is correct in saying that the bird does not eat the acorn. Some few of the American species will eat ripe fruit, berries, and the succulent grains of growing Indian corn; but as a rule they are not vegetarians; its object in storing away the acorns exhibits foresight and knowledge of results more akin to reason than to instinct. The succeeding winter the acorn remains intact, but becoming saturated with rain, is predisposed to decay, when it is attacked by maggots, who seem to rejoice in this special food, it is *then* that the woodpecker reaps the harvest its wisdom had provided, at a time when, the ground being covered with snow, it would experience a difficulty otherwise in procuring suitable or palatable food. It is a subject of speculation why the red-wood cedar or sugar-pine are invariably selected; but it is not probable that the insect, the most dainty to the woodpecker's taste, frequents only the outside of wet trees; but so it is, that in Calaveras, Muriporee, and other countries of California, trees of this kind may be frequently seen covered all over their trunks with acorns when there is not an oak tree within several miles.—*A. B., Burton.*

To Preserve Larvæ.—Could you give me any hints how to preserve the larvæ and pupæ of moths and butterflies, so as to be able to mount them on paper along with the butterflies, you would much oblige—*A. H.*

We have sent the results, but could never learn the method; only one or two persons have accomplished it successfully.—*Ed.*

Spider Poison.—Can it be really shown that spiders' fangs emit any kind of poison? It is, I know, commonly stated to be the case, and it is copied from one work to another, but I have never been able to see any appearance of it. The fangs of a spider must certainly be sufficient to kill a fly without any other help. I fancy if a man or an animal had two such instruments of a proportionate size run into their bodies, they would soon die, in a shorter or longer time, according to the part pierced. If the fang contains poison, there must be an aperture in the fang, but I can find nothing of the kind. In the sting of a nettle a slight pressure will force the poison out; or if the sting be immersed in water, a bubble of air can be forced out at the point; but nothing of the kind occurs in the spider's fang, which, like that of the dragon-fly, fresh-water squilla, and other similar creatures, is of a horny nature, and hollow up to a certain point. I have been led to mention this, as I have seen the spider's poison mentioned in one or two places in S. G., as well as in other works, as if it were an established fact.—*E. T. Scott.*

Sword-Grass.—Can any one inform me which of the grasses is called the sword-grass? It is mentioned by Tennyson in his "May Queen," viz.—

> The oat grass and the sword-grass and the bulrush in the pool.

It is probably, from the connection, an aquatic; but it seems to me that there are several which might lay claim to the distinction. If, however, as I suspect, it is a common local name in some parts of the country, I have no doubt some of your readers can answer my question.—*R.S.*

Stephanotis floribunda.—Can you inform me when *Stephanotis floribunda* was introduced?—*G.M.*

Stephanotis floribunda was sent by M. Belanger from the Botanic Garden of the Isle of Bourbon to the Jardin des Plantes at Paris, and flowered there in 1834. It was figured in the *Botanical Magazine* as having been introduced into England by Mrs. Lawrence, in 1843.—*Bot. Mag.*, vol. lxx. tab. 4058.

Volvox Globator.—Dr. Hicks says, in his article on this subject, in the *Popular Science Review*, "It is quite certain that the Volvox does not remain as Volvox through the winter. You may search for it assiduously, but you will not find it; therefore we may fairly assume that it takes on some quiet condition, possibly more than one, perhaps so unlike its summer shape as to have deceived the most careful observer." Did it never occur to him to try the experiment of keeping them through the winter? Had he done so, he would have discovered that the hibernal state is discoid, closely resembling some *Rivulariæ*, perhaps *Capsosira*, of which a correspondent (C. P. A.) has sent us specimens.

Poppy Seeds were frequently mixed with the food of the ancients, strewed over their bread, and also sent to table mixed with honey. The Persians still continue to sprinkle them on their rice and cakes; and confectionery in India is commonly covered with them. The practice is also sometimes followed in Germany.

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus—X 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. Address No. 192, Piccadilly, London, W.

J. C. W.—Your fungus on leaves of *Cotyledon* is *Puccinia umbilici*. For the rest—thanks!

B. (Melle).—We do not insert lists or catalogues, because only a few are interested in them.

F. B. notes the appearance of a number of maimed and dead frogs on the bank of a stream. We observed the same circumstance last week, and are convinced that rats are the culprits.

J. J. R.—The black spots on the fern stem are fungi, named *Leptostroma filicinum*.

J. P.—We think that we have figured and described wire clips in sufficient variety to satisfy our readers.

G. E. C.—We are not aware of any medium of exchange for the article you name.

A. C.—Your shells are,—1. *Pupa secale*. 2. *Zua lubrica*. 3. *Anodon cygneus*, var. *anatinus* (young). 4. *Helix aspera* (young).—*R. T.*

T. B. W.—Your fungus is *Xylaria hypoxylon* in fruit.

F. R. R.—We have added fresh spirit, and also transferred specimens so preserved into a saline solution without damage. Neither should be too strong.

J. S.—You will see by the present number that your fears were groundless.

G. F. P.—We learn, upon inquiry, that the articles you name reached the publishers.

C. A. J.—How could you expect us to name the fish from such a description?

Errata.—Sound-producing Beetles, page 88, for "*Lamia*" read "*Lamia;*" for "*Atonia*," "*Celonia;*" and for "croaking," "creaking."—*W. H. G.*

R. G. S.—It is a kind of gall produced by insects, of which specimens were exhibited at the Entomological Society last year.

Henry.—The spots are a common fungus, *Hypoxylon fuscum*.

F. W.—Your *Jungermannia* is *Radula complanata*. Can you send us specimens in fruit for a correspondent?

T. S.—The plant No. 1 is *Ranunculus aquatilis*. No. 2 is *Chara vulgaris*. They are not suitable for an aquarium.—*W. C.*

R. A.—The leaves are *not* those of *Hedera Canariensis*. The plant may be a form of *Hedera Helix*, but the stellate hairs are rather different.—*W. C.*

B. (Melle).—We do not remember a monograph of the Urticaceæ since "Miquel Commentarii, No. III., Lugd. Bat., 1840," or H. A. Weddell's "Monographie de la famille des Urticées." 4to. Paris. 1856.

E. D. C.—You will find practical instructions for drying plants in the "Botanist's Chronicle," No. 10, which may probably still be had of Mr. Irvine, 28, Upper Manor Street, King's Road, Chelsea, for one penny.

B. I.—See page 113.

J. C. W.—We know of no remedy but cleanliness and perseverance. If whitewash and a free use of water will not cause the fleas to shift their quarters, we would recommend you to shift away from them.

J. A., Jun.—No. 1 is the Tapè or Bark cloth of the South-Sea Islanders; No. 2 *not* enclosed; No. 3 the Grass Wrack, *Zostera marina*.

E. B.—We really cannot be supposed to know everything intuitively; if you forward specimen, we will furnish the name, but cannot do so from a brief description of the larva.

B. I.—We are not so fortunate as to know the parody to which you allude.

North London Naturalists' Club meets on the second Thursday in the month. The secretary is Mr. J. Slade, 103, St. John Street Road.

C. L.—It is so long since that we cannot now trace the address.

J. S.—Comparatively few local names have hitherto reached us. At least not sufficient to turn to practical account.

Kentish Glory Moth.—A correspondent desires a chrysalis or two to be sent to B. E. G., 23, John-street, Bedford-row, W. C.

S G G.—The parasites of the Humble Bee sent are a species of *Acarus*, commonly found in such a situation.—*R. B.*

To Kill Insects.—Confine them in a box or bottle with bruised laurel-leaves.

C. A. J.—See vol. i. pp. 20, 44, 92, 109, 188, 239, 262, for hints on fern culture.

A. M.—It is not at all an uncommon occurrence for the crested newt to make a meal of the smaller species, the smooth newt. See "Our Reptiles."

S. A. G.—The coccus on *Cornus sanguinea* is an *Aleyrodes*, probably *Aleyrodes Phylliriæ*, Haliday. The examination of winged specimens may prove it to be a distinct species.—*F. W.*

E. G.—The white substance on beech appears to be the same as was formerly included among fungi, under the name of *Psilonia nivea*. It is, however, a coccus, the *Coccus Fagi*, Walker, "Cat. Homoptera," p. 1080.—*F. W.*

T. R. B. M.—We can only recommend you to study nature, and imitate the conditions as closely as possible. No general instructions can be given.—*F. M.*

B. T.—No. 1. Ivory coralline, "Ellis' Corallines," t. xxi. f. A, *Cellularia eburnea*. No. 3. Creeping coralline, "Ellis' Coral.," t. xx. f. B., *Cellularia reptans*.—*J. E. G.*

Hairs.—W. H. R. wishes for a few hairs of the Indian bat, or the kangaroo.—1, Nelson Place, Aberdeen.

Correspondents who did not furnish their names and addresses with their queries, and consequently find no answer, will please to observe the notice which is repeated every month at the head of this page.

EXCHANGES.

Polariscope Objects (mounted) for diatoms, &c.—Photo. Dereham Road, Norwich.

Butterfly Scales for other objects; also birds' eggs and shells for objects of interest.—E. G. W., 3, Bertie Terrace, Leamington.

Living Desmids.—Apply to J. C. W., Montpellier House, Budleigh Salterton, Devon.

Deutzia scabra (unmounted) for other objects.—E. Marks, 6, Holford Square, London, W.C.

Deutzia scabra (flower).—Address F. 23, Post Office, Manchester.

Colias edusa for birds' eggs.—H. S., 11, Grove End Road, St. John's Wood, N.W.

Horn Sections, &c., for Echinus Spines, &c.—Thomas Sharp, Ackworth, near Pontefract.

Helix lamellata offered for *Cyclas pisidioides*, or *Pupa Anglica* for *Pupa angustior*.—J. H. Ashford, Scarborough.

Arachnoidiscus Ehrenbergii (mounted) for other good objects.—W. C., 62, Kirkgate, Leeds.

Communications Received.—W. C. P.—G. F. P. (Hill Wootton)—W. A. L.—E. W.—G. F. P. (Huddersfield)—A. J. N. M.—G. M. (Norwich)—J. S.—E G. W.—T. P. B.—E. D. C. —F. R. R.—G. M. (Wood Green)—J. C. M.—J. A. S.—C. A. J. —T. B. W.—W. H. G.—S. J. B.—A. W.—J. W.—G. E. C.— J. P.—W. H. K.—J. J. R.—F. B.—A. H.—A. G—J. S. H.— E. F. W.—B.—B. T.—F. W.—T. S.—M. B.—J. C. W.—J. A.— R. A.—W. N.—E. B.—E. G.—L. G.—W. H. W.—B. F. M.— J. W. T.—S C.—H. A. A.—W. W. S.—G S – A. E. C.—E. T. S.—J. G.—T. G. P.—E. S —J. C. W.—B. S D —H B.—T. R. B. M.—S. A. G.—B. I.—W. G.—J S.—C. W W.—C. L.—J. C. W —G. M.—R. B.—J. P. –R. G.—S.—B. (H. Wycombe)— H. G. E.—W. McI.—B. E. G.—J.—S. J. M.—E. M.—A. B. B. —R. B. (Alton)—H. S.—M. D. P.—J. J. F.—T. S.- J. H. A.— F. K.—J. E. T.—A. M.—C. L.—E. H. F.—W. H. R.—W. C.— F. W.

SPEEDWELLS.

> What heart does not know
> Thee, cluster'd smiler of the bank, where plays
> The sunbeam on the emerald snake, and strays
> The dazzling rill, companion of the road.—ELLIOTT.

AMONG the many unscientific observers of nature, there are those who possess a sort of general idea of the names of the plants or insects which they cannot help seeing, and who group together under one name many widely differing members of the same family. If there is one genus of plants more ill-used than another in this respect, that one is, as far as my experience goes, the genus *Veronica,* or Speedwell, various species of which are now beginning to deck our banks and waste places. To those who are in the habit of keeping a "Naturalist's Calendar," after the fashion of good old Gilbert White, it cannot fail to be embarrassing to be told—say at the beginning of March, by a trustworthy, but unscientific friend, "I saw *the* Speedwell in flower to-day." "*Which* Speedwell?" you naturally ask, and the reply is, "Oh, you must know, the common Speedwell, with a blue flower!" Perhaps, after such a reply, the necessity of the strictest *accuracy* in all statements concerning Natural History is "borne in" upon one more forcibly than is usually the case. But, after all, better that people should know just a little of the wonders spread before them year by year in the green fields, than be altogether ignorant of them; and it is both unfair and useless to point out faults which we ourselves do not attempt to remedy: so, taking our Speedwells as a subject, let us try if we cannot briefly and plainly point out the resemblances, and, at the same time, the differences which exist between our common species.

We have seventeen species of *Veronica,* or Speedwell, indigenous to, or at any rate thoroughly established, in this country; and of these twelve at least may be considered as generally distributed. To these twelve, therefore, let us more particularly turn our attention, first marking the points of resemblance which are common to all the British species, and then proceeding to note the differences by which each may be distinguished.

Perhaps the most striking family likeness, common to all our Speedwells, lies in what is usually termed the *blossom,* or, more correctly, in the coloured and most conspicuous portion of it which is called the *corolla.* This is most frequently *blue;* it is *monopetalous* (*i. e.* all in one piece), and is shaped somewhat like a cross with rounded ends, save that the lobe or division, which would correspond with the foot of the cross, is always smaller than the other three. Again each blossom of all the species contains *two* stamens and *one* pistil; therefore all are placed in the Linnæan class *Diandria,* order *Monogynia.* All have fibrous roots; the stems of the tallest species (*V. Anagallis*) do not exceed two feet in height, while those of the other species seldom attain more than a foot; and the corollas of all are very *fugacious, falling off* with, or even without, a touch; to which peculiarity Bishop Mant thus alludes:—

> Be cautious lest you shed
> The petals of the tender flower,
> And shorten thus the little hour,
> At most allotted it to grace
> With transient bloom its native place.

The twelve species which we are going to consider more especially, may be conveniently arranged under three heads:—1. Those which have weak trailing stems, and the flowers of which grow singly in the *axils* of the leaves—*i. e.* in the angle formed where the leaf-stalk joins the stem. 2. Those with upright or ascending stems, terminated by a *spike* of flowers.

3. Those with stems similar to the last, but having spikes of flowers, growing, as in group 1, from the axils of the leaves.

Our first section comprises four species, all of which are annuals. For the first of these, the Ivy-leaved Speedwell (*V. hederifolia*) we have only to look in February or March in any cornfield, or on a hedge-bank, and we shall be almost sure to find a soft-looking little plant, with weak trailing stems, rather thick, light-green hairy leaves, and grey or pale blue flowers, which is the very thing we are in search of. The shape of the leaves, similar to that of ivy-leaves, at once distinguishes this species from any other; and it may be found in blossom during all the earlier months of the year, commencing to flower early in January. As the season advances, however, the stems become very straggling, and the leaves smaller, but their shape and general appearance still remain. Our next example, the Procumbent or Green Field Speedwell (*V. agrestis*) is well known to all who have a garden; for it has a most reprehensible liking for cultivated ground, and, when allowed to remain, spreads so widely, both root and branch, that its extermination is no easy matter. And really its bright little blossom—blue, save the lower lip, which is white—seems to appeal against destruction; and its perseverance in attempting to establish a footing is astonishing. The leaves of this species are of a darker green than the preceding, are more deeply cut, and smaller; the blossoms have been already described, and are frequently entirely white. The next species, the Grey Field Speedwell (*V. polita*), is not considered more than a variety of *V. agrestis* by Mr. Bentham; it frequents the same habitats as its predecessor, but its flowers are larger, and *entirely* blue; and by this it may readily be distinguished. The last on our list is considered by botanists as a "distinguished foreigner:" however, it seems to like our British soil uncommonly well, and evidently has no intention of leaving us. It is known as Buxbaum's Speedwell (*V. Buxbaumii*), and is certainly by far the handsomest of the procumbent species. It is altogether a stronger plant than its predecessors, and its blossoms are much larger—of a bright light blue, the lower lip paler than the rest: the leaves, too, are of a livelier green, and the plant as a whole is very ornamental. It is very hardy, blooming nearly all through the winter, as well as during the rest of the year, in corn, and especially in clover fields, and on waste ground. It appears to be widely distributed; and, though only observed for the first time in 1826, has emulated the American Waterweed (*Anacharis Alsinastrum*) in its rapid spread throughout the country.

Our second group contains seven species, two only of which are common, the remaining five being of unfrequent occurrence. If we would find the Wall, or Field Speedwell (*V. arvensis*), we must leave the cornfields which have yielded us our previous examples, and take for inspection some dry wall or dusty roadside, or some barren gravelly bank. Here we shall probably find a small upright plant, with oval leaves, which have rounded teeth, growing in pairs up a stem from two to four inches high; the said leaves passing gradually into smaller leaves or *bracts*, one at the base of each flower. The pale blue blossoms are very small, and seldom fully expand. The whole plant is often covered with dust, and is insignificant in appearance; it varies much in size, in favourable situations attaining a height of 10 inches, with all the parts large in proportion; but it is usually a lowly little herb, and except that it seems fond of company, and frequently grows in large patches, it would be even more overlooked than it is at present. It is an annual, and blossoms from April to August. Our other common species, the Thyme-leaved Speedwell (*V. serpyllifolia*) is very different in appearance. It usually grows to the height of four inches, and has a spike of small whitish flowers, marked with dark blue veins. Its leaves are oval, smooth, and frequently somewhat thick; the stem roots at its base, and adheres closely to the ground. The Thyme-leaved Speedwell is common enough by roadsides, especially where water has stood: we shall also find it on commons and in waste places. Its blossoms expand from May to September, and sometimes remain even later in the season. The five rare species belonging to this group are:—the Spiked Speedwell (*V. spicata*), common in gardens, having a long spike of cobalt-blue blossoms, found rarely on limestone cliffs and in chalky pastures in England; the Rock Speedwell (*V. saxatilis*) and the Alpine Speedwell (*V. alpina*), two bright blue-blossomed beauties of the Scotch mountains; the small Vernal Speedwell (*V. verna*), and the Three-fingered Speedwell (*V. triphyllos*), the former with light, and the latter with dark, blue blossoms, both confined to sandy fields and heaths in one or two places in England. A sixth species (*V. peregrina*) is semi-naturalised in some Scotch and Irish localities; it has white blossoms, tinged with pink.

Pass we on now to our last group, which contains six species, all of which have perennial roots, and are of frequent occurrence. And first, let us notice the well-known Germander Speedwell (*V. Chamædrys*), favourite of Ebenezer Elliott, the Corn-law Rhymer, who calls it the

> Loveliest flower of all that grow
> In flower-loved England.

Lovely, indeed, it is, growing in large tufts, and decking the hedge-banks with its spikes of bright azure-blue blossoms, delicately marked with small white veins, and bringing into prominence the two white anthers. We need not wonder that it usurps, and with many successfully, the name "Forget-me-not," for none who had once noticed could ever forget so beautiful a flower. In Essex, as in many other counties, it is called "Bird's-eye" and "Cat's-eye," and it is evidently the "Eyebright" of Wordsworth—

The trembling Eyebright show'd her sapphire-blue.

If description be needed of this common and well-known Speedwell, we may begin by remarking the *sessile*—almost stemless—incised leaves, which grow in pairs up the stem. And here, be it observed, that the alternate pairs point in a different direction to those between them; *i. e.* if the first pair on the stem points one leaf north, the other south, the second pair will point one leaf east, the other west; and so on. Again, we shall remark upon the stem two rows of hairs, which change sides with each pair of leaves. These peculiarities, together with the *many-flowered* spikes of *bright* blue blossoms, will serve to distinguish it from our next species—the Wood or Mountain Speedwell (*V. montana*), to which some have considered it very closely related. The resemblance between the two is, however, but a superficial one; for, in the first place, the Wood Speedwell loves damp, shady places, whereas the Germander delights in the open hedge-bank or the grassy field. Let no one imagine from its name that *V. montana* has any particular liking for *mountainous* districts, for such is not the case. In this species, we shall note the pale soft green of the leaves (their under side being frequently of a brownish hue), and their long hairy footstalks, so different to the almost imperceptible ones of *V. Chamædrys*. Our Wood Speedwell, too, has fewer blossoms than its predecessor, and these are pale blue, or purplish. Both are in perfection during the month of May, but *V. montana* requires to be searched for more diligently than *V. Chamædrys*. The next species is the Common, or Officinal Speedwell (*V. officinalis*), and we shall find it in perfection on dry commons, though it is also frequently to be seen in the woods. It grows usually in dense tufts, and its stems, which root at the base, creep closely along the ground for two or three inches: they are very frequently somewhat woody. The leaves are usually smaller than in the two preceding species, and are egg-shaped, on *short* stalks; the spike, or *raceme*, of blossoms is long and many-flowered, and the flowers, which expand from May until August, are paler in hue and smaller than those of *V. Chamædrys*. "Speedwell tea," made from the leaves of this plant, was formerly much esteemed, and the names of "Honour and Praise," and "Paul's Betony," were given to this species.

Now, having noticed at length the Speedwells of dry grounds, of the corn-field, the hedge-bank, the heath, the wall, and the wood, let us look for our three last examples in very different situations—by ditches and streams, and in bogs. The Brooklime (*V. Beccabunga*), a pretty plant with an ugly name, may be found in, or by the side of, almost every small stream or ditch. It is a stout species, with smooth thick procumbent stems, which root at their base; the leaves, which grow in pairs, have short stalks; they are roundish or egg-shaped, serrate, glossy, and succulent, of a "lively green," as Gerarde would say, with very distinct whitish veins, and are sometimes eaten as a salad, resembling in taste a mild water-cress. The flowers, which expand from May to August, are small, but of a very bright blue, and are occasionally called "Forget-me-nots." If we would find the Water Speedwell (*V. Anagallis*), we must go to the side of a pond, or to the muddy margin of a river, in June or August, where we shall see a tall upright plant, the blossoms of which at once tell us that it belongs to the genus *Veronica*.* Very different is it to any of its allies; the stem, taller than that of any other species, is usually a foot, or even two, in height; thick, smooth, and *hollow*. The leaves are smooth, *sessile, sitting* close to the main stem, stalkless and lance-shaped, often two inches long, and the blossoms are usually pale blue or pink, delicately marked with darker lines; they are smaller than those of the preceding. The Marsh or Bog Speedwell (*V. scutellata*) resembles *V. Anagallis* in the shape of its leaves; but they are smaller and narrower, and frequently of a brownish hue. This species affects bogs and damp meadows, and is less common than its predecessor. It is a weak, straggling plant, with pale blue or flesh-coloured flowers, a little larger, though fewer, than those of *V. Anagallis*, and, like them, marked with darker stripes.

One word in conclusion to those who wish to preserve dried specimens of the Speedwells. Be prepared for disappointment. Do not complain if each species (except, perhaps, *V. spicata*) assumes, when dried, an uniformly *dark-brown* hue: rather be thankful that they are not altogether *black;* and if the blossoms of some (as *V. Chamædrys*) become *only white*, rejoice with all your heart. Do not think that care will prevent these results; for the effects of "care" in this instance are usually decidedly "black." But slip a spray of a Speedwell into your pocket-book; think no more about it for two or three days; and then, if you look at it, you *may* find, as I have found with *V. Buxbaumii*, that the colour has remained, and will remain, at any rate for a short time. Should any one, however, more fortunate than myself, have found a really satisfactory way of drying Speedwells, let me beg that he will enlighten me, and others who may be similarly ignorant, through the pages of Science Gossip. B.

* Hoffman says, this name was derived from the Greek, φερονικην,—"to bring victory."

CORALLINES AND ACALEPHS.

IN the No. 8 of Science Gossip for August, 1865, Mr. Fife gives us a very pleasing sketch of the elegant little branching corallines, sea-mosses, or whichever we may choose to adopt of the various names which have been given to the Polyzoan Zoophytes. Among the Tubularias (pipe corallines), Sertularias and Plumularias are perhaps the best known and most striking favourites. These have been popularly quoted as "nameless tribes, half-plant, half-animal, rooted and *slumbering* through a dream of life!" Now, the later researches of naturalists—such as the Norwegian observers, Sars, van Beneden, Steenstrup, and many others—sufficiently prove that, so far from *slumbering* through their appointed cycle, they really lead a most active and varied life; at one stage of their existence skimming the expanse of ocean as perfect radiated animals, clothed in masses of translucent jelly, which refracts the most gorgeous colours, and even in many species giving out phosphorescent lights; in others throwing out long thread-like tentacles, and exercising their power of stinging severely the hand that dares to meddle with them to arrest their course.

"Who," exclaims M. de Quatrefages (in his fascinating history of his researches, conjointly with M. Milne Edwards, on the coasts of Sicily), "who would not declare that a *miracle* had come to pass, if he saw a reptile emerge from the egg dropped by a hen in his poultry-yard, and the reptile give birth to an indefinite progeny of fishes or birds?" This, of course, is an exaggerated supposition of a totally impossible occurrence, and yet the generations of the Medusæ, and their connection with the Hydroid Corallines, are fully as marvellous, and until thoroughly investigated might appear quite as incredible. In the very interesting "Sea-side Studies" just published in America by E. and A. Agassiz, we have a figure and description of a huge umbrella-shaped jelly-fish (*Cyanea Arctica* of Agassiz), of which the disk measured seven feet diameter, and the very numerous tentacles, of about fifty-two feet long, issuing in eight distinct bundles from lobes of the disk floating around, and thus covering a space of nearly 112 feet. Strange to say, this gigantic "*Discophore*" is produced from a "Hydroid" measuring not more than half an inch in height when full grown, and which in its Hydroid (or Coralloid) state has been named *Strobila*, and its changes carefully watched. The history of any one egg laid by one of these Discophore Medusæ in the autumn has been indeed as yet but partially followed, yet sufficiently so to show us that the young hatched from the egg is at first spherical, but presently becomes pear-shaped and attaches itself to the ground. But few of the Meduseans produced from Hydroid stocks attain this gigantic size; yet the type of their transformations differs but little, and their numbers must be indeed "myriads on myriads peopling every wave."

These are single specimens of *Plumeria falcata* (the sickle coralline), or *Sertularia argentea* (the squirrel's-tail coralline) on which the family may consist of from eighty to one hundred thousand individual Polypes seated on one stem—a rate of population which, says Dr. G. Johnson, not London, not Pekin can rival! I do not, however, think it is the opinion of naturalist-investigators that each and all of these Polyp-buds actually become "*Medusean Acalephs*," which seems to be the most accepted scientific term for jelly-fishes or sea-blubbers; many of the buds wither and drop off from their stems, others shed their seed to spring up again as Corallines; the Laomedia (sea-thread coralline of Johnston and Landsborough) develops Medusæ, which remain always attached to the stem, so far as is yet known, and die when they have laid their eggs. Among the Sertulareans the free and adult

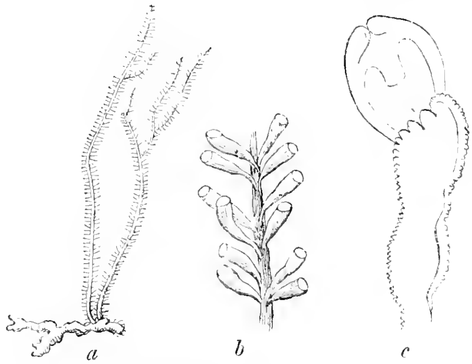

Fig. 115. *a. Lafœa dumosa*, natural size. *b.* Polyp cells of the same. *c.* Young Sertularian Medusa, from *Lafœa*.

Medusa is only as yet known as proceeding from one species, *Lafœa* of Lamouroux, *Cornularia rugosa* of Dr. J. E. Gray, or *Sertularia* of Johnston, who gives an enlarged figure of the Polypes. Forbes says of it, It is the most active Polype of its tribe I ever saw, starting up and down in its cell like one of the Ascidioids." Does this action show instinctive impatience for freedom? Of those more vigorous Polyp-flowers (let us call them) that grow and thrive, there seems to be a probability that some contain ovarian vesicles only, and others the fertilizing spores, somewhat analogous to the female germ or stigma and the male pollen-cells of plants, and that here the movements of the waves and currents take the place of the winds and insects, which, among the flowers of the earth, convey the fertilizing influences to the "Ovaria," and that possibly only those Polyp-cells thus perfected swell and in due time float away from the Polypidom to which they have hitherto been fixed; then increase in size, put forth tentacles, more or less according to their species, swell into umbrella-shaped bladders, and become true Acalephæ, resembling some of those beautiful forms so exquisitely depicted by Forbes in his "Monograph of the Naked-eyed Medusæ." Here then we have a creature totally different from its immediate progenitor, the polyp-bearing coralline. But the wonderful exemplification of the so-called "Alternation of Generations" does not end

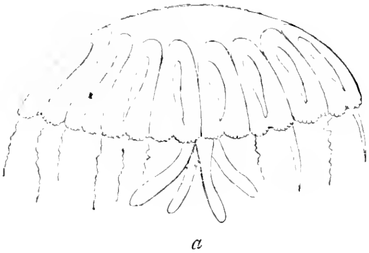

Fig. 116. Free swimming *Melicertum*.
a. Pedicel or proboscis.

here. The Medusæ are furnished with each a proboscis or pedicel, really the mouth and stomach of the animal, hanging down from the centre of the umbrella (fig. 4, A) round or upon which, or attached to the lobes of the disk, are frequently clustered little *gemmæ*, which are budded off in the way so common with the Actinæ, and these become true representatives of their immediate parent; but, look at these frail, scarcely tangible beauties, which though they have been proved to be perfect radiated animals, and have ever been thought by Steenstrup and Milne Edwards to possess rudimentary organs of sight and hearing, are yet most of them as unsubstantial as if they were really only the mass of vivified

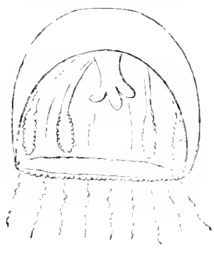

Fig. 117. *Polyxenia cyanostites*, natural size.

jelly they were so long supposed to be. When left by the tide on the sand, we find only an obscure film of skin, which soon withers away entirely. The utmost delicacy of manipulation, can with difficulty preserve faint traces of them dried on paper. In the celebrated blue grotto of Amalfi (near Naples), myriads of floating fringed balls of sapphire seem to allure the tourist, and tantalize the eye by their brilliant loveliness; but they collapse and seem to shrink into impalpability on every attempt to grasp them. Could these creatures, so frail and evanescent, survive the buffetings of the rough wintry storms and waves? Ah, no! and here we see the efficiency of the remedy provided. Besides the medusoid gemmæ budded off, the female perfect medusa produces eggs. These are at first round, then become oval, and clothed with ciliæ, so that they can swim freely about; but becoming oblong pear-shaped, the narrow end at length fixes itself to some safe anchorage on stone or weed, where the polypidom grows and strengthens, and during this "*Nahrungs-Process*," as the Germans aptly call it, faithfully nourishes the embryo life, which gradually developes the graceful feathery or moss-like corallines destined to produce the polyp-flowers, which in due course will again become medusæ.

That the exact stages and gradations of these changes of form have not yet been quite clearly observed and described need not be wondered at, when we consider that all these operations are going on in the hidden arcana of that mighty ocean,—

> Where plummet of archangel's intellect
> Could never yet find soundings, but from age
> To age let down, drawn up, then thrown again
> With lengthen'd line and added weight, still fails;
> And still the cry in heaven is, "*Oh, the depth!*"

P. S. B.

MOUNTING CRYSTALS.

A FEW remarks, embodying the results of personal experience with this class of objects, may not be unacceptable to those readers of SCIENCE GOSSSIP who have but little time to devote to this particular study. From books, so far as I am acquainted, but little assistance can be got, as the subject is treated of in so general a manner, that when the student wishes to prepare and mount a special crystal, he is almost always at a loss as to the way in which he should proceed. The method I propose is, to speak of the crystals most usually mounted, and with the preparation of which I am personally acquainted, and if others, whose opportunities and experience are greater than my own, will "follow suit" with descriptions of the mounting of the rarer salts, the list asked for by W. S. in the January number may eventually be completed.

I must premise that I have no "book-learning" upon the subject; all the information I possess being the result of many experiments and of numerous failures. Still, if by this means I shall have paved the path for others desirous of entering upon the study of this branch of microscopical science, the repayment for the disappointments I have suffered will be ample.

The crystals referred to above are those of the sulphates of iron, copper, and magnesia, chlorate of potash, tartaric, citric, and gallic acids, salicine, and the mixture of the sulphates of copper and magnesia.

In the preparation of the first two, I use saturated solutions, made with cold distilled water, and subsequently strained through bibulous paper, to rid them of the mechanical impurities generally found in them. I must here remark that these crystals, and many others, may be made to assume *two* forms, which, to the unpractised eye, are totally dissimilar. To prove this, place a drop of the solution of either of these salts upon a glass slide, *previously made perfectly free from grease.* Let it evaporate, and the result will be crystals, which may be compared to the fronds of ferns in outline. Now place another drop upon a similarly cleaned slide, evaporate it, but not too quickly, over a hot-water bath, gently stirring it with a thin glass rod. In this case the crystals will be found to exhibit rhombic prisms, separate and distinct, which give varied and beautiful colours under the polariscope, even without the selenite, and showing up well upon the dark ground. Of the two forms, the latter seems preferable, not only on account of their greater beauty, but also because they exhibit more clearly the true form of the crystals, with reference to the "system" in which they are placed by crystallographers. The medium used for mounting may be either Canada balsam or castor-oil. No special directions for the use of the former are required; all that is necessary being to see that sufficient water be driven out from the crystals, or water bubbles will be formed when mounted, which are extremely difficult to get rid of. On the other hand, care must be taken that the water of crystallization be not parted with, by too long an exposure to the action of the hot-water bath, in which case the crystals will present only an amorphous mass, of little beauty, and still less use. Should castor-oil be the medium employed, only just sufficient to fill the space underneath the thin glass cover must be used, since the removal of the superfluous oil is attended with much trouble. The exact quantity varies with circumstances, and must be learned by experience. The method I have adopted to effect this, is to put a weak clip with a cork disk underneath, upon the mounting, and, after scraping away the crystals around the cover with a penknife, to soak up the expressed oil with blotting-paper. When this method of cleaning has been carried as far as possible, I apply a saponifying compound to the remains of the oil (taking care that it does not run in under the cover), which renders the adhesion of the cement used to fasten down the cover more certain. One side is then secured with gold size, and sufficient time given it to harden thoroughly; then another side is treated in the same manner, and so on, allowing ample opportunity for each side to dry perfectly before the next is proceeded with. When all are done, the clip may be removed entirely, but until then it should only be shifted as occasion may require. Two or more coats, either of gold-size or asphalt, must be added, observing to give each of them plenty of time to harden before the next is applied, more especially when asphalt is used over the gold-size. This completed, the slide may be safely placed in the cabinet.

The foregoing remarks apply equally to the sulphate of magnesia, or Epsom salts, better known under the latter name. Castor-oil is preferable for this salt, as balsam gives some trouble, owing to a cause unknown to me.

With the chlorate of potash there is no trouble, unless the crystals are wanted separate, and not agglomerate. I have succeeded in obtaining the latter form in two ways; in both cases using a saturated solution in *hot* water. The first plan is to tilt the slide at rather an acute angle with the perpendicular, and to let drop a good quantity of the solution over the centre of the slide, in such a manner that the superfluous liquid runs off immediately. The contact of the hot solution with the cold glass instantaneously develops the crystals (which have a square outline) in a separate form. The second method is to keep the slide horizontal, and in its centre to place a drop of lukewarm distilled water, into which the hot solution is dropped from a pipette. This gives results similar to those produced by the first plan; but the water must be drained off, and the slide dried by *gentle* heat. When quite dry, mount in balsam in the usual manner. The disadvantage of this last plan is, that the crystals frequently seem to be broken at the angles, and do not exhibit such fine colours as in the first case. Occasionally, however, very large and beautiful crystals result, which it is well worth the cost of a few failures to obtain.

Tartaric acid is one of the easiest salts to prepare. I prefer to evaporate this rather quickly over a lamp, at a temperature pleasantly warm to the hand. By holding the slide, which should be slightly tilted, in the fingers, too great a heat will be readily prevented. Mount in balsam, which is best, or in castor-oil.

Citric acid offers some peculiarities. When first I tried this, I used a saturated solution, which I heated on the glass slide, until I was tired, without result further than that the drop of the solution had assumed a viscous, glass-like appearance. The slide was put away until the following morning, when it was found almost covered with circular expansions, forming a fine object, save that its beauty was marred by imperfect forms which appeared between the crystals, quite spoiling it when viewed with the dark ground obtained by the polariscope. These imperfect forms can only be got rid of (so far as my experience goes) by keeping the slide upon the hot-water bath until the crystals are fully formed. This, however, is attained at the cost of fissures in the crystal itself, unless it be carefully watched, and removed from the bath directly they appear. Either balsam or castor-oil may be used to mount, but balsam brings the outlines up more sharply than the oil.

For gallic acid I use a nearly saturated solution in cold water, which I prefer to evaporate rather quickly. The crystals are smaller with the rapid evaporation, but prettier. When the solution is evaporated slowly, the crystals present an acicular form with no very interesting appearance, unless in the course of their formation they meet with some obstruction or impurity, when they exhibit a form not unlike the "eye" in the peacock's tail-feathers, as pointed out by Mr. Davies in his excellent little handbook, when treating of pyro-gallic acid. On the other hand, by rapid evaporation the crystals assume the shape of small bundles of twigs tied together at one end, and present varied shades of colour with the selenite plate. As to mounting, these crystals seem somewhat capricious. The first slide I prepared was put up in castor-oil, and it stands well now, fourteen months after. Upon using the same medium, however, with subsequent specimens, they immediately faded away and dissolved in the oil, owing to some cause I cannot explain. Since then I have used balsam, and have not lost a single slide.

Salicine must be fused upon the slide itself. The only precaution to be observed is not to overheat it. Spread the salt as thinly as possible over the centre of the slide, which must then be held over a lamp in a pair of wooden forceps, as the temperature required is very considerable. By beginning at one end, and gradually moving the slide as the fusion proceeds, all chance of driving out too great a quantity of water from the salt will be avoided. The sort of paste thus formed upon the slide must be gently and evenly spread over the surface with a knife, and upon cooling the crystals will form. The crystals may also be procured from a strong solution of the salt in water, but they are much smaller, and do not exhibit the same brilliancy of colour as those obtained by fusion.

The mixture of the two sulphates is so fully and carefully described by Mr. Davies in his handbook (pp. 76 and 77) that I must refer those interested to the book itself. I would recommend the piercing of the film, which is there mentioned, as giving certainty to the production of a good slide. The beauty of the resulting crystals fully justifies the encomiums passed upon them by Mr. Davies.

As an addendum to the above remarks, let me state that much *must* be learned by actual experience; for example, if the stirring of the sulphate of copper or iron solutions be carried too far, the crystals will be very small, and much too crowded. If, on the other hand, it be not continued sufficiently long, the slide will consist only in part of perfect rhombic crystals. The time to desist is, when a peculiar gritty feeling is experienced upon the contact of the glass-rod and the slide: no description of this will convey the exact idea, but it will readily be felt. If examined at this stage under the microscope, although nothing can be discerned by the unassisted eye, the crystals will be found forming, and upon the dark ground afforded by the polariscope exhibit a most beautiful appearance, like jewels upon black velvet.

In conclusion, I beg the consideration of those more experienced than myself. Though other methods may give as good results, my experience proves that good and perfect slides may be obtained by the methods described above.

E. M.

INSECT FUNGI.

Of all the curious forms which fungi assume, none are more curious or interesting than those which are occasionally developed on insects. These productions have, some of them, been for a long time known, but, until recently, only little understood. As an illustration of the structure and development of these parasites, we will take a species which recently was observed more commonly than usual in a brickfield, near Hitchin, in Hertfordshire. This, which is known to mycologists as *Torrubia entomorrhiza*, was attached to the larvæ of the swift-moth (*Hepialus lupulinus*, fig. 118) in most instances, only one individual being developed on a single larva, but occasionally two. It consists of a white, branched mycelium, spreading externally over the insect, and internally absorbing the natural structure and converting it into a kind of pulverulent sclerotium.

Fig. 118. *Torrubia entomorrhiza*, natural size; attached to larvæ of a moth.

From near the head of the larva, as we observed generally from the second joint, and at the back of the head arose a stem of from three quarters of an inch to two inches in length, bearing at its summit a small orate, or egg-shaped head, in which the fructifying organs are imbedded, the length and direction of the stem being influenced by the position of the insect. When, as is often the case, the larva was imbedded at right angles to the soil, head uppermost, and near the surface, the stem was short, and in a line with the body; but if more deeply imbedded the stem was lengthened, so that the head was elevated about a quarter of an inch above the surface. If the insect lay in any other position the stem was contorted, or arose at right angles to the larva, always striving to appear above the surface, and there produce its rounded head. The stem was externally of a dirty, yellowish colour, and the head of a brick-red, or livid brown. The whole substance is fleshy and fragile when fresh, so as to snap readily when roughly handled. Our figure represents two specimens, natural size, and in the position in which they

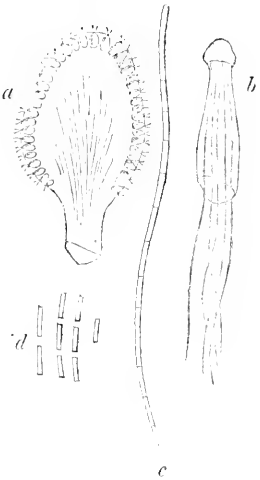

Fig. 119. *a*. Section of head of *Torrubia entomorrhiza*, magnified. *b*. Portion of ascus, with sporidia. *c*. Sporidium. *d*. Joints of sporidium, more highly magnified.

were found, the upper portion only, to the length of about half an inch, appearing above the surface.

If the head of this parasitic fungus be cut either vertically or horizontally, there will be observed near the margin a number of small cells (fig. 119, *a*) which contain the perithecia, or flask-shaped vessels, within which the fruit is generated. These perithecia puncture the surface of the head with their ostiola, or necks, through an orifice of which the sporidia are ultimately excluded. Within the perithecia are a number of long cylindrical asci, or transparent membranaceous vessels, at first attached at the base, and closed at the summit, in each of which are produced eight long threadlike sporidia (fig. 119, *b*, top of ascus, the lower portion being removed to show the sporidia). Each sporidium (fig. 119, *c*) ultimately breaks up into a number of small joints (fig. 119, *d*). A similar structure prevails in all the species of the genus *Torrubia*, to which this fungus belongs.

A curious notion prevails in the district where these parasites were found that they and the insect are somewhat mysteriously associated with the coltsfoot (*Tussilago farfar*), that plant being common in the same locality; and, certainly when breaking through the ground, the buds bear some resemblance to the *Torrubia*. One individual transplanted into his own garden some larvæ with their parasites, confident that he should obtain from them as many plants of "coltsfoot." By the present time, he is probably convinced, by failure, of his error.

A more conspicuous species than the foregoing is found on pupæ buried in the ground. The head in

Fig. 120. *Torrubia militaris*.

Fig. 121. *Isaria farinosa*.

this instance (fig. 120) is club-shaped, and rises from an inch to an inch and a half above the soil. Its colour is of a brilliant orange, almost vermilion. This species is known by the name of *Torrubia militaris*. It cannot be regarded as common, though perhaps more widely distributed than the former. We may observe that sometimes this fungus maintains through its whole existence a state very different to that we have just described. Instead of producing a club-shaped head, a smaller, more delicate and friable white stem grows up, which is often branched, and the (fig. 120) whole surface is clothed with a white powder, as if it were flour or chalk. No perithecia, asci, or sporidia are produced, nothing save the white dust, which consists of minute cellular bodies termed *conidia*. This conidiiferous condition was for a long time regarded as a distinct fungus, and under the name of *Isaria farinosa* is still alluded to as though it had an independent existence. It is very probable that all the species of *Isaria* are only condiiferous conditions of other fungi.

Dr. Greville has figured in his Cryptogamic Flora a species of *Torrubia*, to which he gives the name of *gracilis*, which some regard as identical with the species with which this chapter commenced. Others have considered it as distinct. Never having seen it we will not venture an opinion. It has been found also in Algiers. Although said to be discovered in moist mossy places, it is undoubtedly parasitic on some larva.

Fig. 122. *Torrubia unilateralis*; on a species of Ant from Brazil.

One other species has been discovered in Britain, to which the name of *Torrubia myrmecophila* has been given. One specimen only was found near Bristol, on an *Ichneumon*, and it has occurred in Italy. It may be observed that both *T. entomorrhiza* and *T. militaris* occur in the United States.

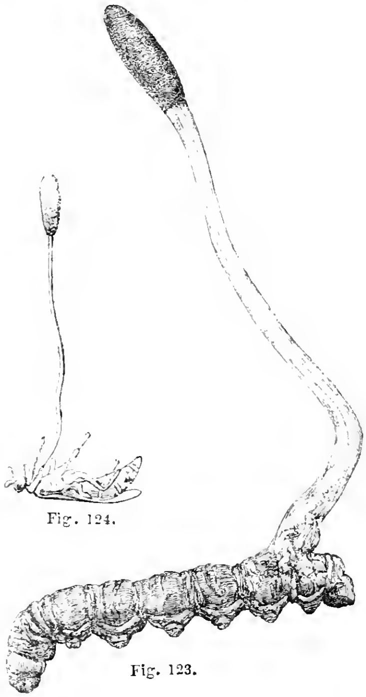

Fig. 124.

Fig. 123.

Fig. 123. *Torrubia Gunnii*, from Tasmania. Fig. 124. *Torrubia sphecocephala*, on a Wasp, from the Antilles.

The most splendid species of this genus are found at our Antipodes. In Australia, two species called respectively *Torrubia Gunnii* and *Torrubia Taylori*. The former of these we have figured from a specimen presented to us by Dr. Milligan, from Tasmania (fig. 123). Two species are natives of New Zealand, of which *Torrubia Robertsii* has been longest known, and is figured in Lindley's "Vegetable Kingdom," (p. 40), the other is *T. Sinclairii*. Dr. Hooker found two species in the Khazia mountains of India; and *Torrubia sphingum* (an American species) occurs also at Darjeeling, of which we give a figure, the

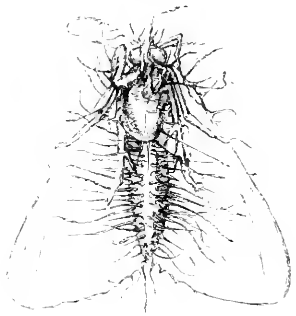

Fig. 125. *Torrubia sphingum*, on *Spirama retorta* ♂, from Darjeeling.

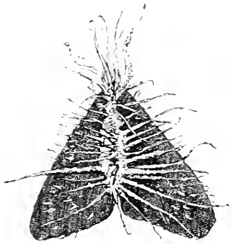

Fig. 126. Isaroid condition of *Torrubia sphingum*, on a species of *Hypena*, from Darjeeling.

Fig. 127. Fertile stipe of *Torrubia sphingum*, bearing perithecia, magnified.

Fig. 128. *Torrubia stylophora*, from South Carolina.

parasitic threads being developed freely from the body, and the nerves of the wings of *Spirama retorta* ♂ (fig. 125). We have also added a magnified figure of one of these stipes (fig. 127) bearing the peritheeia. The other figure (126), of a species of *Hypena* from the same locality, supports the Isarioid condition of the same fungus. Both these insects are in the collection of our friend Mr. Frederic Moore. One species is indigenous to China (*Torrubia sinensis*), where it is held in great esteem as a drug, and realizes a high price. Five species are recorded in South Carolina, one in Pennsylvania, parasitic on the larvæ of the May-bug (*Melolontha*), and one other North American species of a very curious kind on Nocturnal Lepidoptera, one in Cayenne, one in Brazil, on the larvæ of a *Cicada*, and one on a species of ant (fig. 122), two in the West Indies, one of them being parasitic on a species of wasp (fig. 124), one in New Guinea on a species of *Coccus*, and one on a species of *Vespa* in Senegal. Thus about twenty-five species are known which are parasitic upon insects, in some stage or other of their existence, either as larva, pupa, or imago, and the majority of them in sub-tropical climates. As our knowledge of the fungi of tropical countries increases, we may become acquainted with new forms. Hitherto the large, conspicuous, leathery fungi have been almost all that have reached Europe, from many warm regions where fungi must abound. Entomological collectors abroad would do well to preserve all specimens that may fall in their way, akin to those we have been describing, and not discard them as mere curiosities, or with regret that for them a good specimen has been spoilt by the presence of the parasite. M. C. C.

THE GIGANTIC JAPANESE SALAMANDER.

(*Sieboldia maxima.*)

THE greatest individual ever imported into Europe of this largest member of the soft-skinned and scaleless reptiles (family *Urodela*) is now in the Hamburg Aquarium. This enormous water-newt,* the Japanese or Javanese representative of the little pond-newt, or water-eft, of Britain, measures 4 feet in length, and weighs twenty-two pounds. It lives in a room expressly built for it, measuring 16 feet long, 8 feet broad, and 12 feet high, at the further end of which is a tank, measuring internally 8 feet long, 6 feet broad, and 1 foot deep, and having an additional depth of 6 inches of fine sand. The front of the tank is of thick plate-glass, continued 18 inches above the water-line, so that the salamander cannot climb over and fall on the floor of the room, as it once did before it got accustomed to its home, previously to the heightening of the glass; but since then it has shown no disposition to leave the water. The other three sides of the tank are lined with rock-work cemented together, and it runs up in a picturesque manner, with bold overhanging and shelving masses, till it terminates at about four or five feet above the surface of the water, to which it gives the requisite degree of shadow to suit the animal. This rock-work is plentifully furnished with ferns and other living plants, and among them fly about and roost a few tame canaries and goldfinches. On one side of the tank is a little beach, and near the middle is an island of about two feet square, formed of rock-work. From the centre springs a slender fountain of one jet, or of a group of jets, as may be needed by the weather, which, playing day and night, keeps the water always in good condition. The overflow passes off at one corner, and is returned through the fountain by an engine working in an adjoining apartment, so that the same water is ever used. The illumination is from a small skylight, and from a window in front. This aquarium is thus particularly described, because it is found to be an excellent arrangement, not only for the *Sieboldia*, but for other animals of the same general habits, such as tritons, frogs, small tortoises, &c.; and, moreover, owing to the large surface exposure and small depth of the water, and its even temperature of about 55° to 60° Fahr. all the year, it is found to be well adapted for many delicate fishes. In winter the room is warmed by hot-water pipes, and in summer the construction of the walls and roof keeps it cool. Gas is laid on for evening observations.

But though thus provided with a beach and an island, which I once supposed to be requisite for this great salamander, in order that it might have places to creep up upon, to get out of the water and expose itself to the air, after the fashion of British animals of the same order, it really never does avail itself of these means of getting an airing, but it generally lies, during the hours of daylight, in the half-shadow of the foreward overhanging edge of the little island, and in a sort of cavern it has excavated by digging away the sand and throwing it up around. Here by preference it reposes with its huge flat head in the darkest spot; yet, fortunately, as it is never thus more than from a foot or so away from the glass front of the aquarium, it is

* The publication *All the Year Round*, of May 19th, 1860, as an amusing paper on a specimen of this salamander, then hecently imported to the Zoological Gardens, Regent's Park, and from this I extract a few sentences expressive of the popular dislike for this creature. Few people, indeed, look on t without shuddering, and the Hamburg specimen is much arger than the London one:—

"A sort of eft or lizard, of enormous size, brown, bloated, and hideous . . . the bloated and abhorrent eft . . . this noisome animal . . . this huge and bloated eft . . . a creature about two feet in its extreme length, from the end of its most appalling snout to the extremity of its hideous tail. It s a crawling dragon, an exaggerated eft, a pestiferous and appalling lizard, a soft and dwarfish crocodile. What is it not that is unclean and fearful? From end to end it is covered, and on its huge and flattened head especially, with blotchy manginess, of a diseased and mouldy order . . . The ugliest and largest lizard that was ever seen."

always fairly in the sight of visitors, and nearly every part of it can be inspected. It never by any chance shows any disposition to leave the water, and the only part of its body which it exposes to the air is the extreme tip of its nose (where its nostrils are placed), when it comes up to the surface to breathe at irregular intervals, varying from five to thirty-five minutes. I can usually tell a little while beforehand when it desires to breathe; for it then ceases to be quite so still as before, and fidgets about a little, and slowly turns its head about from side to side, or it slightly alters the position of one or more of its four clumsy feet and fingers (it frequently reposes with some of its limbs doubled up under it awkwardly, palm upwards), and then with great deliberation it moves slantingly upwards; and when its nostrils have reached the water's surface, it expires through them a considerable amount of vitiated air with a prolonged, subdued, but audible sigh. It then takes in, through the same channel, a fresh supply of air, but without making any sound, and passes it into its lungs in a great wave, which as it goes along largely distends the loose thin skin or dewlap below the under jaw. It then retires backwards into its hole in the same slow manner that it advanced; but in returning, and when below the surface, it expels the superfluous air in bubbles, through both the nostrils and the mouth, making a slight pause to do so.

Sometimes, but rarely, by daytime it makes a little journey all round the tank, with occasional stoppages by the way; but it becomes really active only at night, when it moves about in a restless manner, backwards and forwards, with a motion surprisingly quick for so slow a creature. Yet its motions are apparently aimless, as regards the procuring of food, which consists of living fishes, which swim about the salamander's jaws unsuspectingly, and only when the animal is hungry does it suddenly open its enormous mouth (pale-yellow inside), at the same time making a slight quick onward movement, and swallowing whatever fishes are near, they being swept in by the whirlpool caused by the swift opening and closing of the mouth, and are then swallowed and seen no more. Dull as this salamander seems to be, it possesses a power of discriminating its food; for though in the course of a year it eats several hundreds of fishes, consisting of carp, tench, dace, barbel, minnows, gudgeon, and others (its most favourite food of all being smelt and schnäpel), it will not take any which are too large or too hard to be conveniently swallowed. Thus it does not touch a pair of great gold-fish which have been with it for a long time; nor a rather large *Silurus glanis*, which has been imprisoned with it for more than a year; nor one or two armour-plated sturgeons, nor some small water tortoises of various sizes; but if it does by chance seize any of these two last-named hard animals, it speedily opens its mouth and lets them escape unhurt. When the seizure of prey takes place below the surface of the water, the resistance of the fluid prevents the jaws opening and closing with such a marvellously quick double motion, and with a loud snap like that of a spring rat-trap, as that which takes place when the prey is seized when quite at the water's surface, and when, therefore, the jaws move through the air only, without much resistance being offered them.

But since it has resided here with plenty of food always around it, it is not so hungry as when it first came, and displays of voracity are now seldom.

For about a week after its getting out of the tank and remaining on the dry floor of the room all night —on August 7th, 1864—it could not properly sink in the water, and remained partially floating on the surface for some seconds after each inspiration of air in breathing. It evidently could not get rid of the wind it took in during its night's involuntary stay out of its element.

There is one very curious thing about it. Its eyes are very small, and are so much like the numerous warts with which its skin is covered, that they cannot be easily discerned; and so long as they are not apparent, the whole animal looks like an inert mass of something not living. But as soon as the eyes are made out, these eyes, small, dull, naked, idless, and motionless as they are, instantly light up the whole head and face of the animal with expressiveness. The expression is certainly of a stolid, reptilian, and repulsive kind, but still it *is* an expression, and one which imparts a character and aspect to the animal very different to what it would have if it had no eyes at all, and quite dissimilar to that which it has before the eyes are seen. Yet they are so very small that the proportion they bear to the creature's head is about the same as that which a small pea bears to a 12-inch globe. A specimen of this animal lived at Leyden for more than thirty years, and one now at Amsterdam has been there for a long time. The Hamburg example was presented by the Prussian Consul, Mr. Overbeck, of Hong Kong.

Feb. 1st.—Since writing the foregoing, Dr. J. G. Fischer, of Hamburg, a great authority on animals of the class to which the salamander belongs, tells me that the specimens in the Regent's Park Aquarium House, in London, voluntarily leave the water, sometimes; but as far as I can remember, both they, and the one other specimen (the first one obtained) in the tank in the Python House in Regent's Park, had precisely the same habits as the Hamburg one. But in 1860 I had not the same opportunities of observing as I now have, especially at night; and therefore I should be glad to know anything of the habits of these salamanders in London, especially as to their leaving the water occasionally or not. W. ALFORD LLOYD.

SIMPLE OBJECTS.—No. XIII.

FLOSCULARIA CORNUTA.

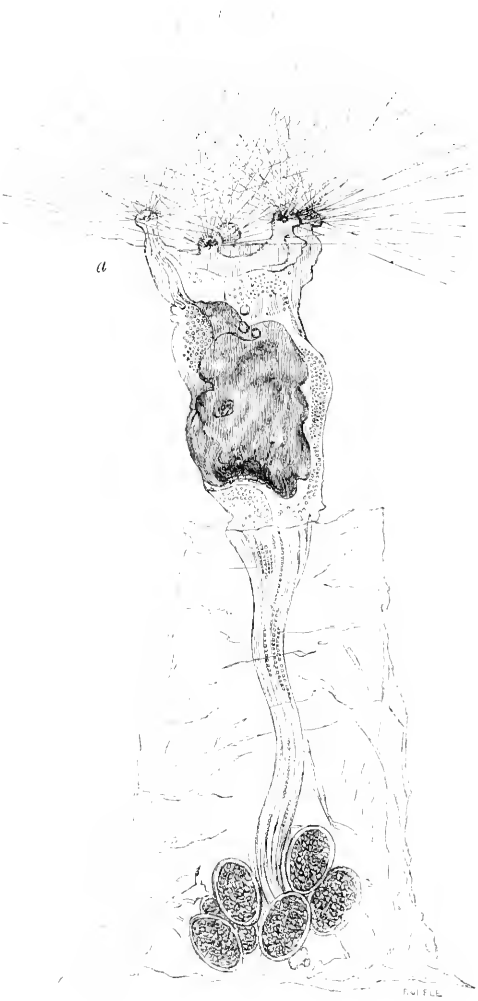

Fig. 129.

THIS beautiful little creature, which is one of the large family of Rotatoria, may be found in ponds and ditches adhering to fresh-water plants. It exists in a gelatinous case, so exceedingly transparent, that it sometimes escapes notice, but more frequently its presence is shown by a number of minute Algæ and other substances attached to it. When the Floscularia is searching for its food, which consists of the spores of Algæ, and other similar vegetable substances, it stretches itself out of its case, and expands its rotary organ, which consists of a number of long and delicate tentacles spread out in fan-like form from the lobes which surround the mouth. In *Floscularia cornuta*, these lobes are five in number, and in addition to these there is a *horn* (fig. 129, *a*), which seems to occupy the place of the sixth lobe, found in some other species.

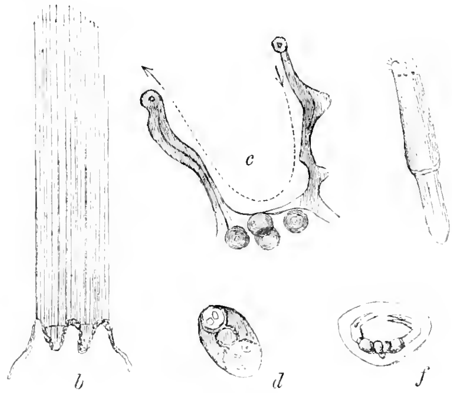

Fig. 130.

These tentacles do not however seem to have any proper motion of their own; their office appearing to be that of forming a cup-like expansion round the mouth, which may serve to guide the food into it. A strong current is observable running into and out of the mouth, caused no doubt by a lining of very delicate cilia, the course of which is shown in fig. 130, *c*, which represents a section of the mouth between two lobes.

"The alimentary canal" is described by Pritchard * as "simple and conical, but it is remarkable as possessing a second æsophageal bulb or head-the lower one only having jaws and teeth; two pancreatic glands are present auteriorly."

A number of very small round granules are also observable, which within the body lie freely scattered about, but in the tail or foot are gathered into lines, and pass backwards and forwards as the animal moves. When it is about to expand its tentacles, these granules exhibit a swarming motion about the mouth. When it is disturbed the creature retreats into its case, and the mouth is closed so that the tentacles assume a parallel condition (fig. 130, *b*).

The ova are deposited at the bottom of the case around the foot, and contain (as seen by transmitted light), a dark granular mass.

As they approach maturity they become of a lighter colour, and the young may be seen moving within the envelope, and having two red eye-spots (fig. 130, *d*). Fig. 130, *e*, shows the animal shortly after it has left the egg, having a fringe of cilia round its head, and two eyes, which however disappear as the animal grows older.

J. S. TUTE.

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* History of Infusorial Animalcules, Art. Floscularia. From the same source the teeth (fig. 130, *f*) are copied.

BIDDULPHIA AND ISTHMIA.

THESE two genera of British diatoms are associated together in a group named *Biddulphieæ*, which might almost be termed the Royal Family of diatoms.

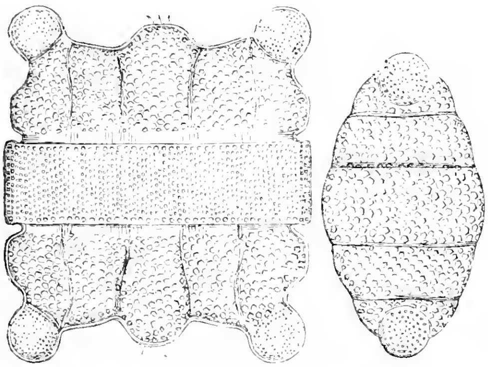


Fig. 131. *Biddulphia pulchella* × 400.

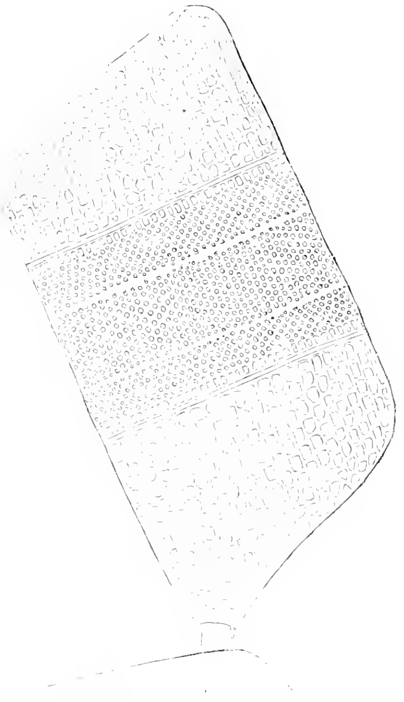


Fig. 132. *Isthmia enervis* × 400.

BIDDULPHIA is characterized as having the valve roundish or elliptical, frequently constricted. Frustule compressed, quadrilateral, the corners produced into rounded or horn-like processes, and the ends generally bearing spines. The frustules united into a continuous or zigzag filament. The species selected for illustration (fig. 131) is *Biddulphia pulchella*.

ISTHMIA has the valve elliptical, frustule compressed, trapezoidal, the lower angle of each frustule attached by a small gelatinous cushion to the one beneath, the whole forming an irregularly branched filament. Of the two British species our figure (fig. 132) represents *Isthmia enervis*.

AN ARMY OF CATERPILLARS.

HEARING on the 8th of May, from a farmer, a curious story about a "fall of worms" in his neighbourhood, which caused some excitement, I visited the ground, and found the field crossed by a zigzag black line, about a yard in breadth, giving it the appearance at a distance as if a cart had passed through it from which soot had been thrown out in shovelfuls. The caterpillars were not in motion, nor feeding, but basking in the sun, rolled together in thick and deep lumps. I took up about fifty of them by simply putting down my hand. The owner of the land informed me that they had appeared "suddenly," at five o'clock in the morning, on the 28th of April, and that they were then ten times thicker than I saw them, lying just as if they had been emptied out "from pots or bushels." Allowing something for rustic exaggeration, this cannot have been far from the truth; for when I saw them, more than a week after, there were signs of constant dispersion, as I found another body in rapid march across the road adjoining the field, while those remaining were certainly, when I saw them, lying as if they had been emptied out from breakfast-cups at intervals of a few inches. These had moved, on the whole, a distance of two fields from that in which they were first seen. None had ever been observed in the neighbourhood before. From rough estimates I have made since, I think I am within the mark in saying there were at least a million in the remnant I saw in the fields, though I am well aware that this, to some people, may seem almost incredible. I should be glad to know if this is an unusual phenomenon, and how to account for the sudden appearance of such an army. I have never seen or heard of anything at all resembling it. I need scarcely add that the aborigines were greatly terrified, and seemed divided in opinion as to whether it portended war or only cholera.—*S. Leslie Brakey, Ennis, Co. Clare, Ireland.*

Fig. 133.

[The caterpillars received were those of the "Greasy Fritillary" (*Melitæa artemis*), a local species, feeding on the Scabious. One of these we have engraved (fig. 133) from a specimen forwarded by our correspondent.—*Ed.*]

CHEMISTRY AND NATURAL PHILOSOPHY.

CAUSE OF THE ABSORPTION OF LIGHT BY THE ATMOSPHERE AND OF THE COLOUR OF THE SKY.—According to observations by Mr. J. P. Cooke, jun., a very large number of the more faint dark lines of the solar spectrum, hitherto known simply as *air-lines*, are due solely to the *aqueous vapour* in the atmosphere. From this it results that the absorption of the luminous solar rays by the atmosphere is, chiefly at least, owing to the aqueous vapour which it contains. From observations with his spectroscope of the atmosphere of Cambridge, Massachusetts, he has found that these air-lines increase in number and intensity with the increase in the quantity of aqueous vapour in the atmosphere. The absorption of the luminous rays of the sun by the earth's atmosphere, which is estimated by Pouillet to occur to the extent of a third of the whole passing into it, seems therefore, according to Mr. J. P Cooke's observations, to be due to the aqueous vapour in the atmosphere. The aqueous lines of the spectrum are almost entirely confined to the yellow and red regions of the spectrum, from which it follows that few or none of the blue rays of light are absorbed. The necessary consequence of this is the *blue* colour of the sky. The setting down the colour of the sky to the absorbent action of aqueous vapour in the air upon the red and yellow rays is in accordance with the fact of familiar observation, that the blueness of the sky is much more intense with the moist air of summer than it is with the dry air of winter.

IS THERE OZONE IN THE ATMOSPHERE?—Many of our readers have performed the experiment by which ozone is said to be detected in the atmosphere, namely, that of exposing to the air a slip of test-paper made active by a mixture of starch and iodide of potassium, and observing if it acquires any colour. Now the evidence afforded by this test has been very justly questioned by Admiral Bérigny and M. Frémy, as there are other substances which occur in the atmosphere capable of affecting the ordinary ozone test-papers, and as great irregularity is observed in the results obtained by the use of these papers. M. Houzeau, however, who employs a different kind of test-paper, and one not open to most of the objections which are brought against the ordinary papers of Schoenbein, seems to have established the existence of an ozone-like body, and he has further obtained, by condensing the vapours of the atmosphere, an aqueous liquid having all the properties of oxygenated water. He finds that ozone is always present in the atmosphere in both town and country, and that it is principally formed during the occurrence of storms, hurricanes, and waterspouts, which influence the ozone indications at distances where their existence even remains unknown. D.

MICROSCOPY.

COLLECTING GROUND.—Amongst the numerous readers of "Science-Gossip," I daresay there are many who have not opportunity to make long excursions into the country in search of microscopic objects. For the information of such, permit me to say, that there are localities in the suburbs of London capable of being reached by a railway trip of a few minutes, and for the trifling cost of a few pence, which during the summer months would well repay a visit. The small pools on Hampstead Heath, for instance, abound with that interesting and beautiful object conochilus, also brachionus pala, and other varieties of Rotatoria, together with *volvox globator*, and several kinds of desmidiaceæ. In the well-known Hampstead ponds *chara nitellus*, remarkable for the facilities it affords of observing sap circulation, grows in abundance. Another locality worth notice is the common at New Wandsworth; the ponds here, formed from old gravel-pit excavations, are teeming with small life. A few weeks since a friend and I took a fourpenny return ticket from Victoria Station to Clapham Junction, from thence a quarter of an hour's walk brought us to the Common. We commenced operations at the pond almost adjoining the enclosure, where once stood the tower built for Rev. Mr. Craig's large telescope, of which nothing now remains but its rusty tube, rotting amidst dirt and rank weeds: here we found large quantities of volvox, red and green hydra, almost every description of fresh-water entomostraca, the smaller kind of caddis-worm, whose beautifully constructed cases, built up of the minutest particles of sand and dirt, and cemented with inimitable skill and precision, defy the powers of our first-class masons to imitate; and a large variety of aquatic larvæ, amongst which was that favourite of the microscopist the transparent larvæ of a small kind of gnat, and that Dahomean savage of the waters the larvæ of the dytiscus, valuable for its fine development of the tracheal process. In a ditch close by, running at the end of several cottage gardens, we collected fine closterium, showing the circulation with a ¼-inch objective, Micrasterias and other desmids. In conclusion I may say, New Wandsworth Common is a favorite spot with me; it was here, in a large piece of water near to the railway station known as the "Black Sea," I first discovered, after years of search in other directions, that rare and exquisite polyzoar *Cristatella mucedo*; and from another large pond skirting the road and opposite the cemetery, I obtained the equally rare and interesting member of the same family, *Cristalina lophophus*—*J. S.*

PLANT CIRCULATION.—A *cyclosis*, or circulation of protoplasm, may be very easily seen in the fine rootlets of the common water-weed known by the name of "Frog-bit." A power of from 250 to 300 diameters shows the circulation well.—*J. J. R.*

TOXONIDEA GREGORIANA.—During last autumn I secured several gatherings of diatoms in which *T. Gregoriana* were more or less present. I obtained them in the outer harbour at Whitehaven a little above low-tide mark. I can furnish a few slides containing specimens, which I shall be glad to exchange for others of value.—*B. Taylor, 57, Lowther Street, Whitehaven.*

DEPENDENCY OF SCIENCE.—No one who attentively examines the progress of any department of science, save such as are (like mathematics or metaphysics) of a purely abstract character, can fail to perceive how much it is dependent upon the perfection of its *instruments.—Dr. Carpenter on the Microscope.*"

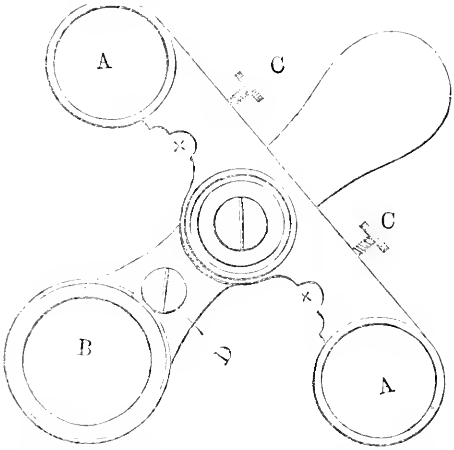


Fig. 134. A A. Orifices into which screw the Object-glasses. B. Adapter to Microscope body. C C. Adjusting screws working through the notches × and bearing upon the stud D, whereby exact lateral adjustment can be secured.

ADJUSTMENT TO BROOKE'S DOUBLE NOSE-PIECE.—The facility which the original nose-piece affords of rapidly making use of a low or a high power, is, I am afraid, not sufficiently appreciated by the public; but the continuous use of one for some time enables me to imagine that their limited use arises from the piece of apparatus having to be especially adapted to the objectives. It is perhaps necessary to point out that the optical centre of two objectives of different powers may not fall identically upon the same point, not necessarily from any fault in their construction, but because the smallest play in the universal screw will throw it out. The instrument itself, as all microscopists know, consists of a solid bar, with two orifices, into which screw the object-glasses, generally a 1 in. and $\frac{1}{4}$ in., or a 2 in. and $\frac{2}{3}$ in., or $\frac{1}{4}$ in. and $\frac{1}{12}$ in.; but where, in changing the one for the other, the object looked at does not occupy the same position in the field, an adjustment is necessary. To accomplish this two notches are filed in the before-mentioned bar, into which fits a steel stud, against which the bar presses; and as the centre of the object-glass orifices are equidistant, the only adjustment required will be a lateral one, and by filing out one or other or both of these notches, two glasses can be centred exactly. It occurred to me that, by drilling a small hole through each of the notches, and fitting therein a small screw, the filing might be done away with altogether, and any pair of glasses adjusted with very little trouble. This has been done, and the instrument (fig. 134) as altered gives the greatest satisfaction. Two $\frac{1}{2}$ in., two $\frac{1}{4}$ in., two $\frac{1}{8}$ in., or even two $\frac{1}{12}$ in. can be readily adjusted so that an object shall occupy the self-same place in each. For comparison of different objectives, I would point out that this piece of apparatus and its adjusting screws appear to me to be very valuable, and as the alteration, or, I should say, the addition, is very inexpensive, I simply lay the matter before your readers. If necessary, a further adjustment could be fitted by making one of the orifices moveable and sliding in a dovetail, a spring being adapted to force it out; a counteracting screw would then enable any one to obtain perfect centricity should the centres of the object-glass orifices not be equidistant.—*J. Bockett.*

MAKING GLASS CELLS.—The way to make cells out of thin microscopic glass, described in Dr. Carpenter's work, is well known, and after numerous experiments I found that a somewhat similar method could be applied to thicker glass. I procure two pieces of steel, or iron made hard as possible, the size and shape of cell required,—in short, two steel cells the pattern of the glass one wanted, and about one-tenth of an inch thick. I then cut some squares of ordinary window glass the exact size of the steel cells; on each side of a glass square I then, with marine glue, cement one of the steel plates, taking care to have the edges of the two steel plates and glass square all parallel; if the cementing is perfect, a hole may now be made with impunity through the glass by a few taps with the point of a rat-tail file, and enlarged with the file to the size of the holes in the steel plates; heat is then applied to liberate the glass cell from between the steel ones, a fresh square put in, and the process repeated. It is obvious that cells of any size and shape can be made in this manner, and by working with four or five pairs of plates at once a gross of cells may be made in a very short time, at a cost of a few pence—a considerable saving, as glass cells are rather expensive to buy. The same plan will of course answer for making a hole through the centre of a slide. Thin crown or plate glass is easily perforated, and makes a most useful cell. I have tried to cut cells from tube with a cutting saw and emery in a lathe, but the less said of this the better; it can only be done with proper apparatus.—*E. G., Matlock.*

BOTANY.

The Morel, *Morchella esculenta.*—A Correspondent having sent us one of these curious looking fungi, desiring to know its name, we have given an

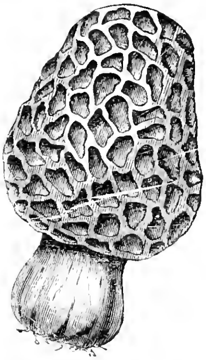


Fig. 135.

illustration, so that all who may find it in future, may turn it to good account. This is one of the best of the edible spec's, and may be dried readily in a current of air, so as to be available for flavouring soups &c., at a season when fresh morels or mushrooms cannot be obtained. We have no poisonous species at all resembling it in appearance, so that when found, it may be eaten without fear.

A Gigantic Morel (*Morchella crassipes*) was exhibited by Mr. W. G. Smith at a recent meeting of the Horticultural Society, which had not previously been observed in this country. It attains a height of from eight to ten inches or more. The substance is brittle and watery, and soon decays. It may be eaten when young, but cannot be dried in the same manner as the common species. The specimen exhibited was found at King's Kerswell, near Newton Abbot, Devonshire, and had a " top " fully as large as an infant's head.

A Hint.—Sounder views of the requirements of science ought to satisfy us, that he who can show good reason for expunging a plant from the list of our strictly indigenous species, does some real service towards the attainment of truth, whilst he who needlessly swells his catalogue by the admission of a species on doubtful authority, throws a decided obstacle in its way, and surely doubly puerile is that vanity, by which some are said to have been influenced, who have one year sown the seeds of a rare, or even of an exotic species, in an unfrequented spot, that they might become the earliest discoverers of a *new native!*—*Rev. L. Jeyns.*

Legend of the Forget-me-not.—As told by the Persian poet Shiraz, this story is far more poetical than the German one. " It was " says he, " in the golden mornings of the early-world, when an angel sat weeping outside the closed gates of Eden, for he had fallen from his high estate through loving a daughter of earth, nor was he permitted to enter again, until she whom he loved had planted the flowers of the forget-me-not in every corner of the earth. So the angel returned to the earth and assisted her, and they went hand-in-hand over the world, planting the forget-me-not, and when their task was ended entered Eden together,—for she without tasting the bitterness of death became immortal, like the angel whose love her beauty had won, when she sat by the river twining her hair with the forget-me-not."—*Common Wayside Flowers.*

Star of Bethlehem.—The plants noted at page 115, are not the species named, but *Ornithogalum nutans.* The locality in which they were found was an orchard.

The Tulip.—This flower appears to have been scarce at Constantinople, even so late as the middle of the sixteenth century, as in the year 1554, Auger Gislen Busbec (*Busbequius*) being at the Porte as Ambassador from the Emperor Ferdinand I. of Germany, sent both seeds and the bulbs of the Tulip to Vienna, with an observation that the Turks charged a high price for these flowers, which would not have been the case had the Tulip been then growing spontaneously in that country. —*Flora Historica.*

The Daisy.—Fabulous history informs us that this plant is called *Bellis,* because it owes its origin to *Belides,* a grand-daughter to Danaüs, and one of the nymphs called Dryads, that presided over the meadows and pastures in ancient times. Belides is said to have encouraged the suit of Ephigeus, but whilst dancing on the grass with this rural Deity she attracted the admiration of Vertumnus, who, just as he was about to seize her in his embrace, saw her transformed into the humble plant that now bears her name.

Hampshire Beeches.—The finest beech-trees in England, are said to grow in Hampshire. The forest of St. Leonard, near Horsham, in Sussex, abounds with noble beech-trees. The cottagers of this forest inform you, that when St. Leonard wished to rest beneath these trees, he was disturbed during the day by the biting of vipers, and that his repose was broken in the night by the warbling of nightingales, and on that account they were removed by his prayers, since which time tradition says of this forest :—

The Viper has ne'er been known to sting,
Or the Nightingale e'er heard to sing.

Phillips. Fruits of Great Britain.

ZOOLOGY.

The Brambling or Mountain Linnet (*Fringilla montifringilla*.—This bird is an occasional visitor in this part of York; but occurring at rare intervals. Lately we have had a Flax mill established in the neighbouring village; where an extensive business is carried on in the thrashing of line for the seed, and in steeping and manufacturing the stem; consequently much refuse is scattered about. To this refuse during the past winter, large flocks of bramblings have resorted, and great numbers have been taken by snares or shot.—*John Ranson, Linton-on-Ouse, York.*

Freshwater Sponge (*Spongia fluviatilis*), &c.—In H. S. G. for May 1866, in a paper written ten weeks previously, I said that I had not been able to keep this sponge alive. But since then (May 8th), two patches of it have appeared on the rockwork of the freshwater tank, No. 1, in the Hamburg aquarium. These patches are each as large as a crown piece, are irregular in form and outline, and are of a dirty greyish-white colour. They are evidently in good health, and are growing fast in both diameter and height. As far as I know, I have never placed in this tank any sponge, and I can only account for its origin by supposing that some spores contained in the Elbe water accidentally found suitable resting places, and thus flourished. I have many times in England tried to cultivate this sponge, but never once succeeded; nor could I now succeed if I were to take some out of the river ready grown and transfer it to an aquarium. All that can be done in such cases is to endeavour to put certain conditions together, and trust to chance for the result. The spots of the rockwork occupied by the animals are not much shaded, nor are yet in very light places; and this observation applies to the marine sponges I grow, and which I have already referred to in the May number. In No. I of "Recreative Science," (August 1859, p. 31), Mr. Shirley Hibberd says that, "in the tank fitted up by Mr. Bowerbank, and presented to the Crystal Palace, there were, not long since, a number of living sponges in very good condition for observation." This is a great mistake, for there never were any living sponges shown at Sydenham, and those alluded to by Mr. Hibberd, formed a collection of dead sponges deposited by Mr. Bowerbank, and arranged in one, two, or more large glass cases furnished with looking glasses and rockwork, so as to give some idea of the sea-bottom. I saw them when I was last in England, about four years ago. I intended to have noticed this error in the article, "Animals in Aquaria" (H. S. G., May 1866), but forgot it, and having the magazine, "Recreative Science," before me, I misquoted it at page 106, column 2, of H. S. G., for "The Intellectual Observer." The former publication being merged into the latter, and as both bear each other's titles reversed, I confused the two. The paragraph, "An Ancient Sea-Anemone," in H. S. G. for January last, gives the year 1820 as the date of finding the famous specimen of *Actinia Mesembryanthemum*, formerly belonging to Sir J. G. Dalyell; whereas according to an interesting little biography of the animal written by Mr. Adam White, late of the British Museum, it was in August 1828 that she was picked up at North Berwick. I call her "she," because from her great age she is known as "Granny." She is quite well; has had no babies for about four years; and if the old lady has any more, I am kindly promised some to rear, by Dr. James W. Bain, of Edinburgh, who has her in charge, and is the trustee of the animal for Mrs. Fleming. This famous zoophyte is, indeed, quite a Scotch national celebrity.—*W. Alford Lloyd.*

Straw-Necked Ibis (*Ibis spinicollis*).—A pair of these birds, from New South Wales, have been added to the collection at the Zoological Gardens, Regent's Park, as well as some other interesting animals.

A Nest in a Grave.—A few days ago, soon after the sexton of the parish of Alfriston finished digging a grave, a robin took a great fancy to this new domicile, and soon built a nest in it. She must have worked hard to complete her design in so short a space, for when the sexton went on the following day to see that all things were as he left them the night before, he saw the robin pop out from her hiding place, and to his great astonishment found her nest.—*The Standard, 5th May.*

Habits of the Rook.—I was witness, the other day, of a curious scene in the social life of a rookery situated close to my house. It was about six o'clock in the evening, when my attention was called to a combat that was going on between two rooks on the lawn. They were fighting in the fiercest manner, rolling over and over on the grass, working away with beak and claws; presently, as if exhausted with their efforts, they lay side by side to rest, and, after a pause of a minute or so, were up and at it again, precisely as Falstaff describes his single combat with Hotspur. While the battle was thus raging below, there were above twenty rooks sitting on the lower branches of a tree close by, evidently interested spectators of the match, and, for ought I know, may have been giving and taking the odds, and backing the favourite. Other rooks, meanwhile, were flying backward and forward on their ordinary business, paying, apparently, not the least attention to the gladiators on the grass. I cannot say for how long the fight may have lasted before I saw it, but it continued for fully five minutes afterwards, when suddenly there appeared a policeman, in the shape of a large rook, which came flying from among the trees close by. He lighted on the grass a few yards distant from the combatants, who just then were resting, and walked slowly towards them. As soon as they saw him approach, one of them got up, shook himself, and flew heavily away; the other fellow apparently could not fly, but just shuffled off some little way; and the policeman, having thus put a stop to the fight, seemed to consider he had done his duty, and flew off also, and so ended the duel. I may mention a fact regarding this rookery, which is situated close to the shore of a bay on the West Coast of Ireland, and is much exposed to the south-west winds. Shortly after the stormy weather began last December, I observed that the rooks did not come in the evening to roost as usual. During the rest of the winter and early spring they stayed away, a few invariably coming every morning and remaining about the place all day, as if to keep possession of it, and every evening retiring to some near sheltered roosting-place inland; but as soon as the time came for them to repair their nests, the whole colony again took up their permanent abode here. —*H. G. E.*

CURIOUS NEST OF THE CHAFFINCH (*Fringilla Cœlebs*).—Two young gentlemen found a nest in a hedge on their farm, and my attention was directed to the same nest by them, as something curious. I went to the place indicated, and found a nest in the fork of a thorn bush. It looked, at first sight, not unlike the nest of a long-tailed tit; but upon closer examination, I found that it consisted of two nests, placed one upon the other. The lower nest, for some reason, had been found unsuitable, and the little builders had filled the nest up with moss, and using the lower nest as a base, had raised a column of moss, lichens, wool, and hair, to a height of seven or eight inches; and upon this column they had built the real nest of the usual materials, *i. e.*, moss, lichens, feathers, hair, and wool; and in this nest was laid one egg of the usual and unmistaken chaffinch colour, so well known to bird-nesters. The chaffinch is called in North Yorkshire, the "bully," and "wet bird."—*John Ranson, Linton-on-Ouse, York.*

INGENUITY OF THE GARDEN SPIDER (*Epeira Diadema*).—These spiders have a most singular plan of strengthening their web, when the wind is more than ordinarily violent. If they find that the wind stretches their net to a dangerous extent, they hang pieces of wood, or stone, or other substances to the web, so as to obtain the needful steadiness. I have seen a piece of wood which had been used by a garden spider, and which was some two inches in length, and thicker than an ordinary drawing-pencil. The spider hauled it to a height of nearly five feet; and when by some accident the suspending thread was broken, the little creature immediately lowered itself to the ground, attached a fresh thread, ascended again to the web, and hauled the piece of wood after it.—*Rev. J. G. Wood.*

THE RINGDOVE (*Columba palumbus*). — Mr. Waterton mentions a curious circumstance connected with this bird. In a spruce fir-tree there was the nest of a magpie containing seven eggs, which were removed, and those of the jackdaw substituted. Below this nest a ringdove had chosen to fix her abode, and so the curious fact was seen, that on the same tree, in close proximity to each other, were magpies, jackdaws, and ringdoves, and all living in perfect amity. It might have been supposed that the magpies and jackdaws would have robbed the nest of the ringdove, but such was not the case. Moreover, the bird knew instinctively that she would not be endangered by her neighbours, for she came to the tree after the magpie had settled in it.

A MYCOPHAGOUS SQUIRREL.—One evening, in the autumn of 1864, while in search of fungi in a small plantation of Scotch firs, near the Wrekin, the writer noticed a squirrel seated on its haunches on a limb of a wych elm, and holding between its paws, by the stem, a fungus. There was no mistaking it. Agaric it was—stipes, pileus, and lamellæ all being plainly visible. To see the pretty creature sitting as described, with its bushy tail erect, and gracefully curved at the end, nibbling away *à la gourmand*, and seeming quite unaware of the presence of a spectator, was indeed most interesting. A piece of rotten wood, thrown so as to strike the limb, disturbed the meal, and the epicurean leaping to an adjoining tree, the dainty morsel fell to the ground, and was at once appropriated by the writer for examination. Enough of the pileus remained to show that it had been a full grown specimen of the red Russula (*R. rubra*); and a few yards from the wych elm, the writer stumbled upon some half dozen of the same species: their crimson caps resembling at a distance, so many round patches of blood, of the size of a crown piece, half hid in the stubbly grass (see also vol. i. p. 40).—*R. A.*

VIPERS IN COMPANY.—While on a visit to the Isle of Wight, early in last April, I observed three full-grown vipers in a wood together. I killed two of them, but the other managed to get off. I have frequently captured vipers before of all sorts and sizes, but never have I seen them in company.—*C. Lister.*

EDWARD'S MIDGE (*Couchia Edwardii*). — Mr. Jonathan Couch has recently communicated to the Linnæan Society the particulars of a new species of very minute fish found by Mr. Thomas Edward, of Banff, in the Moray Firth, of which the following is a figure the natural size :—

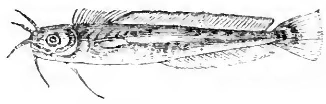


Fig. 135. Edwards' Midge (*Conchia Edwardii*).

"Five examples of these little fishes were kept alive by Mr. Edward for a week; and during that time he describes their action as being lively and singular, although perhaps not generally so active as the Mackerel Midge (*C. glauca*), and in general they appeared to prefer to remain near the bottom rather than to swim aloft. When at liberty, their habit is to keep in small companies; but they seem to treat other fishes as enemies, and even their own companions are occasionally subject to their hostility, as is shown in the following instances related by Mr. Edward. He placed a Goby, he does not say of what species, in the same vessel with these fishes; but in the space of twenty minutes his attention was drawn to a commotion among them, which arose from the persecution inflicted on the unfortunate stranger, which they were violently assailing with their heads, while it endeavoured to escape from their fury. After a considerable time, however, this eager violence proved a misfortune to one of the Midges; for, missing its mark as it rushed forward, its head was dashed against the side of its glass prison with such force as to cause it to sink motionless to the bottom, and, although at times it appeared to struggle against its fate, in about an hour it was dead, as was the Goby in a few minutes after. Nor did this pugnacious disposition cease when the apparent cause of it had ceased to live; for, although they seemed peaceably disposed when first placed in the vessel, they now began to attack each other vigorously, as also their dead companion at the bottom; and if this fury subsided for a time, it was repeatedly renewed without apparent cause, and with an activity which caused them sometimes to leap out of the water, and even over the side of the vessel, to a considerable distance. Mr. Edward surmises that in the open sea this propensity to leap above the surface is rarely exercised; but it renders it difficult to keep them alive within a narrow space, and in the present instance it became necessary to place a (glass) cover on the vessel in which they were confined, — an arrangement which speedily caused the death of two of the remaining combatants, in consequence of the injury they received from leaping against it in the violence of their contention. Mr. Edward remarks that he never witnessed the lifting up of the longer filament in front of the ciliated membrane on the back, but only of such as were behind it. The latter, however, were kept in constant vibratile action when the proper fins were at rest (as is the case also with this membrane in the Rocklings), while on the slightest disturbance their motion ceased, and they sank within the protection of the channel prepared to receive them. The single barb in front of the upper lip appears to be endued with some special function, since, unlike the others, it is capable of visible, and perhaps voluntary, extension and retraction."—*Journ. Linn. Soc.*

AQUATIC WARBLER (*Sylvia aquatica*, Latham).—At the meeting of the Zoological Society, on the 8th May last, Mr. A. Newton exhibited, from the collection of Mr. W. Borrer, a specimen of this bird recently killed in England. The Aquatic Warbler is figured in Bree's "Birds of Europe," vol. ii., p. 80. It breeds in Germany and Holland, is plentiful in Italy and the South of France, occurs in Switzerland and Sardinia, and has been observed in Algeria. Count Muhle says, "It is really plentiful nowhere, and dwells preferably in large wild swamps. It is a very restless and lively bird, and also crafty and cunning. It creeps with great agility through the twigs and stalks of the thick swampy plants, in which it excels all other Reed Warblers. It may be seen gliding along near the ground, like a mouse; it never hops on the ground, but goes along step by step. On the stalks and perpendicular stems of plants it may be seen running up and down with such agility that it seems to slide along without using its feet at all."

A CYGNICIDAL PIKE.—Some eight or nine years ago, one of the swans on the large ornamental lake, known as Aqualate Mere, near Newport, Salop, was noticed by the boat-keeper to be in a diving position, the tail part only being above water. Thinking the bird was "fishing," he thought no more about it that day; but, on the day following, missing a swan, he was surprised to see the one he had observed the day before in the same place and position. He obtained a boat and rowed out to the spot, and, with some difficulty, hauled the bird on board. But not alone, with the swan's head, tightly fixed in its throat, was an enormous pike still living, and which struggled resolutely to escape. The head of his intended prey, however, was so firmly wedged in his luceship's throat, as to render all his efforts to get out of the scrape useless. The poor swan was dead, and had probably been so for at least four and twenty hours: death, of course resulting from suffocation. The finny cygnicide was, at once, despatched by a blow from an oar, and rowed to land on the same bier as his feathered victim. He was in good condition, and weighed 36 lbs.—*R. A.*

NOTES AND QUERIES.

COCCINELLIDÆ, (*Bibliography*).—For papers and memoirs on this group of Beetles, "Emma" is referred to Westwood's Introduction, vol. i. pp. 395; Haworth in Trans. Entom. Society, vol. i., 1807; Schönherr Synon. Insect. vol. ii.; Gyllenhall Insect. suec., vol. iv.; Milne in Zoolog. Journ., No. 2; Brahm in Der Naturforscher, st. 29; Ruch in Berlin Naturforsch Mag., vol. iii., 1809; Schneider in Mag. für Entom., vol. i.; Frohlich in der Naturforscher, st. 28; Paykull in Act Holm, 1789, 1798; Ann. Soc. Ent. de France, tom. i., p. 233; Kirby & Spence, vol. i. and vol. ii., p. 9 and 230; Gardener's Magazine, vol. iv., p. 159, 415; De Geer Mem., tom. v., pl. 10, 11, &c.

DIPPER WALKING UNDER WATER. — I have raised quite a storm of criticism about the water-ousel by my last letter. One gentleman describes its "walking" very minutely, and if the other two gentlemen, that wrote about the subject, ever saw the bird go through such a performance, they must have been very much astonished. None of the correspondents, however, condescend to answer my argument, and I will, at once, give three reasons against the so-called walking: — *First*, It is well known that the bodies of all birds float on the water. *Secondly*, I am convinced that birds are obliged to make great exertions wth their wings and feet in order to be able to reach the bottom. *Thirdly*, I am satisfied that as soon as they have arrived at the bottom of the water, the force which enables them to descend to it ceases to act. Consequently, I infer that the body of a bird, impelled to the bottom by the aid of feet and wings, *must* rise again when deprived of that aid. I maintain, *positively*, that a bird cannot, by any chance, *walk on the ground under water*. The moment it attempted to do so, the legs and wings, by the altered position of the body, would be deprived of all depressing power, and the body itself would be raised up towards the surface of the water. These arguments clearly prove to me that the so-called walking is *impossible*. And now, a word in conclusion, as to Mr. Morris' statement—did he ever himself *see the bird walk under water?* I have seen many of these birds, both in Yorkshire and Northumberland, but have to meet the first yet that walks on the ground under water.—*Geo. F. Smith, Durham.*

SILVERING MIRRORS (reply to E. F. W.)—The operation of silvering a curved surface of glass requires rather dexterous manipulation. The simplest method I can describe, is as follows:—A cast in plaster of Paris must be taken from the surface that is to be silvered. This may be easily done, by surrounding the edge of the glass with a border of stiff paper, and pouring the plaster, mixed with water to the consistence of cream, into the mould thus formed. The glass should be slightly greased, to prevent the plaster adhering to it. When the plaster has set, say in about twenty minutes or so, the paper may be stripped off the edge, and the cast removed by cautiously warming the glass over the flame of a spirit lamp. A piece of tin-foil must then be laid on the face of the cast, and rubbed down smoothly upon it. The creases which will be made upon the foil may be readily obliterated, by rubbing with an ivory paper-knife or the thumb nail. When the tinfoil is quite smooth, a small globule of mercury is to be spread over it with a tuft of cotton wool. The mercury will quickly amalgamate with the tin, and the oxide and any dirt which may be present, will float upon the surface. A piece of the thinnest tissue-paper procurable, is now to be laid upon the amalgam, and the glass, which must be perfectly clean, laid upon the paper. A moderate pressure must then be applied to the glass, and the paper carefully drawn out from between the glass and the amalgam, bringing with it all the oxide, and any air or dirt that may be there. The plaster cast must then be cautiously removed, and the glass stood upon its edge for a day or two, to allow the superfluous mercury to drain out. If E. F. W. is unsuccessful in silvering his mirror, I shall be happy to tell him where he can get it done at a trifling expense.—*Richard Pearson.*

RAT-TAIL VENOM. — Having been staying in Norfolk for several weeks, I find that the people there have a curious notion that the tail of the rat is venomous. Not having heard of such a thing before, I thought it might interest some of the readers.—*R. J. J.*

THE BLACK RAT.—A colony of these most destructive animals have established themselves in a granary on the Thames, where also the brown rat dwells. I always understood that the two waged war whenever they came into contact, which generally ended in the extermination of the black; but, instead of this, the black rat seems on the increase. Are they not now rather rare in England? —*C. A. J.* [Is our correspondent certain of its being the black rat (*Mus rattus*), or only a black variety of the brown rat? The true black rat is becoming rare in Europe.—ED.]

BOMBYX CYNTHIA.—I am possessed of two very fine chrysalis of the above moth—that is, from the Ailanthus silkworm, acclimatized in Devonshire—as I am afraid, both the perfect insects may perhaps be of one sex. I should be happy to hand them over to any gentleman similarly situated, so as to ensure proper copulation, with a view to receiving a share of the eggs afterwards, or I would myself take charge of other chrysalis with my own.—Address *N., care of Wilson & Sons*, 103, *Cheapside.*

THE TOADSTONE.—Many old writers refer to this stone. Albertus Magnus, who wrote about 1275, seems to be a reliable authority. He was very fond of the natural philosophy of his day, and was the tutor of St. Thomas Aquinas. He mentions toadstone having the figure of the toad upon it, when taken out of the toad's head. Others have doubted this fact, and suggested that the figure might be artifically produced. Fenton, writing in 1569, says,—"There is to be found in the heads of old and great toads, a stone they call borax or stelon, used as rings, which gives forewarning against venom." Lupton refers to it as an antidote to the poison of venomous stings. Lyly refers to it in his Euphues; Ben Jonson in "The Fox," scene 3d, does so also. Yet all that we can tell of mediæval lore will scarcely be conclusive to the present scientific world, without actual modern experiment upon an "old and great toad." This would not be so useless as many scientific experiments are; for it is quite possible that this borax, or stelon, or crepandina (toadstone), may be allied to the famous bezoar or snakestone.—*E. L.*

The Chigoe.—Your correspondent (S. J. M. in S. G. Vol. ii, p. 47) will perhaps gather the information he desires from the following quotation, from Waterton's Essays on Natural History, series i. page 240. "The Chigoe represents a flea: and had you just come out of a dovecot, you might easily mistake it for a small pigeon flea; although upon a closer inspection you would surmise that it is not capable of taking those amazingly elastic bounds, so notorious in the flea of Europe. Not content with merely paying you a visit, and then taking itself off again, as is the custom with most insects, this insidious miner contrives to work its way quite under your skin, and there remains to rear a numerous progeny. I once had the curiosity to watch the movements of a chigoe on the back of my hand, a part not usually selected by it to form a settlement. It worked its way pretty rapidly for so small an insect. In half-an-hour it had bored quite through the skin, and was completely hidden from sight."

Hæmony.—What plant is it that Milton names "Hæmony" in the masque of Comus?

> "A small unsightly root,
> But of divine effect, he culled me out;
> The leaf was darkish, and had prickles on it,
> But in another country, as he said,
> Bore a bright golden flower, but not in this soil:
> Unknown, and like esteem'd, and the dull swain
> Treads on it daily with his clouted shoon:
> And yet more med'cinal is it than that moly
> That Hermes once to wise Ulysses gave;
> He called it *Hæmony*."

—*S. Cleveland.*

Guinea-Pig. —— This little animal, now so thoroughly domesticated in Europe, is a native of the banks of the Rio Plata, in South America. It is known to zoologists as *Cavia cobaya*, the "restless cavy," or "variegated cavy," of Shaw. The affinities of this animal are with the porcupines, since it belongs to the family of *Hystricidæ* of the order *Rodentia*, or gnawing animals. From the name by which it is commonly known, this creature has been supposed to have come from *Guinea*, and to belong to the pigs. Even this has appeared in print, whereas the pig is a much nearer relation to the horse, and the elephant, than to this little favourite with the juvenile population.

Jackdaws.—How do jackdaws manage to get their young ones out of the chimneys in which they so love to build their nests? There are two nests at present in the chimneys of my house, which are placed eight feet down a small perpendicular flue. The old birds, I suppose, manage to climb up and down, but how the young ones are to get out is a mystery to me.—*H. G. E.*

Parrot Eggs.—A correspondent of a Dorchester paper states that an old parrot, many years in the possession of Mr. James Frampton, at Wimborne, about six weeks ago laid an egg pure white, and last week laid another.—*W. S. J.*

Proboscis of Hawk Moth.—In answer to E. M.'s inquiries respecting the proboscis of the hawk-moth, I can say that several species of hawk-moths which I obtained in India had a double proboscis, but whether it was the case with all or not I am unable to state.—*J. W. T.*

A Frog Found in a Clay Bed.—The *Sunderland Times* says, "A live frog was discovered on Tuesday, May 8th, in a bed of clay, in Bishopwearmouth. Some labourers, engaged in digging clay in a field in Oates Street, in the west end of the borough, at a depth of about fourteen feet below the surface, turned up a spit of dry hard blue clay, which broke to pieces, and from the midst of it hopped out a frog. The little prisoner, thus suddenly released from the place where he had been confined, soon became extremely lively on being exposed to the air. At first his colour was lighter than usually found in frogs, but his hues soon began to darken as the light affected him. Whether he may have been confined in the place he was found for days, months, or years, it is certain that he was in the midst of the clay from which he hopped out. How he sustained life there was nothing to indicate; no cracks in the clay were seen through which he could have obtained a supply of fresh air."

Preserving Larvæ.—The following plan was recommended to me by Mr. C. S. Gregson, and is, I think, much better than the usual way of *pressing* the contents of the larva out. By this mode pupæ may also be emptied of their contents, a proceeding which cannot be done by the other plan but with great risk. Get a ball of worsted and a bodkin or darning-needle, thread the worsted and insert the needle in the head of the larva to be preserved (after having previously killed it by immersion in spirits of wine), push the needle through the larva lengthwise, drawing the worsted through after it. Continue to draw the worsted through the insect until it comes out at the end perfectly dry; then cut off the supply of worsted, and draw the remaining piece through, so as to leave the larva (or what *was* the larva) perfectly empty. Fill the empty skin with fine sea sand by means of the hole made by the needle and worsted, until it is inflated to its natural size, and place it in a warm dry place. When quite dry, the sand may be shaken out and the skin mounted on card.—*Jno. W. Love.*

Birds Poisoning their Young.—My gardener has just brought in from a pear-tree in the garden a nest of four fine young blackbirds. In reply to a suggestion of mine that the birds should be put into a cage, and then hung up again in the tree, that the old ones might feed them through the wires, he made the greatest objection, asserting that the parent birds would poison their offspring if they were unable to get them out of the cage. I have since spoken to Barnford, a bird-fancier here, on the subject, and he not only corroborates the gardener's assertion, but adds that all the thrush tribe will do the same, and that he has of late years had opportunities of observing that linnets will also poison their captive young. "Up to a certain point," says my informant, "the old ones will feed them all right, but when the young ones are able to fly, and the old birds cannot get them out of the cage, the parent bird brings some poisonous seed—I think it is the seed of belladonna—and at daybreak drops it down the throats of all the young ones in the nest; and if you see them all right the last thing at night, you will find them all dead in the morning." It may be worth while to inquire if any similar occurrence has come under the notice of your readers.—*W. L. S.*

Poison-fangs of Spiders.—In reply to E. T. Scott, in the last number of Science Gossip, I think spiders *do* emit poison; for without its aid how could a fly be killed in so short a time? A fly may have pins thrust through its body, and yet appear little worse for the operation; but when once within the power of a spider its death is speedy and sure.—*R. M.*

[Will our correspondents bear in mind, both in this and other controverted subjects, that opinions are not proofs, and that little facts are superior to much conjecture. If R. M. will dissect out the poison apparatus which he believes to exist in the spider, and furnish us therewith, we will have it engraved for the benefit of our readers.—ED.]

WILKIN or QUILKIN.—W. R. T. gives "Wilkin" as the local name at St. Austle (E. Cornwall) for the frog. Further west in that county, he will find it named "Quilkin," while the lizard rejoices in the appellation of "Padgey-pow."—*E. W.*

THE TRANSMISSION OF SHELLS.—For the benefit of young conchologists who may frequently be exchanging specimens through the medium of the post, a hint or two may be useful with regard to packing shells, so as to secure them from breakage. Having myself exchanged many species, I have frequently been disappointed on opening the boxes to find several good specimens broken by the ruthless stamp of the postman. *Pill-boxes* are often employed to convey shells, &c., which, if properly packed, *may be* safe; but are never so unless secured by some stout protection, and in doing so the weight is increased, thus costing the sender a penny or twopence additional postage. To obviate this, the following method will be found *exceedingly safe* and *very economical*:—Procure a piece of light wood, in which make various small cells; in these specimens may be deposited with a little cotton wool, and a gummed label placed over each, with the name written thereon. The note or letter accompanying such package should be folded round the block, and the whole wrapped in paper and directed in the usual manner. It is very *rarely* that shells remitted in this way sustain damage. It is a good plan to have the block of such dimensions that when weighed with the letter and wrapper it will not exceed the half ounce and one ounce allowed for postage. Eggs of birds, too, not unfrequently sustain breakage for want of proper packing, and they are more liable to be broken from the use of *too much* wool or moss than from *too little*. Bran will be found more useful than wool, and cheaper. *Wooden* or *tin* boxes should always be used for eggs; cardboard boxes *never*.—*John H. Ashford.*

MARYGOLD (*vide* Sc. G., p. 107). — That flower, which in the language of flowers is the emblem of grief, has received this sad honour only by a calembour, or play of the word; its name into *patois*, or vulgar language, is often *soucicle*, perfectly conforming to the etymology of "*solis cyclus*," circle of the sun; this word was afterwards contracted into *souci*. In German, "ringelblume" is the commonly used name; "goldblume" is not much employed, but "goudbloem" is the name in Flemish.—*B., Melle.*

ARROWROOT.—Another play of words, I believe. It is said in many books that arrowroot derives its name from the use of its plant by the Indians to cure wounds caused by poisoned arrows; do any of the readers of Sc. G. know an instance of this application? Mr. Lad. Netto, in "Apontamentos Sobre as Plantas do Brasil, 1866," says the name, in the Tupy language (of the Brasilian Indians) is *aru-aru*, which means "flour of flour," and was given to that starch for the minuteness of its grains, and that this name of *aru-aru* was changed to the English word arrowroot. Would not, then, the whole story of the cure above mentioned be founded on a play of words?—*Bernardin, Melle, near Ghent.*

SWIFTS AND SWALLOWS. — One single swift arrived here this year, on the 11th of April, and went directly to one of the nests occupied annually by them, and just to the one best situated. It was seen there daily flying around. The "gros de l'armée" only arrived on the 20th. It is the first time since ten years that the swifts arrive here before the 21st of April. The swallows (*H. rustica*) arrived on the 2nd of April; in the last fifteen years, there have been but two instances of an earlier arrival (1852 and 1860). One of these birds is making its nest under the corniche of a gallery, in one of the playgrounds of the College, only ten or twelve feet above the ground, and seems quite undisturbed by the tumultuous hubbub of the youths, even when the football rebounds on the zinc roof of the gallery.—*Bernardin, Melle, near Ghent.*

SWORD-GRASS (answer to q., p. 119).—Of many English words, the best way to find the etymology is, to put to contribution the Flemish or the German language: applying this rule, I remark that all the *Iris* are called in German "*Sword-lilies*," and I conclude the common yellow-flag (*Iris pseudo-acorus*) is the plant alluded to; it seems to answer well to all the desiderata indicated in the query. I add a piece of gossip more: an ancient writer attributes to this flower the origin of the lilies in the arms of France. Clovis, the first Christian king of that country, having beaten the Alemani, all the Frank soldiers of his army took yellow-flag flowers in a neighbouring marsh, and adorned their helmets with them, which obliged the king to take for his arms three golden lilies instead of three crowns, which he had, according to P. Emile, or of three frogs, according to T. Nancker; for this last shield, Nostradamus called the King of France, in one of his centuries, "the king of the toads." [Would this not be the origin of the name of *Jack frog?*] This opinion of the origin of the arms of France receives another probability in the form of the flowers on the shield; they are really *Iris*, and not *Lilies*.—*Bernardin, Melle, near Ghent.*

NIGHTINGALES NEAR LONDON. — Nightingales have been singing freely during the past week at this place. Have any of your readers heard them nearer to the metropolis? We are exactly four miles from Shoreditch Church. — *Charles Ashford, Grove House, Tottenham.*

LIMNÆA INVOLUTA.—Mr. Tate, in his "British Mollusks," quotes Dr. Evans's experience, he having searched in vain for signs of the outward expansion of the mantle of *Limnæa involuta*. He will perhaps be interested in hearing that my attention was first attracted to this beautiful little creature by its curiously lobed mantle, when last summer, as a novice in "fresh-water animals," I was searching for objects of interest by the side of a canal. It strongly reminded me of the "Sunday-brushed hair" of some old rustic whom one has seen in a village church, with his few remaining long locks of silvery grey carefully combed up over his bald pate. I searched in vain for another specimen nearly the whole summer, until at last I came upon a preserve of them, whence I could carry home ten or twelve in a morning. I have now no greater favourites in my aquarium, and I love to watch the motions of these graceful animals, whether skimming along the sides of the glass, slooplike in their swift steady motion, and grazing as they go with their pretty pink mouths, or swimming with long extended foot, inverted on the surface of the water. Most irascible little fellows they are, too; they fight with the flattened apex of the shell, and when interfered with in their course, they use the foot as a fulcrum, and then swing round to the right and left with such fury that they make even their monster cousins, *L. stagnalis* or *L. auricularia*, give way to their impetuosity, and "draw in their horns." I have often laughed heartily at seeing a dozen of them in a tumbler, swinging about, and elbowing their way among each other like police-constables in a crowd. The body is beautifully mottled with bright dark green and yellow, and the lobes of the mantle are of a pale amber colour, extending up in deep vandykes over the shell, seven on each side, till they meet at the top. This is seldom seen during the winter, as they hybernate. I shall be happy to exchange a few (with hints for finding them) in return for some living specimens of *L. glutinosa*, which I do not possess.—*E. W.*

FRITILLARIA MELEAGRIS.—About a month ago, being at a friend's house near the borders of Surrey and Sussex, I was astonished to find in some of the vases several plants of *Fritillaria Meleagris*. The spot where the plant grew was perhaps fifty or sixty yards in diameter, and over all this space the plant grew luxuriantly, here and there varying with a white flower. I was also told (though I could not verify this at the time, my stay being so short) that it grew in several places in the neighbourhood. I have always been somewhat sceptical as to its being a native: does the foregoing throw any light on the subject? Perhaps some of your correspondents can answer the question.—*T. W.*

NEWT EATING ITS CAST SKIN.—A male crested newt in my aquarium lately devoured his old skin in my presence. Some time since I mentioned having seen one of my frogs similarly engaged, and Holland, the keeper of the reptiles in the Zoological Gardens, who takes a very great interest in his charge, tells me that all kinds of salamanders do so; so that it seems to be a habit common to all Batrachia, and by no means peculiar to the toads.—*W. R. Tate, Grove Place, Denmark Hill.*

PIED ADDER.—I have just deposited in the Reptile House of the Zoological Gardens, Regent's Park, a very beautiful adder, which exactly corresponds with the description given by Mr. Bell in his work of one sent him from Hornsey Wood—*viz.*, that it has the "ground colour almost perfectly white, with all the markings jet black." I was lucky enough to catch him on Wisley Heath, Surrey, on Monday, May 7th.—*W. R. Tate, Grove Place, Denmark Hill.*

NEW ZEALAND EXHIBITION.—From the volume of "Jury Reports" of this Exhibition we find that special silver medals have been awarded to the following distinguished naturalists and scientific men for the reasons stated:—J. Gould and J. E. Gray, Ph. D. F.R.S., for the valuable services rendered to the natural history of New Zealand by their ornithological labours. To J. D. Hooker, M.D., F.R.S., Kew, for the able and zealous services he has rendered to the colony by his works on the botany of New Zealand. To Dr. Lander Lindsay, F.R.S.E., Perth, N.B., for his interesting researches on the brown coals of Otago and the properties of the Tutu plant. To Richard Owen, D.C.L., F.R.S., &c., for the valuable services rendered to the natural history of New Zealand by his works on comparative anatomy, especially on the anatomy of the Moa. To P. L. Simmonds, F.S.S., editor of the *Technologist*, London, in recognition of special services to the New Zealand Exhibition, and his services generally towards the development of colonial industrial resources.

TOXONIDEA.—Your correspondent, Mr. Barkas of Newcastle, and other students of diatoms, may like to know that *T. Gregoriana* and *T. insignis* are not peculiar to the Northumberland coast; I have found them on the Norfolk coast, at Cromer, Wells, and Hunstanton, and in the noctilucæ from Yarmouth. In the Wells and Hunstanton gatherings *T. insignis* is the more common form, but *T. Gregoriana* is not rare. We find, I believe, all the sand forms decribed by Dr. Donkin on the Norfolk coast, and I have no doubt that other localities on the British shores would also yield the same forms. Diatoms are not (with some few exceptions) local: other conditions being similar, I should expect to find in these isles any form found in Europe; the sand forms on sandy shores, and alpine species in mountain streams. I may mention that the following may at present be considered local: *Campylodiscus clypeus*, found living in Breydon, Norfolk, by Mr. Wigham; *Pinnularia cardinalis*, living in the marshes at Hickling, Norfolk, by myself. *Triceratium? exiguum*, Ormesby broad: this species has long been a puzzle, it certainly is not a Triceratium; I am inclined to think that it is an Odontidium, and probably a variety of *O. anomalum* or *O. parositicum*. I have seen it parasitic on larger diatoms. The description in the "Synopsis of the British Diatomaceæ" does not accord with my own observations; I cannot detect any puncta on side view of valve; the margin is striate and the centre smooth. —*Fred. Kitton, Norwich.*

DEATH OF PROFESSOR HARVEY.—We regret to announce that this eminent algologist can no more furnish replies to the queries of our correspondents regarding sea-weeds. He expired at Taunton on the 15th of May universally regretted by those who knew him; for to his scientific attainments, which were of no mean order, was added kindness and urbanity to all with whom he was brought in contact. This is a cloud which has cast its shadow across the Botanical Congress, for his labours are known and appreciated throughout the civilized world.

STINGING POWER OF SEA ANEMONES.—After long observation I have come to the conclusion that the Opelet *Anthea Cereus*, and probably any other species that is possessed of this power, only uses it when out of health. I have at all times freely captured them on the shore with my uncovered hand, and have never, under such circumstances, been stung; but when putting my hand into the tank where any were that were looking flabby and collapsed, I have many times been seized and much annoyed by the very painful effects the adherence of the flaccid tentacles produced. The parts so affected have speedily become mottled and rough, like the skin of a person with measles; and this appearance, and the sharp pain, like the stinging of nettles, has continued for hours.—*M. D. P.*

RED LOBSTERS.—Is the change in the colour of the shell in boiling chemical or mechanical?—*W. H. K.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus—X 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. Address No. 192, Piccadilly, London, W.

J. A. Jun.—The newspaper story is marvellous. Is it true? Unfortunately such accounts are seldom worth the space it occupies to reprint them.

J. R.—The "British Amphibia" are contained in "Our Reptiles."

F. W. C.—The marygold is so common that the seed may be obtained anywhere.

G. E. F.—It is *Chætomium elatum*. For figure and description see Cooke's Microscopic Fungi, pages 175 and 221.

W. H. K.—Add molluscs. Two or three snails will soon reduce your conferva.

E. S. A.—Bats have often been observed on the wing during the day. See Zoologist, pp. 6, 35, 75, &c.

J. H. F.—You will observe (page 14) that we have already described a fountain, as applicable to the aëration of aquaria.

N. E. C.—We do not know a good work on falconry, but perhaps some of our correspondents can inform you.

E. H. F.—For chloroform and balsam, see S.G. vol. 1. p. 45.

B. I.—You would get more information on dissecting from "Davies on Preparing and Mounting Objects" than we could afford space to detail.

J. C. M.—The subject is a doubtful one, and we are not at present disposed to enter upon it more fully.

W. H. W.—Newts take to the water during the breeding season and afterwards to the land. They do not always (but generally) attach their ova to aquatic plants. For further particulars see "Our Reptiles," published by Hardwicke, 192 Piccadilly.

T. (Bristol).—It is impossible to answer without seeing specimens, and examining them microscopically.

Oak Egger Moth.—A correspondent would be glad of a few eggs of the "Oak Egger Moth," and will forward a stamped envelope to anyone who will kindly oblige him with a few.—S. J. B., 1 Alpha Place, Trafalgar Road, Mosely, Birmingham.

S. M.—The specimen of flowering shrub is *Amelanchier glabra* from North America.

H. M.—Little white slugs or earthworms.

W. B.—Your plant called "Billy Buttons" is *Saxifraga granulata*, apparently from your very fragmentary specimens.

S. A.—To mount pollen consult "Davies on Mounting," page 47 and 74.

E. W.—We can by no means undertake the naming of diatoms. Moreover, your slide was broken to atoms in the transit.

T. H.—Your moth is *Hadena oleracea*. The only available book for moths and butterflies is *Stainton's Manual*, published by Van Voorst, London.

E. H.—We believe it to be entirely fabulous.

M. A. L.—The expression in itself is correct enough, but of its meaning or connection we are profoundly ignorant.

G. R. J.—No. 1. Query not sufficiently clear. 2. By exposure to atmospheric agency, and working out by means of needles and other pointed instruments. 3. Fractured specimens are best kept as they are.—*R. T.*

J. A.—No such locality known.

J. S. sends us the common polypody, yellow dead nettle, and stitchwort to be named; could he not also have found a daisy and a primrose?

T. R. J.—We have not been able to obtain information about "dredges" in time for the present issue.

H. S.—We cannot undertake such a string of queries; it is our plan to attend to one thing at a time. Surely a little trouble in looking over some elementary work would have enabled you to answer most of the queries for yourself.

W. R.—We confess ourselves sceptical of much of the sub-division proposed for the species of "water-ranunculus."

M. M.—Go to a heap of rubbish that has lain some time, turn over the broken tiles and brickbats, and underneath them, if you do not find the objects you seek, you will at least secure employment for your microscope till next month.

W. W.—Your red sea-weed is the common *Plocamium coccineum*.

R. S.—We cannot undertake the naming of foreign zoophytes or other objects of natural history; we find already plenty of employment with the queries or subjects connected with our own country.

EXCHANGES.

Campylodiscus costatus for other objects.—H. M., jun., 46, Union Grove, Wandsworth-road, Clapham.

Birds' Eggs and Minerals for objects of interest.—E. G. D., St. Blazey, Cornwall.

Campylodiscus spiralis for *Coscinodiscus radiatus*.—B. T., 57, Lowther street, Whitehaven.

Mosses: required fresh specimens of andreæa, Buxbaumia, Splachnum, Neckera, Phascum, or Schistostega, in fruit.—C. F. White, St. Anne's Heath, Chertsey.

British Land and Freshwater Shells for eggs of British birds.—J. H., Ashford, Scarborough.

Rare British Plants.—Address, J. F. R., Stamp Office, Frodsham, Cheshire.

Communications Received.—E. T. S.—J. W.—S. C.—J. A.—R. P.—W. S. J.—M. P.—C. A. J.—W. A. L.—W. B.—B. T.—S. J. B.—J. R.—T. B.—G. F. S.—R. J. J.—N.—E. L.—S. F. M.—F. W. C.—G. E. F.—W. H. K.—A. M.—E. S. A.—R. B.—J. H. F.—W. W. S.—G. R. J.—G. T. P.—T.—F. S.—H. R. B.—E. G.—H. U.—W. W.—I. P.—J. W. L.—J. C. G.—J. S.—Benardin—J. S.—C. L.—F. K.—E. H.—C. A.—J. F. R.—T. H.—T. P. B.—M. J. P.—W. R. T.—J. B.—M. A. L.—W. H.—J. N.—J. S.—W. C.—S. A.—B.—H. M.—E. G. D.—J. J. R.—M. D.—W. B.—C. F. W.—E. W.—J. H. A.—E. G. W.—J. B.—R. M.—W. L. S.—T. R. J.—T. W.

Local Names.—W. B.

Books Received.—"The Action of Fungi in the Production of Disease," by Tilbury Fox, M.D. Edinburgh: Oliver & Boyd.

Ferns, British and Foreign: their History, Organography, Classification, and Enumeration, with a treatise on their Cultivation," by John Smith, A.L.S. London: Robert Hardwicke.

THE GREY MULLET.

Mullets, unlike the rest, are just and mild,
No fish they harm, by them no seas are spoiled:
Not on their own nor different kinds they prey,
But equal laws of common right obey.
Undreaded they with guiltless pleasure feed
On fattening slime, or bite the seagrown weed.—OPPIAN.

THIS fish (*Mugil capito*) is one of the best I know for a marine aquarium, as it does not hide, but swims all day in the open water, and besides being very hardy, it is of graceful shape, and of a silvery gleaming hue, prettily marked on the sides with numerous dark parallel bands, running lengthwise. I have about thirty-five or forty of these mullets, each measuring from two to three inches long, in a tank containing 300 gallons of water, and having a surface exposure to the atmosphere of twenty square feet. Through this tank runs a stream of sea-water, varying from 100 to 500 gallons per twenty-four hours, the current being always much increased immediately after feeding, to carry off the turbidity caused by the presence of food. Mr. Gosse, in his book, "The Aquarium," 2nd edition, 1856, pp. 102—104, describes half a dozen little mullets which he kept at Weymouth in 1853, and says they swam *in a shoal* in his tank. They do the same here, and sometimes, when quite undisturbed, and not feeding, they form a compact little wedge-shaped phalanx, with their noses all pointed one way, and their bodies precisely parallel with each other, and using their fins only just enough to keep themselves together, and in one spot. At other times the group will be equally compact, but their bodies will be placed at various angles relatively to one another. It is very curious to see them form themselves into a party, and set off on an exploring expedition. They commence on a certain part of the rockwork, generally on the portion most exposed to light (because, it may be inferred, there are more of minute animals concealed among the more luxuriant vegetable growths on those spots), and then they will regularly work this district for hours together, by most industriously and rapidly picking off from the rocks, and devouring whatever may be upon them. I am not sure what this food is, as a scraping from the rocks submitted to the microscope gives a variety of infusoria *and* minute algæ, and I believe that the mullet eat both of them; at any rate, in a natural state they take both animal and vegetable food. Occasionally the exploring party will form themselves into two groups, one group taking one end of the tank, and the other lot the other end, and then they will eat their way along till the two groups combine. Their extreme earnestness is remarkable, for in their search for food in awkward crannies, they will, in order to get at what they want, place themselves in all manner of queer positions. And all the time their tails are kept wagging with much rapidity, so that their noses may be maintained close up to the rock at which they are nibbling. Occasionally I give them the raw flesh of a newly-killed crab—either the shore-crab (*Carcinus mænas*), or else the edible crab (*Cancer pagurus*), of both of which they are very fond. When the body of the crab is first thrown into the tank, it usually remains on the sand at the bottom for some minutes unperceived by the mullet, but it is instantly discovered by some of the other animals, who begin to pull it about, and thus the smell is gradually communicated to the mullet, and thereupon one or two of them leave the main body and find out the dead crab. Presently, more arrive, and in a little time the shoal is scattered all over the tank, till after a while they re-unite by dropping in to the feast, one or two at a time, and in a very short period they densely surround the crab, eating it as fast as they can, dragging it asunder, poking their noses into the limbs and into soft parts of the meat, and making quite a cloud with the commotion, till, in a brief space, the shell only remains. Mr. Gosse ascribes much of their hardiness in aquaria to the fact of their keeping much at the surface; and that no doubt is so, as the top of the water is more aërated than at the bottom—in an aquarium, at any rate;—and to this must be added, that their vivacity keeps the water in motion, and stirs air into it, and thus health is given by their own liveliness.

But no stronger proof of the powers of endurance of these fish can be given, than the telling of what our little lot had to go through before I received them. They were caught at Torquay, in Devonshire, and were sent thence to London by rail, and after having been forwarded across London, were despatched by rail to Southend, in Essex. After being kept there awhile, waiting for the steamer, they were re-transported to London and placed on board a Hamburg steamship, in which they had a sixty hours' rough voyage, and seven hours' extra detention in the Elbe, before arriving here in our gardens in a cab. And yet the loss from the time of leaving Torquay till their deposit in their final home was only twenty per cent., this being occasioned by their having had to be accommodated in some narrow glass jars, of a quart capacity each, on board the steamer from London Bridge till she got out to sea, when some salt water was dipped up, and the fish were placed in a large vessel.

Another cause of their longevity in confinement is that they so soon make themselves at home, and feed so perpetually. I have had my specimens about a month (it is now January 24th), and during this time they have visibly grown bigger, and they have also in great measure renewed their tails; for it is curious, and I noticed it years ago, that young mullet, on being first placed in aquaria, are apt to lose their tails from some cause unknown to me; but I am sure it is not caused by biting one another, nor by any other creature biting them.

A good account of this fish, by Mr. Yarrell and Mr. Couch, is to be found in Yarrell's "British Fishes," 2nd ed. 1851, vol. i., pp. 234—240; and it is there said that when in confinement it will make successful efforts to jump over the edge of the vessel in which it is kept; but my specimens show no such inclination: they seem quite happy and contented.

It is well known that the grey mullet will thrive in fresh-water. I have never seen it under such circumstances; but some months ago one of about eight inches long was caught in the Baltic, in the Bay of Kiel, and was sent me in some of the water from that place, and containing only 12 per mil. of saline matters. It arrived in perfect health, but upon being placed in North Sea water, containing 36 or 38 per mil. of salts, it could not preserve its gravity, but rolled about from side to side, and sometimes turned belly topmost, when it came up to the water's surface rapidly, and being there, it gradually righted itself, and then descending with an effort, it vainly endeavoured to accommodate itself to a fluid the specific gravity of which was evidently too great for it. These evolutions were repeated again and again many times, and I, knowing that sometimes such attempts are successful, and having no vessel large enough to contain in it brackish water, to which it had become accustomed, I left it, and returning in three hours, I found it dead. Had the transition from one kind of water to another not been so sudden, it might have been saved, and gradually got to live in water of the full specific gravity. At about the same time I received from Kiel another consignment, containing some marine fish, consisting of *Syngnathus* (pipe-fish), *Zoarces* (viviparous blenny), *Palæmon* (prawns), and so forth, and among them were some other fish which by their feel in my hand I thought were marine perch or basse (*Perca labrax*). It was in the dusk of the evening, and I could not see well, so I placed these rough-feeling fishes in a marine-tank till I got a light, when I saw them all floating belly upwards and gasping, and found that they were only the common perch (*Perca fluviatilis*). Then I transferred them to a fresh-water tank, where they soon recovered, and where they still are. Here, then, is an instance of a true marine fish living only in brackish water, and not in fully salt sea-water, and of a true fluviatile fish existing in the same brackish water, and continuing to thrive when suddenly placed in fresh-water without any salt in it. I have had no opportunity of trying whether a mullet from the Baltic would, like the perch from the same place, live in perfectly fresh-water.

To return to the shoal of little mullets, however. The other animals with them in the same tank are 2 large spinous spider-crabs (*Maia squinado*), 3 or 4 other spider-crabs (*Hyas araneus*), about 25 prawns of two species (*Palæmon serratus*, and *P. squilla*), 6 black gobies (*Gobius niger*), 50 or 60 very small double-spotted gobies (*Gobius bipunctatus*), about 20 small shannies (*Blennius pholis*), half a dozen each of the three and ten spined fresh-water sticklebacks (*Gasterosteus aculeatus*, and *G. pungitius*)—both of these live perfectly well in either river or sea water without any gradual preparation,—and 10 five-bearded rocklings (*Motella quinquecirrata*). All of these are predatory in their habits, and, with the exception of the spider-crabs, which are too slow to catch any healthy living fish I am acquainted with—are quick enough in their motions to do mischief to the mullets, which are so peaceable that they very seldom even raise their formidable spiny first dorsal fin, and therefore it becomes an object to protect the mullet (obtained at so much cost and trouble from England, and not procurable save by rare chance any nearer here) from the aggressions of their fellow prisoners; and this is a constant source of difficulty for me, for large as this establishment is, and many as are the separate tanks, they are not numerous enough to contain all the kinds of creatures which can be got, without most of them meeting with enemies of some sort—active or passive—in the same receptacles; and yet all the animals, whether friendly or unfriendly to each other, are of interest to the public. For example, sometimes when food is given to the mullets, and long before they are aware of its presence on the floor of the tank, an enormous black goby will rush out of its hiding-place, and, while its colours are rapidly changing from inky blackness to pale grey, and *vice versâ*, according to the wont of many fishes when excited, it will seize hold of the food, and if too large to be carried away bodily, will shake it like a terrier dog, and hover about it for a long time, so that the mullets get no chance; and indeed they would have but a sorry life if it were not that the black gobies are bottom fish and the mullet are not. Then, at nightfall, the rocklings, which hide nearly all day, issue forth, and are quite as tyrannical as the gobies. Therefore the only plan I can adopt is first to feed these antagonistic fishes to satiety at proper times, such as late at night, on mussels and other kinds of food which the mullets do not much care for. The blennies tease the mullets but do not harm them much, as the former are small specimens, and they themselves have been much thinned down of late by their fellow ground-fish the black gobies. And so the war goes on: whatever changes of arrangement are made, some enemy is sure to be found. There is another difficulty, that of having to keep animals which will not eat anything. The pogge or armed bullhead (*Aspidophorus cataphractus*) is an example of this perversity. Fishermen tell me that they see them when in the sea, or in their well-boats, feeding freely on shrimps, and these crustaceans can be found in their stomachs; but in an aquarium, neither shrimps nor any other food I have ever offered them will induce them to eat. All day they repose motionless at the bottom of the tank, and at night they occasionally take a laborious swim and settle down again, and this is all I have ever seen them do till they die. Of very different habits is their first cousin, the father-lasher, or sea-scorpion (*Cottus scorpius*). It, indeed, can be kept for any time, as it has an insatiable appetite in confinement, and will swallow anything and everything, alive or dead, which will pass into its huge cavernous mouth. It is an expensive fish to keep, for not only does it devour most other animals weaker than itself, but it demands a large tank in order to thrive well. But it is an attractive and curious-looking fish, and deservedly a favourite with visitors.

Hamburg. W. Alford Lloyd.

P.S.—Feb. 1st. The mullet still continue to improve and grow, and all have nearly recovered their lost tails. Their appetites, too, have got to be more universal, and they will freely eat the flesh of the oyster or mussel. But they will leave anything for crustacea flesh.—W. A. L.

Note.—April 20th. The mullet have grown much lately, and they take a greater variety of food than at first. Only one has died here. I have at length got *Aspidophorus* to feed on living *Mysis chamæleon*, a small shrimp-like crustacean of rather less than an inch long, found abundantly in the Baltic Sea at Kiel, and besides being thus useful for breeding purposes, it is itself an interesting aquarium object. Unlike the shrimp, which usually burrows out of sight in the sand, taking now and then a flight in the water above, and also unlike the prawn, which passes much of its time in clinging, partially hidden, to rocks, *Mysis* is ever perpendicularly suspended in mid-water, and when some hundreds are present in some tanks, and thousands in others, the effect produced by their being thus all quite parallel to each other is a very singular one.—W. A. L.

DESMIDIACEÆ.

Having dealt with the most common genera of desmids, we proceed to notice a few others which, though not so plentiful as those enumerated, are yet too frequently met with to be excluded from our chapter.

We have made great efforts to obtain the specimens necessary for the purpose, in the neighbourhoods of Keston (Kent), Esher, Wimbledon Common, and Streatham. The bog at Keston yielded our most beautiful examples, and our richest collection. The other localities produced more limited supplies, and, with some exceptions, the specimens were not so bright in colour.

After allowing each gathering to settle, the superfluous clear water was poured off, and the residue of mud, &c., was placed in the light, to enable the desmids to extricate themselves under its potent influence. This they did very readily, congregating in tiny green clusters on the top of the sediment. Any one of these clusters, removed to a glass slide and examined, presented a most beautiful appearance.

Closteria appear to be more generally distributed than any other Desmidiaceæ. We found many kinds in all our gatherings: occasionally, self-division was seen, and one or two examples of conjugation occurred with a species having attenuated ends (probably *C. setaceum* or *C. rostratum*), which we gathered at Streatham (Telford Park).

The genera *Penium* and *Docidium* bear a close resemblance to *Closterium*, both in outward form and in possessing, save in a few cases, terminal cells containing active granules, like the genus referred to. *Penium*, of which there are, according to

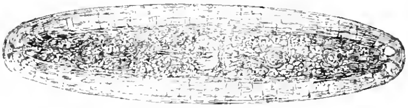


Fig. 136. *Penium digitus* × 250.

Pritchard, ten species, vary much in size and appearance. They are all straight, and mostly stouter at the middle than at the ends; that is to say, they are cylindrical, but taper more or less towards the

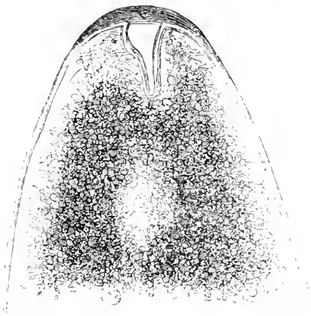


Fig. 137. End of *Penium digitus* (?) × 1000.

extremities. Some species are exceedingly pretty, the endochrome being arranged in fillets, or in "interrupted divided planes radiating from the central axis." From the figures we have seen, we think

Fig. 138.—*a. Penium Naviculæ* × 250. *b.* End of the same × 1000.

P. interruptum is the most beautiful, but we have not yet found a specimen, though it appears to be widely distributed both in Europe and America.

Docidium, of which about twelve species are recognized, differs from the last in having a constriction, more or less conspicuous, at the centre of the frond, which is elongated, and terminates in abruptly truncate ends, where there is always (?) a rounded clear space with active granules. Among those which we examined, we found one bearing a strong likeness to the figure given in Pritchard and elsewhere of *D. truncatum;* but in many examples an appearance (perhaps deceptive) of cilia or setæ was conspicuous under the microscope. We found this kind at West End, near Esher. Another (*D. clavatum*) exhibited the swarming motion so well, that we endeavour to give a representation of it. At certain points the moving granules were collected in greater numbers than elsewhere.

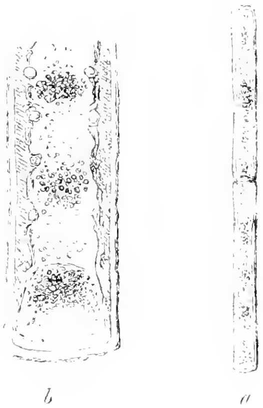


Fig. 139.—*a. Docidium clavatum* × 40. *b.* End of frond × 350.

The filamentous *Desmidiaceæ* are not of such common occurrence in Great Britain; having their head-quarters in other countries. Still, however, several species are to be met with; and among the greatest favourites is *Didymoprium*. This fortunately is widely spread, but it has not as yet come in our way. The numerous joints or segments are somewhat barrel-shaped. There are two species.

We found at Keston, the pretty *Hyalotheca dissiliens* in considerable quantity. It is enclosed

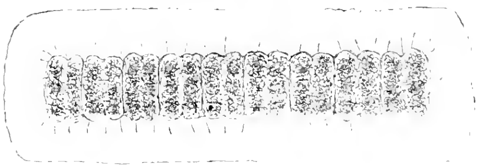


Fig. 140. *Hyalotheca dissiliens.*

in a thick gelatinous sheath, serving to keep the joints together; for they are very fragile, and hence pieces of greater or less length often occur. There are two species; one of them *H. dubia*, found in Germany, is said to be without the mucous sheath. Pritchard doubts this.

Passing over many interesting genera of filamentous desmids, the end view of all of which is peculiar, from the arrangement of the *endochrome* in a three-rayed, four-rayed, circular or spiral manner, we come to an exceedingly pretty form, *Spirotænia*.

It is enclosed in a somewhat egg-shaped mass of mucus, and the chlorophyll is arranged in one or more spiral bands. The sheath in this genus and many others is difficult to be seen on account of its transparency. Colouring the water is recommended as a good plan for rendering it more plainly visible.

Doubtless different positions of the mirror, and modifications of the light by means of the stage-diaphragms, tend to the same end. Pritchard

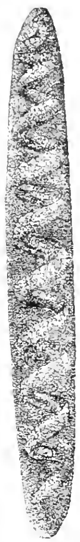
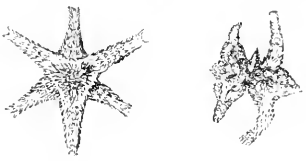


Fig. 141. *Spirotænia condensata* × 300.

acknowledges four species of *Spirotænia*. Two of them appear to be restricted to the Continent of Europe.

While examining our collection from Keston on several occasions, we met with solitary examples of



a *b*

Fig. 142. *Staurastum dejectum* × 250.—*a*. End view.—*b*. Side view.

the numerous genus *Staurastrum*. Their habit is said to be to attach themselves to the stems and leaves of aquatic plants; there abiding in delicate

a

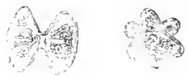
Fig. 143. *Staurastrum gracile* (?) × 250.—*a*. End view.—*b*. Side view.

clouds which the slightest touch is sufficient to disperse through the water. For this reason it was hardly expected that we should find any *Staurastrum* in this locality, unless in the ponds. The species, seventy-three or thereabouts in number, in

a *b*

Fig. 144. *Staurastum spongiosum* × 250.—*a*. Side view.—*b*. End view.

some cases approach *Cosmarium*, but many examples are very different. Often they are furnished with projecting spines which make their shapes



a *b*

Fig. 145. *Staurastum alternans* × 250.—*a*. Side view.—*b*. End view.

still more fantastic. The figures representing both the end and front views of the species we saw, will give a better notion of them than a verbal description.

They are all minute, and thus liable to be overlooked if a quarter-inch objective be not employed in the search. We found one curious example of self-division.

The result of conjugation in *Desmidiaceæ*, viz., a *Sporangium*, is generally spherical. Its surface is very often studded with eminences or forked spines. Mr. Ralfs, speaking of the development of these curious bodies, says, "the *Sporangia* I consider capsules, and this view seems to be confirmed by the experience of Mr. Jenner, who states that the covering of the *Sporangium* swells, and a mucus is secreted in which minute fronds appear, and by their increase at length rupture the attenuated covering;" then Brawn, also quoted by Pritchard, writes respecting the same obscure subject, "certain early conditions observed in *Closterium* and *Euastrum*, namely, families of unusually small indi-

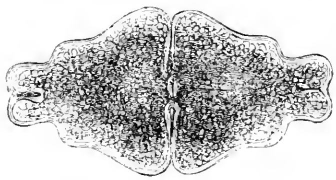


Fig. 146. *Euastrum didelta*.

viduals enclosed in transparent colourless vesicles, render it even probable that in certain genera of *Desmidieæ*, a number of individuals are produced from one spore by a formation of transitory generations occurring already within the spore. The enclosing vesicle is probably the dissolved and swollen-up internal cell-coat of the spore, which holds the young individuals combined for some time after the outer coat of the spore has been thrown off;" and Mrs. Thomas also gives her opinion that "the *Sporangium* is the winter casing of a large number of young plants which escape from it by rapidly knocking against the walls, when these have been loosened by spring warmth, or which grow up as the walls gradually decay in the midst of slimy gelatinous masses."*

In our own examinations we found the minute fronds exceedingly numerous, and to our surprise, under very high powers we observed the swarming motion of the granules of *Endochrome* (to which reference has been made), in many of those which we were disposed from their shape to consider as immature; leaving us in doubt whether the phenomenon so frequently seen is a symptom of growth, reproduction or decay.

Curious bodies closely resembling *Sporangia*, frequently occurring in flints, have puzzled their discoverers much. Their similarity to *recent* forms inclines to the belief, almost amounting to a certainty, that in them the *Desmidiaceæ* of past eras have left their only traces, while the fact that *Desmids* of modern times are wholly of fresh-water habit, whereas flints are admitted on all sides to be the remains of marine sponges, militates in some degree against the supposition. These bodies are called *Xanthidia*, and are thus spoken of by Mr. Ralfs, who appears to have no doubts as to their nature. "The fossil forms vary like recent *Sporangia* in being smooth, bristly, or furnished with spines, which in some are simple, and in others branched at the extremity."

It may be well to notice the advantages we gained in the examination of our Desmids by means of Messrs. Powell and Lealand's new binocular, as applied to a one-twelfth object-glass. The circulatory currents in and around them, under these conditions, as may be imagined, were rendered far more distinct than before, and thus new beauties in these minute organisms were displayed. In one fragment of *Hyalotheca*, the continuous current in the water, rendered apparent by the particles carried along with it, gave rise to the suspicion of cilia. But the motion may have had some other cause, such as the struggles to get free of a cramped up *Cypris*, on a comparatively distant part of the slide; and we place very little faith in the existence of cilia in desmids.

When speaking of the *Polycistina* in SCIENCE GOSSIP, Vol. I., Mrs. Bury compares them to the "Toilette-service of Titania, with all her essence-bottles and trinkets." Following up the notion, may we also inquire respecting the fairy bijouterie of the said queen, if she ever commissions her sprites to collect from the bottom of the rills and brooks of earth, gems wherewith to deck her royal brow in the moon-lit glade where she holds court? Disdaining rubies and emeralds, as suited only to mortals' wear, do her zealous servants supply the place of the latter gems with choice desmids, than which no emerald can be more beautiful; and of the former by the eyes of *Cypris* and *Cyclops*, than which no ruby can display more living fire?

Disbelieving, let us hear from the elves' own mouths their duties.

> "Over hill, over dale,
> Thorough bush, thorough briar,
> Over path, over pale,
> Thorough flood, thorough fire,
> I do wander everywhere,
> Swifter than the moone's sphere;
> And I serve the fairy queen."

Doubts however still arise, but there is another alternative to satisfy our curiosity. Gentle Reader, announce where she is to be found, and

> "I'll meet by moonlight, proud Titania."

J. M'INTIRE.

* We may infer from this lady's observations that conjugation is best witnessed in summer and autumn.

THE LARGE WOOD ANT.

DURING a warm spring, a workman dispersed a nest of the large wood ant (*Formica Herculanea*). This species is of a dark chesnut colour. It is chiefly found in woods where fir-trees predominate. There they build large conical shaped nests, composed principally of fir-leaves. The male ant is said to be winged; yet, during the many years I had the opportunity of daily observing these ants, I never saw one of them with wings. This dispersion occurred two fields distant from the house, situated eastward from the nest. The country people say these ants always travel *east*, that is towards the rising sun.

They took possession of our entrance door, and made their first habitation in the space between the woodwork and the lead over the porch. There they increased rapidly, and amused rather than annoyed us. Indeed, we passed much time in observing these industrious little people. Whether—according to the prediction of Solomon—we were wiser for our studies I must leave. We were not long in discovering that our new visitors were superior to mere plodders for their daily bread, and that they possessed more intelligence than we thought possible. To our surprise we were never stung by them, even when unintentionally touched rather rudely, or when they strayed on our persons. In fact, they appeared to consider us friends, residing under the same roof. I state this now, because the reverse took place in the sequel.

The way these ants carry food, sticks, &c., to their nest, is well known; but I think few persons are aware that these ever busy ants occasionally allow themselves a holiday, not individually, but the whole community enjoy a day of festival. A fine one was chosen, when all were abroad without employment or work. They passed to and fro, greeting each other evidently in a kindly manner: they touched with their antennæ, like one shaking hands, remaining a few moments together, as if in friendly conversation, then passing on, the same ceremony was performed towards other fellow citizens. These proceedings continued until evening. On the following morning they were all at work again. We often threw our lowly companions crumbs of bread, pieces of meat, or grains of wheat. It was curious to see how quickly these gifts were carried away. If part of the offering proved too large for the strength of a single ant to remove, then as many as the load required would instantly offer aid to their overburdened friends, although previously busily engaged themselves. Their readiness to help their neighbours I have admired again and again. Some naturalists attribute this to the supposition that their possessions are in common. If they really are, it is an admirable proof of their willingness to do their duty as citizens of a commonwealth. Well would it be if men, in their transactions with each other, were as disinterested as the insignificant ant.

Milton writes:—

> "The parsimonious emmet, provident of future:
> In small room large heart enclosed.
> Pattern of just equality perhaps
> Hereafter; joined in her popular tribes
> Of commonality."

My observation led me to conclude these ants are not *provident* for the *future* beyond securing a convenient and warm dwelling, while in a state of torpidity. Without this forethought the winter frosts would destroy them. The food so industriously collected during summer is, I think, only for their young, and their own immediate eating. When some of my ants were disinterred during winter, no stores of any kind were discovered. The ants were simply packed together in little heaps, as if waiting for the sun's heat to reanimate them.

Once, and only once, during many years, I witnessed a battle between these creatures, generally so peaceful. It was fought on the wall of the house; so furious was the struggling and fighting between the opponents, that there could be no doubt of their deadly intentions. The contest lasted the whole day, and the ground beneath was covered with the slain. The following morning the victors were actively engaged in removing the dead. This task performed, their usual occupations were resumed, as if nothing extraordinary had previously occurred.

I have seen these determined insects attack a large earthworm, probably a quarter of a yard long, and its defenceless body so thickly covered with ants that it resembled a piece of dark cord. The poor worm was not quickly killed, the whole mass occasionally moved as the victim writhed in its agony.

More extraordinary was an attack made by them upon a large unshelled snail, or slug. I was attracted to the spot by the strange bubbling noise the snail made in its defence. This was to throw out its slime all over its body so profusely as to cover it with foam; but to no purpose: the persevering ants vanquished the snail.

After a time the ants increased greatly. They became so bold as to enter our sitting-rooms, and chambers. Of course they were troublesome, and the order was reluctantly given for their destruction. Many methods were tried unsuccessfully. They had got so completely into the foundation of the house, that it was impossible to get at them during the winter, when they are in a torpid state. Therefore the tedious and painful one was resorted to of killing them singly. After the slaughter had commenced, it was sad to see the distress of the poor insects, when they discovered their friends had become their foes. Their confiding manner was gone. When they caught sight of us—which they did quickly—they stopt, stood partly erect, and put forth their feelers in an attitude of defence, and darted forth the poisonous fluid, with which we then discovered they were armed. This fluid was a strong acid; if it fell on the dress or gloves, the colour was instantly changed, or, if on the skin, it raised a blister. The work of extermination lasted nearly the whole summer. When the last day's slaughter was over, there were a few ants left. Whether they died in despair, or left the following morning, we did not discover. I was grieved for the cruel treatment they had received. Had they remained contented on the outside of our dwelling, they would not have been disturbed.—*S. C.*

What is the Object?—"We not unfrequently hear the section of an Echinus spine pronounced 'very pretty, exactly like a crochet pattern,' the Echinus itself being an unknown thing. Spicules of Holotharia or Gregorica are brilliant little clubs or crosses, but what a Holotharia is they (many young persons who now purchase microscopes and collect objects) cannot imagine. The foot of a dytiscus, with its cluster of suckers, is like the eye of a peacock's feather; cells of spiral fibre nothing more than coils of variegated wire; and the head of Rhingia, with its wonderful eyes, is looked at as a beautiful piece of network . . . . To sit for an hour at the microscope, and pass slide after slide upon the stage with superficial attention, is not a worthy occupation for the great spirit within us."—*S. S Clarke's "Objects for the Microscope."*

MISTLETOE OF THE OAK.

A CHAPTER appeared recently in a French journal (*l'Illustration*) in which the object of the writer was to solve certain difficulties in respect to the mistletoe of the oak. A correspondent has kindly forwarded us a translation of this chapter, from which we have extracted the following remarks —"In a little article on the sacred plants of the Druids we showed ourselves incredulous on the subject of the mistletoe of the oak, and at the same time stated our reasons. Our opinion was at once attacked, and we published the letters of M. Perron and M. Lacour, asserting that they had found the mistletoe on the oak;* the former near to Visoul, the latter in the department of the Yonne. Other correspondents have since confirmed their assertions, especially M. Dessaint, at Chalons-sur-Saône, and M. Fleuvier, at Constantine, in Algeria. Without reproducing these letters we admit the evidence and confess that we were wrong. In a correspondence dated from Berne, M. Lafuge states a doubt concerning the identity of the mistletoe found on the oak, with that which grows so commonly on fruit trees. To satisfy ourselves we requested M. Dessaint to forward us a specimen of the oak mistletoe, which he had stated was in his possession. This gentleman acceded to our wishes by sending us the branch of oak to which the parasite adhered. 'One thing which surprised me,' he said, in the letter which accompanied it, 'was, that at the time I gathered this mistletoe it was completely stripped of its berries, whilst other specimens of the mistletoe of the apple tree, &c., which I saw at the same time, had large quantities of them.' The results of our examination were, that the wood upon which the parasite was implanted was certainly oak—that is incontrovertible; but the mistletoe of the oak is different from our common mistletoe. The latter is the *Viscum album* of botanists, the former is *Loranthus Europæus*, which serves as the type of the family of *Loranthaceæ*. These two plants resemble each other perfectly in the dichotomous disposition of their branches and leaves, so that, at first sight, they are easily confounded; but the organs of reproduction are different, and separate them clearly from each other. The flowers of *Viscum album* have quadrified perianths, and are sessile. The flowers of *Loranthus Europæus* have sextified perianths, and are pedunculate. The same difference appears in the fruits.

"Fig. 147 represents the flowers and fruit of *Viscum album*, and fig. 148 those of *Loranthus Europæus*. To which may be added that the sessile berries of the common mistletoe (*Viscum album*) are white and persistent until the spring, whilst the pedunculate berries of the mistletoe of the oa *Loranthus Europæus*) are of a yellow tinge, and

Fig. 147. Common Mistletoe, *Viscum album*.—*a*. Flower. *b*. Fruit.

drop off at the commencement of winter. This explains the surprise of M. Dessaint. The floriferous axes were beginning to develop themselves when the fine specimen before us was gathered, towards the middle of March. All botanists agree in describing *Loranthus Europæus* as the parasite of the oak *par excellence*. According to Jacquin, Koch, &c., it is not rare in Central and Southern Europe. If it is not mentioned in the ancient floras of France, it is apparently because of its having been confounded with the common mistletoe.

Fig. 148. Mistletoe of the Oak, *Loranthus Europæus*.—*a*. Flower. *b*. Fruit.

"If our characteristics, which we are far from giving as irreproachable, are well founded, what are we to conclude therefrom? That it was not our common mistletoe, but the *Loranthus Europæus*, which the Druids made use of in their religious ceremonies."

Nothing now remains for us but to wait with patience, in the hope that some of our correspondents will seek diligently for the mistletoe of the oak, and when found, that such fortunate individual will kindly forward us a specimen in flower or fruit, that we may convince ourselves and our readers of the true plant which is parasitic on the oak. If it should prove to be the *Loranthus*, another example will be furnished to us that in science, whether botanical or zoological, we should never take for granted anything which we have the power to verify.

* See also the records of its occurrence in England in SCIENCE GOSSIP, vol. 1. p. 283.

STICKLEBACK BREEDING.

I HAVE received a most interesting letter from Mr. W. A. Lloyd, the manager of the Hamburg aquaria, and as one of the paragraphs bears on the point of stickleback breeding in confinement, I extract it for the benefit of your readers:—"What you say about *Alpheus ruber* greatly interests me. I would walk many miles to see so rare an animal, especially if alive. I am also much pleased to read your observations about *Gonoplax angulatum*, and I must try to get some, and see if they will behave similarly with me. You have been more lucky than I ever have with the fifteen-spined stickleback (*Gasterosteus spinachia*), as with me it only begins to build a nest in spring, but it is never finished, and I get no young ones, and I have the same want of success with the various freshwater species of the genus. But I possess a nice coloured drawing, full size, of a very beautiful nest of *G. spinachia* found at Heligoland, and of this I want somebody to send a copy to H. S. G., giving directions that the wood-cut shall show the numerous *threads* with which it is carefully sown together; the creature making a needle of itself in order to do the marvellous bit of stitching." The stickleback is a delicate animal in confinement at the breeding-time; but your correspondent, who limits the life of *Gasterosteus spinachia* to twelve months, is quite wrong.

I believe animals of the genus *Sabella* cast their gill-jaws periodically. I have three very handsome ones, who have lately cast their jaws. I brought them from the sea in September. They increased the diameter of their jaws nearly double (from good living, I presume), and then, when at their greatest beauty, cast them, and the tiny, tiny new ones are just beginning to appear.

Three very interesting cases of animals building habitations in any aquaria have occurred lately. The first, that very beautiful annelide, *Amphitrite infundibulum*, who, though an inhabitant of foul, black mud on his native shores, made himself at home in the ordinary white sand of one of my aquaria. The second case is a large, handsome, orange-coloured *Terebella*, who was dredged in a tube attached to an old oyster shell. He left that and built his new house against the side of one of my tanks, thus enabling me to watch all his motions through the *glass* side of his tube. It is wonderful to see his thin, delicate tentacles coiling themselves round, and lifting the stones and fragments of shell required for building his tube. The other animal, whose building habits I have been fortunate enough to have had the opportunity of observing is a large species of *Sabella*, whose scientific name I cannot certainly discover, but I have several of them, and their tube is built of agglutinated sand, and is generally three or four times the length of their (contracted) body, and closed at one end.

Two handsome specimens of *Gonoplax angulata* fought for supremacy in my aquaria in July last: each lost one of the large claws. In one of the specimens this claw is now perfectly reproduced, in the other it is hardly grown at all. This difference of constitution in the two animals is very singular. I notice with great interest what Mr. Lloyd says of the great size anemones grow to with liberal feeding. In the aquarium of a friend of mine (an eminent sculptor) lives the most magnificent venusta I ever saw, and I have two *Corynactis viridis*, whose diameter of disc, exclusive of tentacles, is nearly the size of a shilling. I am endeavouring to ascertain the different varieties of colour in *Corynactis*. I have had twenty-six myself. Would any of your readers trouble themselves to send me any? I would send a travelling-basket for them.

The sand-launce has very funny ways in an aquarium. He darts in and out of the sand like an arrow, and frequently lies for hours with his head just peeping out from the top of the sand.

S. W., F.Z.S.

COWSLIPS.

BELOVED by the country children, to whom "Cowslip balls" are, as each spring comes round, an ever new delight, requiring the exercise of such careful manipulation, such judgment in the selection of flower-heads, and such patience in manufacturing, but, when completed, amply rewarding the maker by their rich, golden green hue, and delicious fragrance, we can well imagine that to any of them, separated, it may be by sickness, from the meadows, where the "sweet wagging cowslips" hang their heads, Spring is but a name without a reality. All children, indeed, seem to delight in Cowslips, or "peggles," as they are called in Essex; and, in one country town which we could name, we trust also in many more, there are ladies who go in parties to the Cowslip-loved fields and rob them of their flowery treasures; that, sent off in hampers to the children's ward in one of the hospitals of dark and flowerless London, the heart of the country-bred child may delight in, and the hand may fondle, and—for children are destructive animals of no mean order—pick to pieces, and thus enjoy the well-loved blossoms. Costly toys would fail to give the pleasure which a simple hamper of Cowslips affords.

Let us look for a few moments at some of the interesting abnormal forms which we have noticed during the present season. "Pin-centres and rose-centres" belong to the Cowslip as well as to the Primrose, though in the former, our own observations lead us to believe that in this (Wycombe) neighbourhood the "pin-centres" predominate. The stem of the Cowslip frequently presents some interesting features; we gathered one which was not more than an inch and a-half high, though surmounted by an average-sized head of blossoms. This suggests that instances may possibly occur in which this stem or *scape*, may be altogether wanting, and the flowers appear among the leaves, after the fashion of Primroses, as is occasionally the case with the bird's-eye primrose (*Primula farinosa*). Again, if you pluck a handful of Cowslips, you will probably find that one or two have their scapes broad and flat; this is apparently caused by the "joining partnerships," or *anastomosing*, of two scapes at an early stage of their existence, for we notice that the head of blossoms upon such stems has quite the appearance of a double one.

Since we began this paper we have gathered from one bank, where were also some very fine examples, some twenty or thirty Cowslips, the stems of each being surmounted by but a single flower! This, as well as other observations, would seem to favour the idea that the Cowslip, Primrose, and Oxlip, are but forms of one species.

In the corolla, which is usually termed the "flower" or the "pip," a very little examination will suffice to show us how great a variety exists. The colour varies much in intensity; and the five red spots are sometimes round, sometimes linear, and sometimes almost wanting. In one specimen two distinct corollas were enclosed in one calyx, each with five stamens and one pistil. In another, a more peculiar malformation existed; the single corolla having, as it were, two divisions, in each of which were the full complement of stamens and pistil. This specimen would have puzzled any one who had attempted to classify it according to the Linnean system.

Cowslips sometimes attain a very large size. On the 12th ult. we picked four Brobdignagian examples, some of the corollas measuring three-quarters of an inch across. Two specimens we have noticed, in which a second umbel of blossoms was formed above the primary one, the scape being, as it were, continued through the centre of the flower-head, and crowned by a smaller umbel of flowers.

As we have above referred to the Primrose (*P. vulgaris*), we may briefly remark upon its connection with the plant commonly termed the Oxlip (*P. caulescens*). All of us may not be aware that the Primrose blossoms, though appearing to spring singly from different parts of the root, in reality constitute as true an umbel as those of the Cowslip (*P. veris*). Let any one take the trouble to cut across the root-stock of a Primrose a little above the actual root, and he will soon be convinced of this by observing that all the flowers spring from a common centre. Let him elevate the head of blossoms thus obtained upon a stem, and a *stalked* Primrose, or Oxlip, is produced. A very interesting specimen which we found growing in a wood near Wycombe, on the 3rd of May, produced from the same root two fine stalked umbels of flowers—Oxlips; besides a great number of ordinary Primroses. We scarcely think that the Oxlip is a hybrid between the Cowslip and Primrose; we rather imagine it to be a developed form of the latter plant. In the above locality, for instance, no Cowslip occurred. Of course, the *true* Oxlip (*P. elatior*) is not alluded to in these remarks.

Since writing the above, we have found a specimen in which the blossoms were disposed Primrose-fashion about the root.—*B.*

THE TRACK OF THE PYGMIES.

SINCE some time great curiosity has been directed towards the researches of Dr. Dupont, in several holes or grottoes of the province of Namur, in Belgium (v. SCIENCE GOSSIP, i., p. 161). The Nutton's cavern, among others, has given extremely important fossil remains; this hole, like many others, has its legend:—"The Nuttons were little genii or imps living there; they mended the iron objects that were put at the entrance of the grotto, and received for reward some loaves of bread; once this reward was omitted, and since the genii appeared no more." Struck with the analogy this legend presents with what is told in Germany, &c., about the "Wichtelmünner," and with the traditions on the pygmies, &c., I had the idea to make some researches on the *legends or traditions* relative to pygmies, imps, &c., to put down on a map the localities where they were said to have lived, to indicate on the same map the places where, according to the geographers, yet live *people of small stature*, and finally, to mark the principal countries where *holes with human bones* or *remains of human industry* have been found. I intended to see if this presented any suite; I took my notes without the least preconceived opinion; I wondered at the result—the continuity, nearly, of those stations; but I prefer to beg the reader to follow me on a map, and conclude for himself.

In remote times we have the *pygmies of Ethiopia*, or *pechinies*, and those of Egypt and of Thracia; they are quoted by many authors: Aristotle, Pliny, Photius, Saint Augustine, Pomponius Melas, &c. (v. G. Schott, *Physica curiosa*; Wurzburg, 1667).

Ritter, in his "General Geography," speaking of the actual inhabitants of part of Ethiopia, suggests what former people may have been:—"When the rainy season approaches, they make their winter provisions, and as soon as the soil of the forest is changed into black mud and marshes, they leave it and retire to the mountains; there they live in holes they dig in the sides of the cliffs, where they meet veins of sandstone or of some other soft stone; from this custom they are called, by ancient and modern, *troglodytes;* during the winter they live upon meat and dried fish, of which they have made provision."

The pygmies of Thracia, as well as those of Ethiopia, were attacked by cranes, says the legend; are not these cranes the Epiornis of New Zealand or the Dinornis of Madagascar? It is curious to state that the present Maoris of New Zealand say yet that their ancestors had to struggle with the great birds.

Leaving Thracia, we find many holes, which, according to Cantu, have been human dwellings, in Greece and in the Italian peninsula; in Dalmatia bones and flints were found; in Hungary the belief in imps was yet existing in the time of Kircherus (v. *Mundus Subterraneus.* Amsterdam. 1682). Speaking of Hungary, I remark that farther on our way we find the Laplanders, people related, as is known, to the Hungarians by language (Wiseman, *Lect.*, &c.). The primitive Magyars belong to the Ougrian race of northern Siberia, says L. F. Maury (*La Terre et l'Homme*, Paris, 1861). He adds, "probably the Indo-European tribes penetrating into Europe found there tribes of the Ougro-Finish family, with whom they mixed. The skulls found in old bogs or peat holes, and associated with the bones of extinct animals, remind by their form those of the Finlanders."

But let us leave Hungary and go to Central Germany; there we find the legend of the *Kobold,* the genii who transformed the tin ore in the mines into another metal, yet called cobalt; the legend of the *Wichtelmanner*, the most officious genii, &c.

Near several lakes of Switzerland, imps were said to inhabit (Kircherus, *Mund. Sub.*); passing the Swiss lacustrine dwellings we arrive in France, there the human remains, the flints and other implements, abound from the south to the north; in several places the human bones are said to denote a small stature. The numerous Belgian holes, with their interesting fossils, have their legends of the "Nuttons," and in the Flemish provinces many stories are yet told of the imps called "Kabouter mannekens." Passing aside Kent and Ireland, we arrive in Frisia and Hanover, immense numbers of flints of Frisia are to be seen in the Museum at Leyde; in Hanover, the legend says the imps used to repair iron kettles, &c., for a small reward; the remains found in Danemarck are sufficiently known by the works of Dr. Worsaae, &c.; the "Duergars" or dwarfs of Norway, lead us to the actual Laplanders and the Samoyedes.

Olaus Magnus and many other writers quoted dwarfs in the north, Schott and P. Tovius believe these were the Greenlanders; the present Eskimoos or Esquimaux have yet their stone weapons, several of which we can see in the British Museum. (Ethnographical Room, C. 14-22.) The jawbone of Abbeville, says Figuier, presented traits of resemblance with that of an Eskimoo, and also particularities which have been recognised in an Egyptian mummy, in a Neo-caledonian, and in a Malay. The Eskimoos are bound by an uninterrupted chain to the populations of Siberia, of which they are but the most eastern expansion (Maury). Another people of pygmies, and very singular, the Aïnos, yet live in the north of Japan.

Near the Eskimoos we find the earth-diggers of California, and on the borders of the Merrimac bones are found of men of 3 ft. to 4 ft. high, with large heads. The obsidian weapons of Mexico bring us to the Aztecs and the Mayas, or to their ancestors; dwarfs or pygmies were found in the Cordilleras, by Maldonatà (G. Schott); actually yet in Peru the Indians regarded as descending from the primitive inhabitants, are of very small stature.

I left Ethiopia going to the North. In the South also I find a track for my dwarf. Several authors quote them at Madagascar. Madagascar is united by the language to Malaysia, N. Guinea, &c. This has been positively stated (Wiseman, Lect.)*

The pygmies of Bali are described by Rumphius and those of Sumatra by Rienzi. Recent geographical reports mention wild dwarfs on the Andaman Islands; Philostrates quoted them yet on the Ganges.

The stone implements are known in many parts of Oceania, New Caledonia, Australia, &c.

I would be happy if these rough sketches should throw any light on the track of primitive men; and am curious to know if others have made analogous observations.—*B. Melle.*

[We have made no attempt at altering our Belgian correspondent's idiomatic English, lest we should sacrifice any of his intentions in so doing. —ED.]

AN EXEMPLAR.—"He alwaies protested never to have written any thing either for malice, feare, or favour, nor to seek his owne particular gaine or vaine glory; and that his only paines and care was to write *truth*."—*Edmund Howes on John Stow,* 1525—1605.

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* May it not be supposed there was once a continent uniting Madagascar with Australia and New Zealand, and that by a cataclysm part of the men and animals fled to Madagascar, to New Zealand, &c.? This would account for the great number of species of animals found in those islands: in the present time, the number of the Neo-Zelandic species is as great as that of the species of the rest of the globe altogether.

SIMPLE OBJECTS.—No. XIV.

WATER-FLEAS.

IN nearly every ditch or pool, at this period of the year, little vivacious crustaceans may be faintly discerned by the naked eye, sporting at will, and apparently enjoying themselves in their freedom. The commonest of these are the water-fleas, and the most frequent of all is *Daphnia pulex*. Several British species are known, but our observations will partake more of a generic than specific character. The woodcuts will convey an idea of the appearance of these creatures under the microscope, as seen by a one-inch objective. The water-fleas belong to the *Entomostraca*, a division of the class *Crustacea*, to which also the fish parasite (*Argulus*) and the four-horned *Cyclops*, already figured in this journal, belong.

The body of *Daphnia* is composed of two portions; the smaller forms the head, the larger consists of the thorax and abdomen, contained within a delicate shell. The valves of this shell are marked about their centre with a reticulation of faint lines. They are united along the hinder margins, and open in front, the lower extremity in some species being prolonged into a kind of spur of variable length.

The head is lengthened out in front to a kind of beak, beneath which are the superior antennæ (differing greatly in the two sexes of the same species). In the female these antennæ are very small. On each side, at the base of the head, the larger antennæ are attached. These consist of a single joint, dividing upwards into two branches, the posterior of which has four joints, the other three. Both branches are furnished with long filaments, which in some species are feathered throughout their length.

The eye of the water-flea is spherical, and composed of about twenty lenses. The mouth is a somewhat complicated organ, and consists of a lip, two mandibles, and a pair of jaws, seated near the junction of the head with the body. The stomach is plainly distinguishable as a long vessel, curved upwards at its lower extremity. The body consists of eight segments, the upper of which only is attached to the shell. An ovoid vescicle at the back of the first segment, subject to rapid contractions during the life of the animal, is the heart. All the species of true *Daphnia* have five pairs of legs; these are variable from each other, and may be observed in motion through the transparent shell. The eggs having attained a certain period of development in the ovaries of the female, are ejected, and from that time until fully mature, are carried in the space between the back of the body and the shell.

Water-fleas are only found in fresh water, generally in ponds or ditches, especially where there is plenty of duckweed, and in horseponds by myriads. Swammerdam says that he has seen them in such numbers at Vincennes as actually to give the water of the horsepond the colour of blood. Other observers have noticed their communicating to the water in which they swarmed a ruddy tinge. All these creatures increase and multiply at an astonishing rate. Muller observes that *one act* is sufficient to fecundate the mother for life, and all her female descendants for several successive generations. It is certain that males are rarely found, and only in the autumn, whilst females may be obtained throughout the year.*

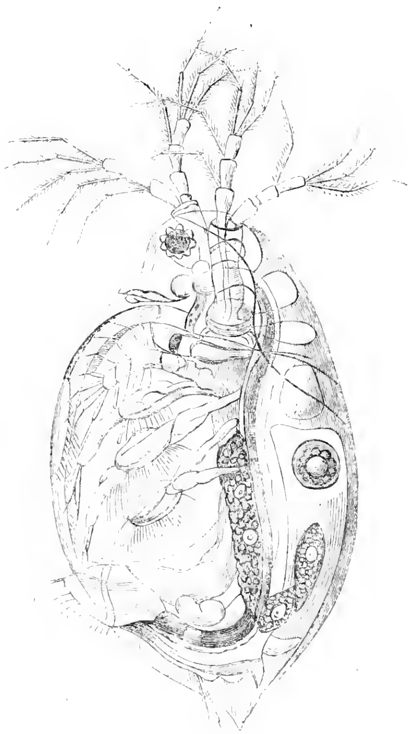


Fig. 149. *Daphnia pulex* (female).

This brief account could hardly be considered complete without an enumeration of the British species. According to Dr. Baird there are seven, the names and characters of which are as follows:—

The common Water-flea (*Daphnia pulex*) found in almost every pool or ditch of standing water during nine months of the year (fig. 149, female, fig. 150, male).

The Parrot-beak Water-flea (*Daphnia psittacea*) which has the front part of the head beaked

* A great amount of interesting and valuable information relative to this genus may be found in Baird's "British Entomostraca," page 62 to 100.

like the beak of a parrot, whence its name is derived. It has been found in a pond on Blackheath between the months of April and September, but whether discovered elsewhere we have no knowledge.

THE LARGE WATER-FLEA (*Daphnia schæfferi*). This is larger than the common water-flea, and the eye is smaller in comparison. It is also found in ponds, but less commonly. Dr. Baird collected it at Bexley Heath and Norwood Green.

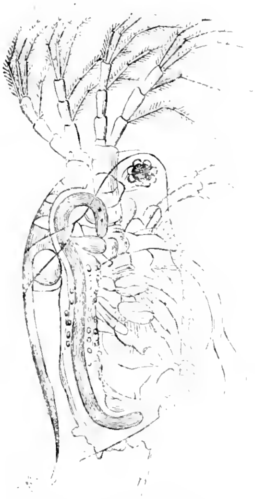


Fig. 150. *Daphnia pulex* (male).

THE SPINELESS WATER-FLEA (*Daphnia vetula*), which has a smaller beard than the common water-flea, and is destitute of the tail-like pine. It is a common species in similar localities around London.

THE RETICULATED WATER-FLEA (*Daphnia reticulata*). In his species the shell is covered with a network of hexagonal cells. The tail is very short, and a little inclined backwards. It is by no means uncommon, especially at Highgate and Battersea, during summer and autumn.

Fig. 151. *Daphnia schæfferi* (female).

THE ROUNDED WATER-FLEA (*Daphnia rotunda*). As its name indicates, the shell of this species is nearly round. The tail is short and blunt, but it is altogether larger than the reticulated water-flea. It occurs in the same localities.

Fig. 152. *Daphnia vetula* (female).

THE LONG-SPINED WATER-FLEA (*Daphnia mucronata*).—This species may be easily known by the front edge of the shell being perfectly straight, and the long pointed spine at the lower extremity. It is not a common species, but has been found in ponds about Isleworth &c., in the autumn.

The characters we have given, are merely those which would be recognized at once. There are other features whereby one species is separated from another, but it is hoped that the figures and points

Fig. 153. *Daphnia reticulata* (female).

Fig. 154. *Daphnia mucronata* (female).

of difference indicated, will be a sufficient guide for the discrimination of the several species. C.

GEOLOGY.

RECENT EARTHQUAKES.—1. The first shock of an earthquake at Chittagong, Bengal, was felt on December 15th, 1865, at 6.50 P.M., and between that time and 2 A.M. on the twentieth of the same month, twelve distinct shocks were felt, of various degrees of intensity. In Thannah Roajan the earth's surface cracked in several places, and poured forth jets of water and a fine dark grey-coloured sand. No sand has ever been found in the deepest excavations, either at that spot or within many miles, so that it must have been forced up from a great depth. The heaps of sand thrown out varied from the size of a molehill up to twelve feet in diameter, and three feet deep. At the cessation of the shocks the large sand-heap was still wet, and the ground showed signs of having been recently flooded. The water rose some inches from the ground, and so far as could be ascertained, it was cold. It appears that there are in the neighbourhood several "burning wells," which are supposed to be connected with volcanic agency, but none of them exhibited any change during the earthquake.—2. On March 9th, at 2 A.M., an earthquake was felt at Christiania, in many places in Norway, along the west coast at Verblungäs and Drontheim, and the tower of Frauenkirche rocked so violently that the bells began to ring.—3. The earthquake felt in Norway on March 9th appears to have extended as far as the Shetland Isles. The keeper of the lighthouse on the Flugga rock, which is situated about a mile and a half north of Unst, reports that at 1.20 A.M. on the same day the tower began to shake terribly, and continued doing so for thirty seconds. There was no wind or sea to cause the vibration, and it must, therefore, be attributed to the shock of an earthquake. If the shocks felt at the Shetlands and Norway are in any way connected, they must have proceeded in a north-easterly direction from the former to the latter place, occupying a period of forty minutes—the wave having a velocity of about seven or eight miles per minute.—*Reader.*

PTERODACTYLES NOT REPTILES.—Mr. H. Seeley says;—"It seems to me no hard task to determine whether the Pterodactyle has the organization of a reptile or of a bird; I find it in every essential principle to be formed on the avian plan. Yet it differs more from existing birds than they do among themselves, and therefore cannot be included as an order of Aves; for the points of structure in which it differs from birds are those in which all existing birds agree. I therefore regard it as forming a group of equal value with Aves (Saurornia), each as a sub-class, forming together a great class of birds. Its distinctive characters are—in having teeth, in the simple convex or concave articulation of the vertebræ in the separate condition of the tarsal and metatarsal bones, in having three bones in the forearm instead of two, in a peculiar carpal bone, in the sacrum formed of few vertebræ, and in the modification of the wing by the enormous development of the phalanges of one finger. The sub-class so characterized forms a parallel group with the true birds. Whether it may not in some points of organization rise above birds, is a question on which I offer no opinion, further than to state that in none of the typical mammalian characters does it approach the mammals."—*Ann. and Mag. Nat. Hist.*

ARAUCARIAN CONES.—In the "Geological Magazine" for June, Mr. W. Carruthers characterizes two Araucarian cones from the secondary beds of Britain, allied to existing Australian species: one, *A. sphærocarpa*, from the inferior oolite, Bruton, Somersetshire; the other, *A. Pippingfordiensis*, from the wealden in a mass of hard greenish grit at Peppingford, in Ashdown forest.

SIBERIAN MAMMOTH.—Another specimen of the *Elephas primigenius* has been discovered in the bay of Tazooskaia, in the government of Tomsk. The flesh, skin, and hair are said to be in a perfect state of preservation. A commission has been named by the Academy of St. Petersburg for the purpose of taking measures to disinter the monster and remove it to St. Petersburg. It was discovered accidentally. A native in search of some domestic animals which had strayed, perceived a great horn sticking up in the midst of a marshy moor. In his endeavours to remove it, he broke the horn and perceived a piece of skin from the head, which was covered with reddish hair nearly three inches in length.—*Public Opinion.*

NEW MINERALS.—In the *Comptes Rendus* for March 19th, M. Pisani describes a Cornish mineral to which he gives the name *Chenevixite*. It is an arseniate of copper and iron, the iron being in the state of ferric oxide. M. Pisani gives its hardness as 4·5, and its density as 3·93. The colour is a blackish green, and the fracture conchoidal. *Adamite*, a new and interesting hydrated arseniate of zinc is also described in the *Comptes Rendus* for March 19th. Adamite is similar in crystalline form and in constitution to olivenite. It occurs with native silver, limonite, and calcite, at Chanarcillo, Chili. The crystallography of adamite has been worked out by M. des Cloiseaux. Knop has described under the name of *Pachnolite*, a mineral occurring in Greenland with cryolite, and presenting a weathered aspect. It differs from cryolite chiefly by containing calcium.

HONOUR TO SCIENCE.—The University of Oxford has conferred an honorary doctorate on Professor Alphonse de Candolle of Geneva, Dr. Hooker of Kew, Professor William Thompson of Glasgow, and Professor Phillips, the veteran Geologist.

ZOOLOGY.

Pulsations of Mollusks.—It is well known that during hybernation our land pulmoniferous gasteropods experience an almost total cessation of the action of the heart. On subjecting a few of our common snails, some time ago, to considerable changes of temperature, I found the circulation to be increased or diminished to an extraordinary degree. The results here given may, perhaps, induce others interested in conchology to make more complete investigation. *Zonites radiatulus*, when laid upon a deal table, in a room in which the thermometer stood at 62°, showed 52 pulsations a minute. It was then placed upon the palm of the hand, and in the course of a short time the action rose to 108—more than double its previous rate. *Helix hybrida*, a much larger animal, showed under similar circumstances a variation from 49 to 92. *Zonites alliarius* ranged from 72 to 110. This animal was then placed in a small platinum cup, and floated upon water drawn from a tap in the room. The action of the heart was suddenly checked, and soon fell to 29 pulsations a minute, a rate which was maintained until the animal was removed from its cool quarters. In this instance a range of about 45° of temperature caused a variation of from 29 to 110 pulsations—a ratio of one to four nearly. I believe it has never yet been ascertained whether these animals have, like man, the power of generating heat, so as to maintain a nearly equable temperature of the body, whatever the temperature of the surrounding medium, or whether, as in the case of some cold-blooded animals, considerable variation of internal heat ensues. It would be interesting, too, to know whether our more hardy mollusks, such as *Helix fusca* and *Vitrina pellucida*, which are to be found moving about with energy even on frosty mornings, are subject to the same affections of the heart as have been mentioned above.—*C. Ashford, Grove House, Tottenham.*

Rooks Resting on the Ground.—One evening some years since, I was returning from a visit to a friend in the country, when my attention was directed to some dark objects lying on the bare ground at the further end of a field that adjoined the road. The distance, however, and the twilight, prevented my ascertaining their nature, but while I was looking at them a labouring man came up, who informed me that they were rooks resting for the night, that he had frequently seen them at the same place not only when he passed in the evening, but also in the early morning, in going to his daily labour. As I did not have another opportunity of witnessing, nor ever heard of, such an apparently unusual habit of these birds, I know not whether it is general with them, and therefore make a note of it for a corner in Science Gossip.—*J. B. A.*

Rook stealing Eggs.—Having for some weeks past been losing eggs from the hens' nests near my house, and suspecting the thief to be a magpie or crow, I made an artificial nest in a hedge-trough, placing two eggs in it. I then stuck in the ground some bushes, making a path about six inches in length up to the nest, and set a gin in it. On visiting my trap the next morning, I was surprised to find it held an old rook. There could be no mistake in the identity, others saw the bird besides myself. I am confident this rook could not have hopped accidentally into the gin; he must, therefore, have been the thief. Is it not an uncommon occurrence for rooks to suck eggs?—*N. E. C.*

Tree-Sparrows.—I have found two tree-sparrows (*Passer montanus*) in sand-martins' nests near Leamington, a circumstance which may be of interest to some of your readers.—*E. G. Wheler.*

Suicide among the Scorpions.—Captain Pasley, R.A., mentioned that he had repeatedly tried the experiment of surrounding the scorpion with a ring of fire, and that it had invariably stung itself to death. The fiery circle was about fifteen inches in diameter, and composed of smouldering ashes. In every instance the scorpion ran about for some minutes, trying to escape, and then deliberately bent its tail over its back, inserted the point of its sting between two of the segments of its body, and speedily died. This experiment was repeated seven or eight times, and always with the same results, so that a further repetition would have been but a useless cruelty. The heat given out by the ashes was very trifling, and not equal to that which is caused by the noontide sun—a temperature which the scorpion certainly does not like, but which it can endure without suffering much inconvenience. Generally the scorpion was dead in a few minutes after the wound was inflicted.—*Wood's "Homes without Hands."*

Sting of Sea Anemones.—I cannot agree with your correspondent, M. D. P., in the supposition that anemones only sting "when out of health," for it was only a few weeks since that I noted a fact which leads me to a contrary conclusion. I was down on the rocks at low tide, and determined, on seeing a fine *Anthea*, to test its stinging powers, and very soon received a sensible proof on the back of my hand between the little and third fingers, not only from the pain experienced, but by the white spots produced, like those from the sting of a nettle. I certainly had no power of examining the tongue or feeling the pulse of this anthea, but, judging from its general appearance and complexion, and from seeing it in its native home, I should have no hesitation in pronouncing it to be in perfect health, yet possessing the urticating power.—*J. G. B.*

Seven Barrow Loads of Swallows.—Conversing a short time ago with a sub-contractor on the subject of birds hybernating, he rather astonished me with the following statement. He was one of the men engaged in excavating for the North Midland line near Chesterfield, some years ago, and in going through some rocks or quarries, they came upon a great quantity of swallows in a torpid state. He said there were seven barrows full of them, and they were taken to the Hall, where Mr. Stephenson lived, and kept until they revived. I tried to shake his belief as to their being swallows, and suggested bats—but he was firm. My reason for troubling you now is, to ask if any of your readers in the Midland district know anything of such a circumstance.—*J. Goodyear, Barnsley.*

Adder in a Nest.—Walking with a keeper in a gentleman's park a few days since, my attention was drawn to the extraordinary movements of two willow wrens (*Sylvia trochilus*), which were fluttering about in some brambles. From the cries they emitted, and the anxiety which they evidently were in, I at once arrived at the conclusion that something "startling" had interfered with their domestic arrangements. Upon going to the spot over which they hovered most, the keeper discovered their nest, domed over as usual, and, merely remarking that the entrance seemed full of feathers, he was about to feel inside, when, starting back, he exclaimed, with more vehemence than sense, "By Gosh! there's an adder"; and a remarkable fine adder there was, completely curled up in the nest, evidently preying on the young birds. I soon made the adder beat a retreat and captured him, he being one of the most handsomely marked specimens I have ever seen. He measured twenty-three inches in length, and had already gorged three out of the six young birds, when his meal was so abruptly terminated, and I have no doubt but that the remainder of the progeny would have found equal "accomodation inside" but for my timely appearance. The parent birds evinced delight upon my withdrawing with their enemy, but I fear that the young ones left in the nest would scarcely survive the deprivation of air caused by the weight of the adder.—*A. B. F.*

Hermit Crabs.—Miss Smee, some time ago, published an interesting account of the manner in which caddis-worms (the aquatic larvæ of *Phryganea*) will sometimes construct new cases for themselves from various other substances when in an aquarium, than those they employ when in a state of nature, and I, as a sort of pendant to this, have to state that hermit crabs at times exemplify that "necessity is the mother of invention," for lately I received two tiny *Paguri*, alive, but each wanting the empty shell which they employ as a house, as every one knows. I put them into a jar of sea water and forgot them, and next morning I found that one had made a home of the shell of the hand and wrist of another and larger hermit, which had exuviated in the jar a few days previously, and which had been removed, all but the portion of shell named, and which was accidentally left behind. The other living hermit, being similarly hard up for a covering, converted a deserted fragment of a *Serpula* tube into a house. I then threw in a couple of small empty shells of periwinkles (*Littorina*), and these, after careful examination, they finally took possession of, as being more natural to them than the provisional accommodations which served their purpose in their need, for a few hours.—*W. Alford Lloyd.*

Nest of the Bullfinch (*Pyrrhula vulgaris*).—This season, I found a nest of the Bullfinch, up in a thorn-bush, on the borders of a planting. It was composed of the smaller twigs of larch, and lined with bent; there was a total absence of wool and hair, the usual lining, and the nest was very shallow. It contained three eggs. In the breeding season, the bullfinch generally chooses a retired place to build in; but in 1861, I found a nest in an hedge-row, which parted the fields from the high road; walkers on the foot-path would frequently brush the hedge. My companion was amusing himself with throwing stones, and killed the cock bird, and when he ran to find the bird, we found it and the nest.—*John Ranson, Linton-on-Ouse, York.*

Corn Crake or Drake Hen (*Crex pratensis*).—I first heard this bird this year on the seventh of May, in the meadow at the bottom of my garden. I find, on reference to my notes, that it was first heard on April 17th in 1864, and on May 1st in 1865, so that it is later in its appearance this year than usual.—*John Ranson, Linton-on-Ouse, York.*

Bee-loving Cuckoo.—During the last fortnight the cuckoo has been a frequent visitor in my garden, sometimes perching on a bush about twelve yards from the door. I encouraged its visits by causing every one to leave the garden, when I heard it in the neighbourhood. I had a very strong hive of bees in the garden, which I was expecting would swarm in a few days. On Tuesday they were particularly busy, but on visiting them on Wednesday morning, there was no appearance of any work going on, and when I lifted the "*skep*," I found that there were only four or five bees inside. I could not account for them leaving so early until to day, when a working man informed me that yesterday he found a cuckoo sitting on the landing board of one of his hives devouring the bees as fast as they came out, and on examination he found that two of his hives were completely harried out.—*J. Clark, Lochmaben, Dumfriesshire.*

Tones of the Cuckoo.—I happened the other day to be in very close proximity to a most indefatigable cuckoo, though, as is generally the case, I could not see it. The variations in its tones struck me rather forcibly, as up to that time I had always imagined a cuckoo to be possessed of two notes, and two only. After listening carefully for some time I clearly perceived such variations as the following, which I give below on a treble stave—

The last two cries appeared to have been the result of excitement on the part of the bird, as they were screamed out *con amore*, after which ebullition it subsided into its usual tones once more.—*A. J. N. Macdonald, Taunton.*

Nest of the Lesser Redpole; or Rose Linnet (*Linota linaria*).—A nest of this little and scarce bird was found this season in Benningbro' Park, York. It was built between a branch and the trunk of an ash tree. It was a very beautiful nest, and for neatness of construction only second to the Chaffinch. Externally it was composed of bent and moss, with a few small twigs interwoven among them, and it was lined with hair, a feather or two, and the down of the willow. It contained three eggs of a pale milky blue, and spotted with reddish brown, the spots being thickest at the thick end.—*John Ranson, Linton-on-Ouse, York.*

Convocation of Sparrows.—Frequent on the fine days in February, March, and April, large numbers of sparrows congregate together, or as one of your Correspondents terms it, meet in convocation. Some ash trees in the field below my residence, are the favourite meeting places here. In these trees they frequently meet to the amount of 100. Seated on the bare branches not a sound is heard, when suddenly every sparrow leaves his perch, and babel commences; every bird seems endowed with a miraculous power of tongue; and as they fly round and round the tree, and through and through, all mingled together, and all chirping together, the sight is by no means unpleasant, nor the clamour disagreeable. These meetings continue frequently for a couple of hours; but what their object is, if it is not an instinctive rejoicing at the return of warm weather, and the season of love, I cannot comprehend.—*J. Ranson, Linton-on-Ouse, York.*

Palmate Newt (*Triton palmipes*).—Abounds, as I have been told, in a pond close to Woking Station. I lately found the Natterjack among the reeds in Send sandpits, three miles from the station; but have had no opportunity of looking for the newts in the above-mentioned pond.—*W. R. T.*

LESBIA TO HER SPARROW.

Friend, for thee on plant and shrub,
Fattens many a dainty grub;
Thick for thee the aphis grows
On the branchlets of the rose;
Beetles (crisp delights to crunch)
Multiply to serve thy lunch;
Plumpest spiders weave the web,
Fated for thy greedy neb.
Worm, snail, slug, and blowfly—all
Crowd thy hunger to forestall.
Therefore, hopster, feed thy fill,
Cram thy all-devouring bill,
Roam my garden freely through
And devour the crawling crew.
This, and welcome, do!—But please,
Spare—oh, spare—my growing peas.—*Fun.*

Partridge (*Perdix cinerea*).—The number of eggs which the partridge lays, has been variously stated at from eight to twenty; but this year I have a partridge who sat in my garden hedge on twenty-nine eggs; and a few years ago I found a nest containing thirty-two. This latter was very unfortunately situated in the hedge row, close to the high road, and close to a stone heap; the breaker of which found it and showed it to others, so that by being frequently disturbed she forsook the eggs.—*J. Ranson, Linton-on-Ouse.*

Insects at Sea.—At a recent meeting of the Zoological Society, Mr. Flower exhibited some insects captured in the Atlantic on board the ship "Hotspur," about 300 miles from land.

Orange-Legged Hobby (*Falco vespertinus*).—A female was sent to me for preservation on the 29th May of the present year; it was killed in the neighbourhood of this town, and is the first, so far as I am aware, that has yet been obtained in Scotland. Its stomach contained a mouse and some beetles.—*G. Sim, Aberdeen.*

New British Fish.—At the meeting of the Zoological Society of London (June 12th) a communication was read from Mr. Jonathan Couch, giving an account of the occurrence of *Ausonia Cuvieri*, a fish new to the British Fauna, on the coast of Cornwall.

Larvæ of Melitæa (see Science Gossip, p. 133).—At a meeting of the Entomological Society, held May 5th, 1841, "a note was read from the Rev. R. A. Cox relative to the appearance of immense numbers of minute black caterpillars on the surface of pasture grounds in the parish of West Camel, Somerset, to the extent of twenty acres. The caterpillars were regarded by Mr. Stephens as those of a species of *Melitæa*, which are known occasionally to congregate in great numbers."—*Ann. and Mag. Nat. Hist.*, Series i., vol. vii., p. 298 (1842).

MICROSCOPY.

A LOST VETERAN.—It is our painful duty to record the death of another distinguished Botanist and Microscopist. On the 4th of June Dr. R. K. Greville, so well known for his elegant Scottish Cryptogamic Flora, and his elaborate papers on Diatomaceæ, passed to his rest.—*Requiescat in pace.*

SEASIDE MICROSCOPE.—Messrs. Murray & Heath have recently introduced a new form of pocket seaside Microscope, which is remarkable for portability and efficiency. It consists of a sliding body, to which a stage with springs is attached by a

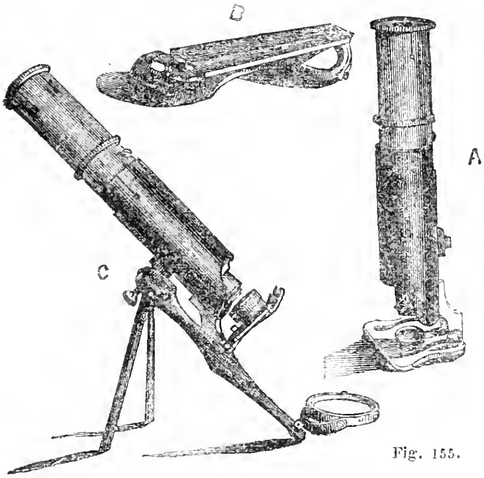


Fig. 155.

stout arm, which secures perfect steadiness, and at the same time removes the stage so far from the body, that both opaque and transparent objects can be examined. In this state it forms a convenient hand microscope for out-of-door work. To make it complete, a folding stand and mirror are provided, shutting up quite flat, and then occupying only five inches long by one inch wide, but making when open a firm tripod; on to this the microscope is secured by a small claw at the bottom of the stage, and a thumb-screw in the body. The instrument is provided with a triple separating English Achromatic, but being furnished with the Microscopic Society's thread, may be used with any Object Glass.

CUTICLE OF ORCHIS.—On examining the epidermis of the under side of a fresh gathered leaf of the lovely Orchis, to ascertain if it contained any Raphides, I was surprised to see in many of the cells a large number of little colourless globules in active motion. There was nothing like regular circulation, such as you find in *Valisneria*. The motion was more of a vibratory character, but so distinct that there could be no mistake about it. The smaller globules especially seemed, if I may use the term, to be swarming. In the larger globules was a spot like a nucleus. I submitted several portions of the epidermis to examination, and in all of them found numerous cells in this condition. As I have seen no record of anything precisely similar in any botanical work, perhaps some of your readers will say if they have met with anything of the kind. I may add that the stomata of this plant are beautiful objects, with their purple coloured mouths. I had on my microscope a $\frac{4}{10}$ths object-glass, with a B. eye-piece.—*J. C. G.*

SEASIDE DIATOMACEÆ.—On Whit-Monday I visited Whitley Sands, a long reach of sea beach on the Northumberland coast, not far from the mouth of the river Tyne. The sands are about two miles in length, and at the northern end they are protected from the violence of the waves by a projecting mass of rocks covered with Algæ. On that part of the beach screened by the rocks, and near low tide mark, I made a collection of *Diatomaceæ* from the shallow pools, which were scattered at intervals along the beach. The result of the gathering may be best understood by running over the following of the leading diatoms obtained in considerable abundance, and the richness of the gathering will, I trust, induce those Microscopical readers of SCIENCE GOSSIP who have access to the sea coast, to search their various localities for diatomaceous treasures. Besides those enumerated, there were occasional frustules of *Toxonidea Gregoriana*, and about twenty other species. The following were abundant:—*Amphiprora alata*, *A. fulva*, *Actinoptychus undulatus*, *Biddulphia Baileyii*, *Epithemia marina*, *Nitzschia bilobata*, *N. virgata*, *Navicula didyma*, *N. lyra*, *N. granulata*, *N. forcipata*, *N. lineata*, *N. æstiva*, *N. retusa*; *Pleurosigma hippocampus*, *P. æstuarii*, *P. marinum*, *P. lanceolatum*, *P. arcuatum*; *Donkinia carinatum*, *D. rectum*, *D. minutum*, *Toxonidea insignis*, *&c.* In diatom gathering it is very desirable to know on the spot what diatoms have been obtained, and many modes for the accomplishment of this purpose have been suggested; small microscopes, Coddington and Stanhope lenses, &c., but all have been more or less cumbersome and imperfect. I have recently had introduced to my notice a small lens of French manufacture, designated a Stanhopescope; the entire apparatus is only one inch long by $\frac{3}{8}$ths of an inch diameter, and is therefore very portable, its magnifying power is fully 100 diameters, and by it I can recognise not only the genera, but the species of the larger form of diatoms. The prices of this little apparatus are 1*s*. or 1*s*. 6*d*., there being two styles of fitting, and it may be had of any dealer in optical instruments, or at any toy-shop. Should any of your readers be unable to obtain them, I shall be glad to forward them post free to any address on receipt of the price in postage stamps.—*T. P. Barkas, Newcastle-on-Tyne.*

BOTANY.

"SPIKED STAR OF BETHLEHEM" (*Ornithogalum Pyrenaicum*).—In this neighbourhood it grows in such abundance that it is annually sold in Bath market as a vegetable, under the name of "French Asparagus." The part eaten is the unexpanded flower-bud; the flavour is delicate, somewhat resembling common asparagus, and as it is very cheap, about 2d. a bunch, I believe there is always a ready sale for it. This is about the proper season for it. I see by Withering's "Botany" that the neighbourhood of Bath has always produced this plant, as the edition of 1812 mentions it as growing in the same localities it now inhabits.—*M. J. P.*

"FRENCH MARYGOLD."—May I venture to suggest to "S. C." that the plant described by him under this name in last month's GOSSIP is not the rightful owner thereof? *Calendula officinalis* is the name of the *common* marygold; but any florist, or amateur gardener, if asked for the *French* marigold, would point to the *Tagetes patula*, equally common and well known, with its elegantly-cut foliage, and large chocolate-coloured ray-florets. This, the true *French* marigold, is a native of Mexico, and appears to have been introduced to this country at about the same time as the *Calendula*. With reference to the "winking Mary-buds," I rather fancy that a *Ranunculus*, probably *R. Ficaria* (pilewort) was intended—at least, I should imagine from the context that a *wild* flower was alluded to.—*B.*

WHITE-FLOWERD WOOD VIOLET (*Viola sylvatica*).—Three specimens of this were found on the 30th of April last, by Mr. Frank Wheeler, of High Wycombe, in a lane near that place. The blossoms possessed a faint, sweet scent; each petal was quite white, and unveined, but narrower and smaller than is usually the case. The form *V. Reichenbachiana* is not known to occur in the Wycombe district, or I should have been inclined to refer the specimens to that rather than to our common form, *V. Riviniana*. I think the variety is sufficiently rare to be worthy of special mention.—*B.*

EARLY PURPLE ORCHIS (*Orchis mascula*).—The scent of this species varies greatly in individuals. In some specimens gathered in a wood near Buttsbury, Essex, when I was staying there two or three years ago, the odour was most offensive, becoming much stronger towards evening; while others, from the same locality, were remarkably fragrant. Is this peculiarity capable of explanation?—*B.*

A NEW DUCKWEED.—Dr. Henry Trimen has found the long-sought species of duckweed (*Lemna arrhiza*) in the neighbourhood of London. It was alluded to as probably one day to be found in Britain in Vol. i. of this Journal, p. 6 and 264.

RURAL NATURAL HISTORY.—Perhaps the following local names and uses made of certain plants here at Drayton, in Leicestershire, may be interesting to the readers of SCIENCE GOSSIP. The dandelion (*Leontodon Taraxacum*) is made into a beer by the poor people, and is supposed to purify the blood, and cure gravel and scarlet fever. They pick the flowers and dry them in the sun or in an oven; they then boil them and add yeast to them, and after having left the beer to ferment for a time, they bottle it and use it when it is wanted. Here gooseweed (*Potentilla anserina*) is used for taking away the marks of small-pox. They boil a number of the roots down, and rub it over the marks. Whether it cures them or no I do not know, but they put great faith in the above cure. Gooseweed is here called silver-weed. Black horehound (*Ballota nigra*) called here "Lound's wounds wort," is supposed, when made into a tea, to be a cure for asthma, bronchitis, consumption, and diseases of the chest in general. I tried the tea the other day out of curiosity, and never, with the exception of senna tea, tasted such disgusting stuff. The nettle (*Urtica dioica*) is eaten as a spinach, and is used by the poor for cutaneous eruptions. Beer is made out of the parsnip (*Pastinaca sativa*) but they do not use it for any disease, but drink the beer, much as we should eat it at dinner. The chickweed (*Stellaria media*) is used as a spinach. I tasted it the other day in a cottage, and very good it was too. They make tea also out of the following plants:—thyme, hyssop, French marygolds, and mint. The tea made from them is used to cure measles, small-pox, and cutaneous eruptions. Here the bindweed (*Convolvulus arvensis*) is called "devil's gut," and the common male fern is called snake's ladder. I make it a rule, whenever I come home from a walk, to find out all the local information concerning the plants I have gathered that I can. Can any of your correspondents tell me whether they have ever tasted rhubarb wine? It must be very sour stuff.—*W. Bethell, Drayton, Leicestershire.*

[We drank of it in Norfolk about a week since; it was *not* "sour stuff," but though thin and with little flavour, it was very agreeable as a cheap beverage.—ED.]

VERVAIN.—The Germans to this day present a hat of vervain to the new married bride, as if to put her under the protection of Venus victorious, which is evidently a remnant of ancient customs.—*Flora Historica.*

MONSTROUS MUSHROOM.—I have just gathered in my garden a mushroom, similar to the one described and figured on page 209, Vol. i. of SCIENCE GOSSIP. My specimen is exactly represented by the portion in the drawing *below* the dotted line.—*Robert Holland.*

Wood Anemone (*Anemone nemorosa*). — In a plainly-written little book lately published, entitled "The Every-Day Book of Natural History," the following passage occurs in an article on the Wood Anemone:—"The blossom of the plant is succeeded by clusters of minute seeds, with *long shining curious tails*, that have a very peculiar appearance when waving in the wind" (p. 140). I would just mention, for the benefit of young beginners in botany, that this "very peculiar appearance" exists only in the author's imagination, as the seeds of *A. nemorosa* are *destitute of "tails,"* the Pasque-flower (*A. pulsatilla*) being the only British anemone which exhibits them.—*B.*

Drying Speedwells.—After reading the excellent article on "speedwells," I recollected seeing the germander speedwell (*Veronica Chamædrys*) dried, so as to retain its colour, by one of my family, who is just now busily employed in collecting the weeds and native plants around us. Her method of preserving them is this:—she carefully places the specimen between two sheets of blotting paper, filtering paper is better for some plants, and with a common flat iron, such as used in the laundry, she presses it until it remains perfectly even upon the paper, and then removes it to her collection. The iron must be moderately heated, and the plant well protected. I have often seen the ordinary method of drying succeed, if the following rule is observed:—always flatten the veins, stalks, &c., with the thumb nail, or an ivory paper cutter. This prevents the air permeating between the sheets of paper and causing the colour to change.

Cluster Cups.—During a recent trip into Norfolk I found the dock cluster cups (*Æcidium rubellum*) exceedingly common, not only on dock and sorrel, but also on rhubarb leaves. The honey-suckle cluster cups (*Æcidium periclymeni*) were also plentiful. Both species are rare in the neighbourhood of London. I also discovered, in a marsh belonging to Mr. S. B. Cooke, of Dilham, a species new to this country, on the leaves of an orchis; this is the *Æcidium orchidearum*, Fiedl. In the same spot several specimens of *Æcidium pedicularis*, another rare species, were found. At Horstead, as well as in the neighbourhood of Bungay, and probably elsewhere, *Æcidium quadrifidum* is found on the leaves of the garden anemone.—*M. C. Cooke.*

Sunflower.—The annual sunflower (*Helianthus annuus*) is first mentioned in this country by Gerard, who notices it in the year 1596, under the name of "The Flower of the Sunne, or the Marigolde of Peru."

Ferns of Java. — In Blume's "Enumeration," no less than 460 species are described, of which about 300 are regarded as new. —*Smith's Ferns, British and Foreign.*

PHOTOGRAPHIC GOSSIP.

The Permanence of Photographs.—However doctors may differ as to why photographs commonly fade, they are tolerably well agreed as to the fact that they do so fade, and very few, therefore, will fail to hail with profound satisfaction a discovery which removes what, by universal consent, is regarded as the source of destruction, viz., the presence of hyposulphites in the finished print. The discovery in question we owe to Dr. Angus Smith, F.R.S., who has pointed out that, by using a weak solution of peroxide of hydrogen, the hyposulphites which may be locked up from mechanical action in the size of the paper may be decomposed into the sulphates, which are held to be harmless. By adopting this plan—and already the photographic chemists find a growing demand for this new compound springing up, there is every reason for believing that photographs will, at last, be rendered permanent. Mr. Dawson, of King's College, who is usually first in the field when the value of any new discovery is to be tested and reported on, has carried out numerous excellent experiments, all tending to illustrate the immense value of this novel photographic agent, by demonstrating not only the impossibility of removing every trace of the hyposulphites from sized paper, but also the permanence of prints treated with the per-oxide in question. According to this gentleman's experience one fluid ounce of a ten-volume solution of peroxide of hydrogen, diluted with one quart of water, will convert into the sulphates the sulphites contained in four full size sheets of photographic paper (18 × 22) after they have been thoroughly washed in the usual way.

Photographing the Pyramids.—The Astronomer Royal for Scotland has brought home from Egypt some of the most interesting mementoes of his visit in the shape of some very small but singularly perfect photographs, which, when recently enlarged and thrown upon the screen at a public meeting in Edinburgh, astonished and delighted those present in no small degree. The negatives obtained by the wet process, necessarily, are but one inch square in size, yet they bear magnifying up to fifteen feet without apparent loss of sharpness or distinctness, and when we consider the difficulties with which Professor C. Piazzi Smith had to contend, this amount of perfection appears the more remarkable. These were—a temperature of 90°;—the minute particles of sand with which the atmosphere was loaded, which rendered necessary a special mode of preparing and exposing the plates, and the necessity of having to prepare the plate some time before it could be exposed, and keeping it some time before it could be developed, together with other technical difficulties, forming a long and formidable list.—J. W. W.

NOTES AND QUERIES.

PROBOSCIS OF HAWK-MOTH.—In all Lepidoptera this organ is double, *i. e.*, it consists of two hollow portions joined together, and forming a tube in the centre, through which the food passes. It is easily to be discovered in most species. In Burmeister's Manual your correspondents will find a figure of a proboscis, and section of same, Pl. VI., figs. 1, 2; and in Kirby and Spence's Introduction there is also a figure, Pl. VII., f. 13.—*J. L. B.*

CAN THE HEDGEHOG BE POISONED?—Having read in the Natural History, edited by the Rev. J. G. Wood, that it is impossible to poison the hedgehog, I was induced after having destroyed some mice with Battle's Vermin killer, to feed the hedgehog with one of the mice so poisoned. The effect was almost instantaneously fatal to our erinaceous friend, whose brief span abruptly terminated on the spot, leaving pendant from his mouth the tail of the poisoned mouse. Have any of your readers tested the same question, and if so, with what results?—*P.*

SWORD GRASS.—Both the *Arenaria segetalis*, and the *Melilotus segetalis*, are known by the name of Sword Grass. Gladiolus also is often so called.—*Helen E. Watney.*

ARROW-ROOT.—I have been told that although this name is given to the produce of various plants, it applies more especially to that of the *Maranta arundinacea*, which is cultivated in the West Indies for the sake of its starch, and hence the word arrow-root, a corruption of ara-root. The Brazilian arrow-root mentioned by Professor Bernardin, is made from the *Manihot utilissima.*—*Helen E. Watney.*

FALCONRY.—Your Correspondent "N. E. C." will find Freeman and Salvin's work on Falconry a good one, it is the only one that I know of, that is not high-priced. The price is, I think, half-a-guinea, and the Publishers, Longman & Co. The only other English work I have heard of, is Salvin's "Falconry in the British Isles," price 24*s.*, but the book is out of print, and is scarce now. If N. E. C. intends training or keeping hawks, and will communicate with me, I will give him if he requires it, any information I may be possessed of respecting their management.—*J. G. G.*

CAN BIRDS WALK UNDER WATER?—The question has, as yet, been evaded rather than answered. It is easy to heap up arguments, showing that it cannot be done. Many such theories have been constructed which a strong indisputable fact has knocked to pieces. As my contribution towards this controversy, I beg merely to quote the following sentence from Rennie, a well-known and very accurate observer of Nature. "The amphibious nature of those winged beetles which can walk at the bottom of water, is matched, if not outrivalled by the water-ouzel, which we have repeatedly seen walk deliberately under water, and continue its pace for many yards, as if it had been on land. As this little bird lives on water insects and the fry of fish, its amphibious powers are indispensable."—*J. C.*

HÆMONY.—Not being a Botanist, I cannot answer J. Cleveland's question satisfactorily, but he and other readers may be interested to know that some have supposed Milton had Christianity in view throughout this quotation, and thus the humble plant Hæmony, "of which I little reckoning made," stands for the divine cure 'gainst all the evils flesh is heir to. Probably the Greek word *Eumeneia* may have suggested Hæmony.—*J. G.*

LIMNÆA INVOLUTA.—Your Correspondent E. W. mentions having found this extremely local shell in comparative abundance "in a canal." As far as I am aware, no locality but one small lake in County Kerry, has yet been assigned as its habitat. Would E. W. state whether the canal is in England, Scotland, or Ireland? If he has really found this animal out of Ireland, the fact should be at once recorded more definitely.—*C. A.*

[Having examined shells forwarded by our correspondent since the paragraph appeared, and supposed to be those of *Limnæa involuta*, we regret to announce that they are those of *Physa fontinalis*. This affords another proof how essential it is that specimens should be forwarded with communications on new or rare objects, and leads us again to urge on our correspondents the desirability of permitting their names and addresses to be published with such communications. In this instance it has cost us time and trouble to clear the mystery.—ED.]

COMMON DOG FISH.—Is it usual for this fish to swallow its young? I caught one about two feet in length a short time ago, and after having kept it on board all night, cut it up for bait the next morning, when to my surprise, three small fish about five or six inches long came out of it and swam away, as if nothing had happened.—*B. S.*

SEX OF GOLD FISH.—I wish to learn what are really the distinguishing marks of sex in gold fish. Do the short fin on the back and the burnished spots near the tail mark the male or female? Different dealers, influenced probably by what they have for sale at the time, give me most positive but contrary assurances.—*E. H. H.*

OAK GALLS.—I was astonished at Professor Buckman writing that the oak galls were confined to Devonshire prior to 1853, for when a boy, which is at least thirty years ago, my father, a field naturalist of some local note, called my attention to these very galls and explained to me their origin, showing me the larva in the interior. We had some stuck in a flower-pot and covered with a large tumbler glass, and from these galls the perfect fly was bred, and that was as far back, at least, as 1830, and in the neighbourhood of Hull. During a seven years' residence at Harrogate I frequently found them, and during the last nine years I have also frequently found them here. Last year they were numerous on the young shoots of some oak saplings growing in a hedge-row; the saplings had been trimmed with the hedge. From these I bred the imago in considerable numbers, but did not preserve them.—*John Ranson, Linton-on-Ouse, York.*

STICKLEBACKS.—To view the circulation of the blood in the young fry is worth purchasing a microscope. The fish should not exceed $\frac{3}{8}$ths of an inch in length. The Branchiæ (not having the gill flap) branch like the boughs of a tree, through which the oval globules circulate with astonishing velocity. With an animalcule cage any power from 25 to 400 can easily be brought to bear.—*A. Martinelli*, 106 *Albany Street.*

ROBIN, THE "BIRD OF DEATH."—The quotation from "Once a Week" in the April number of S. G., stating the robin received the name of red-breast because it extracted a thorn from our Lord's crown at the crucifixion, adds another instance to the general belief that the robin is the "bird of death." This idea was strong with the English peasantry as long ago as the tale of the "Babes in the Wood." Cock Robin covers the dead children with leaves. Shakespeare takes up the superstition (if superstition it be), and writes, when the brothers in "Cymbeline" mourn the supposed death of Imogen, they add their intention to strew flowers over the corse:—

> "The Rudduck would
> With charitable bill (oh, bill sore shaming
> Those rich-left heirs, that let their fathers lie
> Without a monument) bring thee all this;
> Yea, and furred moss besides, when flowers are none
> To winter gown thy corse."

Tales are numerous in out-of-the-way country villages of this pretty bird's watchfulness when death is taking place, or has taken place. A poor widow told me that the night before her husband died, a robin-ruck flew many times against the window, "because," she said, "it knew *he* would die." After a death in my own family a robin flew into the chamber, and did not leave it until the interment had taken place! I attach no superstition to these facts; on the contrary, I attribute them to the peculiar scent that prevails on these sad occasions, and to the kindly feeling the robin possesses towards mankind. Besides the provincial name of redbreast, is "robin-ruck" and "rudduck" in the north; where *red* is called *rud*, we still say *ruddy* to express rosy cheeks.

Since writing the above, I see it is stated in the June number of S. G., that a robin had recently built its nest on a newly-made grave. Surely this little incident supports the old thought, that the robin is the "bird of death."—*S. C.*

PRESERVING SALINE PLANTS.—Is there any better method of preserving saline plants for the herbarium than merely drying them? I have in my collection a number of these so-called Halophytes. Some of these as the Samphire, Golden Samphire, Salicornia, and Sueda, have in their tissues a large amount of soda salts, and attract moisture from the air to such an extent that the specimens become quite damp; and in addition to their own unsightliness, they injure such plants as may be in contact with them. A plan to get rid of this property of deliquescence in the species referred to is a desideratum.—*S. A. Stewart, Belfast.*

NEST OF THE KINGFISHER (*Alcedo ispida*).—Much has been written about the nest of the Kingfisher. I am humbly of opinion that no nest is made, or intended to be made. The bones of the small fish, which constitute their food, are ejected from the stomachs of the birds, and on the bones so ejected upon the floor of their nesting places the eggs are laid, a hollow place being scraped among them to prevent the eggs being broken by lying on the bones. The bird is not at all uncommon here, and I have had frequent opportunities of examining their nests, and I never found the bones laid in any order, but scattered about. Where does the Kingfisher roost?—*J. Ranson, York.*

DEEP SEA SOUNDINGS.—Can any of your correspondents inform me how to operate on soundings taken in white lead, tallow, &c., with a view to finding foraminifera, diatoms, &c.?—*E. H. L.*

FOSSILS OF THE UPPER CHALK FORMATION.—These fossils with me are constantly crumbling away. Can any one tell me of the cause and a cure wherewith to prevent this sometimes serious loss in specimens?—*C. A. J.* [Have you tried immersing them in a warm solution of gelatine?—ED.]

TOXONIDEA.—I have had slides of this genus forwarded to me from Cornwall, Exmouth, and Whitehaven; and am now inclined, with Mr. Kitton, to believe that the diatoms found by Dr. Donkin on the Northumberland shores may, if searched for, be found on any part of the British coasts. Has any correspondent found *Atthega decora?* It is very abundant on the Northumberland coast.—*T. P. Barkas.*

THE SWORD-GRASS.—"R. S" (page 119) inquires which of the Grasses is the "Sword-grass" mentioned by Tennyson in "The May Queen"—"the Oat-grass and the Sword-grass, and the Bull-rush in the Pool." A correspondent writes the Sword-grass is the common yellow-flag (*Iris pseudo-acorus*). It is presumption for me to doubt this, unless I had a specimen of the plant I suppose to be the one meant by Tennyson. Nevertheless, I believe the poet's thought to be the *Poa aquatica* "Reed Grass." It grows on the banks of rivers with the Bullrush, &c.; is from 4ft. to 6ft. high, leaves bright-green, polished, with the edges very sharp. I remember, when a child, being warned by a fond mother not to touch "the Sword-grass." The advice not being heeded, bleeding fingers was the consequence. If your correspondent is wrong it is a matter of congratulation, his opinion having led to the relation of the interesting anecdote of the origin of the lilies in the arms of France.—*S. C.*

DISSECTION OF MOSSES.—Must the sporangium be quite ripe for the complete development of the peristome? When ripe, and the operculum removed, should not the peristome be distinctly visible? I have taken a capsule of *Tortula muralis*, moistened it with spirit, and then dissected it in water. I removed the lid and divided the sporangium, but can find no peristome.—*J. E. T.*

AQUARIUM PEST.—What is it which forms on the sides of my aquarium, and on the leaves of *Vallisneria*, like a gelatinous slug, dotted all over, and of a similar shape?—*C. L.*

MUDDY WATER.—I stocked my tank early this spring, and all went well till about three weeks since, when the water suddenly became thick, so that it is impossible to see any of the animals unless they come quite near to the sides of the tank. It affects the health of the inmates but little, though *Callitriche* seems disposed to decay. What can I do?—*G. E. P.*

MOUNTING CINCHONIDINE.—Can any one tell me the best way to prepare microscopic slides of this alkaloid? I have tried fusion and solution, but cannot equal the slides usually sold.—*M. D.*

NIGHTINGALES IN VICTORIA PARK.—I have heard Nightingales this spring, and also during the spring of last year, in the Victoria Park. An enthusiastic admirer of our British song-birds, whom I occasionally meet in this park, tells me that he has listened to them for several years past, in the plantations surrounding the lakes.—*T. Davies, 47, Rutland Road, N.*

NIGHTINGALES NEAR LONDON.—We had Nightingales here early in May this year, and still have them, as has been usual for *many years* with us. Distance from Shoreditch Church, two miles and a half.—*W. Reddall, Stamford Hill.*

MARKINGS OF LEPIDOPTERA.—What is the cause of the variation in the markings of *Lepidoptera?* The small white cabbage butterfly (*Pieris rapæ*) which I have been rearing, are nearly all without the black spots; some of them entirely white on the upper surface. Another batch of pupæ obtained from the same garden are now emerging, and are of the ordinary type. What occasions the difference; has excessive moisture or dryness anything to do with it?—*G. T. P.*

WILKIN, QUILKIN, ETC.—I find that in Dr. Borlase's "Cornish Glossary" *Gwilkin* and *Quilquin* are given as the words for the frog, from which it appears that they are genuine Celtic terms.—*W. R. Tate, 4, Grove Place, Denmark Hill.*

BIRDS POISONING THEIR YOUNG.—(See p. 141.) In a little village in Cheshire, where I once resided, lived an old man, who regularly year after year, reared a brood of song thrushes, taken from a nest, built in a cherry tree in his garden, these were confined in a cage, and fed by the parent birds; but never were poisoned or destroyed, as the old man was famed for his thrushes. This is only a solitary instance, many more might be enumerated; on the contrary, I know not a case where the birds were poisoned.—*R.*

ALAS, POOR HEDGEHOG!—The other day I caught a hedgehog, which was running about. There were several blue-bottles on it, which were laying a great number of eggs. Would these hatch; and if hatched could they penetrate the skin of the live hedgehog?—*C. K., Christchurch, Hants.*

BLUE EGGS OF CHAFFINCH.—I took this spring a chaffinch's nest, with three eggs of a blue quite as bright as a hedge-sparrow's; two of them had one spot on them, the other none. I know I was not mistaken in the nests, as I saw the old bird. I have often taken them of a dull blue, but never of this bright colour.—*E. G. Wheler.*

WATER-RATS.—On the 14th May, while making a little voyage of discovery on our lake, I observed a curious looking nest among the rushes, just above the surface of the water. It was made of rushes, bitten into small pieces, and, in appearance, resembled a wren's nest, only larger. I put my hand in, and found three young water-rats. While I was examining them, the old rat swam close up to the boat before it saw me; it then dived, and reappeared about three yards off, on a heap of cut rushes. About a minute after, it was joined by the other old one, and they both watched me for some time. The next day the young ones had disappeared. I suppose the old ones had carried them away, as the little animals were blind, and the nest was some yards from the shore. On the 13th June I again visited the nest, which had been much enlarged, and found that the young ones had returned. I caught one of them, and it was about the size of a dormouse. The old one was busily engaged in gnawing the stems of the green rushes, which for yards round were bitten off. Can any one inform me whether water-rats usually build their nests in the water, and whether they are often seen in pairs?—*J. M. W. F.*

PARROTS BREEDING.—A lady residing near Cromer, in Norfolk, has for some years been in the habit of keeping parrots in a semi-wild state. She has now upwards of twenty, all of which live out of doors all winter, with the exception of one or two of a more delicate species. When I was there in the year 1864, there was one parrot, which had had its toes frozen off, one hard winter and walked on its stumps. It had two white eggs laid in a sort of little coop, something like a dog's kennel; they were pure white, as W. S. J. states. In another part of the garden by the house, a pair had hatched one egg the year before, and when I saw it, it was a fine bird, as healthy as any of the others, and they had then got a nest with another very young bird in it, in a box where they had built the year before. The curious thing was that each parrot had a particular part of the garden to himself, and would not allow any other to intrude, unless he had a mate: they knew the gardener who fed them, and would perch upon his shoulder to be fed; but were suspicious of strangers: they very seldom strayed far.—*E. G. Wheler.*

STONES ON MOUNTAINS.—Can any of your readers enlighten me as to the origin of the loose masses of rough sharp stones which cover the sides and summits of Helvellyn, Cumberland, and other mountains in the vicinity? Not being, to all appearance, water-worn in the least, and occurring, as they do, on the mountain *summits* in as large quantities as in the valleys, I am unable to account for their presence by any natural process; but perhaps some geological subscriber could explain the matter, or direct me to some work where I may obtain information respecting it.—*J. Q., Liverpool.*

COMMON SNAKE.—Can any of your readers state from personal knowledge whether the common snake is found as far north as Yorkshire?—*J. R. D. Bethune.*

THE MORE THE MERRIER.—The enterprising naturalists of High Wycombe (Bucks) are about to publish a local quarterly magazine of Natural History, in which project we wish them success.

THE LOCUST-TREE.—The acacia, or, more correctly speaking, the false acacia, or locust-tree (*Robinia pseud-Acacia*), was first introduced into Europe by Vespasian Robin, forester to Louis XIII., in the year 1635. The original tree, brought by Robin from North America, and planted in the Jardin-des-Plantes, is still in existence, and is now putting forth a few leaves. In 1815 it began to show symptoms of decay, but the branches being lopped, the trunk shot out with redoubled vigour. Mr. Loudon visited this veteran in 1835, and it was then thirty-five feet high, but in its prime it was nearly twice that height. It has now dwindled down, and its worm-eaten and wrinkled trunk is carefully supported by iron bands, so as to prolong its existence as much as possible. The appearance of the leaves is looked forward to with much interest and anxiety by the visitors to the garden, as it is feared that every year may be its last.—*The Builder.*

"IF anybody with ordinary powers of observation and description will go anywhere and relate what he sees and hears faithfully, he can scarcely fail to interest those who listen to him. *It is when people write all out of their own heads that they are dull and incomprehensible.*"—*All the Year Round*, May 12th, 1866.

NOTICES TO CORRESPONDENTS.

ALL communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the PUBLISHER. All contributions, books, and pamphlets for the EDITOR should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus—X 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. ADDRESS No. 192, PICCADILLY, LONDON, W.

C. A. J.—The work on Aquaria will not be ready for some time.

E. H. L.—See notes on "Mounting Polyzoa," in SCIENCE GOSSIP, vol. i. pp. 65, 93, 94.

L. N. P.—Your fungus is the "Nettle Cluster-cups," *Æcidium Urticæ*. See Microscopic Fungi, p. 14, plate 1., fig. 10.

W. T. H. should insert the scientific names of the insects required.

B. S.—*Asplenium marinum* is found at a greater distance from the sea than you name. It is common on rocks near the Lakes of Killarney, but evidently its favourite locality is the clefts of sea-rocks or cliffs.

G. W. G.—Your specimen is one of the starry puff-balls, *Geaster hygrometricus*, certainly not one of the commonest species.

J. R.—There is a common proliferous variety of the double daisy, like the specimen enclosed. The single daisy is sometimes also proliferous. See SCIENCE GOSSIP, vol. i. p. 182.

E. L.—Your specimen was forwarded to our contributor "B."

A. M.—The small red excrescences on sycamore leaves are a kind of gall produced by insects.

S. F. C.—Not in "our line." If we answer one such query, we shall soon have many proposed.

C. A.—No. 1. *Littorina tenebrosa* apparently, but the shells are much covered with algæ. No. 2. *Assiminia Grayana*. You should have stated their habitats; please do so.—*J. E. G.*

E. B.—Your insect is *Chrysis ignita*, "the Golden Wasp." —*F. W.*

R. L.—Your flies are *Bibio Johannis*, so named because the time of appearance is nearly that of St. John's day.—*F. W.*

T. S.—No. 1 is *Andrena fulvicrus*. No. 3, *Bibio Marci*, so named because the time of its appearance is nearly that of St. Mark's day.—*F. W.*

R. W. P.—No. 2 is the Bee Hawk-moth, *Sesia bombyliformis*, I should suppose from your rough sketch. It is always better to forward a specimen.—*F. M.* No. 1 is *Bombylius major*, Linn.—*F. W.*

M. R.—Your green scum is *Euglena viridis*, common in stagnant water.

Geo. F.—No. 1 is Valerian (*Valeriana dioica*). No. 2 is Pepperwort, *Thlaspi arvense*.—*L.*

B. F. M.—It is the Bird's-nest Orchis, *Neottia nidus-avis*, Rich.—*W. C.*

R. W.—Although the small mites found on the corolla of a cucumber in a frame bear a strong resemblance to the *Aropodæ*, which infest the bodies of other insects, I believe they are *Notaspis obscurus*, Koch (*Cont. Panz.*, 132, 5).—*I. O. W.*

T. W. B.—It is impossible to determine a Noctuideous caterpillar in such a shrivelled condition as yours arrived. —*I. O. W.*

W. H. B.—Your orchis is certainly *Ophrys apifera*, Huds. —*W. C.*

R. H. H. A.—We cannot depart from our rule. Postage stamps are not generally regarded as forming any part of Natural History.

J. B.—We are aware that the reasons given by Geo. F. Smith (p. 140) are *not* original, but copied from "Waterton's Essays." It would have been better for him honestly to have stated as much.

AN APOLOGY.—Correspondents who may have looked in vain in the present and past number for their communications must not suppose that consequently we have arrived at unfavourable conclusions regarding them. The fact is, that we have for some time past been in possession of far more "accepted copy" than we have been able to publish. Hence we have been compelled to make a selection, in the hope that at some future time we might be able to print all the communications now in arrear. Whilst thanking our numerous contributors for their hearty and zealous co-operation, we must beg their forbearance if we are reluctantly compelled to postpone their communications and inflict disappointment.

A. L. T.—Nothing extraordinary in the circumstance. The small objects were undoubtedly the eggs of the insect.

E. H. W.—The bivalve was apparently *Pisidium amnicum*, but was broken up, so as not to be easily identified.

T. R. J.—Improved Ball's dredges may be had of Mr. Highley, Green Street, Leicester Square.

E. C. J.—You would find all the information you desire concerning British land shells, &c., in Tate's "British Molluscs." We cannot answer in full questions which a good manual would solve.

W. A. G.—The parasite of *Zootoca vivipara* is a species of Dermanyssus, possibly *D. lanius*, or, more probably, new, but there was only one specimen in the quill, which was carelessly closed.—I. O. W.

EXCHANGES.

ADVERTISEMENTS.—Specimens offered for sale must be inserted and paid for as Advertisements. Only those submitted for exchange or gratuitous distribution can be inserted here free of charge.

SPICULES AND EARTHS.—Ten slides for exchange.—J. A., jun., 12, North-terrace, Clapham, S.

PLATINO-CYANIDE OF MAGNESIA AND SALICINE (mounted) for *Deutzia scabra* or other objects.—J. A., 81, Litchfield-road, Tredegar-square, Mile-end-road.

CARABUS NITENS and *Cicindela campestris* for any other good beetles.—H. Hutchinson, Waring Green, Brighouse.

PUPÆ OF LEPIDOPTERA.—W. T. H., at Mr. Dry's, opposite East-street, Old Kent-road, London.

BIRDS' EGGS for ova, larvæ, pupæ, or imagos of Lepidoptera.—G. T. Porritt, 8, Clare-hill, Huddersfield.

CUTICLES OF LEAVES AND PETALS, also FORAMINIFERA and DIATOMS.—T. Brittain, Fallowfield, Manchester.

ECHINUS SPINES.—Mr. W. A. Lloyd has sent us a few sections for distribution on receipt of stamped envelopes. Address, W. A. L., care of the Editor.

WHALEBONE.—Sections required by T. H. M., 78, Week-street, Maidstone.

EMPEROR MOTH (*Saturnia pavonia*).—Larvæ required for shells or ferns.—E. C. J., Eldon Villa, Redland, Bristol.

BOOKS RECEIVED.

"The Autobiography of a Gossamer Spider," by Michael Westcott. London: Groombridge & Sons.

"The Autobiography of a White Cabbage Butterfly," by Michael Westcott. London: Groombridge & Sons.

"Dr. Gairdner on the Function of Articulate Speech, with a Case of Aphasia." Glasgow: Bell & Bain.

"North Staffordshire Field Club." Reports 1865-6. Hanley: Allbut & Daniel.

"Nature and Art," No. 1, June, 1866. London: Day & Son.

"Sur la Culture des Algues Marines," par M. Cohn de Breslau.

"Report of the Belfast Naturalists' Field Club," 1865-66.

COMMUNICATIONS RECEIVED.—S. J. McI.—C. A. J.—H. E.—B. F. M.—A. M.—J. A.—E. H. H.—J. J. R.—J. A.—E. H. L.—J. R.—T. P. B.—L. N. P.—J. L. B.—H. H.—F. W.—W. T. H.—J. H.—B. S.—E. B.—T. B. W.—E. S.—W. B.—G. W. G.—C. A.—S. C.—R. L.—J. R.—C. A. (Tottenham)—J. G. B.—A. G. N. M.—S. A. S.—E. L.—J. C.—A. M.—G. T. P.—J. G.—S. F. C.—R. C. D.—J. Q.—W. R. T.—P.—B. Melle—J. Y.—R. T. M. A.—G. E. F.—W. A. L.—R. W. P.—J. G. G.—R. H.—A. B. F.—H. E. W.—N. E. C.—A. M.—J. C.—B.—E. H. W.—A. L. D.—J. R.—J. B. A.—H. A. A.—J. M. F. W.—J. R. D. B.—T. W. (Hanwell)—W. R.—E. G. W.—R. H. H. A.—J. F. R.—G. S.—W. A. G.—E. C. J.—S. H.—T. D.—C. K.—H. W.—G. F.—J. P.—W. H. E.—D. C. T.—F. H. M.—J. B.—W. E. W.—O. W. T.—J. G. W.—J. A. M.—W. B.—H. T. K.—H. E. W.—W. H. G.—F. A. A.

LADYBIRDS.

> Ladybird, ladybird, prythee begone;
> Thy house is on fire, and thy children at home.

THIS interesting family of Coleopterous insects (Beetles) enjoys a greater popularity than any of its allies, their domestic habits and pretty appearance attracting the attention of the juvenile population, and their many virtues endearing them to persons of riper years. In most countries they have received pet names. In France they are regarded as sacred to the Virgin, and are called *Vaches à Dieu*, or *Bêtes de la Vierge;* and with us, Ladybirds, Ladycows, and in Norfolk, "Bish - a - barna - bee," the latter cognomen being preserved by children in the chant wherewith they greet the appearance of these insects:—

> Bish-a-bish a barna bee,
> Tell me what the matter be;
> If it be to fly away,
> Then come again another day.

Professor Westwood has given an interesting popular summary of these little creatures in his "Introduction:"—

"The general colours are red or yellow, with black spots, varying greatly in number and size; or black, with white, red, or yellow spots. As, however, the union of individuals of opposite colours is of constant occurrence, the difficulty of investigating the species may be easily imagined. M. Audouin has published some interesting notes upon this subject, which appear to show that the result of the union of allied species in this group are sterile eggs. When alarmed, they fold up their legs and emit a mucilaginous yellow fluid from the joints of the limbs, having a very powerful and disagreeable scent, and which, according to some writers, is an admirable specific against the toothache. They creep but slowly, but fly well; are abundant in our gardens and plantations, where, both in the larva and perfect states, they are very serviceable in destroying the aphides upon various plants. And, inasmuch as they occasionally appear in such swarms as to attract public attention, the injury done by the aphides is, by ignorant persons, attributed to the more conspicuous *Coccinellidæ*. The eggs are deposited in small yellow patches in the midst of the plant-lice; so that the larva, when hatched, is in the midst of its food. The larva is depressed, and somewhat of an elongate-ovate form and fleshy consistence, having the three anterior segments the largest, and the abdominal segments tubercled and spotted, and emitting a fluid similar to that of the imago from the tubercles. When full grown, it attaches itself to a leaf by the extremity of the body, casts off its larva skin, which is collected in a mass at the tail, *within* which the pupa also remains attached in this state." *

The great service which these insects render to man in the destruction of plant-lice is illustrated by a circumstance related by Kirby and Spence:—

"In 1807 the shore at Brighton and all the watering-places on the south coast was literally covered with them, to the great surprise, and even alarm, of the inhabitants, who were ignorant that their little visitors were emigrants from the neighbouring hop-grounds, where, in their larva state, each had slain his thousands and tens of thousands of the aphis, which, under the name of the *fly*, so frequently blasts the hope of the hop-grower. If we could but discover a mode of increasing these insects at will, we might not only, as Dr. Darwin has suggested, clear our hothouses of *Aphides* by their means, but render our crops of hops much more certain than

* "Introduction to Modern Classification of Insects," vol. i. p. 396.

they now are. Even without this knowledge, nothing is more easy, as I have experienced, than to clear a plant or small tree by placing upon it several larvæ of *Coccinellæ*, or of aphidivorous flies collected from less valuable vegetables."

And in another portion of the same work the author says:—

"As the locust-eating thrush accompanies the locusts, so the ladybirds seem to pursue the aphides; for I know no other reason to assign for the vast number that are sometimes, especially in the autumn, to be met with on the sea-coast, or the banks of large rivers. Many years ago, those of the Humber were so thickly strewed with the common ladybird, that it was difficult to avoid treading on them. Some years afterwards I noticed a mixture of species, collected in vast numbers, on the sand-hills on the sea-shore at the north-west extremity of Norfolk. My friend, the Rev. Peter Lathbury, made long since a similar observation at Orford, on the Suffolk coast; and about five or six years ago they covered the cliffs of all the watering-places on the Kentish and Sussex coasts, to the no small alarm of the superstitious, who thought them forerunners of some direful evil."

The *Reading Mercury* informs us that the authorities of a Berkshire town were alarmed in October, 1835, by a most formidable invasion of these beautiful insects, and that the parish engines, as well as private ones, were called into requisition, with tobacco-fumigated water, to attack and disperse them.

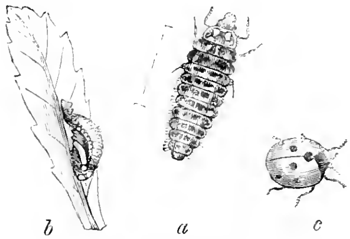


Fig. 156. Ladybird (*Coccinella 7-punctata*). *a*, larva; *b*, pupa; *c*, perfect insect.

Curtis informs us that the ladybirds hybernate and pass the winter in the crevices of paling and trunks of trees under loose bark, in dry leaves, on the ground, &c., and are therefore ready on the shortest notice to come from their hiding-places, from which they are allured by the sunny days of December, and on the approach of spring are amongst our first vernal visitors, when the female lays her little eggs beneath leaves, close together, in clusters of about fifty. They are cylindrical, buff-coloured, and set on one end; from these, little sprawling larvæ soon issue, of a lead colour, gaily ornamented with orange or scarlet spots, and are soon spread over the leaves of trees, palings, grass in fields; indeed, everywhere in the vicinity of the plant-lice, to which they are much more formidable than their parents. Their method of attacking the aphides is curious. I have seen one of these struggling, whilst this little insect alligator threw his forelegs about it, and was greatly amused at the skill it exhibited; for, fearing that the aphis might escape, it gradually slid along to the wings, which were closed, and immediately began to bite them, so that in a very short time they were rendered useless, being matted together; it then returned in triumph to the side of its helpless victim, and seizing the thorax firmly in its grasp, it ate into the side, coolly putting its hind leg over those of the aphis, whose convulsive throbs annoyed its relentless enemy. These larvæ are full-grown in about a fortnight or three weeks, when they are from a quarter to a third of an inch long and upwards; they are then slate-coloured and yellow, with numerous black spots and hairy tubercles down the back, intermixed with a few scarlet spots. They soon retire to a leaf or some secure locality, and attaching themselves by the tail, change to pupæ of a shining black colour, with a row of orange spots down the back. Thus they remain during another fortnight or three weeks, when the inmate bursts through her cell, and appears again a perfect ladybird.

THE END OF ODD FISHES.

SEVERAL observers had noticed certain remarkable appendages, as of frequent occurrence on individuals of most of the species belonging to the genus *Aspredo*. In the "Règne Animal," we find Cuvier alludes to them "as globules, which appear to be their eggs, adhering to the thorax by pedicles." Bloch also observed them, and not clearly understanding what such an unusual accumulation of strange-looking pores meant, described a species of the six-barbled Aspredo (*A. sex-cirrhis*) as being new to science, naming it *Platystachus cotylephorus*. In the *Histoire Naturelle des Poissons*, we read, "I have never seen them in the males, and the females do not possess them at all seasons." Here the author clearly imagines these appendages mark some peculiar condition of the female, an assumption more recent investigations prove to be quite correct.

The *Aspredo batrachus*, or toad-like Aspredo, is not by any means attractive as an object of beauty; the upper jaw, broad and flat, projects far beyond the lower, the eyes are small, and the ugly unkissable-looking mouth is further—I cannot say adorned, supplied will do—with eight long fleshy pendants, barbels or beards in other words, which dangle, like living fishing-lines, from different parts of this odd and ugly fish's face. Two barbels spring from the maxillary; these are dilated at their bases into broad ribbon-like membranes, from each of which sprouts a single baby-barbel; 'a third pair grow from each corner of the mouth; and the fourth pair originate a short distance behind the third.

The ladies Aspredo are alone concerned in nursing their progeny, and on females only are the curious "fish-cradles" found, so specially contrived for the conveyance of the eggs. Dr. Gunther (to whom belongs the honour of first clearly pointing out the use of this obscure structure) says,* "The ovaria of the fish examined are two nearly empty sacs, with thick walls, as if the ova had just been excluded; some of *them* which had not been developed still remained between the folds of the interior. The whole lower surface of the belly, thorax, throat, and even a portion of the pectoral fins, showed numerous shallow round impressions, to which a part of the ova still adhered." Perhaps the reader has borne in mind what I said in a previous number in reference to the strange similitude there is betwixt the cellular-like cavities found on the back of the Surinam toad when compared to those on the under surface of the female Aspredo. Towards the time of spawning, the skin covering the lower parts of the female Aspredo becomes thickened, and assumes a spongy character. The spawn or ova are in all probability deposited, in the manner usual with most fishes, on a mud bank or in some other suitable locality. Then the mamma presses herself on the extended mass of roe, and in that way squeezes the eggs into the soft sponge-like skin of the abdomen; the throat and fins are also made available for the conveyance of the eggs. The spongy substance between the eggs is subsequently gradually absorbed by the pressure of the latter, excepting in the interspaces, where it remains in the form of the appendages previously described. What becomes of the infant fishes when they escape from this novel hatching-machine is not known. The only described species—as far as I am aware—of this genus have all been brought from the river Gambia.

Many other species of Siluroid fishes take care of their progeny in different ways. The male (*Arius fissus*), it seems, carries a small cargo of eggs in its mouth. Dr. Gunther describes his finding two males whose stomachs were empty (hence it is fair to assume they were not in the act of devouring a breakfast of new-laid eggs). In the mouth of each fish, however, were about twenty eggs, "larger than a pea, perfectly uninjured, and in a forward state of development."

Europe possesses but one species of the Siluridæ, the *Silurus glanis*,—"*glanis*, a crafty fish, which bites away the bait without meddling with the hook," writes Pliny. Sly soever as it may be, nevertheless it shows some remarkable traits of parental instincts; papa and mamma *sly Silurus* both taking an active part in protecting their numerous children after they emerge from the eggs. The *Sudas gigas*, a Siluroid found in the large rivers Amazon and Negro, and that, according to Schomburgk, attains to a weight of two hundred pounds, regularly bolts its entire family if apprehensive of danger. The roe is never deposited, but the young escape from the eggs whilst contained in the ovarium, and make their way into the cavity of the abdomen, where the hatching is completed. When sufficiently matured to risk an independent life, the numerous offspring issue forth, and, like a pack of aquatic hounds, swim in close companionship immediately above the mother's head. Should an enemy suddenly attack the little assembly, or other danger menace their safety, then, like an immense gateway, the mother's mouth spreads open, and *presto*, pass, in go the infant fishes, slam goes the gate, and safe as in a castle with drawbridge up and portcullis down, the fry lie ensconced in the chest of their mother.

The *Gillbakra*, a marine Siluroid, and the *Zamlau*, from the rivers of Guiana, in a like manner swallow their families and vomit them up again on the disappearance of danger. The latter fish is esteemed a great delicacy by the natives inhabiting the districts wherein it is found; but nevertheless catching it is a service of extreme danger. When hooked, the monster quietly swims off with the canoe and its freight of fishermen quite as easily as a Thames tug-boat paddles away with a long fleet of coal-barges; and as these rivers appear to be broken into numerous waterfalls, over which the "Zamlau" does not in the least mind taking a header—rather likes it than otherwise—the sport, to my fancy, must be far too exciting to be pleasant.

The "Hard-back," a fish belonging to the genus *Callichthys*, which is found along the coast of Guiana, builds a regular nest of leaves and grass-stalks, in holes in mud-banks not very far below the surface of the water; into these fish-nests the roe is placed. The eggs once safely deposited in the nest, let all fishes or other egg-loving enemies stand clear of the watchful mother; she never goes far from the nest, and is ready at any moment to do battle with friend or foe, if either dares approach her sacred charge.

Sir R. Schomburgk tells us that these fish ascend the trenches intersecting the sugar estates in spawning season, where they are easily taken in baskets placed near the nests. The male fish also aids in protecting the young. The nests are easily discoverable, as above each, a little patch of froth invariably accumulates on the water. The parent fishes, however, often fall victims to darkey cunning, from the fearless fury they display if their nests are interfered with The negro places both his hands under water, and gradually brings them towards the nest; the enraged fish dashes at the hands, but only to find itself deftly clutched in a living trap, from which it seldom escapes.

Another singular instance of a nest-building fish

* Brit. Mus. Cat.—Fishes, vol. v. p. 173.

is found in one of the Zalyrinthici, known as the Gourami (*Osphromenus olfax*) of ichthyologists. In the "Zoological Journal" (iv. p. 309), we find a very interesting account of this fish from the pen of General Hardwicke, who paid particular attention to their habits during his residence in the Isle de France. Where water-grass grows thickly, and spreads its green flag-like leaves over the still water of either pool or tank, there the Gourami, at its breeding season, is sure to be met with. These grass culms the fish manage to entangle and twist together, to form a kind of verandah, under which their all-important domestic duties may be carried on safe from prying eyes. The roe deposited, both male and female hover round their treasure, and fight furiously with any prowler that from design or by chance ventures near. After some time, usually about a month, the young fish emerge from the eggs, and as a hen guards her chickens, in like manner the Gourami keeps untiring watch and ward over her baby-brood until they are old enough, and able to shift for themselves.

I could adduce numerous instances of other nest-building fishes. The little sticklebacks, known to every schoolboy, are familiar examples; but as the habits and systems of stickleback nest-building were ably recorded and illustrated in a previous number of Science Gossip, anything I could say would be but useless repetition.

To the angler, who is only an angler as a sportsman, and all honour to him too, but who does not care to be a naturalist as well, a fish is only a fish, against the cunning of which he pits his skill in arts of deception, whether with artificial fly, worm, spoon-bait, or what not, and regards the object of his pursuit only in reference to its value in the matter of size, or as to the sport it may afford. Should the successful angler, or any one else, have the results of his day's fishing set before him in quite another phase—one which appeals to his mind *viâ* his palate, he probably then thinks little more of a fish than as something to be eaten, very delicious, and beyond all praise. To the ichthyologist, a fish, whether it leaps at the gaudy fly, or swallows the tempting bait offered, to lure it, as a sporting fish ought, or whether it be as toothsome and appetizing as the "venison of the sea," or glorious red mullet, which made Quin desire a throat as long as Lombard Street, and every inch a palate: in a word, be the fish's qualities what they may, good, bad, or indifferent, to him, ichthyologically, it is only a cold-blooded animal, possessing a vertebra, gills instead of lungs; fins and scales in lieu of feet, fur, or feathers; spending its life in the water, and developing its young from eggs.

Under all three aspects, by all and every means, think of a fish, if your tastes and inclinations lead you, my young friends, so to do; but what I have sought to do in writing about "odd fishes," is to bring before you certain members of the scaly tribes, in which there are other qualities entitling them to every consideration, beyond those embodied in a strictly ichthyological, gastronomical, or piscatorial point of view; hoping thereby that you may be induced to dive deeper into the countless mysteries to be found in all God's creatures, from the Diatom to the Elephant, if you will but look for them; to discover for yourselves the uses, as well as the structure of, unfamiliar appendages and anatomical peculiarities. Everything, depend upon it, has a use, and we may sit in the studio and think over it for an indefinite time, and after all be none the wiser; but ramble into the haunts and home of the beast, or whatsoever form of life it may be that so puzzles you, play the spy upon its actions, learn its habits, and it will aid you more, even though only a few days be devoted to such observations, than will whole years of indoor study. Who, I ask, would ever have given a *fish* credit for being the embodiment of a home-loving, nest-building, egg-carrying creature, discharging every parental duty in a highly exemplary and praiseworthy manner, unless our finny friends had been visited when at home, or, better, transferred to places wherein their habits could be watched, and what they did recorded from day to day?

There are hosts besides, quite as "odd fishes" as those I have referred to, and if I have succeeded in inducing any of my younger readers, by thus administering a wholesome stimulus to curiosity, to trace out the oddities of odd fishes for themselves, my aim is attained. I. K. Lord, F.Z.S.

The Importance of Immediately Recording Observations.—A pretty long experience in such matters has convinced me that they act wisely and well who, having used their opportunities to the best of their power, communicate the results of their observations to the world without waiting for a period (never perhaps to arrive) when they may themselves have the credit of completing and perfecting them. It is better, whilst the freshness of recollection is undimmed, and the mind is in a position to draw a correct parallel between older and quite recent observations, and thus to give our descriptions the necessary development, to throw into them whatever there may be of value in our peculiar experience or habits of investigation, and frankly to invite our fellow-labourers to do in our stead what we would gladly have done but for some inevitable want of health, leisure, or opportunity. Were this course more generally followed in the sciences, both of observation and experiment, I am persuaded that by grasping at less we should attain more—even in personal reputation—and should unquestionably advance the interests of knowledge. —*Professor James Forbes's "History of Norway and its Glaciers."*

CULTIVATION OF FERNS IN WARD'S CASES.*

"THE case may be constructed of any shape or size, according to taste or means; it can be square or round, an octagon or hexagon; the roof may be a dome, span, or sloping, but by all means avoid a flat one; and be the shape whatever it may, the design should in every point be neat, and not of such an ornamental description as to be more attractive than the plants. A very good, interesting collection may be grown in one 3 ft. long by 1½ ft. in width, and 2½ ft. high; it will have the best appearance if the sides are constructed with single squares of glass; but if divided, it must not be into more than three, as many divisions spoil the effect; the ends should be made to open, to enable any dress-

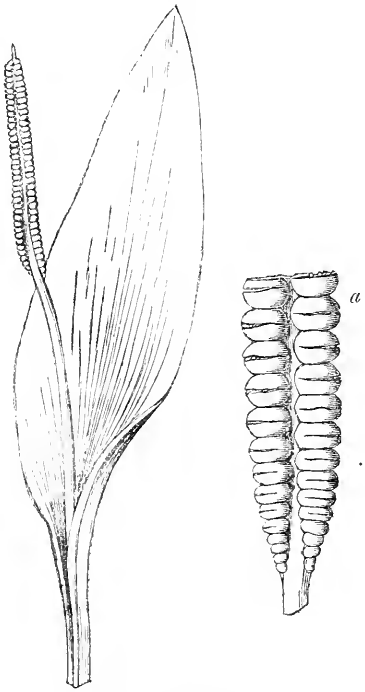


Fig. 157.—*Ophioglossum vulgatum*. *a*, Portion of fertile spike enlarged.

ing or removing of old fronds to be done conveniently, and a small piece of perforated zinc should be inserted in the apex of the roof at each end, which will assist in preventing the almost universal complaint, that the plants cannot be seen for condensed water on the inside of the glass: this is caused by the variation of temperature. If the case stands in the sun or becomes warm inside during the day, and retains the heat, whilst the temperature of the room may fall considerably during the night, the cold air, acting upon the glass, condenses the warmer vapour inside and obscures the plants. By the introduction of the above-named remedy, the temperature is more equally balanced, and the plants are always to be clearly seen. Should the air outside become very hot and dry, it will be advisable to close the ventilators for a short time during the day. The glass

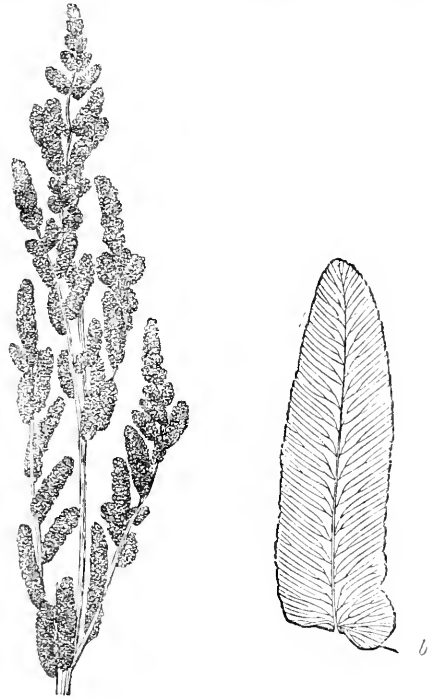


Fig. 158.—Royal Fern (*Osmunda regalis*). *b*. Portion of frond.

case should be entirely independent of the soil-box, but to fit the inside, resting in a groove or rabbet. The box should be about 6 in. deep, and may be made of zinc, brass, or wood lined with gutta-percha

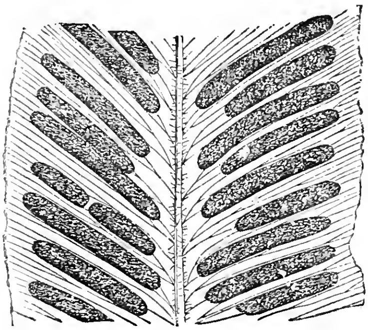
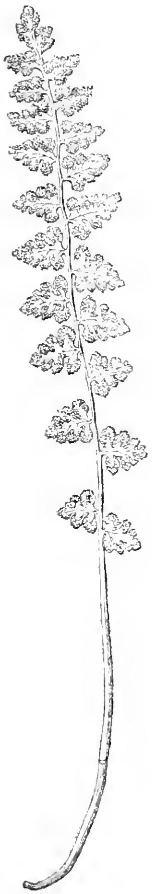


Fig. 159. *Scolopendrium vulgare*.—Portion of frond.

or zinc; but metal of any kind in contact with the earth or air in which plants are grown is not genial to either their roots or foliage. I have always found

* Ferns, British and Foreign. By John Smith, A.L.S.

the plants succeed best in a neatly-made wooden box lined with pitch, having a small tap or cock in one corner of the bottom, for letting away any excess of water; but this will not be necessary if proper attention is observed in supplying the plants with a sufficient amount of water at one time, which, in consequence of little or no evaporation taking place, will be seldom required. This knowledge can only be gained by practice; many amateurs' failures with Ward's cases being caused mostly by giving too copious waterings at certain stated intervals.



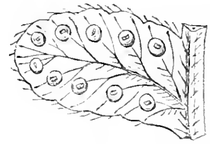
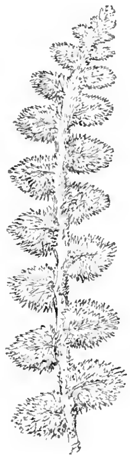


Fig. 160. *b.*



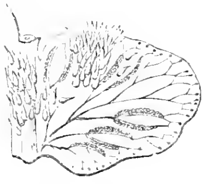


Fig. 161. *b.*

Fig. 160. *Woodsia ilvensis.* *b.* Portion enlarged.

Fig. 161. *Ceterach officinarum.* *b.* Portion enlarged.

"The height of the stand must be regulated according to whether the plants are to be viewed in a sitting or standing position; for the former the ordinary height of a table is a sufficient guide, and for the latter a few inches higher, so that the plants can be seen through the side glass rather than from the top. In preparing the box for the plants, about one inch of its depth should be filled with sand or other drainage material, such as is already explained in pot-culture—but in Ward's cases this is only necessary as a precaution against an over-supply of water,—the rest filled with soil, which should be good fibry peat and silver sand, intermixed with pieces of sandstone broken small, or (if peat cannot be procured) good light loam. Having proceeded so far, two systems of planting the case present themselves.

"The first plan is to plant in the soil, which should be raised in the centre; the number of plants will depend on the size of the box, and care must be taken not to plant them in too crowded a manner, the distance apart depending on the size and nature of the plants; but in no case should they be closer than six inches. The second method is to have the plants established in 4 to 6-inch pots, plunging them in the soil sufficiently deep to hide the rims of the pots. The last system has one decided advantage, namely, should a plant die or does not succeed, it can be removed and replaced without disturbing its neighbour.

"It must be understood that the above mode of planting relates to plants with erect vernation only,

b

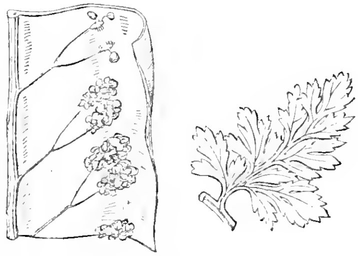


Fig. 162. Parsley Fern (*Cryptogramme crispa*). *b.* Portion enlarged.

but those with creeping rhizomes, that form cæspitose tufts, require to be planted each on a separately raised hillock, of which, if the case is large, there may be a series, and for the creeping *Hymenophylla* lumps of porous stone are very suitable; fine patches may be obtained in this way, not only of *Hymenophylla*, but also of other small species. After the ferns are planted, some small-growing *Selaginella*, such as *S. apus*, may be pricked in over the surface of the soil, in pieces a few inches apart, which will soon cover it, and give to the whole a neat and finished appearance, and also materially assist in maintaining the proper state of moisture in the air of the case and about the plants. The planting being now completed, the soil must be brought to a uniform state of moisture: this is best accomplished by two or three moderate waterings at intervals of half an hour, and when thoroughly drained, the case may be closed and placed in position. To make cases, ornamental pieces of marble, shells, &c., are often introduced; but this should not be tolerated, as they do not harmonize with the occupants of such a structure.

"For *Hymenophylla* it is necessary they should be sprinkled overhead occasionally. To enable this to be done, the tops of all small cases should be moveable, and in large ones a hinged pan is required. A sponge, or small thumb-pots filled with water and placed out of sight, will greatly assist in keeping a moist atmosphere, which is so essential for the health of these filmy-leaved plants. If the cases stand in a room where a fire is regularly kept in the winter, a great many tropical species may be grown, and in situations where they stand exposed, such as balcony windows, halls, &c., care must be taken, as winter approaches, that the soil does not become frozen, such being very detrimental to even the hardiest ferns. Hot bricks and bottles filled with hot water have been resorted to as a preventive against frost, as also for maintaining a proper temperature for tropical species; but unless the bottom of the case is constructed for that purpose, and arrangements made for this mode of heating, to be strictly and regularly attended to, it had better be dispensed with. Should the case be exposed to the direct rays of the sun during the summer, it must be shaded, and care taken that the temperature inside does not become too high: it should not exceed 70°. This will be assisted by placing the shading material at some distance from the case."

[To the above account Mr. Smith subjoins a list of ferns suitable for cultivation in Ward's cases. The woodcuts of British ferns inserted in this extract are from the same work.—Ed.]

ON THE MICROSCOPIC USES OF CANADA BALSAM.

LIKE all other microscopists, I soon found that Canada balsam was a great difficulty. It has been well called the *pons asinorum* of the young microscopist. I got hot-water stands and spirit lamps, so that I might have my balsam and slides of the same temperature; in fact, I did everything that the best authorities recommended. I went on working day by day, hoping against hope, as the air-bubbles danced about my objects, spoiling them for ever. After some twelve months' experience I got so far successful, that I could calculate upon having about fifty per cent. of my slides free from air-bubbles. The rest, frequently containing many darling objects, were lost for ever. It was, however, sometimes possible to re-mount a valuable object; but the effort was rarely successful. I now began to turn my attention to opaque objects of various kinds. Now this was a very simple affair. A bit of cardboard, gummed on the glass, and covered with black paper, made a perfect cell. Every object was successfully mounted, and, as I supposed, would last for ever. After the lapse of a certain time, I cannot say how long, I was running over my opaque objects, when I found them covered more or less with a very interesting chain-like fungus. At first I did not anticipate much evil from this little visitor, but I was soon undeceived, for I found to my great regret all my opaque objects were being slowly but surely destroyed. Now the question was, how to get rid of the fungus? the obvious reply being,—keep out moisture; or, in other words, have a perfectly air-tight cell.

After many experiments with iron and glass, with varnish, marine glue, &c., I have, I believe, hit upon the right thing at last, and that is, a cell ground out of the middle of the glass slide, or *in* the middle of the slide into which the object is placed, the glass cover of which cell is fastened down by Canada balsam. The cell should be rubbed, so as to expel any remains of moisture which might otherwise be there. In putting on the cover, a *very small* quantity of balsam should be applied to the edges of the cover, and the cover pressed down with the finger during the operation. A fine-pointed bit of wood is the best instrument to use in applying the balsam, and a little practice will make the work easy and successful. Some balsam will, by capillary attraction, get betwixt the cover and the slide, but it will not enter the cell, except too much balsam has been used. This must be carefully avoided. Besides, it is essential that the balsam should be allowed to dry gradually, and that no attempt should be made to dry it by artificial heat; for if this be done, vapour will be generated from the turpentine in the balsam, and the beauty of the object gone. I am at present mounting Foraminifera in this way very successfully.

It may occur to some person, that if I mount small objects in a glass cell, they will roll about and break. To this objection I have found the remedy. Before placing my object in the cell, I just moisten the bottom of the cell with spirit of turpentine *very slightly*, and then carefully place my object exactly in the position I wish it to occupy. I allow the slide in this state to remain uncovered about two days; by this time the turpentine has escaped, and left a thin layer of balsam in the cell, by which the object is kept in its place.

If the object to be mounted be a comparatively large object, a minute quantity of the balsam should be placed in the cell, and the object carefully placed upon it. To meet the objection as to the expense of these ground-glass slides, I may say that I can get any quantity at ninepence a dozen.

Several years back I found out a method of mounting transparent objects in balsam with so much success, that I rarely now have a failure; indeed, never, when proper care is taken. The secret is in using cold balsam. Hairs of all kinds, insect preparations, or any other such objects, can be mounted free of air-bubbles in this way. Let the object be first thoroughly saturated in spirit of turpentine. First, put a small quantity of balsam on the slide, then, the object from the turpentine, which press gently into the balsam; cover this with another layer of balsam, then put on the glass cover in a slanting direction, avoiding hard pressure. The object, now mounted, may be surrounded with air-bubbles, but on examination they will be found to be moving away from the object. All that is now wanted is patience. Leave the slide for a few days, and all the air-bubbles will have taken their departure. For the better preservation of the object, it is desirable to let it harden without the application of artificial heat.

Thomas Brittain.

VEGETABLE CATERPILLARS.

Our paper on this subject in a former number (page 127) was necessarily too brief and fragmentary to give information concerning exotic species. This circumstance has brought us into correspondence, more especially with regard to the New Zealand species, and induced us to furnish a few additional notes on the subject. We have already stated that two species have been found in New Zealand. To one of these (*Torrubia Robertsii*) the chief remarks of our correspondents relate. A young officer, returned from a long residence in New Zealand, where he has made this subject his study, has evidently begun at the wrong end, and consequently fallen into serious error. He should first have studied entomology, or at least the prominent features in the structure of hawk-moths (*Sphingidæ*), and then his researches would have produced more satisfactory results. "My theory is," he states, "that many of the same caterpillars under different circumstances turn into the chrysalis state, and then into moths, and that in every stage you can trace the germs of the growth, which in one case is like a bulrush, in the chrysalis like a round handle (fig. 163, *b*), in the moth like a long tongue or feeler coiled up under the mouth, and in the living caterpillar (or what the Maoris consider so) a small horn at the tail (fig. 163, *a*). Some of the caterpillars that come to perfection, and have plenty of food, burrow and become chrysalids; but others living on high trees (*Rata*), under which they are always found, fall to the ground, and finding no food among the dead leaves in the bush, follow their natural instinct and burrow; but as they are not ready to turn to the chrysalis state, die, and then the fungoid growth commences."

The whole of this beautiful theory, being based upon an assumption which is evidently erroneous, crumbles away. The living caterpillar with its horn, the "handle" of the chrysalis, and the long proboscis of the imago, are just sufficient to assure us that a *Sphinx*, similar to our *Sphinx Convolvuli*, has in its perfectly natural condition been mistaken for the development of the fungus which in reality establishes itself on the caterpillar of a species of

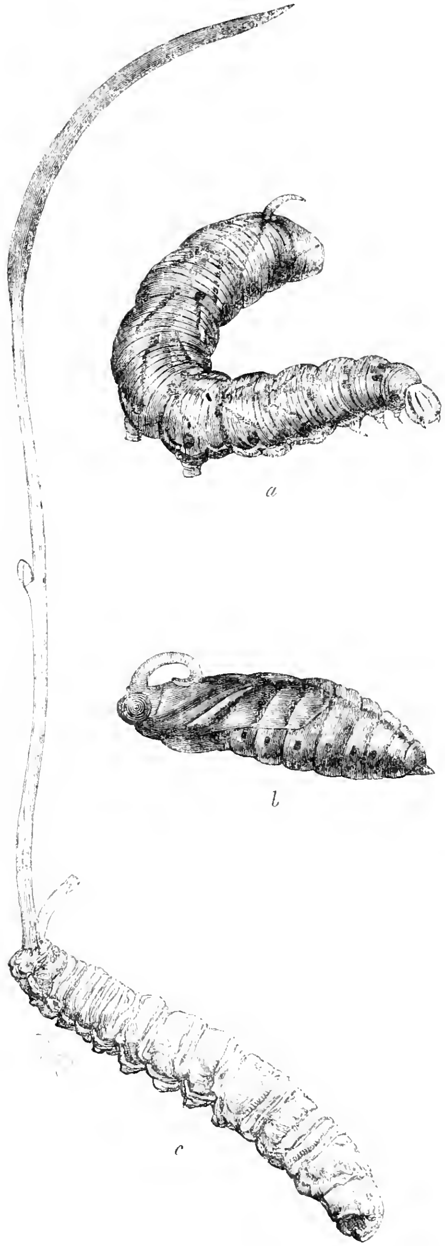


Fig. 163. *a*. Caterpillar of a Sphinx; *b*. Pupa of a Sphinx; *c*. *Torrubia Robertsii* on the caterpillar of *Hepialus virescens*.

Hepialus. Any amateur entomologist will at once recognize the error. A quotation from the same gentleman's journal is, at first, more strictly confined to facts, and consequently of more interest:—

"January 9th.—I and a Maori have just dug up a vegetable caterpillar from under the roots of a 'rata.' There are lots of them just here; he is digging for a third. He says they go under ground in February, and it takes years for the vine (or tendril fungus) to grow to its full length. The tendril appears about four or five inches above the ground generally, but often much more. The whole length of the largest tendril I saw to-day was about nine or ten inches. Some of the caterpillars appeared much fresher than others. The end of the tendril is like the velvety-looking part which grows from the centre of an Arum flower, or the end of a reed (*Typha?*), and tapers off. The caterpillar itself lies close under the root of the 'rata'; the soil where we found them to-day was the ordinary good bush soil. I afterwards went with the native to see what he said was the living caterpillar before it buried itself: there seemed plenty of them in the Kumari's leaves at Pokinhoe. They were green and black, with a horn at the tail, from which he said the tendril grew. Went in the afternoon and dug up half a dozen. There seemed to be any number growing about where we found the first this morning. I am sure the longest tendril was quite a foot long."

The supposition of the growth requiring years, and the repetition of the connection between the buried caterpillars and those of a *Sphinx* must be discarded. It is, however, only just, in this connection, to quote the remarks of Dieffenbach, who has fallen into the same error in his "Travels in New Zealand." He says it is called "Hotete" by the natives; and in his appendix, under the name of *Sphinx*, states: "The caterpillars feed on *Convolvulus Batatas*. The *Sphæria Robertsii* is found parasitical on this caterpillar, which only occurs at the roots of the 'rata' (*Metrosideros robusta*)."

Let us refer to the account given by Dr. Hooker of this same production, in a letter quoted in the *Journal of Botany*, p. 209 (1841):—

"About *Sphæria Robertsii* I collected all the information, and as many specimens as I could, but am still much at a loss to account for its development. They are found in spring, generally under tree-ferns; the caterpillar is buried in the ground, as is the lower portion of the fungus. Now both these fungi (that is, the present and *Torrubia Taylori*, another Australasian species) belong to caterpillars which bury themselves for the purpose of undergoing the metamorphosis; and both Mr. Taylor and Mr. Colenso hold the same opinion, that in the act of working the soil, the spores of the fungus are lodged in the first joint of the neck, and the caterpillar settles head upwards to undergo its change, when the vegetable develops itself. I do not remember you have remarked in your 'Icones' that the entire body of the insect is filled with a pith, or corky vegetable substance, and that the intestines are displaced, which my specimens in spirits show well, and then what does the muscular fibre of the animal become? It must, I suppose, be all turned into vegetable, for the skin of the creatures remains quite sound all the time. This change may take place from the displacement of one gas and development of another; it also occurs in the dark, and is hence somewhat analogous to the formation of fungi on the timber-work in mines. However this may be, the whole insect seems entirely metamorphosed into vegetable, with the exception of the skin and intestines."

A note appended to this extract states that Mr. Dieffenbach determined the moth to which the larva belongs to be *Hepialus virescens*, whereas we have shown that this gentleman regarded it as a *Sphinx*. From another source we gather, on the authority of Dr. Jonathan Pereira, additional information on this point:—

"Dieffenbach suggests that the insect is a species of *Sphinx* which feeds on the 'sweet potato;' but the absence of any spine or horn on the last segment of the larva is an objection to this suggestion. Mr. Doubleday thinks that it may be *Hepialus virescens*, which is found at the root of the rata tree. He has a caterpillar apparently identical with that on which the fungus grows, and which is believed to be the larva of *Hepialus virescens*." *

There is one discrepancy in Dr. Hooker's account which we cannot at present understand in so excellent a botanist, inasmuch as he declares that the infected caterpillars are found under tree-ferns, whereas in all other accounts the "rata" is named, and this is further strengthened by a passage in the "Report of the Royal Society of Tasmania for 1851," p. 289:—

"Major Last states that it is chiefly, if not exclusively, under and above the roots of the 'rata' (*Metrosideros robusta*) that the plant caterpillar, *Sphæria Robertsii*, is met with."

In the first instance we were doubtful whether our correspondent had not found another species of vegetable caterpillar, but this doubt was soon dispelled on receiving from him a veritable specimen of *Torrubia Robertsii* (often called *Sphæria Robertsii*),† together with the sketches of caterpillar and pupa, from whence our figures are derived.

The other New Zealand species of parasite occurs on the pupa of a *cicada*, and is the *Cordyceps Sinclarii* of Berkeley, and the *Torrubia cæspitosa* of Tulasne. C.

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* *Pharmaceutical Journal*, vol. ii. p. 592 (1842-3).

† We may observe that this curious production is figured and described in Hooker's "Icones Plantarum," vol. i. pl. 11; in the "Transactions of the Entomological Society of London," vol. iii. pl. 4; in Lindley's "Vegetable Kingdom," fig. 25; in the "Pharmaceutical Journal," vol. ii. p. 593, fig. 3; in Hooker's "Journal of Botany," vol. iii. pl. 1, fig. A; and under the name of *Sphæria Hugelii* in Corda's "Icones Fungorum," vol. iv. pl. ix. fig. 129.

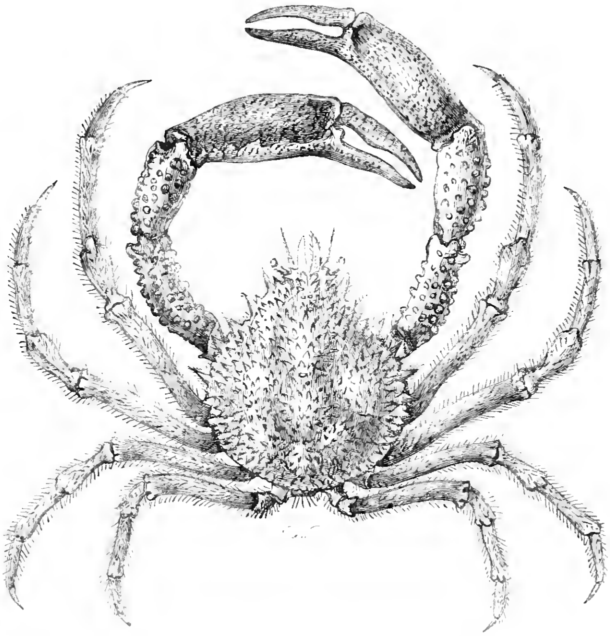


Fig. 164. Spiny Spider Crab—(*Maia Squinado*).

SPIDER-CRABS AND THEIR PARASITES.

THAT excellent naturalist Mr. Edward Jesse, in a short article entitled "The Spider-Crab," in "Once a Week" (July 9th, 1859), says:—"There is a very small species of crab at Bognor, the spider-crab, which has its body and claws covered with numerous minute hooks, scarcely perceptible to the naked eye, but perfectly so with the aid of a magnifying-glass. It may be asked 'What are these hooks?' You shall hear. This crab is a prodigious coxcomb, and very careful of its own precious person. Either for the purpose of concealing itself from its enemies, or from an innate love of finery, it selects a quantity of seaweed, always preferring the most gaudy colours, those chiefly red. Having selected them, he cuts them into fine thread-like strips, and runs them through the hooks. When he has completed his toilette, he appears one mass of seaweed, thus not only disguising himself from those enemies which might otherwise make him their prey, but perhaps feeling himself the best-dressed crab in the neighbourhood. It is also remarkable that this labour for making his toilette is renewed every morning, so that the quantity of seaweed consumed is very great. This may be observed by any-one who has the opportunity of keeping these comical little crabs in an aquarium, although I regret to add that they do not live long in a state of confinement." Mr. Jesse says that he wrote this from his own observation, though the discovery of the crab's habits was made by some friends of his. The paragraph I have quoted "went the round of the papers" at the time, and I, who then kept an aquarium shop in London, was soon favoured with many orders for "the Vanity Crab," "the Dandy Crab," "the Crab that togs himself out in seaweed," and so forth. Mr. Jesse adds "they are caught in considerable numbers at Bognor, together with another crab, about the same size as the spider-crab, but which is not furnished with hooks. On speaking to the Bognor fishermen respecting the latter, I found they all entertained the idea that the seaweed grew on them. The thread-like weeds may, however, be drawn out of the hooks one by one, until the little dandy is left perfectly bare."

However, the fishermen were right, and Mr. Jesse and his friends were wrong, for the seaweeds *do* grow upon the shell of the crab, and are *not* temporarily attached, as Mr. Jesse describes. It is probable that the Crab referred to is the four-horned spider-crab (*Pisa tetraodon*), and Professor Thomas Bell, in his "History of British Stalk-eyed Crustacea" (8vo. 1853, pp. 24, 25), treating of this Crab (which is eminently a Bognor species, by the way), says "it is found concealed under the long hanging fuci which clothe the rocks at some distance from the shore. . . . Like all slow-moving Crustacea, they are liable to be covered with small fuci,* so that they are sometimes completely covered by a mass of these marine plants growing upon their surface, where their roots find a secure hold amongst the villous coat of the shell and limbs. Say supposes that the fuci which are found covering certain Crustacea, are merely entangled mechanically in the hooked hairs by which they are covered, but there is no doubt that they actually grow upon them and are attached by roots. This is evident from the healthy state of the little plants, as well as from the direction of the branches." Mr. Bell also alludes to various kinds of vegetable and other growths covering other spider-crabs (*Stenorhynchus*, page 5; *Inachus*, page 17; *Pisa Gibbsii*, page 28; and *Hyas*, pp. 33, 34). My own experiences in these matters coincide with Mr. Bell's. Thus I have often had brought me living specimens of the spinous spider-crab (*Maia Squinado*), sometimes without any seaweeds on it,

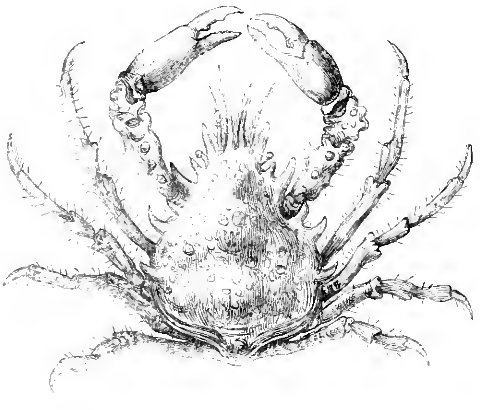


Fig. 165. Four-horned Spider-Crab (*Pisa tetraodon*).

and sometimes quite covered with such algæ as *Gracilaria*, *Hypnea*, *Gelidium*, *Gymnogongrus*, *Furcellaria*, *Polyides*, and other seaweeds having thread-like or stiff wire-like fronds; so that when they were washed about horizontally by the sea, their filiform character caused them to become entangled in a complicated manner in the strongly hooked hairs with which *Maia* is beset, and the weeds could be "drawn out of the hooks" as Mr. Jesse describes, but the plants were always attached fast to the crab shell *by their roots also.* No spider-crab known to me can cut up algæ into strips, nor yet attach such strips to its carapace, at any rate not to its upper portion, for the most they can do in this way is to use their limbs to "preen" themselves with a little, but always in a very feeble and awkward manner.

Hyas araneus is a spider-crab which I get with a perfectly clean shell when brought up from deep water on a clean sandy bottom, on the coasts of Essex and Kent, and off the island of Heligoland; but when it comes closer in shore and hides among weed-covered ledges of rocks, then these crabs are frequently covered with dense bushes of red algæ (*Rhodospermæ*), and, in explanation of why these plants are red, and not brown (*Melanospermæ*), or green (*Chlorospermæ*) — marine algæ being thus systematically divided into these three great classes by their *colour*—it has to be stated that the red algæ grow in shady places, and when found between tide-marks, they are generally met with concealed under a curtain of green and brown weeds, which prefer the light. Consequently, as the hiding habits of the crabs cause them to inhabit the same localities as the red weeds, it is natural that the latter should grow on the animals, especially as their rough and hairy shells and slow motion are well adapted for the purpose. But when the red algæ, whether living on a crab or any other object, are found in a place where the shadow is inconsiderable, as, for example, on the sea-shore, very high up between tide-marks, or in an aquarium, where the light is greater and the temperature higher than in the sea, then the red weed loses its colour, becomes lighter in hue, gets deteriorated, and becomes gradually overgrown with parasitic confervæ. About twelve years ago, Mr. Robert Warington published in the *Zoologist* an account of some interesting experiments made by him, in which he showed how he restored to their normal condition, some *Rhodosperms*, which had become overgrown with confervæ, by placing them in variously coloured glass jars, which permitted the growth of one kind of alga, but not the other.

In the Hamburg Aquarium (tank No. 10) are two large spinous spider-crabs (*Maia Squinado*), which arrived from the coast of France, quite free from any algæ. After they had been here for some weeks their shells began to be rapidly grown over by green algæ, and this had to be removed with much difficulty, by hand. In one corner of the tank is a large and perfectly dark cave, formerly inhabited by a pugnaciously disposed lobster (*Homarus vulgaris*), who would not allow the spider-crabs to enter its den. But I removed the lobster, and the crabs immediately took possession of the cave, and now, as they pass much of their time in darkness, the algæ have ceased to grow upon them, save to a small extent. The under parts, however, of these slow crabs being ever in almost absolute darkness, have become covered with patches of a compound ascidian, *Botryllus polycyclus*, a creature fond of shade.

The specimens of *Hyas*, which I have named as

* The word "fuci," as employed in these two instances, is not intended to convey the idea that actual *fucaceæ* are the plants attached to the crabs. Mr. Bell uses it, as did many of the older naturalists, whose general name for nearly all the *Rhodosperms* was *Fucus*, in the same manner that they applied the term "*Cancer*" to almost all crabs, and *Actinia* to all sea-anemones.

arriving here in a clean state, from sandy bottoms in deep water, do not long keep clean, however; for remain sluggishly as much as they will in the shadows of overhanging rockwork, their pale buff colour becomes gradually green, which darkens as the carapace gets farther covered with a velvety coat of algæ. Some of our *Hyas* have, in addition, numbers of a small simple (*i. e.* not compound) ascidian (*Cynthia*) growing on them, and others have their limbs quite covered with an encrusting Polyzoa. But I have never known any red, or much less any brown algæ spring up on crustacea in aquaria. Nor are active crabs, whether they are occasional burrowers or not, such as, *e.g.*, the common shore crab (*Carcinus mænas*), or the various swimming crabs, as *Portunus* and *Portumnus;* nor are essentially burrowing crabs, however slow they may be, for example, *Ebalia*, *Gonoplax*, and *Corystes*, liable to become thus covered with weeds or other parasites, whether in the sea or in captivity, unless in the latter case they are cruelly deprived of sand or other substances to burrow in, and are otherwise hindered from getting into dark places. Some years ago, a lobster (*Homarus*) was kept in one of the smaller central tanks of the Regent's Park aquarium, where it had no opportunity of hiding, and it became covered with quite a forest of green seaweed (*Enteromorpha*). Here the same species is similarly grown over, especially in summer, but to a very much smaller extent, as in our aquarium there are many hiding-places. But our spiny lobsters (*Palinurus quadricornis*) being of less hiding habits than *Homarus*, become rather more densely invested with plants in warm weather. These specimens of *Palinurus* when they first came from the sea, were thickly covered with thousands of a little living tubicolous annelid (*Spirorbis communis*), the rough carapaces and the prickly peduncles of the great external antennæ of the lobsters forming suitable surfaces for the attachment of the shells of these worms, which have multiplied in the aquarium till they have become quite a nuisance, as they have cemented themselves not only to rough surfaces of the rock-work and slate of the tanks, but also to their glass fronts by hundreds, and have to be scraped off with a steel instrument. One female *Palinurus* is loaded with eggs, which she carries below the abdomen, with the tail closely doubled under, so as to keep the spawn in a kind of pocket thus formed. In this state she is not so active as her fellows, and she is placed in a separate tank, so as not to be disturbed by them; and as a consequence of her slowness she has become grown over on various parts of the lower surface of her shell with a great family of living branching *Polyzoa*. Trifling as is the motion of the creature in her present condition, it may be enough to imitate the waving motion of the sea, in a greater degree than is given by the current of water which usually flows through the tank, while the roughness and darkness of the lower half of the animal's crustaceous covering may supply the other conditions necessary for the well-being of this kind of *Polyzoa*, so seldom kept in aquaria alive.

Slowly moving Crustaceans, however, are not the only animals on the shells of which live other animals and various forms of vegetation. The periwinkle (*Littorina*), for example, is often found with *fucus* (Tang) growing upon it, this plant inhabiting the zone of extreme high water, in which the mollusc also lives. But no mollusc with which I am acquainted is so interesting in this respect as the very slow and very rough rock-winkle (*Murex erinaceus*), when dredged up in Weymouth Bay, in Dorsetshire. Most of the specimens from this locality have attached to them beautiful little healthy fronds of *Rhodymenia*, *Iridæa*, *Chondrus*, *Phyllophora*, and other red algæ, in fine condition, and well adapted from their small size for aquarium purposes. I often obtain them, hoping that the habits of the *Murex* will carry the weed into dark corners of the tanks, where the plants will continue to flourish. But after a time they become covered with dirty-looking confervæ, and lose their freshness of appearance, like all other red algæ in captivity and in too much light. The successful aquarium cultivation of *Rhodosperms* free from confervæ, and under circumstances enabling these plants to be *readily seen* in the very subdued light they require, is a thing to be yet learnt. But I sometimes by chance manage them very well. Last week (April 28th), for instance, I had occasion to examine the state of our two marine filters, which are a pair of slate tanks, seven feet long, and three feet broad and deep, closely covered over with wooden flaps, so that the insides of the vessels are *always in total darkness*. They are filled to within about six inches of their tops with fine sand, through which constantly flow strong currents of sea-water. Into these filters I from time to time throw surplus

Fig. 166. The Spider-Crab (*Hyas araneus*).

specimens of red algæ of various species, and on looking at these on the day named, I found them all nicely growing, having the delicate, plump, transparent pinky-red colour, which is characteristic of them when in the sea, under the most favourable circumstances, while plants of the same species which at the same time I carefully deposited in the tanks, have become so entirely grown over with confervæ, that their character is lost. In Hardwicke's Science Gossip for May, 1865, p. 117, I recorded how once, by accident, I succeeded in growing *Delesseria sanguinea* in a deep and almost quite dark hole in a tank.

The shells of *Murex* from Weymouth not only thus abound with algæ, as described, but are frequently met with rich in numerous parasitic animals—as *Serpulæ* and *Sabellæ* of several species, *Sabellaria*, *Spio*, and other things. The shells of living *Nassa reticulata* (Dog Whelk), found in the Baltic Sea, are usually covered with colonies of a little zoophyte—*Coryne;* but I have not seen English specimens of Nassa thus infested. The shells of *Buccinum*, *Purpura*, *Natica*, and *Fusus*, when inhabited by their proper molluscs, are never grown over with any animal parasites, as far as I have had opportunities of seeing them; but when the same shells are occupied by hermit crabs (*Pagurus*), they —the shells—are then often densely covered with colonies of another beautiful little zoophyte (*Hydractinia echinata*), except at that part of the shell which is dragged along the ground by the crab, and this portion is not only free from zoophytes, but is polished with the friction.

Last Sunday I had brought me a half-grown female living specimen of the edible crab (*Cancer pagurus*), the carapace measuring 10 c. 2 m. long, and 16 c. 4 m. broad. On this carapace has grown, and is still there, a living oyster (*Ostrea edulis*) measuring 8 c. 3 m. × 7 c. 7 m. This oyster is between four and five years old, the age of the mollusc being well known by its appearance, as it is a cultivated article of commerce, and a fixture during its life. Consequently the crab cannot have changed its shell during the existence of the oyster upon it, a period of from four to five years. But when younger, this crustacean (*C. pagurus*) exuviates much oftener. Thus, in our aquarium, on the 2nd of March, 1864, a small specimen, measuring 3 c. 3 m. × 2 c. 1 m., cast its shell, and when it appeared in its new coat it was 4 c. 4 m. × 2 c. 7 m. On February 28th, 1865, it again exuviated, and appeared with a carapace of 6 c. 9 m. × 4 c. 5 m. On April 14th, 1866, it once more changed its shell, and now the crab, which is still in the aquarium and doing well, is quite a portly fellow of 9 c. 8 m. × 6 c. 0 m. These figures do not present to the imagination what the empty shell and the newly coated animal convey to the eye when the two are placed side by side, and unless one has seen the operation as I have often done, it is difficult to believe that the comparatively large creature has emerged from the small case, especially after the lapse of a day or two, when the newly clothed creature has had time to get hard, and can be felt with the fingers to be so.

This article is already too long: if it were not so, I would describe the manner in which I have seen various crustaceans get out of their old shell, and what they do before and after the change. But this I must reserve for another time.

W. Alford Lloyd.

Zoological Gardens, Hamburg.

THE GREAT SAW-FLY (*Urocerus gigas*).

The other day I saw, for the first time, this fine insect alive. My daughter called my attention to it on a new larch telegraph-post near Ditton, Cambridge. Having secured the captive, we came to the conclusion that it had as good a right to its life as ourselves, and put it back on the bark, where, after a few flights, it settled again, and began trying all the bare places on the bark for one to deposit its eggs. Hunching up its great body so as to bring the point of the sheath to the desired spot, it in vain tried to set its auger-like ovipositor to work. Again and again it failed, still trying as busily as ever, and then, finding that our lady friend could make no hand at it, I examined the instrument, and found it had grown to only half its proper length in this specimen.

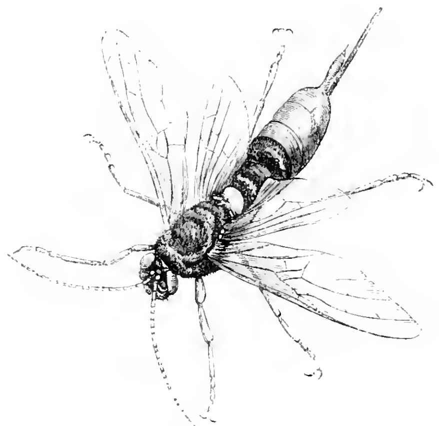


Fig. 167. The Great Saw-fly (*Urocerus gigas*).

The black ovipositor in a perfect insect (we found a smaller one busily at work lower down the post) reaches to the extremity of the sheath; and the instinct of the creature induces it to bend the body so that the point of the sheath and the ovipositor together may make the first impression at the desired spot. The animal must have some means of judging where this should be from its own length, for we saw the yellow antennæ busily feeling or listening (we know not which, and it may be both) for the soft spot, before the attempt was made with the ovipositor.

As this fly had failed, we gently released the one which had made half its bore, and set her to work again. Having a weapon of the right length, she immediately fixed upon a spot, and began precisely as the other had done. When the weapon was inserted, the sheath was released, and remained horizontal, while the auger was pressed vertically from its point of attachment half-way up the broad abdomen. It was then worked a little backwards and forwards, and from side to side, just as a carpenter would carefully use a slender awl. It was tedious work, and took the creature twenty-three minutes, while we ate our luncheon and waited in the hot sun, the animal keeping its horns and yellow legs perfectly still, the black auger alone being actively in motion. When the weapon had been buried half an inch (it is rather longer than this), it was pretty quickly withdrawn, and another spot selected, the fly walking along with a jerking motion like an ant, and again commencing operations. We took possession of our unfortunate friend who had not provided herself with a sufficient instrument, but still kept trying her impossible task. And I fear, having been rewarded for humanity in advance, I should have sent it in this letter, but she made her way out of a paper bag six or seven times folded, and then out of the basket, so we considered her liberty and life fairly won again, and contented ourselves with the dead specimen enclosed, which was attached to the next telegraph-post, and, from its position, had probably died in the act of boring and weakening our national communications. The ants had very properly eaten the soft abdomen, and left the dry parts, so I cannot send you the curious weapon.

J. W. Salter.

HAWTHORN CATERPILLAR.

SEVERAL communications having reached us this year, as well as last, inquiring concerning the caterpillar which strips the leaves from the haw-

Fig. 168.

thorn so assiduously in the neighbourhood of London and elsewhere, we are induced to give a figure of the insect in its three stages of caterpillar, pupa, and imago, for the benefit of those querists. The name by which the perfect insect is known to entomologists is *Hyponomeuta Padella*, and its place will be found amongst the *Tineina*, in Swainson's "Manual," vol. ii. p. 308. The larva feeds on the apple and other trees, as well as the hawthorn, and is destructive on account of its immense numbers. All the figures are represented natural size.

TRICERATIUM.

CLOSELY allied to *Biddulphia* and *Isthmia*, the two genera of diatoms illustrated in our last, are *Triceratium* and *Amphitetras*, associated together in a small group, to which the name of *Angulifera* has been given. In this group the valves are angular, and the frustules are united into a linear series, or by short stipes at the angles.

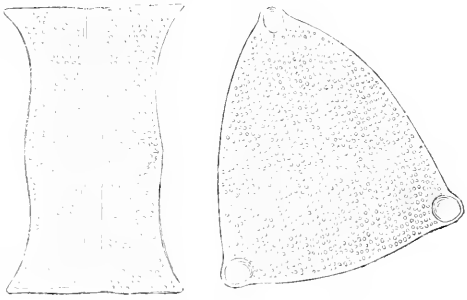


Fig. 169. *Triceratium striolatum.*

Triceratium is represented in Britain by about ten species. The valve is triangular, rarely with four or five angles, frustules free, united into a continuous or zigzag filament. The species selected for illustration is *Triceratium striolatum*, fig. 169.

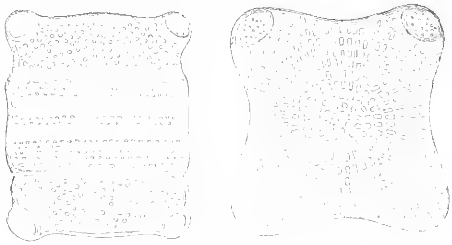


Fig. 170. *Amphitetras antediluviana.*

Amphitetras is represented by one species, of which we give a figure (fig. 170). In this genus the valve is quadrangular, the somewhat tumid angles faintly marked, and looking like openings, the cubiform frustules cohering into a zigzag attached filament (fig. 171).

Fig. 171. *Amphitetras antediluviana.*

WATER-BEETLES.

HAVING recently had in my possession a large aquarium stocked with several species of common British water-beetles, I have had considerable opportunity for watching their various actions and habits; among which the activity which they display in chasing and fixing on their prey, and their extreme voracity, are certainly the most remarkable. To the *Dytiscus marginalis* nought seems to come amiss; for fish, newts, small frogs, and even fresh-water snails, all share the same fate when placed within the reach of this ravenous and powerful insect. It frequently kills more than it is able to consume, and when it has succeeded in destroying every living object not belonging to its own species, it will, without hesitation, fall upon those of

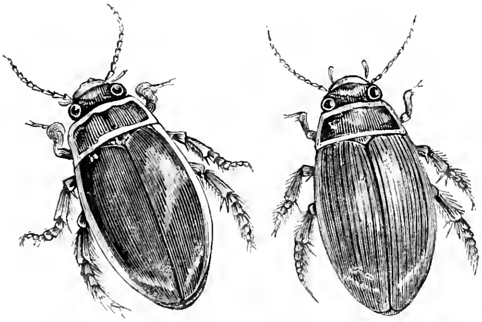


Fig. 172. Water-Beetles (*Dytiscus marginalis*).

its own relatives which may happen to be confined with it. Indeed, sometimes the battles between them are of a most furious and savage nature. The poor newt is obliged to succumb without much resistance; for when its deadly enemy once obtains a hold, all its endeavours to shake it off are entirely useless. I have seen a *Triton cristatus* covered with as many as three or four of these insects, besides an equal number of the *Acilius sulcatus* at the same time, whilst the hapless reptile swam and dashed about the water in the highest state of discomfiture, and, being unable to release itself, was obliged at last to yield to the strong mandibles of its adversaries. It is even difficult to separate their prey from them, so tightly do they cling to their victims. The *Notonecta*, or common boat-fly, is also exceedingly voracious, even darting at and seizing upon the point of a penknife when presented to it whilst lying close to the surface of the water. If a small earthworm be suspended from the end of a piece of thread, and be placed close to any of the insects I have mentioned, it will be almost instantly attacked; and such is the tenacity with which they adhere to the bait, that they may be easily drawn out of the water. This is, in fact, a capital method of catching them in the first instance, as the thread can be annexed to the end of a long stick or fishing-rod, for they are not to be easily captured by means of a hand-net, on account of their quick movements when disturbed, especially if they are seen at some distance from the side of the pond in which they are to be found. Although these insects are able to devour an immense quantity in proportion to their respective sizes, still if a single specimen be kept by itself, it will subsist for a considerable period without any food at all. As almost all water-beetles are of this voracious disposition, they must not, of course, be introduced into an aquarium in which fish, &c., are kept; but when in solitary confinement, and properly fed, they form very interesting and amusing objects. J. H. Fox.

The Black and Brown Rats.—The black rat, which has become more and more rare, is disappearing daily from the continent of Europe, in consequence of a revolution, not less bloody, though less generally known, than those which the barbarians of the North brought in former times upon the empires of the more civilized world. For ages the mouse, which was the only representative of this family known to the ancients, lived at our expense, with no enemy to fear in its quasi-domestic state, save man, whom it pillaged, and the cat, which the lords of the creation had called to their aid against an adversary which had been rendered formidable by its very diminutiveness and timidity. During the middle ages, the black rat, coming no one knew from whence, spread itself over Europe and attacked the mouse, who, too feeble to resist his ferocious antagonist, was obliged to share with him his old haunts, only escaping complete destruction by retiring within his narrow galleries, whither the enemy could not pursue him. At the beginning of the last century, the Norway, or brown rat, brought by merchant vessels from India, appeared in Europe, and at once began to wage an exterminating war against the black rat. Its greater strength, ferocity, and fecundity, enabled it rapidly to gain ground. This rat first appeared in England in 1730; twenty years later it was observed in France; but at the period when Buffon wrote his immortal work, it was only met with in the environs of Paris, and had not yet penetrated to the city. At the present day it is the only rat met with in the capital, and in the greater part of the provinces. Its partiality for the water, and the readiness with which it swims, have enabled it to follow the courses of rivers, and by ascending the smallest affluents, it has contrived to diffuse itself over the whole country. It has driven the black rat before it, exterminating it in many of our provinces, and forcing it to take refuge in mills or isolated farms.—*Quatrefages' Rambles of a Naturalist.*

ZOOLOGY.

FROZEN FISH.—During a very severe frost a few winters ago, some gudgeons, which had been kept alive in a fish-can filled with water, became completely frozen: the water was literally a mass of ice, and I was obliged to cut the fish out with a hatchet. Concluding that they were dead, I threw them upon a manure-heap, slightly covering them with straw; a few hours afterwards I passed by the heap, and upon turning over the straw, I found to my great surprise that the fish were alive and brisk. I put them into fresh water, where they soon perfectly recovered; apparently none the worse for their contact with Jack Frost. The warmth of the dunghill doubtless revived them. In a book published in 1851 by Routledge, entitled "Sir John Franklin and the Arctic Regions," a somewhat similar circumstance is mentioned at page 45. It is as follows:—"The fishing failed as the weather became more severe, and was given up on the 5th of November. About 1,200 white fish, of from two to three pounds, had been procured during the season. The fish froze as they were taken from the nets, becoming in a short time a solid mass of ice, so that a blow or two of the hatchet would easily split them open, when the intestines might be removed in one lump. If thawed before the fire, even after being frozen for nearly two days, the fish would recover their animation."—*H. Wright, Thuxton Rectory, Norfolk.*

CUCKOO (*Cuculus canorus*).—It has long been a matter of dispute among ornithologists whether the cuckoo lays her egg in the nest of the adopted parent, or introduces it by her claws or beak. I have long been convinced that the cuckoo introduces her egg into some nests, if not into all, by her beak. During the last four years I have had the opportunity of seeing two nests into which it was not possible for the parent to get to lay her egg. They were both in holes in a garden wall, and one of the young ones was obliged to leave the nest before it could fly at all, and take up its post in a currant bush, where he was fed by his foster parents, the hole being too small for him. This month (July, 1866) I have had frequent opportunities of inspecting a young cuckoo that has been hatched in a wagtail's nest. The nest is placed in a hole of a barn wall, at Fullgates, the residence of R. Burton, Esq., in this village, and the bird quite fills up the hole now, when eight days old. Seen from the fold-yard, he looks like a bundle of feathers, except when he opens his mouth, when he is decidedly of an open countenance. The hole is a scaffold-hole, and the nest is placed back in it six inches, so that it would be impossible for either the parent to get into the hole to lay her egg, or for her to introduce it by her claws.

FISH MORTALITY.—In the *Globe* of July 3rd there was a small paragraph noticing the death of several salmon by thunderstroke during the late intensely hot weather. On July 1st I noticed several hundred roach lying dead in the canal here. It could hardly be the result of poisoning, because there are numbers of tench in the same water, and if it had been poisoned, why should the tench have escaped its deadly effects? I saw, however, no tench among the ranks of the roach, which appeared in many cases to have died in convulsive struggles, as their bodies were distorted and curved. They had all turned on their side and floated to the top, except where they were caught in the weeds. This may be a parallel case to that of the salmon above quoted, and only needs confirmation by records of similar occurrences in other parts of the country.—*A. J. N. Macdonald.*

"AS SCABBED AS A CUCKOO" is a common saying in Yorkshire, and I certainly never had hold of any living thing from which such an amount of scurf comes off as from a young cuckoo. Of all young birds, the young of the cuckoo seems to be longest in being able to "fend" for himself; for long after they leave their nests they follow their foster parents about, making constant demands upon them for food. The young ones linger in this country until September and October, and they have been shot when snow was on the ground; but these may have been very late birds. I once found one myself in August in a tit-lark's nest; and if, as a friend of mine thinks, they are two months before they can forage for themselves, this bird might reasonably be expected to be in this country in November. If all who are interested in ornithology would give their attention next season to the collection of facts respecting this bird, we might be able to come to something like a correct estimate of the habits and instincts of this interesting spring visitor.—*John Ranson, Linton-on-Ouse, York.*

THE SPOTTED FLYCATCHER.—Books assign the third week in May as the time of the arrival of this summer visitor, and my own observation used to accord with them. But in the spring of last year, persons on whom I can thoroughly depend, and not at all likely to be mistaken, assure me that they saw one on May 3rd. This year one was seen at the same place on April 29th, and I myself saw one on May 4th. Have any of your readers seen similar instances of their arriving so much earlier than usual? The locality of which I am speaking is in North Lincolnshire, near the Humber.—*John Byron, Killingholme Vicarage.*

INSECTS AT SEA.—During a voyage to the Cape, about 300 miles from the coast of Africa, a large dragon-fly came on board, the weather quite calm. —*E. T. Scott.*

Parental Instinct.—On the 20th of June last some mowers on the farm of a friend of mine in Berkshire cut through the nest of a landrail, the young of which had only just broken through the shell. Three young birds were found to be killed by the scythe; several others were seen to run away and hide themselves in the long grass. A minute or two after, as the men were recommencing work, one of the parent birds was seen to rush out towards the nest and then rapidly retreat with something black in its beak towards the high grass on a bank not many feet distant. The curiosity of the men being roused, they immediately searched the place where the old bird was lost to view, and to their surprise found one of the young without feet, both having been cut off by the scythe, and in consequence quite unable to run a step. This the old bird had discovered, and conveyed to a place of safety by means of its beak.—*D. S.*

Curious Food for Slugs and Snails.—A small vivarium I have kept for some time contains a number of specimens of *Helix*, *Arion*, *Limax*, and others. They seem remarkably partial to *pill-boxes*, especially the pink outer paper. They will rapidly devour a large pill-box (particularly if wet), commencing by denuding it of the pink paper, and then eating and nibbling at the edges of the box. Some of the water-snails (*Limnœæ*) seem to have the same fancy for the pink paper.—*C. A., Birmingham.*

The Blindworm (*Anguis fragilis*).—I have a blindworm which is above fifteen inches long. It was killed a short time back at Fen End, near Knowle.—*C. A., Birmingham.*

GEOLOGY.

Stones on Mountains.—The loose angular stones found so abundantly not only on the Cumbrian mountains, but on very many mountains elsewhere, have not been brought from a distance, or rolled, by water. J. L. will find that in every case they are composed of the rock which forms the mass of the mountain on which they occur. All rocks are traversed by joints and crevices. The chief agent in opening the crevices and loosening the rocks is frost; the water which fills them in winter *expands* on freezing, and the ice acts as a wedge: when the thaw sets in, the loosened rocks tumble down a little way, or are moved by torrents or heavy rain, leaving fresh surfaces of rock exposed, to be acted upon by succeeding frosts. In a lesser degree, the roots of rock-loving plants work as wedges to loosen stones. Mountains composed of slate are strewed with slaty *débris;* others, formed of rocks which have fewer planes of division than slate, such as trap, quartz-rock, &c., have on their sides and summits such coarse stuff as that which suggested J. O.'s query. Good descriptions of atmospheric work may be found in Campbell's "Frost and Fire," and in Geikie's eloquent "Scenery and Geology of Scotland."—*W. H. S. W., Dublin.*

I would suggest that "the loose masses of rough sharp stones that cover the sides and summit of Helvellyn," &c., are referable to the Pleistocene age, and are the result of glacial action as much as the water-worn boulders that bestrew our plains. Not having been on the top of Helvellyn, of course I speak with modesty. The phenomenon, however, I have no doubt, is one form of the "Drift," and is of a very local character. On Oldham Edge, a hill about 800 feet above sea-level, similar appearances are to be met with. The rock of which it is composed, however, differs in age and lithological structure from the northern giant, being the elevated out-crop of the "blendfire" rock, a member of the middle coal series. This stone is much quarried for building purposes, and in these works we sometimes get good sections of the loose, broken, and jumbled-up material of which the underlying solid bed is composed. In most cases this mass of angular fragments is freely mixed with a compound of fine sand and mould; but this, like the rest, is native-born. Occasionally, however, we meet with a stranger of foreign extraction, in the shape of a large well-rounded boulder of millstone grit, limestone, or some form of granite, deeply embedded in the confused mass, and singularly striking in its loneliness and its contrast with the rest. The testimony of these boulders is, I think, undoubted. Admitting that an Arctic climate at one time prevailed in the latitude of England, we can easily imagine large masses of ice breaking loose from their moorings in the creeks and bays of a glacial sea; at one time sailing silent and stately in deep and smooth waters, at another time stranded and labouring on the top or sides of your scarcely emersed Helvellyn, and by sheer weight tearing off the upturned edges of the rocks, and pushing the fragments into the hollows and lower levels, undivested of their angles. I have seen sections in Oldham Edge where what was at one time a thin-bedded rock, seemed to have been pressed forward *en masse*, and broken only when bent, a curve or crook being traceable several feet. Should your correspondent J. L. ever visit Manchester or neighbourhood, on business or pleasure, and will call at 27, Radclyffe-street, Oldham, I shall be most happy to spend an hour with him in looking over these things.—*James Nield, Oldham.*

Ever and Ever, since the dry land first appeared, has the sea been at its monotonous toil; ever and ever murmuring, surging, undermining, hurling down the earth, night and day toiling and labouring at work even in its placid moods; when, without a ruffle on its polished face, with gently heaving breast it idly chafes the pebbles of the shore.—*Recreative Science.*

BOTANY.

Drying Plants.—Twenty years ago, when botany was my hobby, I adopted a plan for drying my specimens, which was both rapid and very effectual in preserving colours. I borrowed a tin dripping-pan from the cook, which was just the size of my sheets of blotting-paper. In this I laid the produce of the day's excursion between sheets of blotting-paper in the usual way, and when the pile was complete I covered it over with a layer of common scouring sand half an inch thick, so that the tin dish appeared to be simply full of sand. I then placed it on the kitchen fender, or on the hob, or in the oven if it were not too hot, and in three or four hours the whole batch of specimens was perfectly dried. It required a little care to take them out at the right moment, when they were baked just enough, and not too much; but this care being given, the success of the plan was perfect. Many specimens still in my herbarium bear witness to the superiority of such rapid drying over the old method.—*F. T. M., Loughborough.*

Mortality among Beech Trees.—Last summer a number of beech trees in this neighbourhood were struck with sudden death. They put out their leaves in the spring, as usual, but towards the end of the summer the leaves were all brown and the trees dead. They have since been cut down. These were trees of thirty or forty years' growth, standing upon low ground with a subsoil of gravel. I have just observed a row of a dozen similar trees on rather higher ground, apparently going off in the same manner; but there are plenty of beeches on the neighbouring hills, where the subsoil is slate rock, which remain in perfect health. Can any of your correspondents explain this phenomenon? Do beech trees object to a gravelly subsoil? If so, why did they not show their antipathy earlier, as the roots must have reached it long ago, the surface soil being only two or three feet deep?—*F. T. M., Loughborough.*

Fritillaria Meleagris.—Two of your readers are surprised to find the *Fritillaria Meleagris* mentioned as a rare plant, and even doubted as a British native by a correspondent in your June number. It has been found by me growing abundantly on an island in the Tame, near Tamworth, Staffordshire, and by a friend in still greater profusion in the damp meadows at Oxford, on the banks of the Isis.—*A. M. D.*

Mistletoe of the Oak.—A correspondent (N.) is under the impression that he has certainly seen a specimen of the true *Viscum album* which was parasitic on the oak. The question is still open,—Does *Loranthus* occur in Britain? It has never been recorded.

Fritillaria Meleagris grows in great profusion about a mile from Oxford, covering several fields on the Berkshire bank of the river, between Oxford and Iffley. The white variety is not uncommon. I have also found it near Godstone, and it occurs also on the chalk hills near Wrotham, in Kent. Its profusion near Oxford is remarkable. Its period of flowering is from about May 20th or 25th (according to the season) to the middle of June.—*Douglas C. Timmins, M.A., Oriel College, Oxon.*

Yellow Star of Bethlehem (*Ornithogalum luteum*).—The notice of a locality for the *Spiked Star of Bethlehem* (*O. Pyrenaicum*) in the May number of this Journal suggests the placing on record of one for *O. luteum*, which is also said to be rare. I found two plants of it only, on the 20th of April last, by a mountain stream near Ambleside, having never previously seen it.—*E. Green, Grasmere.*

Drying Flowers by Heat.—I have adopted this plan for some years, on the recommendation of a friend. With some plants it acts very well, but not with others. Much depends on the mode of doing it. It should be done *gradually*, and with an iron *not too hot*. My friend told me that he had taken nearly two hours in thus drying a plant, but he found himself well rewarded. I have *Orchis fusca* now that I ironed out in 1863, and it has lost very little of its colour. *Ophrys muscifera* looks well ironed; so do grasses.—*Henry Ullyett, High Wycombe.*

The Daisy.—The French name this flower *Marguerite*, as well as *Paquerette*. Thence St. Louis took for a device on his ring a daisy and a lily, in allusion to the name of the Queen, his wife, and to the arms of France; to which he added a sapphire, on which a crucifix was engraved, surrounded with this motto:—"*Hors cet annuel, pourrions-nous trouver amour?*" because, as this prince said, it was the emblem of all he held most dear—religion, France, and his spouse. Lady Margaret, Countess of Richmond, bore three white daisies (Marguerites) on a green turf.

The Crocus.—Fabulous history derives the name of this flower from a beautiful youth named Crocus, who was consumed by the ardency of his love for Smilax, and afterwards metamorphosed into the plant which still bears his name. Others suppose it to be taken from Coriscus, a city and mountain of Cilicia. It is one of the flowers of which Homer (*Iliad*, book 4) has composed the genial couch of Jove and Juno.

"And sudden Hyacinths the turf bestrow,
And flow'ry Crocus made the mountain glow."

Flora Historica.

MICROSCOPY.

Dissecting-Troughs.—It is now three or four years since I was looking about for some cheap and convenient vessel in which I could dissect insects and other small animals that require to be examined under water. I found fault with the earthenware troughs used by photographers, because they were expensive and liable to break, and with gutta-percha ones because they would crack at the corners and let the water out. One day the idea struck me that the sardine-box I was emptying might be made into the very thing I wanted; so, having cleaned the box (an operation easy to perform if the oil is first saponified by a solution of soda or ammonia), I cut the rim off with a strong pair of curved lamp-scissors, and my dissecting-trough was complete. I now keep by me several of these troughs of different depths. For pinning-tablets I use either cork or wax, and it is convenient to have them separate, so that you can put them in or lift them out after the animal is pinned down. The tablet must, of course, be weighted; and this is conveniently done by securing it with thin wire to a piece of sheet lead. I am induced to make this trivial invention more widely known, because I feel sure that by simplifying necessary apparatus we increase the number of investigators. Only the other day I met with a young entomologist, who, though he knew more about insects than the majority of the colour-distinguishing insect-catchers that go under that name, still had never attempted to examine their internal structure. I found he thought, as many do, that the inside of an insect was only to be made out by an advanced anatomist, and that to others it was a mere "squash." He was surprised to find how easy it was to see all the parts that are so vaguely written about. When he set to work for himself, his great difficulty was to get something to serve the purpose of a dissecting-trough. I told him of my sardine-box troughs; he thought it a "splendid idea," and forthwith bought some sardines, and made all his friends eat them till the box was empty. Three days afterwards I saw in his sardine-box a more instructive dissection of a caterpillar than is to be found in any museum with which I am acquainted. But I have not done with the sardine-boxes yet; for a Welsh friend of mine, an experienced fly-fisher, has found a use for the brass-foil labels. He first carefully crinkles them up, so as to produce a many-facetted surface, which more easily catches the light, and then on certain days, when the fish take no notice of ordinary flies, he puts a small piece of the foil round the fly's body. This, he says, often enables him to kill his dish of trout when other fishermen have spent their day without a rise.—*J. Gedge, Cambridge.*

To Capture Podur.e.—A short time ago I discovered a number of *Podurœ* on the window-sills at the back of my house, about two feet from the ground: they appear to take up their abode in the crevices of the bricks, and the small openings on the underside of the sill, and come on to the upper surface in search of food. I sometimes meet with them in groups of three or four, but more frequently individually. My mode of capture is as follows:—I take a tumbler or top of a wine-glass, and quickly place it over them; then gradually get them into the centre of the space covered by the glass, and raise one side a little, and puff in a volume of tobacco smoke, immediately dropping the glass to confine it; the little prisoners will be seen to jump about in a most frantic manner for three or four seconds, then suddenly drop down on their backs and stretch out their tails, apparently dead; the glass can then be removed, and the little victims transferred to a pill-box until required for use; but be very cautious when you open the box; for the first lot I caught in this way I put in a box, not requiring them for three or four days, when I opened the box, and to my astonishment they were all alive again, although the morning after I caught them (about twelve hours after being submitted to the smoke) they were still dead to all appearances: another gentle dose of smoke effectually killed them.—*J. R., Clapham.*

The Stanhoscope.—The paragraph in the July Science Gossip on the use of the Stanhoscope in gathering marine Diatomaceæ has been the means of inducing scores of your readers to apply to me for the small optical instrument there referred to. As no printed explanation of the mode of using the lens accompanies it, some of the purchasers have been at a loss to understand how it ought to be used. I therefore request permission to state briefly that the cap containing the lens should be taken off; that the objects to be examined should be placed on the square end of the lens; that the cap should be replaced, and the object be looked at through the apparatus, placing the eye near the curved end of the lens. The magnifying power is so high, that only small objects can be observed by means of the instrument, and the best and simplest mode of testing its power is to place on the square end of the lens some of the dust from the wing of a butterfly or moth. The method for examining Diatomaceæ, is to place a very small portion of the fluid containing the diatoms on the flat end of the lens, and look through it towards the light, as before described.—*T. P. Barkas.*

Preparative Fluid.—M. Chevalier in his *Étudiant Micrographe*, recommends the use of the essence obtained by distilling Canada balsam, as preparing objects more perfectly than any other fluid, for mounting in the balsam itself.

PHOTOGRAPHY.

La Planchette Photographique is the name of a new instrument invented by M. Arthur Chevalier, which is now attracting considerable attention in Paris. A report on its application to military surveys is being prepared to place before the Government, and it is shortly to be tested in the presence of the Emperor in the camp at Chalons.—*J. W. W.*

Photography and Anatomical Science.—M. Ch. Rouget desiring to demonstrate conclusively errors commonly prevailing with respect to the structure of muscular tissue, has applied photography to the purpose with great success. He was induced to do so by finding preparations of the muscles could not well be preserved in the required condition; that drawings were disputed, and the possibility of introducing actual experiment cumbered with too many difficulties and disadvantages. Pictures produced by the objects themselves, with extreme rapidity, unerring accuracy, and exactly at the chosen time, were therefore the best things M. Rouget could think of, and these he has produced. Some of the microscopic photographs exhibited were stereoscopic, which added greatly to their value.—*J. W. W.*

Permanent Photographs.—The use of the peroxide of hydrogen for eliminating from photographs the last trace of the destructive hyposulphites, to which we called attention in our last, has found opponents. Mr. F. W. Hart points out, that as the per-oxide of hydrogen decomposes when in contact with gold or silver, and also contains hydrochloric acid (used for its preservation), he cannot but regard its proposed use as dangerous if not certainly destructive to the photograph. In reply, Mr. Dawson, of King's College, states that using the peroxide of hydrogen manufactured by Mr. Robbin, he found the trace of hydrochloric acid contained in it to be so trifling that in a ten-volume solution, which is the strength at which it is used, blue litmus-paper remained unchanged. He also asserts, as the result of careful experiment, that the preparation does not decompose when in contact with a silver print. Dr. J. Emerson Reynolds is also conducting analyses connected with this subject, the results of which he promises to make public. At present he is inclined to believe that the application of per-oxide of hydrogen to a print is only another mode of giving it a wash in a very weak solution of sulphide of sodium, and thereby facilitating fading. Thus "doctors differ,"—*Tempus omnia revelat.—J. W. W.*

Experiments on Iodide of Silver.—The nature of that invisible image which light fixes on a surface photographically prepared, is a mystery which has baffled the best efforts of our most persevering and distinguished physicists and chemists. Mr. M. Carey Lea (*British Journal of Photography*) described a series of experiments bearing on the subject, in the course of which many errors were demonstrated, and some new evidence of great value made clear. These tended to prove that pure iodide of silver is not chemically affected by light; that although, when exposed to light, it yields an image capable of development, yet the chemical composition of the iodide remains unaltered. The true action has therefore yet to be determined, and the controversy still continues between those who uphold the molecular or physical theory, and those who still retain their faith in the chemical theory. Some of the more recent efforts in this direction are due to Dr. Reissig, and certain experiments, which seem to show that pure iodide of silver exposed to light under a pure aqueous solution of the nitrate releases oxygen and renders the solution acid, are important. —*J. W W.*

Curious Fact.—In the course of some remarks on the precipitation of silver, Mr. Carey Lea describes a curious fact in relation to the colour of the deposited silver. He says, "A plate was covered with a considerable thickness of ammonia nitrate solution, to which was added a dilute solution of Rochelle salt. The plate was then placed in sunlight and left for some time. Reduction took place, and the evaporation, which went on simultaneously, had extended over about one half the plate, when it was removed from the sunshine. It was then carefully washed. All that part of the metallic silver on which the solution had been suffered to dry in the sun was pure steel-grey, whilst that which was removed still wet had a strong reddish bloom." The contrast remained permanently, and evidently depended upon some difference of molecular arrangement. "It would be interesting to observe," says Mr. Lea, in connection with this, "whether negatives which are dried in the sun are not thereby somewhat different from the same or corresponding negatives dried in the shade; and, also, whether positive proofs on paper could not be affected for good or for evil by drying in the sun."—*J. W. W.*

Temperature.—The following data are from the "Times" of July 18th:—

Date.	Sun Maximum.	Shade Maximum.	Shade Minimum.	Range.	Mean.
July 12 ..	137	88·6	56·5	80·5	72·55
„ 13 ..	123	89	59·5	63·5	74·25
„ 14 ..	126	81	57·5	68·5	77·75

NOTES AND QUERIES.

Hæmony.—Perhaps the following passage from Coleridge will be acceptable to J. Cleveland:—"It is found in the study of the Old and New Testament, if only it be combined with a spiritual partaking of the Redeemer's blood, of which, mysterious as the symbol may be, the sacramental wine is no new or arbitrary *memento*. This is the only certain, and this the universal preventive of all debasing superstitions: this the true hæmony (αἷμα, blood, οἶνος, wine) which our Milton has beautifully allegorized in a passage strangely overlooked by all his commentators." He will also find mention made of a plant called *Hemionion* in Pliny's Nat. Hist., book 25, ch. 5; book 26, ch. 7; book 27, ch. 5; and in one of those passages said to be the Spleenwort or Asplenium. I am indebted to "Notes and Queries," 1850, for these notices.—*Lester Lester, Monkton Wyld.*

Little Spiders.—On inspecting a friend's fernery the other day, I saw depending from a frond of the common male fern what appeared to be a little ball of golden down. I touched it, and instantly the whole mass was in motion. It turned out to be an agglomerated mass of tiny golden spiders, bound together by a very fine web, and as soon as they were disturbed they dropped like a shower of gold-dust, and scattered in all directions. Perhaps some of your correspondents can answer the following queries for me:—1. The spiders were about the size of the little scarlet "money-spinners," that are so common in the summer, and of a bright golden colour. To what species do they belong? 2. Is it the nature of *all* spiders to be thus gregarious at some period of their existence, or is this quality peculiar to this particular species?—*A. J. N. Macdonald.*

Tree Frogs.—It is stated by Mr. G. Guyon in your December number, that some green tree frogs in his possession are not in the habit of jumping at a pencil or other object moved in front of them, as the other frogs are. I beg to state that I succeeded in capturing four on some trees round a pond near here, which I feed entirely upon flies; but these will jump many times in succession at almost any moving thing in, or just outside, the vase in which they are kept. Thus, whenever I kill by accident any flies which I am collecting for them, I stick them upon the point of a pencil and move it in front of one of them, which is almost sure to take it. They very often change their colour to deep brown, but always regain their beautiful bright green. What is the cause of this? Do they sleep through the winter? If so, how am I to treat them? If not, what food is suitable for them? How is the male to be distinguished from the female? Perhaps some reader of Science Gossip will kindly answer these questions in your next number, and I shall be very glad of any hints on the subject. I have also taken five young ones, just losing their tails. I have had them about three days, and they have apparently eaten nothing since; they will not take flies; what ought I to give them? They seem quite fat and healthy. —*E. G. Wheler, 4, Rue de la Fontaine, Dijon.*

Suicidal Jackdaws.—Can any of your numerous subscribers inform me of a method of keeping tame daws from drowning themselves? Out of five which I have known during the last two years, four have managed to drown themselves (two in water-butts, one in a pond, and the fourth in the fountain in a conservatory).—*C. J. B.*

Freshwater Sponges.—Mr. Lloyd's passing allusion in Science Gossip for May, to my query of some months back, escaped my notice until after his reference to it last month. The unexpected appearance of some little patches of living sponge on a dead piece I had left submerged during the winter, led me to similar conclusions, and if any of your readers who may not have the means of obtaining specimens, like to forward stamps for postage, I shall be happy to rob my hunting fields of enough to colonize any number of aquariums next spring. Save me only from such neophytes as assiduously empty their tanks every month or so, though these are hardly likely to take an interest in sponges.—*Fred. H. Meggy, Chelmsford.*

Birds Poisoning their Young.—I was not a little surprised on reading W. L. S.'s communication upon this subject. It is a recognized or received fact down here that the Starling does so; but when I first heard the remark, I paid no heed to it, and treated it as a popular error; but another and yet another testimony seems to make one pause in deciding this point. Several years ago, my neighbour, David Davies, our village tailor, took a nest of young unfledged starlings, and hung it up in a cage by the window, where he could observe them while occupied at his calling. The old birds came to feed them regularly, until such time as they were just ready to fly, when all at once they died, but not for want of feeding; and it is fully believed that the parent birds bring some poisoning substance, preferring to kill them thus outright, rather than see them prisoners for life.—*W. P., Llandderfel.*

Lesser Celandine.—Have any of the correspondents of Science Gossip noticed that the Lesser Celandine (*Ranunculus Ficaria*) is poisonous to turkeys, as a friend in the country has informed me that it is fatal to his? The circumstance is not mentioned by Withering, who says, in his note on this plant: "The young leaves may be eaten in the spring, along with other potherbs. Goats and sheep eat it. Cows and horses refuse it. *Curculio dorsalis* is found upon it."—*Vincent A. Smith.*

Poison-Fangs of Spiders.—In reply to your correspondent E. T. Scott, I beg to give it as my firm belief, based on actual observation, that spiders *are* possessed of a poison apparatus. If your correspondent will carefully dissect one of the larger of our spiders, he will find at the back of the horny fang a small bag, which communicates with an orifice at the base of the fang by means of a short tube. This I believe to be the poison-gland; it is also to be remarked that the under surface of the fang is *grooved*, doubtless to facilitate the transmission of the poison oozing from the orifice at its base. A fair drawing of the gland will be found in Rymer Jones's work on the General Structure of the Animal Kingdom, article "Arachnida."—*T. G. P.*

[An interesting communication on this subject, with figures, will appear in our next.—Ed.]

Common Dog-fish.—In reply to B. S., I beg to say, that in visiting the Scilly Isles, a few summers ago, I had the opportunity of seeing several Common Dog-fish brought on shore by the fishermen in their nets. On inquiry into the habits of the fish, I was assured that the young fish continually take refuge in the stomach of the parent on the approach of danger, and have been seen issuing again from its mouth.—*Frances F. Statham.*

Birds Poisoning their Young.—(See p. 167.) In connection with this, I might notice that I reared several young greenfinches two years ago, one of which I put in a cage before it could feed itself, with some others about two months old. They fed it regularly; but in a few days it died, the head being greatly swollen. It struck me that it was poisoned. If placed on the floor of the cage, it could not resist a tendency to run forwards till it came to a corner, or some place where it could bury its head.—*Hy. Ullyett, High Wycombe.*

Where does the Kingfisher roost?—This question is asked at page 166 by Mr. Ranson. A friend of mine, a naturalist, who lived near Portsmouth, once wrote me that he had had a kingfisher brought by some men that had *netted* it in a shrubbery at night. It was evidently roosting there.—*Hy. Ullyett.*

Rhubarb Wine.—This is frequently made in Leicestershire, and is one of the best of home-made wines, being what wine-merchants call "clean," that is, free from any coarse or objectionable flavour. It forms an excellent "foundation" wine, to which any desired flavour can be added.—*F. T. M., Loughborough.*

"Clear-Wings."—Have any of your readers noticed *Trochilium tipuliforme* in great numbers this year? I took no less than six dozen in three days last month. They were feeding on the blossoms of the raspberry, and allowed me to box them with tolerable ease, and I was thus enabled to obtain them in a much better condition than if they had been captured in a net. I should be happy to exchange some for British Lepidoptera.—*A. B. F.*, 64, *North End, Croydon.*

Nightingales and Glowworms.—I suppose it is generally acknowledged that the song of the nightingale is heard no more after the business of feeding the newly-hatched young has once commenced; and also that the glowworm is one of the delicacies indulged in by the songster in question. How long does the nightingale remain here in its songless condition? Is the education of its young left to the concert of birds whose notes it is said to combine? and what does it feed on before the appearance of the glowworm? I believe about July. Are damp or dry situations the better suited to this little night-light? and can any of your correspondents say anything to the following, extracted from a work on "The Natural History and Economy of the Insects injurious to the Field Crops of Great Britain," by J. Curtis, F.L.S., published in 1860, by Blackie & Son: "It is also a singular fact that glowworms (*Lampyris noctiluca*), and the female of an allied genus, named *Drilus flavescens*, feed on snails"?—*F. H. M., Chelmsford.*

Smooth Newt.—I have observed that every specimen of the common smooth newt which has been placed in my aquarium, has cast its skin within a few hours after being in its new abode. I have attentively watched several in order to ascertain, if possible, the manner in which they effect this, but have been unable to perceive even the smallest portion of skin detached. I conjecture that they must shed them in exquisitely small flakes. Probably the change may be owing to the difference existing between the water in the aquarium and that of their native ponds with respect to hardness.—*J. H. F.*

Stinging Power of Sea-Anemones.—[S. G., June, 1866.]—M. D. P. is much mistaken in thinking that *Anthea cereus*, or any other Actinia, stings only when out of health. Let M. D. P. take an *Anthea* in full health and vigour, and draw a few of its tentacles across his (or her) tongue, and then tell me the result. I try, habitually, every sea-anemone I can get in this manner. *The tongue is the only test.—W. Alford Lloyd, Zoological Gardens, Hamburg.*

Beetle Mortality.—Can you account for a great mortality among the destructive little beetle *Phyllopertha horticola*, which I found dead in quantities this morning on top of a cistern of rain-water *only?* —*A. S. Currey.*

Dry Fog, or Peat Fog.—This phenomenon is generally observed in Belgium, during several days at the end of May, ordinarily from the 21st to the 24th, and is accompanied by an eastern or a south-eastern wind: in Germany it is called Landrauch, Moorrauch, Heiderauch, *i. e.* landsmoke, bogsmoke, heathsmoke. According to Kæmtz, different authors attribute this fog to the combustion of the peat-grounds in Holland, Westphalia, &c.; at least these fogs take place at the same time with that combustion of which the products amount to more than nine millions of kilogrammes. I observed the dry fog here, this year, from the 21st of May till the 23rd, and I remarked that the shadows of small objects, *ex. gr.* of a pin, were of a very intense blue. I am curious to know if that fog is also observed in England.—*Bernardin, Melle, near Ghent.*

Ice.—As the season of ices has begun, a word on the commerce of ice may prove interesting to several readers of Science Gossip. This trade began in Boston (U.S.) in 1805; 74,000 tons of ice were shipped there in 1847, in 353 vessels, for Havannah, Calcutta, England, &c. In 1854, the capital engaged in that industry, in North America, amounted to seven millions of dollars; 10,000 persons were employed in it. An American newspaper of this month (May, 1866) says, "The various ice companies in the neighbourhood of New York have on hand now and ready for sale, one million or a million and a half tons of ice. Ice is also exported sometimes from Norway. In Paris the use of ice is universal in the summer months; the quantity consumed is said to amount to 12,000 or 15,000 tons a year: in 1822 it was sold there as high as 300fr. per 50 kilogrammes; but generally it is much cheaper. A new supply of ice has been afforded for some years to Paris from a glacier in Switzerland. The landlord at the "Eagle Hotel," at Grindelwald, in the Bernese Oberland, exploits the lower glacier near his estates; from Grindelwald it is transported to the lake of Thun, and thence on the Central Railway, which conveys it to Mayence, to Paris, &c.; a great quantity of that ice is consumed in Paris. At the lake of Thun it costs about 28s. per ton.—*Bernardin, Melle, near Ghent.*

Prussian Vandalism.—We much regret to hear that the Zoological Garden of Dresden has been destroyed. The smaller animals were given away or turned loose; the large carnivores, &c., were killed; and the ground has been levelled for a fortification. It is apprehended that the fine Zoological Garden of Cologne will suffer the same fate. Alas! for the much-boasted European civilization of the latter half of the nineteenth century.—*Land and Water.*

MARKINGS OF LEPIDOPTERA.—In answer to G. T. P. The causes of the variations in markings and colour are various, and as yet imperfectly understood. Amongst them may be named,—difference of geographical position, peculiarities of food, or scanty supply thereof, possibly even the geological character of the locality, and meteorological influences, as suggested by your correspondent. The small white Cabbage Butterfly (*P. rapæ*) is well known to vary. The males are usually spotless on the upper wings; but both sexes have, in all cases, I believe, one black spot on the hind wings. The females have two or three black spots on the upper wings. A well-marked variety was once called *P. metra*,—this is of a dusky hue; but from the same brood of larvæ have been reared both this and *P. rapæ*. In the case referred to, it is difficult to see how either "excessive moisture or dryness" could have occasioned any difference in the perfect insects, as they were all subjected to similar influences in the same garden; and the presence or absence of the spots on the upper wings is a difference of so little importance as scarcely to be called a variation.—*J. C.*

LAND TORTOISE.—I have a land tortoise (*Testudo Græca*) which lives in the garden, but its shell cracks so very much, I want to know the reason—is it because it is growing?—*E. M. H.*

A HEDGEHOG which held the office of "beetle-destroyer" in our house, some years ago, came to an untimely end through the depredations of "gentles," who were devouring him with such rapidity that we were compelled to drown him. The poor brute was found to be full of large holes, and I am certain that the "maggots" would soon have killed him without our intervention.—*G. J. B.*

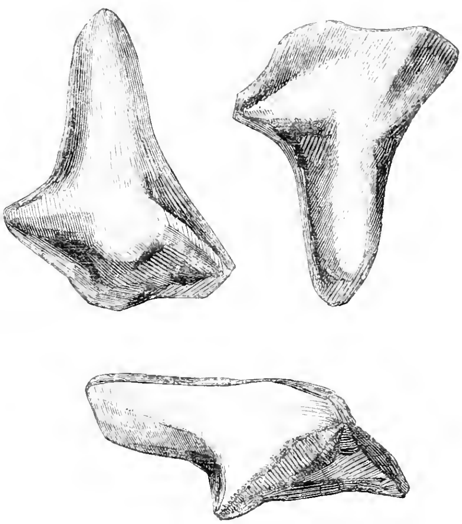
SNAKE IN YORKSHIRE.—The common snake (*Coluber natrix*) is found as far north as Yorkshire, I am in a position, from personal observation, to affirm. In fact, only last evening, I found two that had been recently killed on the Yorkshire moors, forming part of this parish, one measuring three feet in length. On three or four occasions, too, I have picked up the slough or cast-off cuticle, one a perfect specimen, in a tuft of heather or ling, through which I imagine the reptile had purposely crept to facilitate the removal of his encumbrance. In Scotland I have heard the ringed snake is never found; certainly, during a two years' residence there, and in many botanical rambles, I never came across it. The adder (*Pelias berus*) is, of course, an inhabitant of northern regions, and I once caught one in a semi-torpid state on our moors. I recollect, too, having to treat a case of bite in the arm from an adder, in which the youth suffered most severely.—*Henry W. T. Ellis.*

COMMON SNAKE AT LANCASTER.—In reply to the inquiry of your correspondent J. R. D., I believe the common ringed snake (*Coluber natrix*) is frequently found as far north as Yorkshire. I have in my possession now one caught in the grounds of this asylum on Lancaster Moor.—*J. D. M.*

YORKSHIRE REPTILES.—I have seen several Yorkshire specimens of the common snake; it is, in fact, quite plentiful in the North Riding. The viper is more scarce. The blind-worm is common on the Yorkshire moors.—*R. M. Middleton, Jun., West Hartlepool.*

SNAIL EGGS.—If C. L. has any water-snails in his aquarium, the "aquarium pest" he complains of is probably snail-spawn. I have frequently noticed it in my aquarium; but I never removed it, as the fish used to feed on it greedily. The mollusc I allude to is the common pond or water-snail (*Limnæa stagnalis*); and in support of my theory I quote the following from "Wood's Natural History":—"The eggs of the pond-snail are laid in ribbons of transparent gelatinous substances." This "ribbon" does at first sight rather resemble a slug.—*A. J. N. Macdonald.*

WINKING MARYBUDS.—Your correspondent S. C. speaks of the garden marygold as being mentioned as "Winking Marybuds" by Shakespeare. Again, your correspondent B. thinks the plant alluded to is not a garden plant, and suggests *Ranunculus Ficaria* (pilewort). May they not both be reconciled by concluding it to be the marsh marygold (*Caltha palustris*), which I have always considered to be the Marybuds of Shakespeare?—*R. S.*



AMONG the flints at Aldershot I frequently find some of the shape of the above sketch, varying a little in size and shape. The sketch is from reverse, obverse, and side views. I should be glad to be informed of their name. The flints have a slight coating of chert on them.—*T. R.*

THE CUTICLES OF LEAVES AND PETALS are often very beautiful objects for the microscope. Amongst those which I have not seen mentioned is the cuticle of the petal of the rhododendron, in which the cells are covered with irregular waved lines; but I cannot mount it, so as to keep the markings distinct. With a little water it shows nicely, and is different altogether to the generality of cuticles. The pollen, too, is peculiar.—*E. T. Scott.*

ALAS, POOR HEDGEHOG! (See p. 167).—Some years since a hedgehog was found here (East Kent) shockingly mutilated by the larvæ of the bluebottle, yet it was still living, and apparently suffering from no other disease.—*G.*

NOTICES TO CORRESPONDENTS.

All communications relative to advertisements, post-office orders, and orders for the supply of this Journal should be addressed to the Publisher. All contributions, books, and pamphlets for the Editor should be sent to 192, Piccadilly, London, W. To avoid disappointment, contributions should not be received later than the 15th of each month. *No notice whatever can be taken of communications which do not contain the name and address of the writer*, not necessarily for publication, if desired to be withheld. We do not undertake to answer any queries not specially connected with Natural History, in accordance with our acceptance of that term; nor can we answer queries which might be solved by the correspondent by an appeal to any elementary book on the subject. We are always prepared to accept queries of a critical nature, and to publish the replies, provided *some* of our readers, besides the querist, are likely to be interested in them. We cannot undertake to return rejected manuscripts unless sufficient stamps are enclosed to cover the return postage. Neither can we promise to refer to or return any manuscript after one month from the date of its receipt. All microscopical drawings intended for publication should have annexed thereto the powers employed, or the extent of enlargement, indicated in diameters (thus: × 320 diameters). Communications intended for publication should be written on one side of the paper only, and all scientific names, and names of places and individuals should be as legible as possible. Wherever scientific names or technicalities are employed, it is hoped that the common names will accompany them. Lists or tables are inadmissible under any circumstances. Those of the popular names of British plants and animals are retained and registered for publication when sufficiently complete for that purpose, in whatever form may then be decided upon. Address No. 192, Piccadilly, London, W.

T. R.—The "Butterfly number" may be had of Kent & Co., Paternoster Row.

M. D. (*T. Wells*).—Your fungus is *Reticularia umbrina*. See Hooker's "Flora," pl. ii. p. 308.

A. L.—There are several species of moths (*Tineina*) that are destructive to clothing, &c., whilst in their caterpillar stage. Some of these will be found throughout the year, except during the coldest winter months. Keep plenty of camphor with the articles it is desired to preserve. Some persons advocate "Insecticide," but we have never tried it.

A. S. C.—Forwarded to F. M. The insect appears to be the *Chermes bursarius* of Burmeister.

E. H. L. will find a full answer to this query on deep-sea soundings in "Davies on Mounting, &c.," p. 42, &c.—*J. R. E.*

W. M. S.—Your shrub is *Cratægus pyracantha*, a native of the south of Europe.—*W. C.*

H. P. A.—Your water plant was described in the last number of "Seemann's Journal of Botany" (June, 1866).

E. M. H.—Blue cloth covers for Science Gossip, vol. i., may be had of the publisher at one shilling.

A. G. T.—Your little insects were the same as those noticed last month, p. 168, and there stated to be *Notaspis obscurus*.

S. B. G. T.—See a reply to your query in full in Science Gossip, vol. i. p. 191, in a communication by G. Guyon.

The Dipper.—Except a statement of *facts* from personal observation, we can admit no more correspondence respecting "Birds walking under Water."

R. M. (Glasgow).—The "Parr" has been considered by some as an early condition of the salmon. Mr. Couch treats it as a distinct species (*Salmo salmulus*).

H. G. G.—Not an uncommon condition of *Trifolium repens*. The so-called "tea-tree" is *Lycium barbarum*.

P. P. suggests the formation of an Amateur Microscopical Club for Cheltenham. We cannot see how we can assist him. Why not try the effect of a letter in a local paper?

J. G. G.—We have no record of your address, and a correspondent desires information on keeping falcons.

E. M. H.—"Smelts" are *not* young salmon; the young fry of salmon are called "smolts."

F. A. A.—The caterpillars so common on hawthorn are those of *Hyponomeuta padella*. See vol. i. p. 168, and vol. ii. p. 182.

J. P.—Had you sent one query instead of five, it might have been answered.—"Let your moderation be known to all men."

R. T. M. A.—Botanical and Entomological boxes may be had of Mr. How (late Knight), Foster-lane, E.C.

Einna will doubtless find all the information desired in the present number.

B. T.—Your supposed fern is the leaf of the Wood Betony, with the under-side covered by a parasitic fungus called *Puccinia Betonicæ*.

N. S.—The cluster-cups (*Æcidium, sp.*) now to be found, will be those on the berberry, the buckthorn, the sanicle, and the very interesting one on the whitethorn; but for many of them it is too late.

W. S.—You will find about thirty species of the fungi that are found on dead leaves figured and described in "Seemann's Journal of Botany" for the present month.

F. S.—The majority of common zoophytes are figured and described in "Johnston's Zoophytes," published by Van Voorst.

A. M.—Mr. Gosse published a list of the British species of Rotifers in 1851.

R. W.—There is no English work, at all complete, on mites or *Acari*.

C. A.—Conditions like that of your dandelion are met with more or less every year.

J. W. I.—The bodies on oak leaves are young "Oak spangles," so often alluded to in our "Answers." Queries sent to the author named.

W. L. W.—The kind of work you require is much wanted.

G. E. P.—Keep your tank in the dark a few days.—*W. L. W.*

F. Y.—The white knapweed is only a common variety. Ladybirds are not confined to hop districts, but are found everywhere; surely South Wales cannot be an exception. Of course they are much more common in some localities than in others.

J. R. E.—No. 1 is *Potomogeton densum*, L.; No. 2, *Callitriche verna*, L.; No. 3, *Cornus sanguinea*, L.; as far as we can tell from the fragments sent.—*N.*

G. M.—No. 1. *Hypnæa purpurascens* (fruited). 2. *Polysiphonia elongata*. 3. Decayed *Polysiphonia* infested with diatoms. 4. *Sphacelaria scoparia*. 5. Similar to No. 3. 6. *Ceramium diaphanum* (fruited). Such inferior specimens are scarcely possible of identification, and *as* specimens are worthless.—*W. H. G.*

T. H. H. (Gateshead).—No. 1, *Mamestra Brassicæ*; No. 2, *Acronycta Psi*.—*F. M.*

Errata.—At. p. 147, col. 2, line 14, for "breeding," read "feeding."

What is the Object? (p. 151).—For "Holotharia," read "Holothuria;" for "Gregorica," read "Gorgonia;" for "Spicales," read "Spicules;" and for "S S. Clarke," read "J. L. Clarke," the paragraph having been inadvertently inserted without being "read."

N. L. Y.—Your query is too indistinctly stated for us to make out what you require.

Bodowen.—There is a second edition of the "Micrographic Dictionary, which contains additions to the first.

EXCHANGES.

Jamaica Woods.—Apply to W. E. Williams, M.D., Pickwick-road, Corsham, Wilts.

Puss Moth.—Pupæ for those of other good species.—E. A., 8, Victoria-place, Stoke, near Plymouth.

Bog Moss (*Sphagnum cymbifolium*) unmounted, for other objects of interest.—E. M., 6, Holford-square, Pentonville.

Andræa nivalis (in fruit) for *Buxbaumia aphylla* or *Cinclidium stygium*.—Ed. S. G., 192, Piccadilly.

Fossil Teeth.—Sections for objects of similar value.—E. W., 48, Tollington-road, Holloway, N.

Aspartic Acid, wanted for *Deutzia scabra*.—J. S. P., Abbotsbury, Dorset.

BOOKS RECEIVED.

"Chemical Addenda; being a brief Exposition of the Salient Features of Modern Chemistry," by the Rev. B. W. Gibsone, M.A., F.C.S., &c. Pp. 24. London: J. H. Dutton. 1866.

"Popular Science Review," No. 20, July, 1866. London: Hardwicke.

"Quarterly Magazine of the High Wycombe Natural History Society," No. 1, July, 1866. Wycombe: W. Butler.

"Vivisection; is it Necessary or Justifiable?" London: R. Hardwicke.

Communications Received.—J. G.—A. S. C.—T. R.—T. A. S.—J. F.—T. Q. P.—A. L.—T. P. B.—A. M. D.—A. S. C.—J. R. E.—W. M. S.—A. J. N. M.—E. B. (Kensington)—G.—L. L.—H. P. A.—R. S. S.—T. B.—T. C. H.—E. T. M.—W. A. L.—J. G.—E. T. S.—E. G.—J. H. F.—W. H. S. W.—E. M. H.—W. W. S.—D. S.—A. G.—J. R.—E. G. W.—H. W. T. E.—J. N.—H. U.—H. J. B.—S. B. G. T.—F. A. A.—A. B.—J. C.—V. A. S.—J. D. M.—A. B. F.—Q. J. B.—B. M.—L. H. F.—R. T. M. A.—F. F. S.—R. M.—G. M.—H. G. G.—W. H. H.—P. P.—E. A.—R. M. M.—G. F. S.—C. A.—J. W. I.—N. D. L.—W. L. W.—F. Y.—T. H. H.—S. F. C.—H. A. A.—A. F. C.—J. G.—E. W.—J. H. D.—R. B.—H. J. B.—J. S. P.—J. W. L.—T. C.—T. B. W.—C. B.—G. G.—J. M.

Echinus Spines.—Sections sent to E. M.—C.—C. A.—A.—J. T. B.—S. C.—G. E.—G.—C. A. J.—C. E. L.—T. D. M.—J. M.—W. R. M.—W. P.—G. E. Q.—H. T. R.—W. R.—G. W. R.—A. S.—E. W.—T. E. W.—J. W.—T. B.—S B.—J. R. E.—J. H. D.—N. G. G.—Mr. G.—J. G.—G. G.—H. (Poplar)—J. W. I.—W. H. K.—J. L.—W. E. M.—T. S.—W. J. S.—J. H. W.—H. P. A.—T. G. D.—H. G. G.—D. W. R.—J. W. L.—T. B.—W. C.—J. C. D.—W. G.—J. P.—E. T. S.—W. L. S.—J. S.—W. (Ramsgate)—F. J. W.—T. W.—E. W.—F. W.—T. W. W.—J. S. P.—W. B.—C. B.

OUR CLUB.

"It is in memory of the patient workman of Science who toiled out a quiet happy life under the skylights in Lincoln's-Inn Fields, that a Microscopic Club has been established, entitled the Quekett Club. For the encouragement and practice of this most useful branch of science the association has been formed, and it very properly christened itself after the indefatigable and famous master of microscopic learning."

The Daily Telegraph, Sept. 5, 1865.

"LIFE is a chain of surprises, to which every day adds a link," is written by some one, but by whom we do not remember. Had the selfsame author known our little friend, who, like Sir Thomas the Good,

> Would pore by the hour,
> O'er a weed or a flower,
> Or the slugs that come crawling out after a shower;
> Still poking his nose into this and to that,
> At a gnat, or a bat, or a cat, or a rat,
> Or great ugly things,
> All legs and wings,
> With nasty long tails arm'd with nasty long stings:—

Had he known that assiduous little type of a devotee to the microscope twelve months ago, even *he* could never have imagined such a link in the chain of surprises, as the said devotee having "gone to his club." We by no means allude to any personal and individual friend, but to that mythical member of the Q.M.C. who once a month covers his head and rushes from his study, his microscope, and his Canada balsam, to spend the evening at his Club.

This Journal had only fairly started into existence last year, when a correspondent inquired of us, in a communication addressed to the Editor, whether it would not be practicable to associate all the amateur microscopists of the metropolis in a society for their mutual benefit. This letter was printed (at page 116 of vol. 1.), with a note appended, soliciting communications on the subject. So favourably was the proposition received, that it was considered advisable to call a meeting of all who might feel interested in the subject. The result was, that a provisional committee was organized, and the idea, which originated with one individual in May, became a realized fact in July; and (at page 189) the "Quekett Microscopical Club" was announced as having commenced its career, which has been so successfully prosecuted during the past twelve months. Those loquacious old ladies who are so intimately associated with the advent of our juvenile population, are wont to pride themselves when any one of their *protégés* grows up as a "clever boy" and threatens to make "a noise in the world," that it was a "child of their nursing." In like manner *we* regard this offspring of a year as a child of our own nursing, with a longing to pat it on the head, and call it "Our Club."

We deem the present a favourable opportunity for making known to some of our readers *what* this institution *is*, of which we profess ourselves a little proud. The opportunity is a favourable one, because it just succeeds the close of its first year, and because, having presided at its birth, a little feminine loquacity from the "Gossip" of the occasion will be regarded as quite natural, and be pardoned accordingly.

According to custom, the Club issued its prospectus, in which the following paragraph occurs:—

"This Club has been established for the purpose of affording to Microscopists, in and around the Metropolis, opportunities for meeting and exchanging ideas without that diffidence and constraint which an amateur naturally feels when discussing scientific subjects in the presence of professional men."

Thus the general objects of the Club are set forth; how they have been accomplished, a few facts gleaned from the Report presented at the annual meeting will explain. After acknowledging the disadvantages under which Dr. Lankester accepted the office of President of the Club for the first year, and the able and courteous manner in which he filled that office, and after paying a just tribute to the memory of the first member removed from the Club by death, Joseph Toynbee, F.R.S., who was at the period of his decease nominated as President for the ensuing year, the report adverts to the great success of class instruction in microscopical manipulation under the superintendence of Mr. W. T. Suffolk, and gives hope of its being resumed. The field excursions are also alluded to as having been satisfactory, the first of these—to Hampstead-heath—being one Saturday afternoon, and the second to Darenth Wood and Swanscombe Marshes, on the 26th June. It is gratifying to learn that this truly practical phase in the operations of the Club was highly appreciated by the members, and received their cordial support. As good collections of objects are said to have been made on both occasions, these excursions are likely to be continued at intervals during the summer months. With regard to the library of books of reference, we are only informed that several donations have been received; hence it may be inferred that another valuable adjunct to an association of this description has not been forgotten.

It is not less gratifying to learn that one hundred and twenty-three slides of mounted objects have been contributed by members during the past year, and the Committee shrewdly allude to the fact that one of the members has presented a cabinet capable of containing an additional three hundred and fifty. Let us hope that the "canny" hint will not be forgotten.

The list of papers read at the monthly meetings may be taken as an index of the kind of topics which have occupied the attention of the Club. "Work for the Microscope," by M. C. Cooke. "Spiracles of Insects," by R. Beck. "Five new forms of Microscopical Fungi," and "The Application of the Microscope to the Discrimination of Vegetable Fibres," by M. C. Cooke. "How to Arrange and Keep a Cabinet," by J. Bockett. "A New Form of Microscope," by W. Hislop. "Class Instruction," by W. T. Suffolk. "The Respiratory Organs of Insects," by J. A. Archer. "Manipulation with Canada Balsam," by D. E. Goddard. "Universal Microscopical Admeasurements," by M. C. Cooke. "The Application of Photography and the Magic Lantern to Microscopical Demonstrations," by S. Highley. "Some Motions in the Pale Blood-Corpuscles," by H. Wigg, and "The Pigment Cells of Plants, in some of their varied Forms and Structure," by N. Burgess.

Allusion is made in the Report to a sub-committee which has been appointed for the examination of vegetable fibres, with an intimation that an interesting report might be anticipated at the close of their labours.

A brief paragraph announces the important fact, that one hundred and fifty-five members have been admitted during the year, and that their interest in the proceedings of the Club "has been manifested, not only by the good attendance at the meetings, but also by the free discussion and friendly intercourse which has been maintained, and which it is hoped may be still further increased by the genial influences of a *soirée* at no very distant period." This is the climax of the Report.

At first the meetings of the Club were held in a very comfortable and commodious room in Sackville Street, but the rapid increase, and large attendance of members, soon made it manifest that the accommodation was far too limited. In fact, the baby's feet were in danger of being crippled by little boots. In this dilemma, by favour of the Council of University College, the Club removed to the Library of that Institution, where its meetings are now held, on the fourth Friday of every month, at eight o'clock.

Having given this brief epitome of the first Report of the Quekett Microscopical Club, we may be permitted to add that the low rate of subscription, which is only ten shillings per annum, and no entrance fee, places its advantages within the reach of all amateurs, and it would cause in us but little surprise if the number of its members should be nearly doubled during the ensuing year, especially with such an "earnest heart" in the work.

Any one who has attended the meetings, and conversed with the members of this club during its brief career, will not fail to have observed the genial spirit of friendly intercourse which prevails, and the total absence of anything approaching to invidious comparison, jealousy, or antagonism, whereby any other fellow-workers in the same field, though in other associations, can feel themselves aggrieved. "Our Club" is named, perhaps, with a feeling of pride, but not of ostentation, and if they are not addicted to seeking for blame in others, it may be attributed to the earnestness with which they are in pursuit of their own studies, and the good will with which they are striving to benefit each other, and advance the cause of microscopical science.

The prominence which we have given to this subject, or, indeed, any notice of it whatever, may at first appear to have been impolitic in us, who address more readers beyond the boundary of the operations of the club than within it. Still, we would hope that a twofold purpose has been served. Microscopists far away will learn what some of their metropolitan brethren have been doing for themselves, and the successful establishment of one such association may, when known, be the means of inducing similar efforts in other cities, where hitherto nothing of the kind has been attempted. Whether as news or example, therefore, we commit this brief record to their attention.

SNAILS AND THEIR HOUSES.

As there is no creature more common on our chalk and limestone, as well as on our silicious or sandy soils, than the genus *Helix*, so there is none which authors have taken greater pains to classify elaborately. These "common things" belong to the Malacozoa or Mollusca. Blainville gave them the one name (from *malakos*, soft, and *zoön*, animal), and Cuvier gave them the other and more convenient term—"soft things." He also pronounced them gasteropods, or belly-footed, because they possess a muscular disk or foot for creeping, attached to the body underneath. Slugs, however, as well as snails, and even marine whelks and buccines,—indeed, all ordinary mollusks, are familiarly known also to possess this fleshy appendage. But then *Helix* is the Latin for snail, as Dr. Johnson declares *tace* to be that for a candle, and it stands to reason that *Helix* should be distinguished as *the* snail *par excellence;* and it is so regarded both by Linnæus and Lamarck.

The three most familiar to us from their shells are :—

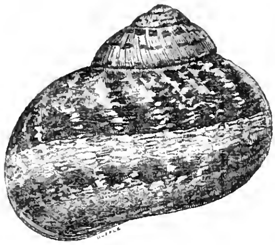


Fig. 174. Spotted Snail (*H. aspersa*).

H. aspersa, or Spotted Snail (figs. 174, 175), the most common of all, whose four brown bands are interrupted by yellow curved spots.

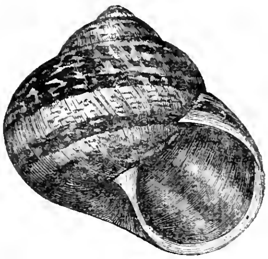


Fig. 175. Spotted Snail (*H. aspersa*).

H. nemoralis or *arbustorum*, the Wood or Orchard Snail (figs. 176, 177), brown, and marbled with yellow, with one long dark brown band continued from the spire to the base of its volutes.

H. hortensis, the Garden Snail (fig. 180), a very pretty yellow shell, with five longitudinal brown bands.*

Of these the first is the larger and more destructive: ask the gardener. Fortunately, however, it is so sensitive to cold, that, whilst carrying large and commodious premises upon its back, it takes

Fig. 176. Wood Snail (*H. nemoralis*).

care to shut itself up in them (closing over the aperture with a film, as also does the wood snail) at the least sensation of frost or discomfort. Thus

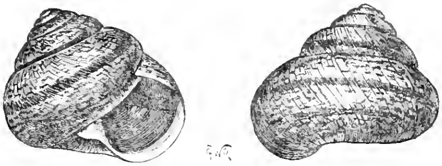


Fig. 177. Orchard Snail (*H. arbustorum*).

children, who are sometimes wonderfully observant naturalists, taunt it with the rhyme,—

> "Snail, oh snail, shoot out your horn,
> And show 'twill be a good day the morn."

Unquestionably the snail will not exhibit a single tentacle, of which it has four, unless to confirm a favourable prognostication of the weather.

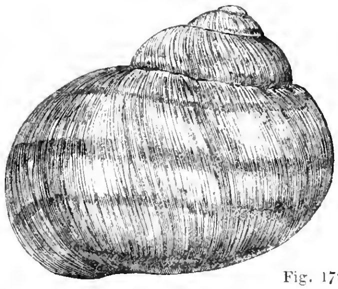
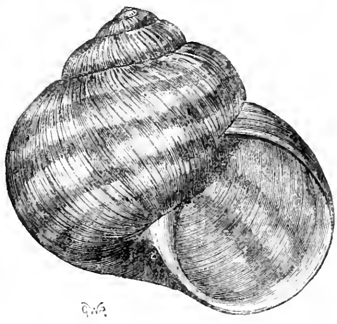


Fig. 178.



Figs. 178, 179. Apple Snail (*H. pomatia*).

When we speak of size, the most respectable British snail is the Apple Snail, *H. pomatia* (figs. 178,

* Some authors regard *Helix nemoralis* and *H. arbustorum* as distinct species, with *H. hybrida* and *H. hortensis* as varieties of *H. nemoralis*.

179), literally the size of a small Somerset cider apple, not unlike one, and, at least, as eatable. The Romans, indeed, were so very partial to this delicacy of the season, that, with them, it was an object of cultivation, and as reasonably so as the oyster with us, or the sea slug with the Chinese. What, in fact, are those periwinkles which certain inhabitants of Whitechapel are at this moment eating with a pin? Only another class of the same order, and, mayhap, not so well fed on the fat and sap of nature. We need not be surprised, therefore, if some nations still show a peculiar relish for snails. During Lent they are used as food in many parts of Catholic Europe. A writer, passing through the market of Rome during the month of March, says he saw things exposed for sale which we should hardly suppose human creatures would choose voluntarily for food. "There were baskets of frogs and shell-snails. These were crawling about and pushed back by the boys."

Likewise in the new world, at Monte Video, Mr. Webster ("Voyage of the *Chanticleer*") informs us that "large quantities of snails are sold in the market and used for making soup." The distinctions of food lawful and unlawful for the Jews are well understood, ever since the vision of St. Peter, to have had only in view objects peculiar to the Jewish nation; and by Lev. xi. 30, snails, in common with some other vermin, were forbidden to the Jews. Man is not the only creature that feeds on snails. Birds do so; and the common eel feeds on snails as well as on worms—nay, at night will quit its watery element and wander in search of them along meadows. A well-known naturalist at Weymouth (Mr. Thompson) lately wrote to me that he rather fancied the profusion of small shell snails consumed by the sheep on its green sea pastures had something to do with the fine flavour of the Portland mutton. Mr. Thompson's authority is important. As a sportsman he has made it his study to distinguish the flavour of all flesh that falls a prey to his gun. The vast quantities, in fact, of gluten which those creeping dainties of old contain, render them of well-known value as a remedy in pulmonary consumption, and "snail's milk" is an old wife's secret of great repute, though generally administered in secret, through dread of ridicule.

We figure this great *Pomatia*. It will be seen (figs. 178, 179) that the stripes passing lengthwise are crossed by very minute spiral stripes, not strong enough to mark it like network. It is only found in the South of England, under hedges, in woods, and on chalky soil; which localization is accounted for by the fact of its not being indigenous, but introduced so recently as the middle of the sixteenth century by Mr. Howard, at Albury, Surrey, whence it increased and spread itself over most of the southern counties, although some attribute its introduction into England to Sir Kenelm Digby for the medical purposes above alluded to.

Although perhaps *H. pomatia* is the only thing in snails anywise tempting, although it was a favourite food of the luxurious Romans, and is still consumed as a rarity in many parts of the world, yet the common spotted snail, *H. aspersa*, is also highly enough esteemed to be thought worthy of culture. I have the authority of my friend Mr. E. J. Lowe for saying that large quantities have been exported alive in barrels to America, and successfully propagated in the United States (the creatures being each bisexual), whilst great numbers are conveyed to the London markets for the cure of chest diseases. This snail enlarges to its greatest dimensions in Algiers. And, by the way, the ratio of spiral development of its subglobose shell has been identified by Professor Goodsir (the friend and companion of the lamented Edward Forbes) with the true logarithmic curve.

Notwithstanding the destructiveness of *H. aspersa* (figs. 174, 175), it is only fair to state that if, and so long as, it can get primroses (*Primula vulgaris*), nettles, elder, or wild celery to devour, it will not trouble anything else. The surface of its shell is rough and apparently strong, yet it is, in reality, thin and brittle, a circumstance which gives every advantage to the song or stone thrush (*Merula vulgaris*) in knocking it against a selected stone in the gravel walk, so frequently found surrounded by the fragments of shell, whence the dainty songster has pecked its "tit-bits." *H. aspersa* deposits its eggs, Chatereaux says, 100 to 110 at a time, in holes at the roots of grass and trees, from May to October. These eggs are from 15 to 30 days in hatching, and the young are 13 months before being fully grown.

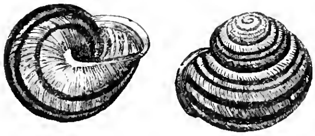


Fig. 180. Garden Snail (*H. hortensis*).

Of the three leading common shells already mentioned (omitting *pomatia*), *H. nemoralis* or *arbustorum* (figs. 176, 177), although it locates in woods, is possibly the more universally diffused, for these reasons,—that *H. aspersa* dislikes argillaceous (clayey) soils, and *H. hortensis* (fig. 180) prefers them. The shell of the wood snail is subject to immense variation in its colours and markings. Indeed, I am not quite sure whether I shall not be denounced as an innovator for not distinguishing sufficiently betwixt the more general *H. nemoralis* (fig. 176) and the more local *H. arbustorum* (fig. 177). *Nemoralis* is the one name given to both by Linnæus. But I think we shall be obliged to allow that, whilst *nemoralis* is the more full-bellied (*ventricose*), the more clear in colour and the more definitely banded, the markings of *arbustorum* are, on the other hand, more mottled and less definite. Although *H. nemoralis* is so globular as not easily to be confounded with other species, its colours are so varied that scientifically there might be formed a whole catalogue of its sub-varieties worthy of distinction. One species, for example, is yellow with dark brown rim; another brown, but banded on tints of white, yellow, or brown; another greenish-yellow, with three narrow brown bands; another, with five broad belts, darker and wider in different places; another, pink with four bands, the three lower dark red-brown; another, brownish-pink, with one broad belt occupying nearly the whole whorl, and a second narrow band above it; and another pink, with five pale brown bands. These, the more common variations, are by no means a complete enumeration of the varieties of colour. Sowerby makes the curious assertion that this wood snail will eat earthworms or even cooked meat, and we dare say it would if it could get the chance. It is in its turn infested with a parasitic insect. In dry weather not a specimen of it is to be seen. An hour after a shower you may count perhaps thousands in the woodlands. In cold, too, it retires, as already hinted, into private life, amongst grass-roots and rubbish. Much discussion has ensued on double glazing in certain contemporaries weighted with the responsibility of our domestic comfort. Let them take a lesson from the snail. In winter it closes over the mouth of its shell, not only with an outer semi-transparent mucous covering, but afterwards retiring further inwards, it protects itself by means of a second film, securing a warm stratum of air betwixt it and the outer cold for the entire duration of its four months' fast.

The shell of *H. hortensis*, the garden snail (fig. 180), again, is always about one-third smaller, and it is a little more globular still than *H. nemoralis* (fig. 176). The eggs of *H. hortensis* resemble small peas, and a bad kind they would be for the gardener to sow. Macgillivray (to whom I shall again refer) notices three varieties of garden snail: the Common Banded; the Unicolor (not banded); the Arenicola (sand-inhabiting).

The peculiarity of this last variety is a strange one—it is a smell. Has any one ever smelt a snail which emits an odour of onions? It was either this variety of the garden snail or the onion snail (*Zonites alliaria*) altogether; and this garlic-scented odour, as it is more properly called, remains perceptible even after the creature has been killed in hot water. [Collectors will understand why we kill snails thus—it is to get quit of the inhabitant at once; and to preserve the enamel of the shell, the scalded one must instantly be dropped from the hot into cold water.]

Linnæus, whose original arrangement of molluscs was successively upset by the new classifications of Lamarck, De Ferussac, and Bosc, and entirely abandoned at the dictation of Dr. Oken, included in the genus *Helix* many fresh-water, fluviatile (river), and even sea species. But so limited has been the view adopted by more modern authorities, that Professor Macgillivray, labouring, it is true, under the restraints of a northern clime (Aberdeenshire), although known as one of our most diligent collectors (he was naturalist to the present Royal family, and the late Prince Consort is understood to have acquired the copyright of his works), adduces, besides the three *Helices* already mentioned, only the following, treating all the minor specimens, not as *Helices*, but as *Zonites*:—The Wrinkled Snail, *Helix caperata** (fig. 181); the Bristly Snail, *H. hispida* (fig. 182); the Scaly Snail, *H. lamellata* (fig. 183); the Prickly Snail, *H. aculeata* (fig. 184); and the Little White Snail, *H. pulchella* (fig. 185).

Fig. 181. Wrinkled Snail (*H. caperata*).

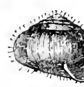


Fig. 182. Bristly Snail (*H. hispida*), enlarged.

Fig. 183. Scaly Snail (*H. lamellata*).

Fig. 184. Prickly Snail (*H. aculeata*), enlarged.

Fig. 185. Little White Snail (*H. pulchella*), enlarged.

These, indeed, are the more typical, the more common, and profuse. But when we classify types,

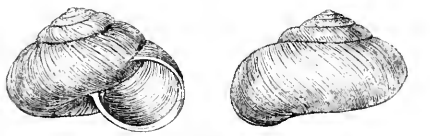


Fig. 186. Kentish Snail (*H. Cantiana*).

they must go together, thus: to the Bristly Snail may be referred two which have been classed as its varieties, namely, the Silky Snail (*H. sericea*), and the Neat Snail (*H. concinna*). In like manner also to

Fig 187. Carthusian Snail (*H. Carthusiana*).

the Little White Snail (*H. pulchella*) we may ascribe the white snails, the Kentish Snail (*H. Cantiana*, fig. 186), and the Carthusian snail (*H. Carthusiana*, fig. 187). Besides these the British list contains the Pisa Snail (*H. Pisana*), the Zoned Snail (*H. virgata*, fig. 188), the Heath Snail (*H. ericetorum*,

* In a few days I have just spent at Professor **Buckman's**, I found *Caperata* to be the prevalent *Helix* on the upper lias.

fig. 189), the Lapidary Snail (*H. lapicida*, fig. 190), the Ruddy Snail (*H. rufescens*, fig. 191), the Rounded Snail (*H. rotundata*, fig. 192), the Bellied Snail (*H.*

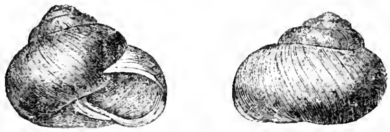


Fig. 188. Zoned Snail (*H. virgata*).

Fig. 189. Heath Snail (*H. ericetorum*).

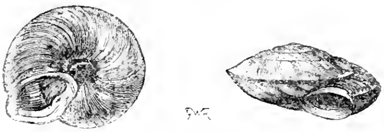


Fig. 190. Lapidary Snail (*H. lapicida*).

umbilicata), and the Pigmy Snail (*H. pygmæa*, fig. 193); together with three rare species, the Bulged Snail (*H. obvoluta*), which occurs only in Hampshire; the Green Snail (*H. revelata*), found on the

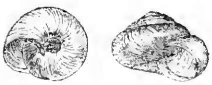


Fig. 191. Ruddy Snail (*H. rufescens*).

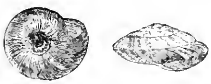


Fig. 192. Rounded Snail (*H. rotundata*).

Fig. 193. Pigmy Snail (*H. pygmæa*), enlarged.

south coast; and the Membranous Snail (*H. fusca*), which is more widely distributed than the two last-named species, being found sparingly in several localities. On each of the species which we have enumerated, a few remarks might with advantage have been offered, but the space already occupied must be our excuse for the omission, for which the figures from nature will partly compensate.

Fig. 194. Hybrid Snail (*H. hybrida*).

Lest any of our readers should be disposed to regard *H. hybrdia* as a distinct species, we have furnished figures (fig. 194) of the shells.

W. Wallace Fyfe.

PWAI-NGYET.

I HAVE noticed your remarks on the substance called *Pwai-ngyet* in your interesting little periodical Science Gossip. As it was I who furnished the bees which were forwarded by the Agri-Horticultural Society of Calcutta to Mr. F. Smith, of the British Museum, for identification, and which he pronounced to be *Trigona læviceps* (as Dr. Mason, to whom you refer, states in his book on the natural productions of the Tenasserim provinces); and as, therefore, I know both the substance and the insect well, I have great pleasure in giving you such information as I can on the subject.

A few years ago, the secretary of the Calcutta Agri-Horticultural Society wrote to me for information regarding *Pwai-ngyet*. Until then, I knew very little about it; but my attention having been called in this way to it, I made it my business to find out what it was.

If I read your remarks rightly, you appear to be of opinion that *Pwai-ngyet* is the pure unaltered gum or resin of *Canarium strictum*, only bored and channelled by the bee. If this were so, then the substance should only be found on that tree. It is, however, found on different trees: sometimes too in the ground, or in a hollow among rocks; and, occasionally, even in the hollow post of an old house. I have seen the bees making their nest in all these several situations.

Pwai-ngyet, I believe myself, is a combination of various gums or resins, and probably also of oils, gathered from various sources, while in a soft state, by the bee, and built up and moulded, very much as wax is moulded; with this difference, that whereas wax is formed by the honey-bee into cells of perfect and uniform symmetry, the cells in *Pwai-ngyet* assume no regular form at all.

What trees contribute their juices to form *Pwai-ngyet* I cannot say for certain, though I incline to think that *Thengan-tsee*, or the resin of the *Thengan* (*Hopea odorata*), is the chief ingredient, and that the oil of the various *Dipterocarps*, or wood-oil trees, particularly of *Dipterocarpus lævis*, *the* wood-oil tree *par excellence*, also enters into the composition of the material. My reasons for thinking so are, that the texture, the colour, and the smell of *Pwai-ngyet* are all such as would apparently result from a combination of the two substances mentioned; and, that *Hopea odorata* and *Dipterocarpus lævis* are among the principal giants of our forests, and common trees. On the other hand, I do not think (though I will not be sure) that *Canarium strictum* is found in our provinces, although I believe a species of *Canarium*, a large timber tree, is found in Pegu.

The *Trigona læviceps* builds its nest *generally* in the hollow of a tree, entering by a small aperture.* These apertures are lined with *Pwai-ngyet*, and sometimes only show a small rim of that substance raised above the bark of the tree. Sometimes, however (perhaps always if undisturbed), the bees go on building outside and adding on to the rim, until they have formed a wide-mouthed entrance which projects as much as a foot from the tree. These structures commonly assume the shape of the mouth of a large trumpet flattened horizontally, and have a perpendicular diameter of a foot or so, and a horizontal diameter of three or four inches. They are built with great regularity in their exterior half, but not so regularly towards the base, from the necessity of adapting the structure to the shape of the tree where the hole may chance to be. They are very curious and pretty objects, but being very prominent, attract the notice of the passer-by, and so often lead to the spoiling of the habitation.

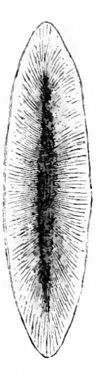


Fig. 195*a*.—Front view of Mouth.

"Sic non vobis *nidificatis* apes."

I send you a rude sketch of one of these trumpet-openings. I despatch also, by post, together with this notice, a small piece of *Pwai-ngyet*, broken off the upper base of such a work. By holding this up to the light, you will see three or four large cells of about an inch in diameter, without any opening. I can only suppose that the object of these cell-walls is to strengthen the narrow base in its support of the larger projecting mass. If so, here is another instance of a mysterious intelligence possessed by one of the smallest of living creatures.

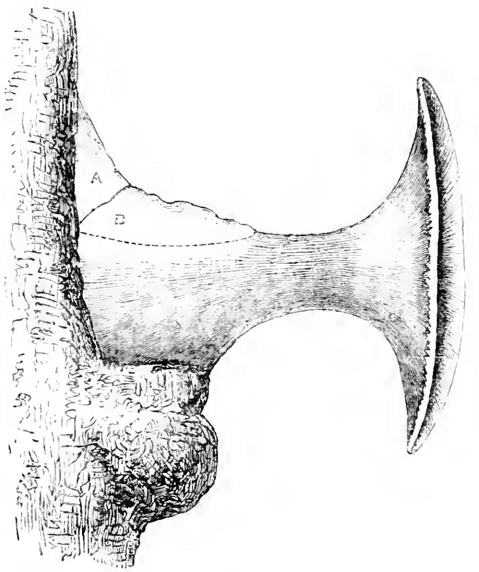


Fig. 195*b*. Nest of *Trigona læviceps*, one-sixth natural size.

This piece, marked *No.* 1, will show the ordinary texture, colour, and general appearance of *Pwai-ngyet*, as it is found in the jungles. *No.* 2 is nearly white, a very unusual colour. I send it because of its greater resemblance to *Thengan-tsee*, or the resin of the *Hopea odorata;* of which I also send a small piece (*No.* 3), in order that you may be able to ascertain how far the two substances are chemically identical.

What the internal economy of the nest of *Trigona læviceps* is I cannot say, as the tree has commonly to be felled in order to obtain the contents, and this I have never seen done. I am informed by the Burmese that from five to ten *riss* are usually obtained from one nest. A *riss* is about $3\frac{3}{4}$ lb., and costs about 4 annas (6*d.*) in the Bazaar. I should imagine that, considering the source whence it is procured, the supply must be very limited; and, if exported, it would soon equal beeswax in price.

Its principal, if not only use, at present, is for caulking; and, for this purpose, it is mixed with earth-oil, or *petroleum*.

The method is to boil the *Pwai-ngyet* in water, which makes it quite soft, and then to knead it with a certain quantity of the petroleum, until it attains the consistency of a lump of putty, which it much resembles. In that state it is fit for use, and is extremely viscid and tenacious. On putting a piece of *Pwai-ngyet* into boiling water, in order to perform the operation myself, I noticed that the surface of the water was covered with a thin film of oil. This confirms me in the idea that oil is united with resin in the composition of *Pwai-ngyet*. It is soluble in *oils* and in turpentine, but not in spirits of wine. I may conclude by mentioning that the mistakes made by several persons in Burmah with regard to the origin of this substance must have arisen from the fact that the name of *Pwai-ngyet* is often used here, in the bazaars, to denote any kind of resin or Dammer, but the true *Pwai-ngyet* of the Burmese is that made by the small bee called *Trigona læviceps*, and is made by them in the manner I have tried to describe.

Moulmein. C. S. P. Parish.

The drawing (fig. 195*b*), one-sixth the natural size, is an imaginary restoration, as but the lower half is before me. The portion marked *A* forms specimen *No.* 1, sent to you. *B*, within the dotted line, marks the space over which the *blind* cells, for strength as I suppose, extend. From the shape of the base, as brought to me, the mass must have rested partly on

* The insect was figured in Science Gossip, vol. I. p. 252, fig. 3.

some such excrescence of the trunk as I have tried to represent. The actual entrance into the tree in this instance was by a narrow perpendicular slit, two and a half inches long and three-tenths of an inch wide, the upper part of which may be seen in the specimen. The width, laterally, in the middle of the stem of the structure, is exactly one and a half inch. The weight of the whole, judging by the portion I have, may have been half a pound.

C. P.

THE LITTLE BITTERN (*Ardea minuta*).

THE student-lover of the natural history of our country always feels, as each fresh phenomenon is brought under his notice, a new interest given to his pursuits, an additional stimulus to his exertions. Whether the discovered object be common or rare is at first of little import, so long as it possesses the merit of being *new*. But, perhaps, after consulting his books, or his more learned companions, our friend finds that what is fresh to him is by no means unknown to the world at large; and then, although he cannot altogether ignore the delight which he has already experienced, he may feel that it has been thrown away upon a comparatively unworthy object. Suppose, however, on the other hand, that his "find" should be really interesting, not merely to the novice who has obtained it, but to the scientific community generally, we cannot but admit that there is a certain feeling of pleasure connected with it, which is renewed as often as the object is contemplated. We may well suppose that this feeling is experienced in no ordinary degree by the few favoured individuals to whose lot it falls to obtain a specimen of the bird whose portrait stands opposite—the Little Bittern (*Ardea minuta*).

The earliest mention of the Little Bittern as a British bird occurs in a valuable old work, perhaps less known than it deserves, and published in 1667—Christopher Merrett's "Pinax Rerum Naturalium Brittanicarum." In this book, immediately succeeding the mention of "*Ardea stellaris*—the Bittourn," comes the following:—"*Ardea minor*, quam ad me transmisit Dr. Jenner, ex agro Wiltoniensi." Of course, in those bygone days, when observers were few, and books on natural history fewer, we could not expect to find the Little Bittern an object of much observation; and it is not until 1808 that it is mentioned by Montagu as having been noticed "contiguous to the river Credey, in Devonshire," where three specimens were shot. The county of Norfolk appears to have produced several examples; in 1826, a young specimen was shot on the banks of the Thames near Windsor, which Yarrell remarks, "was believed to have been bred there, from the situation being favourable, and the circumstance of a second bird in the same state of plumage being seen about the same spot for several days at that time." Specimens, but seldom more than two or three, have been obtained, at various dates, from the counties of Devon, Cornwall, Dorset, Hants, Somerset, Berks, Middlesex, Salop, York, and Northumberland; also from North Wales, from the east and south of Ireland, and from the Orkney Islands. We have recently heard of a specimen obtained near Deal. The specimen figured was shot by Mr. Thomas Marshall, of High Wycombe, at the

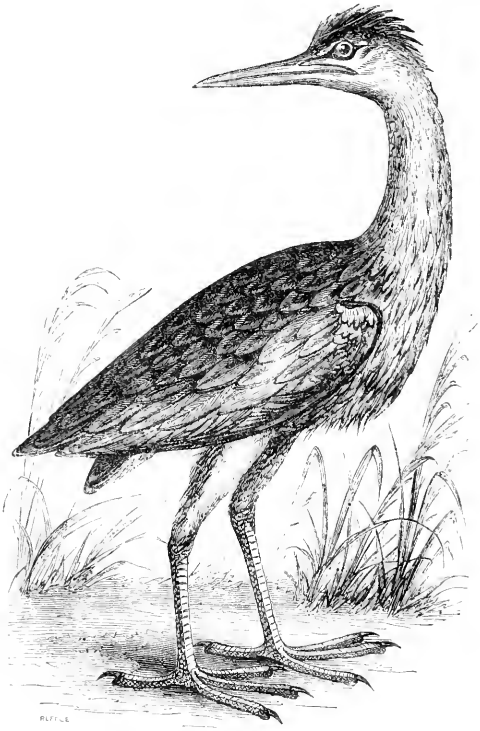


Fig. 196. The Little Bittern.

latter end of last year: it was killed as it flew from a well-known island in the river Thames, called Queen's Ait, about halfway between Maidenhead and Windsor, and just within the confines of the county of Bucks: the island is said to be admirably adapted for its nidification. At about the same time another specimen was shot at Christchurch, Hants, by Mr. Hart; in which locality the Little Bittern had previously occurred.

There is, we believe, no recorded instance of an egg of the Little Bittern having been obtained in Britain. Mr. R. B. Sharpe, indeed, recently mentioned, in the "Naturalist" that he had received a genuine specimen from Norfolk, and was kind enough to offer it for our inspection; but the results of further investigation are very unsatisfactory, and it seems doubtful whether the egg has any claim to be considered British, Mr. Sharpe having, apparently, been much deceived on the subject. Mr. Henry Stevenson, of Norwich, mentions in the same periodical that the bird occurs in Norfolk only "as a rare straggler:" he also states that he "never heard of its nesting, the birds being invariably shot on their first arrival." The Rev. F. O. Morris, in his "Nests and Eggs of British Birds," states that the eggs vary in number from four to six, "and are of a pale whitish-green colour."

The general appearance of the Little Bittern is very striking. The head is somewhat large in proportion to the body, and is surmounted by a black crest. The general hue of the feathers is a rich sienna-brown, with black and white markings: the legs and feet are yellowish-green. The long neck and beak, and peculiar head, show its relationship to the Common Bittern (*A. stellaris*). The bird does not measure more than eighteen inches from top to toe, and its weight is remarkably trifling. When flying, the bird much resembles a woodcock; and was at first considered as such, both by Mr. Marshall and Mr. Hart. It occurs in Sweden, Germany, Holland, France, and Italy, as well as in various of the islands of the Mediterranean. Asia also produces it; and it is mentioned as having been observed in Africa by recent travellers. The reclaiming of our various fen-districts may have resulted in the extermination of the Little Bittern from localities where it may formerly have been abundant; in which case it is not the only treasure which nature has lost while yielding to art.

Bewick's information about the Little Bittern is very scanty, but his figure of it may be preferred to that of Yarrell. For further information regarding this species, as well as for a figure and technical description, reference may be made to Yarrell, Macgillivray, or the Rev F. O. Morris's "Birds of Great Britain." B.

The Importance of definite Principles.— * * * * * * More bones enter into the formation of the skull in fishes than in any other animals; and the composition of this skull has been rightly deemed the most difficult problem in comparative anatomy. "It is truly remarkable," writes the gifted Oken, to whom we owe the first clue to its solution, "what it costs to solve any one problem in philosophical anatomy. Without knowing the *what*, the *how*, and the *why*, one may stand, not for hours or days, but weeks, before a fish's skull, and our contemplation will be little more than a vacant stare at its complex stalactitic form."—*Professor Owen's "Principal Forms of the Skeleton."*

Botanical Mem.—Why is Opium like a truthful father? Because it is Papa-veraceous.—*Fun.*

POISON-FANGS OF SPIDERS.

In one of your later numbers you asked for one or two "little facts" relative to this subject. May I trouble you with the following:—

Nearly 200 years ago, Leeuwenhoek alluding to this fact of the spider, describes it as follows:—"And in each of these fangs (for so I will call them) is a small aperture, through which, in all probability, a

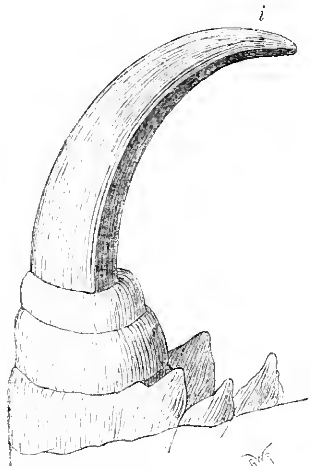


Fig. 197. Fang of a Spider, from Leeuwenhoek.

liquid poison is emitted by the spider at the time it inflicts the wound;" and he gives the above diagram (fig. 197). This representation is that of a fang "as seen through the microscope;" and he says further:—"At *i* is to be seen the small aperture I have mentioned, which aperture appears the same on both sides of each fang, and through this we may reasonably conclude the spider ejects its venom."

In the History of British Spiders lately published by the Ray Society (a work which some of your correspondents would do well to consult before writing to you), Mr. Blackwall states, "The fang is very hard, curved, acute, and has a small fissure near the point, which emits a colourless fluid secreted by a gland."

But the presence of these small openings in the fangs of a spider may be still more satisfactorily proved by any one who has a moderate microscope; he must, however, examine the *inner surface* of the fang, which is towards the mouth, and view it as an opaque object with the lieberkuhn. I have never seen the opening on the outer surface of the fang, and the fact of Leeuwenhoek remarking that the "aperture appears the same on both sides of each fang" might incline one to believe that he never saw it at all; but no one can hold such an opinion after examining the exact drawing he gives. Nevertheless, under most circumstances, it is very difficult to see this aperture in living specimens; and having in my examination commenced with these, I found that it was only by very careful illumination with lamp-light that I could thoroughly satisfy myself in the matter. The following Camera Lucida sketch (fig.

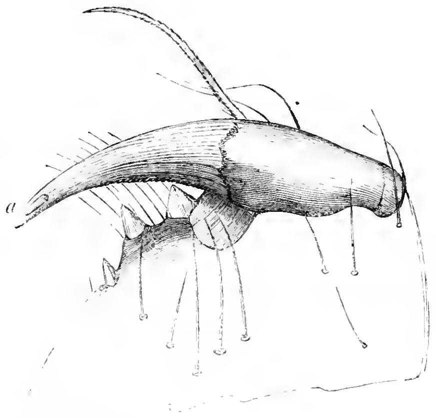


Fig. 198 × 100 diameters.

198) was taken from a recent specimen of an immature *Drassus*, the specific name of which I was unable to determine; but since then I have found that the cast skins of spiders form admirable specimens, for they not only show the opening (*a*) far more distinctly than when connected with the living animal, but they also present the fangs in a most favourable position for examination.

In most instances, and under these circumstances, the opening may be detected without any trouble; but without a more extended examination than that which I have as yet made, I am not at all prepared to state that the same arrangement exists in every spider. RICHARD BECK.

CHALK MARKINGS.—In many chalk quarries the faces caused by natural cracks are covered with black seaweed-like markings. So like are they that many think they are sea-weed impressions. But as they only occur in *natural* cracks, I conclude that they are the result of the percolation of water from the surface earth charged with carbonaceous matter. Am I right?

By way of experiment, I cracked a lump of chalk artificially, put ink along the line of the crack, and produced such a good imitation that a friend was unable to distinguish between it and the reality.

I shall be much obliged if you will tell me what the markings are caused by, and of what substance they are composed. W. T.

CLAWS OF OPHIOCOMA ROSULA.

WHILST examining the remains of an arm of *O. rosula* after maceration in caustic potash, I observed a considerable number of claw-shaped bodies, similar to those shown in fig. 199. These claws, as far as I have been able to ascertain, have not been previously noticed. Professor E. Forbes, in his "Monograph of the British Star-fishes," does not mention them, although he minutely describes this species. Being desirous of ascertaining the position of the claws, I examined by the aid of the microscope, an arm with the spines and plates *in situ*, and found them attached to the lower margin of the lateral ray-plate, near the base of the last spine (fig. 200).

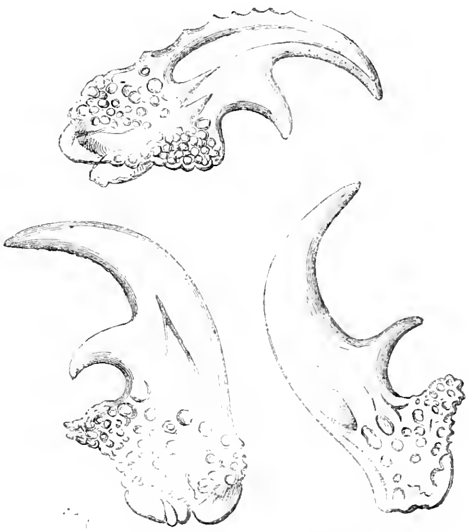


Fig. 199. Claws from *Ophiocoma rosula* × 150.

These appendages have a cellular burr on the lower or attached portion, the remaining portion being smooth and glassy; the inner margin of the claw has a kind of spur or tooth curving downwards. I am unable to say decidedly for what purpose these appendages are intended; but my impression is, that they are used for progression, or it may be to assist the animal in throwing off its arms, a practice the Brittle Stars have in common with many of the Echinodermata, to the great annoyance of the collector. Professor E. Forbes gives the following graphic description of the process:—

"The common Brittle Star often congregates in great numbers on the edge of scallop banks, and I have seen a large dredge come up completely filled with them, a most curious sight; for when the dredge was emptied, the little creatures writhing with the strangest contortions, crept about in all directions, often flinging their arms in broken pieces around them." Describing the Lingthorn, *Luidia fragi-*

lissima, he says:—"The wonderful power possessed by this animal of casting away its arms entire, and even breaking them into small pieces, approximates it to the Ophiuræ: an attempt to procure a perfect specimen by introducing it into a bucket of cold fresh water was unsuccessful; whether the cold air was too much for him, or the sight of the bucket too terrific, I know not; but in a moment he proceeded to dissolve his corporation, and at every mesh of the dredge his fragments were seen escaping. In despair I grasped at the largest, and brought up the extremity of an arm, with its terminating eye, the spinous eyelid of which opened and closed with something exceedingly like a wink of derision."

I append a short description of *O. rosula*, which

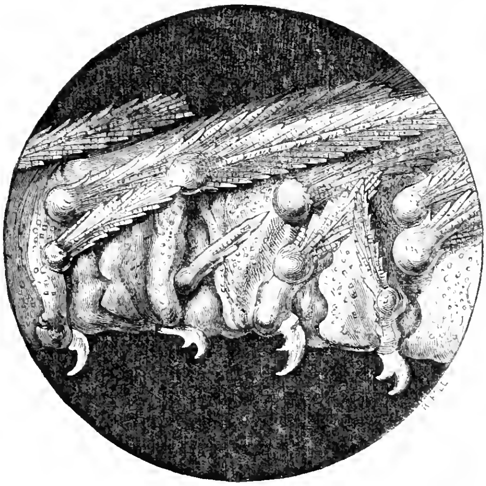


Fig. 200. Portion of one of the rays of *Ophiocoma rosula*, showing the "claws" or "hooks" *in situ* × 25.

may be useful to those readers of SCIENCE GOSSIP who do not posses Forbes's work.

OPHIOCOMA ROSULA, Link, *Specific character*.—"Disc convex, rounded, covered with spines. Two large triangular plates opposite the origin of each ray. Upper ray-scales triangular, carinated, imbricated. Lateral ray-plates bearing five spines each, which are much longer than the breadth of the ray."—*Forbes*.

In the centre of the disc is a small obscurely pentangular transparent plate, irregularly perforated, and in my specimen free from spines; as are also the triangular plates. The disc spines are short, truncate, and frequently square, with a spinous process at each corner.

This species is the most handsome, as well as the commonest of the native Brittle Stars; it is also the most brittle, breaking itself to pieces with great ease and quickness. The ray-spines make a beautiful microscopic object, and like the spines of *Spatangus*, analyze polarized light (using the polarizer and selenite plate only).

I would advise any microscopist who has an opportunity of procuring Brittle Stars alive, to endeavour to ascertain the true use of these organisms. Every part of the skeleton of these animals is replete with interest, and will repay the observer for any labour he may bestow upon it.

The Micrographic Dictionary gives some figures of hooks of *Ophiura*, but they do not resemble those I have just described. Are they the claws of *Astrophyton scutatum?* FRED. KITTON.

THE TRACK OF THE PYGMIES.

As I have bestowed some little attention upon the subject so voluminously and ingeniously treated of by your Belgian correspondent, I should be much obliged by your inserting a few remarks and criticisms upon his essay.

It is very curious that the three or four races which played the most prominent part in primeval civilization—the Toltecs, Chinese, Egyptians, and Hindoos—were all dwarfish races. Had their shortness anything to do with their intellectual prowess, or *vice versâ?* some may be tempted to ask. Probably it had; in the same way that intellectual and sedentary occupations, now, disincline the mind, and diminish the time, for athletic exercises.

The innumerable relics of the existence of a dwarfish race in Europe, in extreme antiquity, seem to prove the truth of the theory which many ethnologists support,—that the Fins were the first inhabitants of our continent, and that they now only survive in the mountains of Biscay and the wilds of Lapland, in their original purity. The caves of Central Europe, and the tumuli of Denmark and Great Britain, contain skulls of the purely Finnish type, and weapons and utensils of the Stone period. The inhabitants of the Swiss lacustrine habitations were, doubtless, Fins—the aborigines of Europe—in their highest stage of civilization, who were even then being rapidly pressed upon and extirpated by the fierce and burly Celtic, Scandinavian, and Helvetian tribes.

Although the author of the essay mentions the classical "Troglodytes," he totally omits all reference to the Bosjesmen of Cape Colony, a most singular and degraded branch of the Hottentot family, which is doubtless the aboriginal African race. Contrary to the general opinion, the Bosjesmen are found with all the peculiarities of their dwarfish race unchanged, as far north as the Gabun and Bonny rivers, in Guinea, and very likely will be discovered in the interior also. Winwood Reade agrees with me in considering this widely-spread and unique race to be the original population of Africa, and in his "Savage Africa" many interesting details may be found concerning them. A writer named Smith also describes them on the western coast of

Africa, in his little work entitled "Trade and Travels on the Gulf of Guinea."

It is singular that the earliest inhabitants of both Europe and Africa were thus, in all probability, diminutive races. The Andaman Islanders, according to the old Mussulman travellers, once terrified the coasts of Malacca and Sumatra with their piracies, and seem related to the Oceanic negroes inhabiting the interior of the larger East-Indian islands. The dwarfish Mlechas of the Indian continent and the wild Veddahs of the forests of Ceylon may be also of the same race; and thus we should go far, embracing the dwarfish Samoyedes in the North and the once highly civilized Ainos of Yesso, towards constructing an originally diminutive aboriginal population for the continent of Asia also. The wild legends of wars with monkeys waged by the early Hindoo monarchs, related in the sacred books of the Brahmins, are, I imagine, in reality the details of the struggles of the wild inhabitants of the peninsula of Hindustan against their civilized Circassian invaders.

There is an interesting historical fact with regard to the presence of the Esquimaux in Greenland, which, so far as I know, has never received the attention which its importance demands. There seems good reason to believe that the aboriginal race in America, as well as in Europe, was of Finnish origin. It might reasonably be supposed that the American Esquimaux, closely connected as they are with the Asiatic Samoyedes, came over Bhering Straits from Asia; but, singular to say, all history represents them as migrating from the south towards the north. When the Norsemen colonized Greenland, they found it totally uninhabited; when they visited Vinland (Massachusetts?), they found no natives there either; but after a lapse of some years the Skreelings or dwarfs, as they called them, suddenly appeared, and after a longer interval, arrived in Greenland, where they finally overwhelmed the Norse colonies, whose disappearance is one of the most mysterious occurrences in history. How the extirpation of the hardy Norwegians was achieved is minutely related in one of the "Legends of the Greenland Esquimaux," which appeared some years ago in "Chambers's Journal."

I have observed a striking likeness between portraits of Esquimaux and the faces sculptured on the walls of the ruined cities in Central America, as given by Stephens in his celebrated work. Is this merely accidental? The cause of the northerly movement of the Esquimaux may possibly have been the advent of tribes from Asia by way of the innumerable archipelagoes of the Pacific.

F. A. ALLEN.

Be not too hasty to erect general theories from a few peculiar observations, appearances, or experiments.—DR. WATTS.

BOX FOR CATCHING INSECTS.

HAVING often felt the want, in catching insects, more especially for the microscope, of a means for readily securing the insect upon the spot, by chloroforming it whilst quite fresh and uninjured, I have been led to devise, with a friend, a little box for this purpose, which has been found so convenient and efficient that a description will probably interest your readers.

A shallow transparent glass jar is fitted with a wood cover lined round the edge with cork to fit air-tight, similar to the ordinary glass pomatum-jars. In the centre of the cover a hole about $\frac{1}{4}$ inch diameter is made (*a*), and a small piece of fine-grained sponge about $\frac{3}{4}$ inch diameter is fixed over this hole inside the cover, by gluing it into a conical recess cut round the hole (*b*); the sponge being trimmed with scissors to a thin edge all round, and pressed down flat whilst the glue is drying, finishes with a close-fitting and neat edge all round: the natural surface of the sponge is left for the face. Directly an insect is caught in the box, a few drops of chloroform are put on the sponge through the hole in the cover, and a finger placed over to close the hole. The smaller insects are killed in two or three seconds in this way by three or four drops of chloroform, and the larger ones are so far stupefied that the box may be safely opened, and the insect killed by some chloroform dropped upon it, the state of the insect being readily observed through the transparent glass.

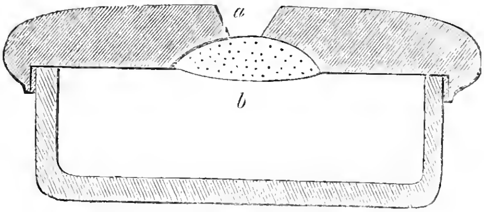


Fig. 201. Section of Collecting-Box.

The most convenient way of carrying the chloroform for the purpose is in one of the small bottles made with a pouring-lip at the edge of the neck, and fitted with a sound cork; this is carried conveniently ready for use in the waistcoat pocket, and lasts for a day's use. In catching insects, the transparent glass box gives the means of seeing at once whether the desired insect has been secured or missed; and, in the case of a winged insect settled upon a plant, the whole leaf or small shoot is enclosed at once in the box on catching the insect, and then by watching the movements of the insect the leaf or shoot can be readily and safely withdrawn by slackening the opposite side of the cover, when the insect is immediately chloroformed and removed to the store-box. By this means a succession of insects can be rapidly secured by the same catching-box, which is ready again each time for the same purpose very quickly, and with the smaller insects the chloroform vapour remaining in the box is then sufficient to stupefy them at once, or even to kill them. In catching insects with a net, the box is introduced into the net by the hand, confining the insect against the side of the net, and the cover of the box being slipped on outside the net, the insect is chloroformed at once through the cover, and then removed safely in the open box directly it is seen to be dead or sufficiently stupefied. A catching-box about two inches diameter and ¾ inch deep inside is found the most convenient for general purposes, as shown full size in the accompanying sketch, and a larger size three inches diameter is used for the larger insects, which is also useful for butterflies and moths bred from the pupa. This box is made with the sponge and hole in the centre of the glass bottom instead of being in the cover, and it has the advantage that the glass box can be dropped over an insect running upon the ground, and sufficient chloroform applied on the spot to stupefy the insect for safe removal, without the risk of soiling and injuring it that is incurred in picking the insect up in a box whilst running upon the ground. In this box the sponge could not be fixed by cement to the glass, on account of the dissolving action of the chloroform, and it is secured by six small holes being drilled through the glass round the centre hole (like the holes in the ends of lustre-drops), and fixing the sponge by a thread sewn all round its edge through the holes.

The smaller size of this box is readily made by cutting off the bottom of a glass bottle of the required size, grinding the edge smooth, and fitting on the cork-lined cover of a pomatum-jar; the bottom of the bottle being cut off by a thread dipped in spirits of wine being wrapped round the bottle and set on fire, and the bottle then dipped into cold water, taking care to keep the line of the thread level with the surface of the water.

W. P. Marshall.

QUEKETT THE MICROSCOPIST.

At the top of the Royal College of Surgeons, in Lincoln's-Inn Fields—*à la belle étoile,* as the French have it, that is to say, under the skylight—lived and laboured Quekett the microscopist. It is now long since he went away from us, and from the great things that are here called little, and the little things which are here held great; but while he worked in that scientific garret he was a sight to see. Odours, not by any means of Araby the Blest, saluted the nose that invaded the philosopher's sanctum; but what has Philosophy to do with noses? Sights not by any means elegant or appetizing met the visitor's glance; but Science is not squeamish. Perhaps it was a wolf's liver upon which the Professor was working at the moment, hunting for parasites with a microscopic ardour that Leicestershire might envy. A sheep with two heads, a chicken with three legs, the nicely-cured head of a Dyak from Borneo; strange sea-weeds, odd-looking fish, and viscera of foreign gentlemen who had done with them under stress of curious wounds or mysterious diseases; new flowers, undescribed birds, egg-shells, feathers, wood, insects, butterflies—such was the collection of curiosities that surrounded the microscopist.

Some of these articles would be decidedly *faisandés*; but, as we have said, the philosopher was profoundly indifferent. People sent him odd and interesting things from all parts of the world, knowing the patient labours of that scientific garret. It was an honourable but a nasty business to deliver the Professor's parcels; for the fish from China would spoil in spite of alcohol, and the Dyak's head would not travel well off its owner's shoulders. Then, in the London markets, and at many such places, there were watchful eyes for the Professor; and when something new or odd in nature turned up, he was sure to get it. The more the better; for there he sat under the skylights, while Nature rained her oddities and wonders in upon him, like a mother asking her child conundrums. And he was good at guessing them; working for ever with forceps and reflector and microscope—slicing sections of bone and nerve—searching into infinitely little organisms—ever learning something new, and fixing it on a slide, for others to come and see. Comparative anatomist and microscopist, he studied the riddles in large print and small print, showing always the same great answer to be written in both, of beneficent and beautiful design. He worked away for the common information, at the changes which disease effects upon tissues and organizations—changes which only the microscope can reveal, and which even in these revelations of disease and degradation of formation present perfect shapes, and forms of curious morbid beauty and colour. He told us a hundred novel things of the way in which Nature builds up her marvellous structures, cell by cell, on one great and simple plan. He studied the blood in health and disease, not as what we see it, a red coagulating fluid, but as what it is, a stream of lymph, with discs like crimson coins, flowing along the channels of vein and artery. He disclosed secrets of colour and character in the other fluids and substances of the body, by which physicians have been aided to discover and arrest maladies; and, last, though not least, in his labours with the little glass which gives an admittance to the world of infinity in the decreasing scale, he left us preparations neither of science nor surgery, so much as of simple loveliness—the perfect forms and hues which Dame Nature prepares as carefully when we cannot see her work as when we can.—*Daily Telegraph, Sept.* 5, 1865.

THE "DIPPER."

IN the hope of ending the controversy respecting this bird, at least as far as we are concerned, the following is extracted from a paper read some time since by Dr. J. R. Kinahan before the Dublin Natural History Society:—

"During the years 1849 and 1850, having nearly daily occasion to frequent that part of the river Dodder which passes through the romantic mountain glens of Glemismaul and Castlekelly, the great abundance of the water ouzel, or, as the peasantry there call it, kingfisher, induced me to study its habits somewhat particularly.

"The general habits of the water ouzel have been so well and so often described that they need not detain us; but although it is now some years since M. Herbert announced the fact that this bird is possessed of the power of walking under water on the bottom of streams; and although the truth of this observation has been strengthened by the evidence of such men as St. John, Dilwyn, Rennie, William Thompson, and M'Gillivray, yet still there are found many (especially among the closet naturalists) who prefer to ignore the fact altogether, or else assert that this bird's habits in this respect are identical with those of other divers.

"My observations, made repeatedly during many months, and having for their object the elucidation of this very point, enable me to corroborate M. Herbert's account in every particular, except that the bird carries down a supply of air to the bottom enclosed within its wings, in which he most certainly is in error, led away by a fancied analogy between the bird and diving beetles, as I have repeatedly seen them rise to the surface to obtain air, which they do exactly like a grebe, merely raising the tip of the bill out of the water.

"The bird has several modes of diving. When seeking food, it generally goes down, like most divers, head foremost in an oblique direction, or else walks deliberately in from the shallow edge of the pool, the head bent down, and the knees (tarsal articulation) crouched. When seeking refuge, however, it sometimes sinks like a stone, exactly as the Great Northern Diver (*C. glacialis*) has been observed to do—that is, gradually, the top of the head the last part submerged, without any apparent exertion, sometimes in the midst of its most rapid flight dropping down suddenly into the water like a plummet. Its course is indifferently with or across the stream, rarely against it.

"It often remains under water totally submerged for fifty seconds and upwards, and during that time will proceed from ten to twenty yards. When it comes out, the water may be seen running rapidly off its plumage. It swims with great rapidity, and appears to rejoice in the water as its true element, hardly ever alighting directly on a rock, but even after its longest flight splashing slap into the water, at the base of the stone selected as a resting-place, and then scrambling to the summit of this. In its motion in the water it more closely resembles the Jackass Penguin of Cape Horn (*Apt. chrysocoma*) than any other aquatic bird I have had an opportunity of studying. Like that bird (especially in the breeding season), the ouzels may be seen at times leaping right out of the water in their gambols.

"That the bird actually does possess the power of motion under water, the following notes on a wounded bird, made on the spot, abundantly prove:—

"'Nov. 29, 1850.—Bohernabreena. Wounded a water ouzel, which, as I observed them all to do, immediately made for shore. On my going to seize him, he darted into the water, running slap in; waded in after him; under water he looks quite glossy, but does not seem increased in bulk, the glossiness probably arising from the oiled state of the plumage, or else from its peculiar texture. When I first got up with the bird he was perfectly stationary at the bottom, not using any exertion to remain there (this remark applies to two other birds wounded later in the day, which also took to the water). The bird next got under a big stone, and when I poked him out on one side he ran to the other—after the lapse of a minute or so he put his head out of the water to breathe, always keeping the stone between him and me, and when I tried to catch him he would dodge under the water again, and come up on the other side.

"'Finding that I was still chasing him, he took to the stream, and went under water faster than I could follow him; he seemed to move now altogether by means of his feet, his wings hanging down behind his tail, though his motions were so quick it was difficult to be positive as to the latter part of this observation. At times he swam in mid-water, using his wings, crossing the current several times, and seeming but little incommoded by it.

"'All at once he turned over on his back—still possessing the power of continuing under water—struggling to regain his original position, he spun round and round; it appeared as though the wounded wing had suddenly failed him, and thus prevented his preserving a due equilibrium in the water. At length he came to the top, when he immediately righted and swam as at other times; every time I tried to lay hold on him he again ducked and dived down to the bottom, at first all right, and then the tumbling began again. When captured at length, I found him merely winged.' I was enabled to confirm these observations several times that day, as I obtained seven specimens, five of which necessitated a watery chase before I succeeded in catching them, and one got clear off."

INSECT VIVARIUM.

I REALLY must indulge in a little gossip about an insect home which my husband, anxious to gratify my naturalist propensities, had constructed for me about two years since. The accompanying sketch will give some slight indea of our Insect Vivarium, which, besides being a really pretty object in the drawing-room, is admirably suited for all the re-

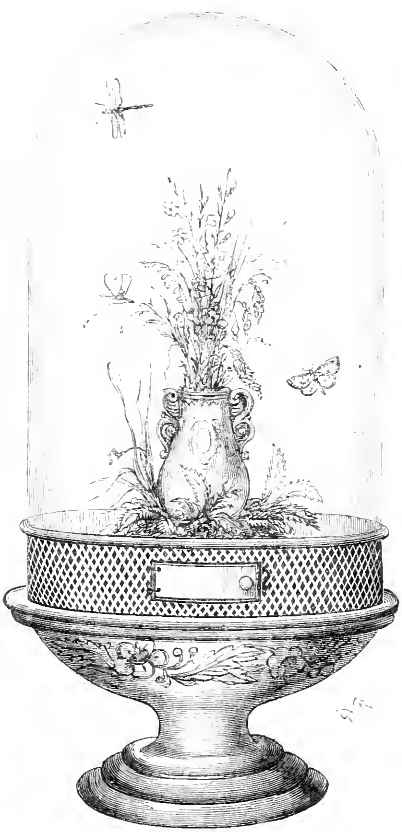


Fig. 202. Insect Vivarium.

quirements of its inhabitants, and is so simple in form, that an ordinary tinman can make up one at

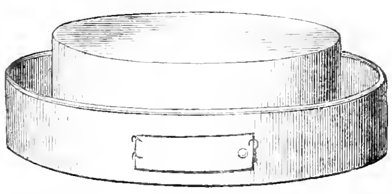


Fig. 203. Zinc frame, with its inner frame.

a trifling cost, and the glass shade necessary can be purchased for four or five shillings. The framework is made of perforated zinc, with a bottom of the same, on which rests an inner circle, also of zinc, but perforated much closer. This is not fastened to the bottom of the outer frame, but can be raised at will, and is covered with a round piece of flat glass; on it stands a saucer or small plate half filled with well-moistened clay, and stuck round the edge with such leaves of trees and plants as the various caterpillars feed on. In the centre of this saucer is a small vase filled daily with fresh flowers and grasses for the butterflies. This inner case is for keeping the baby caterpillars and their food, and for such small ones as are frequently found in leaf-buds: during winter it forms quite a comfortable cradle for the chrysalides of the past season, by placing a little dry moss in it instead of bran, for them to rest on. I have omitted to mention that our Vivarium fits on a green japanned stand,—indeed it was the loose bottom of a Swiss birdcage, and adds greatly to the pretty effect of the whole.

This plan of a Vivarium being altogether our own idea, we feel quite proud of its success, and doubt not, if those readers of Science Gossip who desire something inexpensive will only get one made up in this way, they will, like us, be perfectly charmed with the result. And now having described the Vivarium, I must say a word about its various tenants,—those creatures of beauty, a never-ceasing source of pleasure to watch their interesting changes and "wise ways." I think it is Rogers who says of them in the following lines, which I venture to quote—

> "Child of the sun, pursue thy rapturous flight,
> Mingling with her thou lovest in fields of light,
> And where the flowers of Paradise unfold,
> Quaff fragrant nectar from their cups of gold;
> There shall thy wings, rich as an evening sky,
> Expand and shut with silent ecstasy;
> Yet wert thou once a worm, a thing that crept
> On the bare earth, then wrought a tomb and slept;
> And such is man, soon from his cell of clay
> To burst a seraph in the blaze of day."

We have got a dear little home fairy, whose bright eyes and deft little fingers are ever the first to discover and capture all the prettiest and strange caterpillars. At present we have got Caterpillars of Wood-Leopard Moth (*Zeuzera Æsculi*), Puss Moth (*Cerura vinula*), Privet Hawk Moth (*Sphinx Ligustri*), Emperor butterfly, and many others. These we have reared, in most instances, from the egg, and have watched with wonder the many changes, from the casting of the old coat as each increase of growth called for larger dress, till at last they have industriously spun it up into the comfortable cocoon, or, as in the case of the Cabbage Carterpillar, who unfortunately for himself is not a woolly bear, but dons his almost transparent armour at first of light green, and then changing in a few hours to the strangely-shaped semi-opaque grey-green shell we so often see in the crevices of some wall or doorway, suspended by the smaller end or by a band of hair across the centre, and too often, alas! becoming a tempting bit to some prying sparrow.

Then the Ladybirds, those bright busy little creatures, that seem, as old wives say of cats, to have nine lives, it surely is amusing to watch them creep up and up the side of the glass to the top, and then, when the giddy height is gained, fall backwards with a great thud which ought to kill, but does not,—and ladybird, with laudable perseverance, makes another effort to gain the top.

Were I not afraid of trespassing on the space in your pages others can fill so much better, I should be tempted to tell of many interesting traits of our insect friends; it almost seems as if they came to expect the fresh food and blossoms, and the butterflies will even allow themselves to be caught on the window-pane and restored to their prison-home, a prison after all, though made as gay as its dimensions will admit of. H. R. B.

MICROSCOPY.

Simple Section-machine.—There are many who, though in possession of a tolerably good microscope, are unable to afford much money for the purchase of

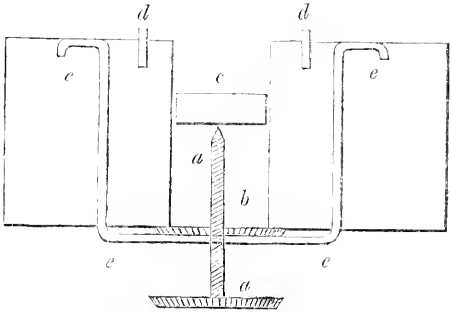


Fig. 204. Section of Machine.

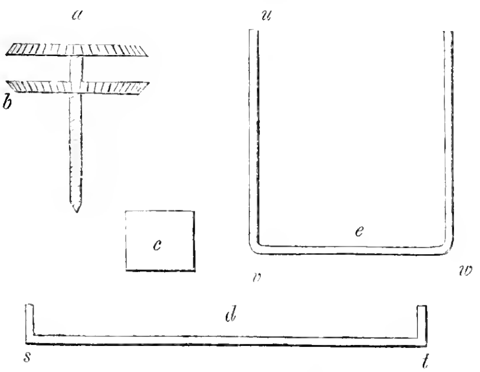


Fig 205. The parts separated.

extra pieces of apparatus, but who, nevertheless, take sufficient interest in the pursuit of microscopical science, to feel the want of simple and efficient means of procuring interesting objects suited to their instruments. Among such objects, sections of various woods occupy a prominent position, but are out of the reach of many, on account of the expense of a machine and knife to cut them, and the difficulty of cutting them without. To supply these with a cheap and efficient section-cutting machine is the object of the present paper.

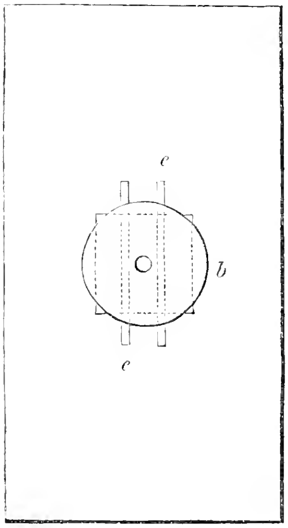


Fig. 206. Bottom Plan.

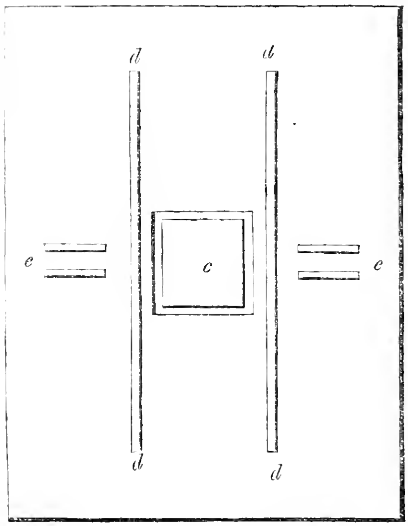


Fig. 207. Top Plan.

Procure a piece of hard wood, six inches long, four broad, and about as thick as the screw *a* (fig. 205) is long. This screw is one of Messrs. Perry & Co.'s music-binders, and costs one penny. Also get some wire bent into the shape of *d e* (fig. 205), so that *s t* shall be two inches long, *v w* one inch long, *u v* about three-quarters of an inch longer than the wood is thick; and a piece of metal of about the size of *c* (fig. 205).

In the centre of the piece of wood cut a neat perpendicular hole, half an inch square; pass *c* through the wood as figs. 204 and 206, so as to retain *b* exactly on the hole, and so that *v w* may be at right angles to the length of the wood; bend over the ends, and drive them below the surface, as in figs. 204 and 207. Next insert *d* in the upper surface of the wood, so that *s t* may lie on the surface in the direction of its length, and form a support for the cutting edge. Screw *a* through *b* from beneath, drop *c* in from above, and the machine is complete. To use it, rest one end on a table at an angle of 45°, lay the flat side of a sharp chisel, wide enough to rest on both the wires, and having previously pressed the wood to be cut into the hole, and dipped the chisel in cold water, press it from you, and take off the sections in the usual manner.

Note that the chisel must be kept flat against the guides, or they will be notched, and the operation will fail. N. D. L.

N.B.—The letters refer to the same part in all the figures.

[We think that our correspondent's machine would be improved by having the hole cut round with a centre-bit, instead of square, as he proposes.—Ed.]

Cuticle of Fern.—If the Harts-tongue (*Scolopendrium vulgare*) be carefully examined when the seeds are pretty well developed, it will be found that the seeds are covered with a thin tissue. This is called the indusium, and is, in fact, simply an extension of the pure cuticle. This can be cut off readily with a razor or sharp knife. It forms a long narrow strip, and is easily mounted.—*Thos. Brittain, Fallowfield.*

The Stanhopescope.—Although a firm believer in a Coddington lens, if sufficiently cut down, I considered the glowing description given of the above small optical instrument in your last July number warranted a trial. With this in view, I wrote to Mr. Barkas, of Newcastle, for one of each description. It is due to your readers, I think, to describe the little apparatus before going into the merits of its performance. 1st. The lens is of the same construction as those used by Dagron, of Paris, to cement his small micro-photographs upon, consisting of a small square bar of glass, upon one end of which is worked a convex surface. It is not right to call it a Stanhope lens; and I notice in the August number of your paper that it is now described as a Stanoscope (*unde derivatur?*). 2nd. A brass tube, into which slides the cap, holding the lens. That in use by Mr. B. must be far better corrected to be of any use than those furnished to me. The short coloured tin one has the bar of glass full of striæ, which give prismatic colours, and the flat surface is short of the focus of the worked convex lens by about the $\frac{1}{32}$nd of an inch. Again, the one in brass is evidently much more carefully got up; but here the flat surface is too far off the lens, and, consequently, anything placed on the plane surface is not in focus. I do not wish to deteriorate the article; but I think the generality of microscopists will be disappointed unless the instrument is more perfectly adjusted than at present appears to be the case. One purpose I found it useful for:—If a drop of fluid containing diatoms, or the dust (if I may so call it) off any moth or other similar object, be placed upon the plane surface, and a Coddington be used to look at the same, the Stanhopescope acting as a condenser, improves the performance of the Coddington very much. Whether this hint is worth anything or nothing, I must leave to others to determine. As I said before, it is no wish of mine to speak against the instrument; but, at present, there is room for great improvement.—*John Bockett.*

Mounting in Balsam.—I hear and read so much of the difficulties of mounting, especially in Canada balsam, that I cannot withhold giving my experience, hoping that it may prove of use to some beginners. A few years ago, I first had a small student's microscope, and wished to mount. A friend gave me a few hints, and lent me a brass balsam-table and turning-table; I bought a small spirit-lamp, and without any other apparatus, I began. Of course, I made mistakes: nothing daunted, I tried again; and when I went in despair to that same friend (who had mounted for herself with considerable success), and asked innumerable questions, the answer I got was—"With brains: use your common sense." Thus driven back upon myself, I tried again; and before three months had elapsed, I laughed at the idea of the difficulties of mounting being insurmountable. Since then, I have a binocular microscope, and have devoted some time to mounting both opaque and transparent objects. But I still have no grand apparatus, such as air-pumps, hot-water stands, &c. I just warm my balsam, and with a bit of stick drop some on the object, having previously warmed the slide on the brass table; with a needle, mounted on a bit of stick, I pick out the larger bubbles. Then I put the thin glass cover on; not at all carefully, as all books so especially recommend: I simply take it between my finger and thumb, and drop it on. I then leave the objects for that day, to allow them to harden a little; and the next, place them before the fire in a small tin oven I have for the purpose; but a tray does quite as well—I used one myself till quite lately. Placing them thus on the fender for a few hours daily, draws out the remaining bubbles, and hardens the balsam. The baking seems to me the principal part in mounting, both for drawing out the bubbles and making the objects durable; for when the balsam has not been well hardened, they are injured by damp, and always remain sticky, and are easily displaced. In mounting dry objects, glass, or wooden cells, secured on with size, are the best for excluding air; but the size must be allowed to be perfectly dry before the object is put in and the cover on, or a mould is sure to appear. I had a great deal of trouble with the sticking on of these cells, until I got a cement which I should recommend to all microscopic mounters.—*F.*

Maltwood's Finder.—It has often been a matter of surprise to me that so few microscopists, comparatively speaking, possess and use Maltwood's Finder; it is without doubt one of the most useful microscopical appliances with which we are now familiar.

I am frequently in the receipt of slides of diatoms on which certain special forms are mounted, and attention is often called to frustules by small spots of ink on the cover, or other rough-and-ready modes of indicating localities, all of which modes being very inferior to that of registration according to a uniform finder, such as Maltwood's, which, if properly used, will invariably enable an observer, or series of observers, to find with ease any registered form.

The mere registration of a diatom by *figures alone* is often not sufficient for *immediate re-discovery* when high powers, such as $\frac{1}{5}$th, $\frac{1}{8}$th, or $\frac{1}{12}$th, are used; but if the registration be carefully conducted, and a spot placed on the register, near the locality where the diatom was visible—thus, $\frac{27^{\cdot}}{24}$, or $.\frac{23}{26}$—then there is no difficulty in re-observing the object registered, and very much valuable time is saved, which, when a mere rough search is made, is necessarily lost. I have a large series of marine diatoms registered in the manner described, and have not the least difficulty in finding any one of them in an instant. T. P. Barkas.

PHOTOGRAPHY

Willis's Aniline Printing Process.—Mr. Vincent Brooks, the well-known lithographer, has taken this patent process in hand; and, as a means of superseding manual or mechanical methods of reproducing architectural drawings, plans, &c., it promises to take high ground in public favour. The main advantage of the process is, or rather should be, in its extreme economy where but a few copies are required. In common with other photographic processes, it secures perfect accuracy and rapidity of production. A tracing may be used with perfect safety for this purpose, but the paper on which it is made should be thin, clear, and colourless, and the drawing made with British, or very black, Indian ink, and the washes given with somewhat more strength than usual. Colours are objectionable, owing to their varied actinic powers. Ordinary sketches on common drawing-paper may be used as negatives; but, when placed over the prepared surface, the light requires more time to do its work, owing to the increased thickness of the medium it has to pass through. Where scientific diagrams and drawings are required in small numbers, this process will be specially advantageous.—*J. W. W.*

Woodbury's Photo-relief Printing Process.—Another modification of this valuable and promising process has been made by the patentee, by virtue of which it promises to take a more useful aspect in connection with book-illustrating than has yet been claimed for it. This is the printing from the relief in ordinary printer's ink, instead of in one special for the purpose.—*J. W. W.*

New Photo-engraving Process.—Mr. Duncan Dallas, the patentee of the photo-electric process of engraving of which we some years ago heard much that was promising, but of which we have now long lost sight, is about to introduce a process by which a photographic negative from a drawing made in lines is used to produce blocks for surface-printing. Mr. J. Trail Taylor some time since called our attention to experiments in a similar direction, by which also very successful results have been produced. We hope, therefore, to find several such processes in good working order.—*J. W. W.*

Lithographic Process for Tinting Photographs.—Messrs. Southwell Brothers have introduced a method of tinting the backgrounds of photographs so as to give the effect of a portrait on a neutral ground with white high lights. The process is thus described in the specification. A good portrait negative has its background carefully blocked out or rendered opaque. In the finished print it is therefore perfectly white, and this is then laid upon a flat board, and covered with a piece of tracing-paper. On this the portrait is carefully outlined with a lead pencil, and the image thus formed is then cut out. Over that portion of the photograph on which the proposed tint is not required, the tracing-paper is fastened with a little gum; and then the tint is printed over the whole, and the removal of the tracing-paper with a damp sponge completes the first part of the process so far as regards the background; if a general tone is required over the whole, a second printing is used. The photograph is next damped between sheets of wet blotting-paper, and a properly-prepared embossing-block is used in a lever or other press, to give a texture to the whole resembling in effect and appearance that of drawing-paper.—*J. W. W.*

ZOOLOGY.

The Spider Crab.—For the last fortnight I have had a specimen of the common spider crab (*Stenorhynchus phalangium*) enjoying himself in one of my tanks. I constantly get them while trawling in our bay (Youghal). I am, however, sorry to have to differ from that accurate observer of aquarian life, Mr. Lloyd, but think from my short experience I can prove that Mr. Edward Jesse was *right* in stating that these crabs have the power of clipping off bits of seaweed and therewith adorning their persons. A few mornings ago I was astonished (as I had not heard of this habit before), and sat watching him for nearly an hour while he adjusted his slips of *ulva* with greater dexterity than any one would give him credit for, judging from the uncouth form of his limbs. One long narrow piece he stuck on the top of his head between the antennæ; it projected in front, and I imagine he was very proud of it, as he several times put up one of his claws to try if it was all right; all the other bits of weed he stuck on his legs. Occasionally he would pick a bit off and hold it in contact with his mandibles by one of his claws, and again return it to its place by rubbing it up and down on one of his legs until it got firmly attached to the spines; he would then serve another bit in the same manner. I hope you won't think this too long for insertion, as my opinion is, that the crab uses the weed as a bait for animalcules, and I should feel greatly interested to know what others think on the subject.—*William S. Green, Youghal.*

Silver-striped Hawk-Moth (*Chærocampa Celerio*).—In April I noticed the capture of a single specimen of this insect (p. 89). Since then Mr. Lawrence, of Coggeshall, has captured and reared the caterpillar of the same insect.—*C. Denny, Kelvedon.*

Acorn Barnacles.—These form interesting objects for a marine aquarium, where they will live for some time if carefully detached from the sides of piers or exposed rocks, which they cover in scurfy patches; one I have constantly casts what I take to be the skin of its cirrhi, which makes a beautiful object for the microscope.—*C. A. J.*

A Rare Fish.—A specimen of the Greater Fork-beard, Hake's Dane, Forked Hake, or Goat Fish (the *Phycis furcatus* of Yarrell), was taken on a trot-line off the south-east coast of this island on the 13th instant. Mr. Couch says, "This species may be regarded as scarce rather than rare, so that examples show themselves singly, for the most part in the colder months, although I have obtained an example in June; and there are not usually more than one or two caught in a season." The example taken here slightly exceeds the length of nineteen inches, and agrees with the description given by Mr. Couch, with the exception of the anterior part of the back, which is of a dusky purple; the cheeks of this example have a decidedly greenish tint.—*J. T. G., Guernsey.*

Tree-Frogs.—There are several species of Tree-frog in America, and I used to be highly amused in watching one of them, called the "Peeping Frog," change his colour. Its transformations were remarkable. At one moment it would be a bright green, like the leaves on which it swung; the next instant a dull brown, the hue of the old lichen-covered stumps on which it rested. A correspondent in Science Gossip asks the cause of this faculty of changing colour possessed by the Tree-frog. I was told that they could, by the modification of pigment-cells under the skin, change their hue at pleasure; and it is, doubtless, a wise provision of Nature to enable them to elude their numerous enemies. We have, I believe, but *one* species in Europe, and "Mr. Wheler's" frogs, of course, belong to it. They will, like their American cousins, bury themselves in mud at the bottom of a pond, and go to sleep during the winter, so I would advise him to provide a nice little soft bed in an aquarium for them. They will breed in the spring, depositing their eggs in the water. There is a beautiful green frog in the Southern States, the *H. viridis.* It is more elegant in shape than its Northern brother, and affects the broad leaves of the Indian corn. Surely Mr. Lord, whose communications in Science Gossip are so charmingly interesting, will tell us all about Tree-frogs, American and European. He will also probably tell me that I am wrong about the Peeping Frog, for I fancy the true Peeping Frog utters a shrill whistle, and that the *H. Squirella* is the changeable gentleman I used to admire, though my American friends called it the "Peeping Frog."—*Helen Watney, Hambledon.*

Nest of the Bullfinch.—There seems to be a strange uncertainty amongst ornithologists respecting the nest of the Bullfinch. Bewick says that it is composed of "moss;" Bechstein, of "twigs covered with moss;" Graves, "moss and dry fibres." Hewitson, our great authority on nests and eggs, says that it is built of twigs, and lined with *wool and hair.* Your correspondent J. Ranson, in last Science Gossip, seems to consider this the usual composition. It would be a curious subject of inquiry whether birds use different materials in different localities. I have seen very many Bullfinch nests, but invariably they were composed of small twigs lined with fibrous roots, and occasionally a few hairs. They are very loosely put together, so that you can see the eggs through any part of them. Indeed, they very much resemble the frail nests of the Stock-dove, only the hollow of the nest is considerably deeper in proportion to the size.—*W. R.*

BOTANY.

Fritillaria Meleagris.—This rare plant is exceedingly abundant near a little place named Ford, at Dinton, near Aylesbury. In 1865 I observed it there, extending over six or seven meadows, where it presented a beautiful appearance. I learned from an inhabitant that persons come from "all round" to gather it when in perfection, and the meadows bear the name of "Crowcup," or "Frowcup" (query Frog-cup?) Fields. The white-flowered variety also occurs there; and the nativity of the species is beyond a doubt.—*B.*

Pink-flowered Pimpernel (*Anagallis arvensis*).—A very pretty Pimpernel was brought me recently by Mr. Thomas Marshall, of Wycombe. The flowers were pale pink, or flesh-colour, with the usual purple centre. It was gathered near Halton, Bucks, and was the only one noticed among a large quantity of the common scarlet-flowered *A. arvensis*.—*B.*

Seeds of Foxglove.—I beg to forward the following as the result of the calculation by a lady, of the astonishing number of seeds produced by a single individual of the common Foxglove (*Digitalis purpurea*). "The plant (self-sown) grew to the height of 7 feet 4 inches. The central stem bore 200 flowers (not including those unexpanded at the summit). Twenty-three lateral shoots bore 500 flowers, making a total of 700. When the capsules ripened, the seeds of five were counted with the following results:—

The first contained . .	1,683 seeds.
The second ,, ...	1,222 ,,
The third ,, ...	1,736 ,,
The fourth ,, ...	1,783 ,,
The fifth ,, ...	1,374 ,,
Total .	7,798

Hence, the average per capsule is 1,559·6, or the total number of seeds yielded by the entire plant no less than 1,091,720."—*G. H.*

The Primrose was anciently called Paralisos, after the name of a beautiful youth, who was the son of Priapus and Flora, and who died of grief for the loss of his betrothed Melicerta, but was preserved by his parents by being metamorphosed into this flower, which has since divided the favours of the poets with the violet and the rose.—*Flora Historica.*

Fungi Spores in Cholera, &c.—Though we have a distinct perception of the mischief which may and does arise in many cases from the spores of fungi, we do not think that there is any evidence to show that they have anything to do with the production of cholera.—*M. J. B., in Gardener's Chronicle.*

The Tulip.—In the History of Plants which Dr. William Turner dedicated to Queen Elizabeth in the year 1568, the Tulip is not mentioned; but in the "Remembrances for Master S.," by Richard Hakluyt, in 1582, we are told that "now within these four years there have been brought in England, from Vienna in Austria, divers kinds of flowers called Tulipas."—*Flora Historica.*

New British Lycopod.—Mr. Lloyd, of Wandsworth, has forwarded to the *Gardener's Chronicle* (p. 753), specimens of *Lycopodium complanatum* gathered in Hampshire, at Lower Wagner's Wells, near Bramshot, in a locality which he regards as undoubtedly wild. It was found by a woman occupied in cutting heath for broom-making.

Welsh Fungi.—During a recent pedestrian tour through a portion of North Wales, we found but few novelties in microscopic fungi. The most interesting were *Puccinia campanulæ*, a rare European species, and *Puccinia asari*, near Bettws-y-coed, and *Puccinia calthæ*, near Rhydd-y-fen. It is worthy of note that we walked one hundred and thirty miles without seeing a wild poppy, the common mallow (*Malva sylvestris*), or a frond of duckweed. Near Bala lake, the fronds of ferns (*Athyrium filix femina*), which we measured, exceeded four feet in length.—*M. C. C.*

Mistletoe on the Oak.—At Hackwood Park, near Basingstoke, there is a very fine oak tree, on the thick branches of which is a considerable quantity of this parasite. In that neighbourhood the tree in question is called the "Druid's oak."—*W. Denning, in the Gardener's Chronicle.*

[We should be glad to learn whether this is the *Viscum* or *Loranthus*.—Ed.]

Bamboo Fungus.—"Wa-mo" (Bamboo mushroom), or "Than-mo" (Worm mushroom), are the Burmese names of a species of *Polyporus*, indigenous to the neighbourhood of Tavoy, in the Tenasserim provinces, and held in high esteem as an anthelmintic. In an article on this subject by the Rev. M. J. Berkeley in the *Gardener's Chronicle* of August 18th, this hitherto undescribed and botanically unknown species was described and named *Polyporus anthelminticus*, from Pegu specimens furnished from the Indian Museum.

The Lancashire Minute Alga.—(*Seemann's Journ. Bot.*, July.)—At a recent meeting of the Botanical Society of Edinburgh, Professor Balfour stated that Dr. J. E. Gray was in error in recording *Phyllactidium pulchellum* as a freshwater alga new to Britain. It might be new to England, but it was certainly found thirteen years ago in Scotland. Mr. Lawson collected it in the water of a vase at the Royal Botanic Garden, in June, 1853, and Prof. Balfour exhibited under the microscope specimens put up at that time by Mr. Lawson.

NOTES AND QUERIES.

Drying Plants.—I have read with interest the remarks "On drying plants by means of heat." I have this summer seen some alpine plants beautifully preserved, both as to form and colour, by the ironing process. But as, in summer travelling, it is often very awkward and troublesome when passing quickly from one foreign hotel to another, to get an iron heated in the usual way, I should be very glad if you, or any of your correspondents, could inform me of any simple apparatus, or method, by which an iron may be quickly heated, so as to render one independent of the kitchen stove.—*M.*

Little Spiders.—I have seen many such "golden balls" as Mr. Macdonald describes (p. 189), and they have invariably proved to be the young of the common Garden Spider (*Epeira diadema*). The nest, when disturbed, always reminds me of a dried fig turned inside out, the young spiders being the size and colour of the seeds.—*Daydon Jackson.*

The Horse-Ant.—Some weeks ago, my attention was directed to a regiment of the Horse-Ant (*Formica rufa*) running in a little furrow, but divided into two companies, one going one way, and the other the opposite. The furrow was worn down for about an inch by the numbers which so often pass backwards and forwards. I followed the road for about twenty yards, when I came upon the nest. It was in a hollow, and was composed of straws, small sticks, and all sorts of rubbish. I then walked round it, and observed seven regular paths leading from the nest. I followed them all, and found that they invariably led to the roots of blackberry bushes. I examined one of the ants, and saw that it had either an egg or a *pupa* in its mouth. What could it mean? Could any of your subscribers oblige me by answering it?—*A. Blomfield, Patterdale, Westmoreland.*

Foreign Periodicals.—Can any correspondent inform me where I can obtain a cheap monthly or quarterly periodical on Natural Science, in both the Spanish and French languages; with the price of publication?—*H. A. A.*

London Rooks.—What becomes of the London rooks during the winter? I am told that they always make their first appearance at the nests by the fountains in Kensington Gardens on the 10th of March. I was told this by a gentleman who has been in the habit of passing there every day for the last thirty years; and I can answer for this year myself.—*J. G. Odell.*

Newts.—As J. H. F. suggests, the cause of his newts casting their skins on the particular occasion he mentions was the change of the water. Of eight or ten newts I have, there is always one, at least, casts its skin when I remove them temporarily into a basin of water whilst cleaning out their tank. I have observed my newts (*punctatus* and *palmipes*) cast their skins in two ways. In the one way, the skin comes in small fragments; and a newt in this condition is easily recognized by its ragged appearance. I think if J. H. F. had watched his newts with a little patience, he could not have failed to observe this. In the other method of casting the skin, it comes off in one entire piece. I have never observed this done completely; but I once observed one of my newts with its skin *turned down*, from its head halfway between its fore and hind legs; and on watching it for a few minutes, I saw it several times bend back its head and seize the skin with its mouth, and apparently attempt to pull it off. In this instance, the skin when cast was a good deal torn, but still retained the form of the animal. It was exceedingly interesting, when the newt got the skin down to its hind legs, to see it gradually pull, first one foot and then the other, out of its envelope. I once found a complete skin lying in my tank. I could see no rupture in it; although there might possibly have been an opening up either the back or abdomen, which is still another way, as I have seen mentioned in a work on this subject, newts have of getting rid of their *old clothes*.—*J. B. G.*

Toads in Winter.—Can you inform me where an account of the hybernation of the toad can be found? I have frequently seen them in a torpid state in winter, with the mouth closed by a diaphragm; but have not found this fact noticed in any Natural History that I have consulted.—*D. P., Margate.*

List of British Insects.—A list of species of all known British insects is in preparation, by the Rev. F. O. Morris, assisted by F. Walker, W. F. Kirby, and F. Smith, which will soon be published by Messrs. Longman & Co., for about five shillings.

Prussian Vandalism?—A continental correspondent has called attention to the paragraph quoted from *Land and Water* at page 190, and denies the facts. He says, "Neither the gardens at Dresden nor anything in them have been in the least disturbed; and as to Cologne, the matter is simply that the gardens there have some small part of their area laid out, *by sufferance*, on a portion of land within the bounds of the fortifications of the city; and, should the exigencies of war demand it, the portions of the gardens referred to *may* be required to be given up; for this reason, no other than light sheds have ever been erected on this particular spot. Another paragraph appeared in the English papers to the effect that the Zoological Gardens are being broken up in the town of Frankfort-on-the-Main, and the contents purchased by a Hamburg company, whereas the reason of a temporary disorganization is owing to the gardens standing on ground which has lately become private property; hence the Zoological Society there has had to obtain a new site. As it was found more convenient to sell the larger carnivorous animals than to keep them in temporary accommodation, this has been done; but the purchase was not made by the Hamburg Company, but by a private dealer." We are glad to be able to contradict the statement, therefore, which we copied, in good faith, from our contemporary.

Grand Lory.—What is the scientific designation of the Parrot called "Grand Lory"? There *was* a specimen in the British Museum with this name attached to it.—*H. G.*

Pagoda Thrush.—What bird is the "Pagoda Thrush" referred to by Moore in his "Lalla Rookh"?

> "And the thrush
> Of Hindostan, whose holy warblings gush,
> At evening from the tall pagoda's top."

Pennant says, "The Pagoda Thrush is esteemed among the first choristers of India. It sits perched on the sacred pagodas, and from thence delivers its melodious song."—*H. G.*

[Is it the "Pagoda Starling," *Temenuchus Pagodarum*?—Ed.]

Slugs in the House.—How can I get rid of some slugs with which I am much troubled? They occur in the closet of a sitting-room; the greater portion of the house is new, but one wall and the floor of the closet are old.—*W. J. G.*

Tones of the Cuckoo.—The musical ear of your correspondent at Taunton has correctly noted the call of the Cuckoo, with its variation at this season of his summer sojourn with us. He is not probably aware that this change of tone occurs with much regularity, for which we have the authority of the old rhymes:—

"In April Come he will.
In May He sings all day.
In June He alters his tune.
In July He prepares to fly.
In August Go he must."

—*C. F. White, St. Anne's Heath, Chertsey.*

Scotch Snakes.—Dr. Ellis corrects an error in our last, relative to the common snake (*Coluber natrix*) not being found in Scotland. He has been informed, upon the authority of Dr. Smith, of Forfar, that it is otherwise, and that he has seen it there. Also, that it has been reported to him, a common snake was lately killed by a hedger and ditcher at Garthorpe, near Crowle, of the unusual length of six feet three inches. Professor Bell gives four feet as the maximum length.

Snake in Yorkshire.—I have seen two in the West Riding of Yorkshire—one I captured as it was crossing the road between Batley and Wakefield; it was a fine specimen, a yard in length. The other I have preserved in spirits; it was found coiled up in a cabbage, in a cottager's garden at Soothill, near Leeds; it is quite as good a specimen as the first. In Middleton Wood, a little out of Leeds, I am told that snakes abound in considerable numbers.—*H. A. Allbutt, Batley.*

The common snake was often met with a few years ago, close to Leeds, at a place called Stony Rock; also near the Lime-kilns at Giggleswick Scur, and in the Willow Garths at Aberford.—*J. S., Leeds.*

Dinobryon.—Early in July, 1863, while searching in a small pond in the neighbourhood of Cleadon, Durham, I found in very great abundance a species of *Dinobryon*, which does not correspond with any of the species described by Mr. Pritchard, in his recent volume on "Infusoria." The family *Dinobryina* is described in pages 546 and 547; it is divided into two genera, and the genus which most closely resembles the specimens I found is that of *Dinobryon*, and the species closely resembles *D. sertularia*, the difference being that *D. sertularia* is represented as one vase proceeding from the mouth of the preceding, while in the specimens I discovered each vase was on a separate stripe, and each branch divided and subdivided until they formed a fan-like expansion. I have, since the time I discovered this form, frequently searched the same pool, but always without succeeding in finding any specimens of *Dinobryina*. Pritchard's "Infusoria," plate 22, fig. 49, is a good representation of each polype case, and fig. 48 would also be a good representation of a group if the vases sprang from a central stem, and did not originate from the mouths of the adjoining vases. Have any of the readers of Science Gossip discovered the species I have attempted to describe?—*T. P. Barkas, Newcastle-on-Tyne.*

Attheya decora (Sc. G., July).—I examined on the 1st of August a gathering of Diatoms forty per cent. of which were *Attheya decora*.—*B. Taylor, Whitehaven.*

Athela of Babylon.—In Michell's "Ruins of many Lands," note 3, there is described a very ancient tree of the supposed age of 2,500 years, which he designates "Athelà of Babylon"—can any one help me to its specific name? It is also alluded to by Buckingham, and is said to be on the north side of the Kasr.—*Bangalore.*

Bidmusk.—Moore, in "Lalla Rookh," People's Edition, page 57, quoting from Le Bruyn, says "a wind which prevails in February, called Bidmusk, from a small and odoriferous flower of that name." What is the flower?—*H. G.*

Blue Birds of Galilee.—In the translation of Renan's "Life of Jesus" (cheap edition), there is mention made at page 74 of "blue birds (at Galilee) so light that they rest on a blade of grass without bending it." Is there a blue bird in that region so small as to afford foundation for the statement, and if so, what is its scientific name?—*H. G.*

Toads changing their Skin.—In the usual accounts of the Toad changing its skin, it is said to finish the operation by swallowing the integument "at a gulp," having rolled it into a ball; but in "Our Reptiles" the action is described as gradual—a statement which I have lately had the opportunity of confirming. A few days ago, on looking into my *Toadery*, I found one of the inmates with a good portion of its skin hanging out of its mouth; it was entirely detached from the animal, and most of it had been already disposed of, while the remainder was disappearing by a succession of efforts with a pause of ten or fifteen seconds between. The apparent strain in gulping, the eyes being depressed longer, I thought, than when swallowing ordinary food, did not give the impression of much enjoyment of the strange meal. In about two minutes the whole affair was over; at least that part of the operation which I witnessed, as I cannot tell at what time the business commenced. It may be observed that most animals "*sicken*," as it is termed, before casting their skin, refusing food for some time beforehand. The Toad in question, however, ate a large earthworm with apparent relish about two hours before this took place. It is not unlikely that this preliminary fasting, by causing the flesh to shrink, may assist shelly-skinned creatures in getting out of their case, while soft-skinned animals like the Toad have no need of such a period of training before they are capable of getting out of their old garments.—*George Guyon, Ventnor, Isle of Wight.*

Clearwing Moth.—I can fully corroborate your correspondent A. B. F.'s notice in this month's Science Gossip, as to the abundance of the Currant Clearwing (*Sesia tipuliformis*) this season. Here they have swarmed amongst the currant and raspberry bushes. I took about a hundred and thirty in a very short time, and might have captured hundreds more. As your correspondent states, they were easily boxed off the blossoms and leaves of the raspberry. Here the raspberry bushes were in close proximity to the currants. Was that the case with those your correspondent took his on? If not, it would be interesting to find out whether the *larva ever feeds* in the stems of that bush.—*G. T. Porrett.*

Hawthorn Caterpillar.—Although the larva of *Hyponomeuta padella* may be the insects which strip the leaves of the hawthorn, &c. (see Science Gossip, p. 182) in the south of England, I believe that in the northern counties it is mostly caused by a totally different species, viz., the Winter moth (*Cheimatobia brumata*); it not only eats the hawthorn, but almost every other tree; in fact, with the assistance of the larva of the green oak-moth (*Tortrix viridana*), whole woods of oak often appear quite withered and bare from its ravages.—*G. T. Porrett.*

Thistle Galls.—These were illustrated and described in the *Gardener's Chronicle* for 1847, p. 815. They are produced by a small dipterous insect called *Musca* (*Tephritis*) *Cardui.*

Ice-Birds.—In Lord Dufferin's "Letters from High Latitudes," p. 319, he speaks of "Ice-birds." Can any one tell what they are?—*Bangalore.*

Snails in Aquaria.—All the little shells in my aquarium have become corroded and whitened, and so thin, that the least touch crushes them. The water is pure, and the growing plants in full vigour. What is the cause?—*E. H. W.*

Guano a Poison.—A peasant cutting wood, says the *Gazette de Lausanne*, was wounded by a splinter, and having afterwards worked in guano, this substance entered the wound and occasioned death by poison after three days' suffering; this fact should be known by all the people working in docks unloading guano ships, &c. What precedes reminds me of a case which may be attended also with dreadful consequences for the labourers in the docks. Sometimes the Buenos Ayres hides are impregnated with a special drug to preserve them better. A powder is sold for that purpose by the Buenos Ayres apothecaries, which is composed of very toxic substances; workmen should then take the utmost care to avoid inhaling the reddish-white dust of those hides.—*B. M.*

Carbolic Acid.—A very minute quantity of a weak solution was added, under the microscope, to water containing various infusoria. The acid proved instantly fatal, arresting the movements of the animalcules at once. Caterpillars, beetles, crickets, fleas, moths, and gnats were covered with a glass, the inside of which was smeared by carbolic acid. The vapour proved quickly fatal. It allays the pain caused by the stings of bees, wasps, hornets, and gnats, if applied pure, or in strong solution, to the wounded part. From the intense aversion shown by all insects to the odour of carbolic acid, it is probable that the plentiful use of this agent would effectually preserve cattle from those terrible scourges met with in certain parts of Africa, the zimb and tsetse-fly.—*Crookes' Application of Disinfectants, &c.*

Laurel Pimples.—What is the little pimple-like, rosy-red formation on the young leaves of the laurel? Ants tap it with their antennæ, and feed on the exuding liquid as they do on Aphis-honey.—*F. W.*

Organisms in Chalk.—There are very many interesting small organic remains in chalk, which may be obtained by any one with a very small amount of trouble.

The following slight modification of the plan recommended in the *Geologist* (1863, p. 331) seems to be the best mode of procedure. Take a lump of chalk about a pound in weight (which may be procured in almost every village shop) and with a stiff brush, such as a nail-brush, rub away the surface in a bowl of water, into which a gentle stream is continually running. As the larger foraminifera and other organisms appear on the surface of the chalk, they should be carefully detached, and suffered to fall into the water. When a sufficient amount of chalk-rubbing has been procured, it should be gently stirred, and the small portions of chalk crushed between the finger and thumb, then washed repeatedly until all milkiness disappears. The grey-coloured residuum should then be thoroughly dried, and sifted through small sieves, which may be readily made by stretching muslin of different degrees of fineness over rings of wood about two inches in diameter. The coarser muslin should retain only the larger foraminifera, the valves of entomostraca, and other larger objects. The finer should permit only the very finest dust to pass through; and the remainder will consist almost entirely of foraminifera. Before mounting these in balsam, in the ordinary manner, they should be placed in a watch-glass, with a small quantity of oil of turpentine, and washed by means of a camel's hair pencil several times, until all chalkiness is got rid of, or the slide will not be satisfactory.

By proceeding in this manner, many of the larger objects are preserved, which would be destroyed, if the chalk were scraped or pounded.—*J. S. Tute.*

The Edible Crab (*Cancer pagurus*).—One of these crabs cast its shell in the Hamburg Aquarium, June 18th, 1866, and the following are the measurements:—

Length of carapace before exuviation	$4\frac{5}{10}$ inches.
Length of carapace after exuviation	$5\frac{2}{10}$,,
Increase of length	$0\frac{7}{10}$,,
Rate of increase of length . .	$15\frac{5}{9}$ per cent.

Breadth of carapace before exuviation	$6\frac{7}{10}$ inches.
Breadth of carapace after exuviation	$7\frac{9}{10}$,,
Increase of breadth	$1\frac{2}{10}$,,
Rate of increase of breadth . .	18 per cent.

N.B.—In measuring Crustacea, it is usual to give the term "length" of carapace, from the insertion of the fifth pair of legs to the front margin of the shell, and the "breadth" to the measurement at right angles to that. Hence, with some forms, as, *e.g.*, *Cancer pagurus* and *Xantho florida*, the breadth is greater than the length; while in others, for example *Maia squinado* and *Lithodes Maia*, the length is greater than the breadth.—*W. Alford Lloyd.*

Winking Marybuds.—R. S. is no doubt right. The Marsh Marygold (*Caltha palustris*) is the "Marybuds" of Shakespeare. In this neighbourhood they are called Mare-blobs, which some think to be a corruption of Mere-blobs, because they grow in the water; but which is just as likely to be an altered form of Marybuds.—*F. T. M., Loughborough.*

NOTICES TO CORRESPONDENTS.

H. G.—Your "fly" is the "Golden wasp," *Chrysis ignita*.

H. J. B. must think that we know everything, or he would not ask us to name a moth from its eggs.

H. G. (Bangalore).—Your fern appears to be *Pleopeltis lepidota*, Wild. See Beddome's "Ferns of S. India," pl. clxxxi. Said to be common about Ootacamund.

W. R.—Your moth is *Anthrocera filipendulæ* (Burnet moth).

R. S.—All specimens announced for distribution or exchange must be applied for during the current month, or no notice can be taken of the communications.

G. S. (Oporto).—Use Condy's Disinfecting Fluid for permanganate of potash.

BANGALORE.—To what work on "Humming Birds" by Mr. Gould do you allude? The volume published by H. G. Bohn in 1851 is *not* by Mr. J. Gould. Gold and silver shells (as they are technically called) are used for illumination, and may be had of an artist's colourman.

J. McK.—We decline the responsibility of recommending any special apparatus for microscopists, whilst there are so many makers, and each offers some advantage.

J. L. C. will find more information on Ligurian bees than we can furnish in the "Gardener's Chronicle" during the past twelve months. On August 18th, a summary of the experience of one correspondent was given.

J. H.—We know of no cheap and good manual.

G. M.—Our search for the contribution named has been fruitless. We do not preserve rejected MSS.

C. A. J.—A solution of silicate of potash will harden chalk. —*A. M.*

A. M.—It is entirely your bookseller's fault. SCIENCE GOSSIP has *always* been published in good time.

J. E. T. should wait till the capsules of *Tortula* are ripe; the use of spirit is unnecessary.—*C. F. W.*

H. T.—It often takes place if the caterpillars are disturbed or cannot find a suitable place to spin.

T. A. K.—It is the female (wingless) of the vapourer moth, *Orgyia antiqua*, with its cocoon and eggs.—*F. M.*

J. B. D.—Not a fungus, but the eggs of a mite (*Trombidium*). See SCIENCE GOSSIP, vol. i. p. 22.

S. A.—The glowworm is the larva of *Lampyris noctiluca*. See "Popular Science Review" for July, 1866.

OAK SPANGLES.—The insect which produces "oak spangles" is *Cynips longipennis*, whilst the button galls are caused by *Neurobius Reaumuri*.

M. M.—Nos. 3 and 4 are the same plant, which is a species of *Lepigonum*. No. 2 is *Plocamium coccineum*. No. 1, probably, *Fucus canaliculatus*. The fragments are too small to name with certainty.

G. E.—You had better have the species of your fern first correctly determined. Many kinds are given to variation.

J. G. O.—Perhaps, like some other people, they don't believe in the existence of such a thing.

S. J. N.—It is a common fungus, named *Cyathus vernicosus*.

W. H. K.—Put the animal in an anthill.

K. D.—A complete list of British insects is in preparation in a cheap form by the Rev. F. O. Morris, M.A.

B. (Melle).—Your fears are groundless. The journal you name has passed into the hands of other editors.

T. BRITTAIN would oblige T. W. W. and others, by stating where he can obtain the glass cells he describes at ninepence per dozen.

J. S. P.—We know nothing of the manufacture which you allude to. It is to be regretted that our correspondent does not permit some friend to copy his queries legibly.

R. M.—The fronds are those of *Cystopteris fragilis*.

C. H. G.—We regret that we can recommend no cheap work on dissection of insects for the microscope.

C. P. (Moulmein).—We have received two specimens of *Pwai-nyet*, and one of the resin of *Hopea odorata*, for which our Moulmein correspondent will accept our thanks.

J. H. M.—The fly is *Platystoma seminationis*, Fabr. It is not rare in chalk and limestone regions.—*F. W.*

C. F. G.—The bee is *Osmia rufa*, Linn.—*F. W.*

R. S.—The "List of British Diptera," published by the authorities of the British Museum, 1853, compiled from the 1st and 2nd vols. of "Diptera Britannica." It is incomplete, since the contents of the 3rd vol. of the above work are not incorporated. No other list has been published since Stephens's and Curtis's. 2. "List of British Hymenoptera," published by the authorities of the British Museum, 1853, is complete. The Rev. F. O. Morris it about to publish a complete list of British Insects, price 5s.—*F. W.*

BRITISH PLANTS.—A parcel received for identification, but with no name enclosed. We cannot identify twelve specimens for the same individual, and we decline to examine any unless accompanied by name and address.

T. S.—No. 2, *Pœcilus cupreus*, one of the commonest British beetles belonging to the family *Carabidæ* and sub-family *Harpalides*.—*I. O. W.*

W. N.—The fern is *Lastrea cristata*.

EINNA.—The plant is *Cynoglossum officinale*.—W.C.

W. W. S.—The Acarus is quite new to me. The only mite I know with the six fore legs of equal size, terminated with curved hooks, and with the two hind legs terminated by a very long thread, is the Elephant mite (*Homopus Elephantis*) of Furstenberg's fine monograph.—*I. O. W.*

F. W.—Two specimens of *Schistidium apocarpum*, var. *rivulare*, the commonest form of the species on wet stones.—*G. E. H.*

E. T. S.—Your galls on evergreen oak (not *Quercus Ilex*) are allied to oak spangles, but evidently distinct. We cannot name the insect, which we have not seen; the only way to do so is to rear it from the galls.

EXCHANGES.

PYRENEAN PLANTS for rare British or other European plants. J. Howse, Garrybank, West Hill, Upper Sydenham.

MOUNTED OBJECTS for unmounted *Surirella nobilis* or *S. lata*, *Pleurosigma formosum*, or *P. fasciola*.—J. B., 3, Whitehall-street, Tottenham.

POPLAR HAWK-MOTH.—A few specimens for distribution on receipt of box with stamps for postage.—J. Skelton, 52, High-street, Bedford.

PLANTS of the North of Ireland (dried) for desiderata from other districts.—S. A. Stewart, North-street, Belfast.

PLUSIA FESTUCÆ for other Lepidoptera.—J. H. Y., 22, William-street, Prussia-street, Oldham-road, Manchester.

MOSSES.—Wanted *Hypnum Silesiacum*, *Buxbaumia*, *Bryum trichodes*, and other northern for southern species.—E. M. Holmes, 2, Arundel-crescent, Plymouth.

VALLISNERIA.—Several plants for pupæ or moth of *Atropos*, *Saturnia*, *Carpini*, or other good species.—M. D., Roundhay School, Leeds.

BOMBYX QUERCUS for other species.—K. D. Hinton, St. George, Taunton, Somersetshire.

SAND, containing diatoms, foraminifera, and sponge spicules, for spores of any but the common ferns.—G. Edey, High-street, Christchurch, Hants.

TRECHUS DISCUS and other beetles for British beetles or birds' eggs. Send lists to T. M., 14, Union-place, Lower Broughton, Manchester.

DIATOMS from Northfleet marshes, and desmids from Keston, sent on receipt of stamped envelope.—H. J. Bacon, 44, Camberwell-road, London.

FOSSILS wanted for Lias fossils, &c., from Lyme Regis, and fossil wood from Isle of Portland.—J. R., 57, Pitfield-street, Hoxton, N.

QUAILS' EGGS, from near Bedford, for other rare eggs.—J. Shelton, 52, High-street, Bedford.

SPINE of foreign Echinus (section) and cuticle of *Deutzia scabra* for fossil or foreign diatoms.—J. S. Tute, Markington, near Ripley, Yorkshire.

RICH FORAMINIFEROUS SAND from Turkey, for objects of interest.—T. F., jun., 2, Ashley-road, Bowden, Cheshire.

BRITISH BIRDS' EGGS for British Sphingidæ. Apply for list to W. M. Cole, 93, St. Helen's-street, Ipswich.

HYPNUM CRISTA-CASTRENSIS (fruit) for the rarer mosses of the South of England.—M. C. C., care of the Editor, 192, Piccadilly.

CAMEL'S HAIR (unmounted) for mounted objects of interest. —L.A., care of the Editor.

BOOKS RECEIVED.

"First Report of the Harrow School Scientific Society," Harrow. Crossley & Clarke, 1866.

"Journal of the Transactions of the Victoria Institute, or Philosophical Society of Great Britain." No. 1, July, 1866. London: Robert Hardwicke.

"On the Application of Disinfectants in Arresting the Spread of the Cattle Plague," by William Crookes, F.R.S. London: J. H. Dutton.

"The Technologist," for August, 1866. New Series, No. 1. 8vo. London: Kent & Co.

"First Report of the Quekett Microscopical Club." London: 1866.

COMMUNICATIONS RECEIVED.—J. S.—R. R. A.—G. S.—A. M.—R. Wood.—S. K.—E. M. H.—J. L. C.—T. W.—T. D. M.—H. W.—C. F. W.—J. Mc.—H. T.—C. P.—H. S.—J. S.—J. H.—J. S. T.—H. C.—R. S.—G. K.—G. H.—G. T. P.—W. L. S.—J. B. D.—T. A. K.—T. S.—E. T. S.—F. T. M.—D. G.—B. T.—T. P. B.—J. W.—J. K. M.—H. W.—H. G.—E. M. H.—M. M.—R. H.—H. A. A.—G. E.—J. G. O.—M. F. B.—W. S. G.—S. J. N.—T. B.—W. H. G.—B. (Melle)—K. D.—J. B. G.—W. H. K.—J. B.—G. H. L.—W. T.—N. D. L.—F.—D. J.—L. N.—D. P.—W. C.—T. R.—J. W.—A. R. B.—N. S.—T. M.—R. M.—J. S. P.—T. W. W.—H. G.—C. H. G.—C. A. J.—J. Y.—H. J. B.—Dr. E.—C. D.—J. R.—P. S. B.—J. S.—J. P. G.—W. J. G.—J. B.—S. A. S.—H. G.—W. R.—F. W.—W. M. C.—T. F.—E. W.—R. M.—M. M. A.—R. A. S.—J. G. G.—Wilde.—P. M.—H. R.—F. F. S.—Einna.—M. H.—G. M.—P.—W. N.—J. W.—T. G. P.—J. S. (Leeds).—B. H.—A. B.

*** *Other* "notices" *must stand over for want of space.*

CONSERVATISM.

"*Conservatism*—The practice of resisting changes; or of maintaining and preserving that which is established."
CRAIG'S ENGLISH DICTIONARY.

THE old adage declares that "it is always safe to learn, even from an enemy." This is a statement which has received many remarkable illustrations in the history of man's relations to the globe on which he dwells. In his contests with nature—the contest of human will with physical law—he has committed many a grievous error, and sustained many a crushing defeat, through ignorance of the truth that in order to conquer nature he must obey her. To speak more accurately, it is only by a careful study of natural phenomena that agencies, apparently adverse, can be rendered subservient to the interests of mankind.

In many parts of the world a struggle for territory is going on, as real as, though, happily, far less destructive than those which of late have crimsoned the fair fields of Continental Europe. Take, for example, the oases of the Algerian desert. The Arab villagers are here constantly engaged in repelling the assaults of the encroaching sands. These, urged onward perpetually by the prevailing winds, would speedily blot out all traces of cultivation were it not for the unremitting labours of the native tribes. Where resistance is not offered, the invading drift carries on with alarming speed the work of desolation.

But operations of a more interesting character are taking place on many of those belts of sand which divide sea from land, and form a neutral territory, which is the subject of continual change.

Under certain conditions, the sands which underlie the waters of the ocean, and have been formed either by agencies no longer in operation, or by running waters and other existing phenomena, heap up *dunes* or hillocks, and ridges along the shore. This apparently simple process is thus analysed by Jobard: "When a wave breaks, it deposits an almost imperceptible line of fine sand, the next wave brings also its contribution, and pushes the preceding line a little higher. As soon as the particles are fairly out of the reach of the water, they are dried by the heat of the burning sun, and immediately seized by the wind and rolled or borne farther inland. The gravel is not thrown out by the waves, but rolls backward and forward until it is worn down to the state of fine sand, when it, in its turn, is cast upon the land and taken up by the wind." This ordinary action is of course greatly intensified whenever a storm arises from the sea.

The sand, thus transferred from the control of the waters to that of the air, is urged forward by the breezes, and rolled up the gentle ascent of the shore, until plants, pebbles, or other slight obstructions arrest its course, and permit the accumulation of a heap. In this way an irregular line of somewhat conical hillocks is formed, which may reach a height of even 5 or 600 feet. By the same agency a second row of dunes is built up within the first, and then a third and a fourth, until these natural ramparts may form a belt of fortifications several miles in width. Thus does the ocean rear mighty and effectual barriers against its own incursions.

But "Forwards!" is as truly the motto of the sand-dune as ever it was of old Marshal Blucher, and the hillocks of the shore may become as formidable invaders as the sand-waves of the desert. The blown dunes advance landward often at a rapid pace, and if not arrested in their course, fields are rendered barren, plantations buried, and the dwelling of man overwhelmed. Instances of this on a scale of alarming magnitude may be found on the coasts of France, Prussia, and Denmark, and the total area of the sand-dunes of Western Europe has been estimated at nearly a million acres. This enormous extent of sand-covered soil would have been far less had man learned to imitate nature—a lesson which he has had to be taught in the bitter school of experience. Where human agency has not interfered, the sand-dune and its counterbalance, if we may so speak, may often be found side by side. The rampart heaped up by winds and waves needs but to be consolidated to become a benefit instead of an injury. This is accomplished by the quiet but mighty influence of *vegetable life*.

A goodly number of plants hasten to make the arid ridge their chosen habitat. Chief among them is the Sand Reed (*Ammophila arenaria*), provincially known as the *Marram* or *Bent*, a humble rush, growing to a height of but a couple of feet, but sending its root-fibres to a distance twenty or thirty times as great beneath the ground, binding together the loose and incoherent soil. It flourishes only in an atmosphere charged with saline particles; and the seemingly barren sand is to it a rich and nutritive earth. Having accomplished its special work, that of arresting the drifting mass, this lowly plant withers and dies, and adds to the soil its quota of fertilizing matter, preparing the ground for other races of vegetable organisms, so that at length "the wilderness" may "become a fruitful field," even by means of agencies apparently so inadequate. But man's interference with these natural compensations has furnished a singular and instructive chapter in the history of physical geography. The sand reed is found to possess various economic properties. Cattle feed on its leaves, and poultry upon its seeds, which have also been made into a coarse kind of bread; its fibres yield material for cordage, its roots are fitted for fuel, and the entire plant is used for thatching. With a degree of blind improvidence scarcely credible, the plants thus given to check impending injury to field and dwelling, are recklessly torn up by the roots to satisfy the necessity or convenience of the moment.

This practice has been continued for centuries; and there is reason for supposing that the present condition of the coasts of France, Prussia, and the Netherlands, already alluded to, is due to the destruction of dune-plants in past ages.

"Before the occupation of the coast," says a writer,* to whom we are indebted for several of the foregoing facts, "by civilized, and therefore destructive, man, dunes, at all points where they have been observed, seem to have been protected in their rear by forests, which serve to break the force of the winds in both directions, and to have spontaneously clothed themselves with a dense growth of the various plants, grasses, shrubs, and trees, which nature has assigned to such soils. It is observed in Europe that dunes, though now without the shelter of a forest country behind them, begin to protect themselves as soon as human trespassers are excluded, and grazing animals denied access to them."

Among the dunes of our own island, those of Cornwall have acquired an interest in antiquarian eyes, from the disinterment some thirty years since of an ancient church and oratory at Perranzabulo, which the drift had hid for centuries. The Scottish coast also furnishes some remarkable deposits; in one of them lies buried what Hugh Miller graphically termed "an ancient fossil barony," with remains of a manor house and its humbler surrounding cottages; and it would appear that the catastrophe thus geologically recorded was due to the wasteful ignorance of the former peasantry of the district. For an act of Parliament of the time of William III. details the mischief occasioned by the "bad practice of pulling the *bent* and juniper," and strictly prohibits such destructive acts in future. Similar legislative measures have had to be adopted in continental countries. In one instance, however, the fault was certainly not with the people. King Friedrich Wilhelm the First of Prussia being sadly in want of cash, a certain Herr von Korff—a devoted Bismarck of the olden time—offered to fill the royal purse to overflowing if he were allowed to remove something quite useless. The delighted monarch at once gave his royal consent (as who would not to such a proposal?) and the loyal Herr proceeded to strip the sand-hills of the "Frische Nehrung" on the coast, of the forests which clothed and consolidated them. He sold the timber, raised the money, relieved his sovereign, set free the sands to march inland, fill harbours and channels, and damage fisheries, and thus completed an enterprise which the state would now give millions to undo. It is only of late years that nations have woke up to a sense of the folly and danger of an indiscriminate destruction of vegetable life. On the Continent the nature, laws of formation, and means of control of sand-dunes have been carefully studied, and various reparative measures adopted, mostly at public expense. The natural vegetation of dunes appears to be remarkably extensive; those of Jutland having been found to yield above two hundred and thirty species, and those of the Prussian coast two-thirds as many.

Practical men have anxiously investigated the best methods of stimulating and accelerating these growths, and both in the Old and New World the sand-reed and plants of similar habit have been extensively planted on moving dunes, and afterwards,

* Hon. G. P. Marsh. "Man and Nature." 1864.

when a soil has been formed, shrubs and trees have been established on the once shifting and arid wastes. The Birch in Denmark, the Maritime Pine (*P. maritima*) in France, and the Ailanthus (*A. glandulosa*) in Russia, have been employed for this purpose with great success. Many thousands of acres have thus been reclaimed, and modern science has made some progress in repairing the mischiefs wrought by ignorance in days gone by. Thus, educated man asserts his superiority to nature by improving upon her processes. Yet, we repeat, the history of sand-dunes is but an elaborate comment on the truth that if we would make nature our friend, when she seems most adverse to our interests, it must be by a reverent study of her laws—the laws of her all-wise Creator, and a humble imitation of her methods. W. H. Groser, B. Sc.

BELL-FLOWERS.

> "Nature gives a parting smile—
> As yet the blue-bells linger on the sod
> That copse the sheepfold ring: and in the woods
> A second blow of many flowers appears,
> Flowers faintly tinged, and breathing no perfume."
>
> Grahame.

THE floral year is fast drawing to a close; summer has given place to autumn, with its rich, many-hued foliage, beautiful in itself, but sad in the warning which it gives of approaching winter. The wild flowers are rapidly disappearing: every day seems to mark a diminution in their numbers; and, of those which still persevere in putting in an appearance, many are but "blighted beings," serving only to recall more vividly their glories which have passed away with the departed summer. Some, however, still adorn the closing hours of the waning year with their blossoms; and conspicuous among these are the various members of the genus *Campanula*, better known to some as Hair-bells, or Bell-flowers.

The British species of the genus *Campanula* are readily distinguished from those of any other group. They are, with but one exception, perennial plants; the leaves, though varying much in shape and size, are, in all cases, almost *entire*, though some have their margins *toothed;* the corolla is in each species normally of some shade of blue, occasionally varying into white. It contains *five* stamens and *one* pistil; thus belonging to the Linnæan class *Pentandria*, order *Monogynia;* and is all in one piece, or *monopetalous*. The shape of the corolla, too, which gives to the genus its English, as well as its Latin name,* is worthy of notice.

Six of the seven British species have their blossoms on long footstalks, while in the remaining one they are *sessile*, *sitting* close to the stem. To consider the larger number first, we may again divide it into two subdivisions, in one of which are four species which have their *capsules*, or seed-vessels, *nodding*, while in the other are two which have them *erect*. The best known of the nodding-capsuled species is the Hair-bell (*C. rotundifolia*), usually, though somewhat unmeaningly, spelt hare-bell; but, as the name seems to have been given it in allusion to its slender hair-like stalks, the former spelling is the more correct. The Hair-bell is so universally known and admired, that little description of it is necessary; its lovely blue flowers have been so often sung of by poets and depicted by painters, that every one must be familiar with them. The specific name *rotundifolia*, or round-leaved, may be considered inappropriate by those who have only seen the plant in the flowering season, when all the leaves are *linear*, or very narrow; but those about the root, which appear in the spring, and wither on the approach of summer, are nearly round, or heart-shaped. These, catching the eye of Linnæus on the steps of the University at Upsal, induced him to bestow this name on the species. In "Hone's Everyday Book" we are told that the Hair-bell is dedicated to St. Dominic; and the holy man may deem himself fortunate to have obtained so lovely a flower. In the winter, when nothing but the fibres of the plant remain, the empty capsules become skeletonized, looking like fairy bells; those of another species, *C. medium*, well known in our gardens as the "Canterbury Bell," are very favourite objects with the skeletonizers of plants. The blossoms are usually pale blue, but are occasionally darker, and are sometimes quite white: this peculiarity is shared by all our British, and many foreign species. Their texture is so delicate that they shrivel up and wither almost as soon as plucked. The Hair-bell is supposed by many to be the true "Blue-bell of Scotland," but others consider that the Wild Hyacinth (*Endymion nutans*) has a better claim to the title; indeed, the latter even disputes the title of Hair-bell with our little *Campanula*, and has found writers willing to take up its cause. The Nettle-leaved Bell-flower (*C. Trachelium*) is in England a common species, decking our woods and hedges with its long leafy spike of deep-blue flowers. Its leaves, as the name implies, much resemble those of the nettle; and each *peduncle*, or flower-stalk, usually supports from two to four blossoms. These are much larger than those of the Hair-bell, and form a handsome addition to our wayside flora. Their colour varies much in intensity, and pink varieties have been met with; in gardens, and occasionally in a wild state, they are double, the stamens being replaced by a second corolla. The stem is from two to four feet high, usually dark, stout, and very hairy. The name Canterbury Bell seems to have been originally applied to this species, although it is now usually

* *Campanula* signifies "a little bell."

awarded to the garden *C. medium*. Clare probably alludes to the Nettle-leaved Bell-flower when he speaks of

"The wild stalking Canterbury bell
By hedgerow side, or bushy bordering spots,
That loves in shade and solitude to dwell."

An old name for it is Throat-wort, given it from the efficacy which it was supposed to possess in relieving swellings of the throat and uvula. "The Antients," says Gerarde, "for anything that we know, have not mentioned, and therefore not set down anything concerning the vertues of these Bell-floures;" an omission which seems somewhat remarkable on their part when we consider how few plants had not some "vertue" or other attributed to them; it is satisfactory to learn that Gerarde's "owne experience" enabled him to fill up the vacancy by prescribing it for various "ills that flesh is heir to." Though general in the south of England, the Nettle-leaved Bell-flower becomes rarer in the north; and in Scotland it is seldom, if ever, found in a truly wild state. It is there replaced by the Giant Bell-flower (*C. latifolia*), a larger and, perhaps, handsomer species, with deep bells, clothed inside with hairs, and leaves somewhat similar to those of the preceding, from which it is distinguished by its *one-flowered peduncles*. This plant is always in our mind associated with flies; for on the day when, some years since, we had the good fortune to gather it in Yorkshire, at Hackness, a lovely little place near Scarborough, we were well nigh stung to distraction by a "grievous swarm" of them, and our temper was scarcely in a state to allow us to appreciate floral beauties; so the Giant Bell-flower was consigned to our vasculum,—*vulgo* sandwich-box,—and received its full share of admiration when we arrived at our lodgings. We remarked on this, the only occasion we have seen the plant in a fresh state, that the blossoms were of a delicate *pale* blue; but it appears that they are usually darker. It is of comparatively rare occurrence in the southern counties, where *C. Trachelium* is not unfrequently mistaken for it. Both species blossom from July to September. The Creeping Bell-flower (*C. rapunculoides*) is a very rare plant, well distinguished by its flower-spike, which is *unilateral*, having the blossoms all *on one side*. The corolla is pale blue, and, though handsome, inferior in size to those of the two last-named species. It is said to grow in some abundance near Nottingham; the root is creeping, the lower leaves are stalked and heart-shaped, and the upper narrow.

Our second subdivision contains but two species, neither of which are by any means common. The Rampion (*C. Rapunculus*) was formerly much cultivated as a vegetable, the roots, which are long, white, and tapering, being the part selected for consumption. Withering tells us that they are "eaten raw in salads, or boiled like asparagus:" and in Gerarde's time they were "boiled and eaten with oile, vineger, and pepper." In many localities, its origin may, doubtless, be traced to former cultivation; but in others it appears to be truly native. It prefers a gravelly soil; we have gathered it in some plenty on steep gravelly banks at Danesfield, near Medmenham, Bucks, where it seems really wild. The Rampion is a tall plant, with a rough branched stem, which, when broken, exudes a milky juice; the leaves are all long, rough, and narrow; and the blossoms somewhat resemble those of the Hair-bell, but are smaller and paler in colour. The Spreading Bell-flower (*C. patula*) is also very rare, though said to be abundant in Warwickshire. The leaves resemble those of the last species; the blossoms are larger and fewer than those of the Rampion, and are less truly bell-shaped: they are situated on very long footstalks, and grow in a loose panicle. Their colour is dark blue, with a tinge of purple; and, judging from our own specimens, this is retained when dried in a much more satisfactory manner than by any other British species. A third species, the Peach-leaved Bell-flower (*C. persicifolia*), is occasionally found, as near Cullen, in Banffshire; but has no claims to be considered a native. It is common in gardens, and has large wide-open blue or white flowers.

The single species which now remains for us to consider, is the Clustered Bell-flower (*C. glomerata*), which may be at once distinguished from any other by its sessile flowers. And, indeed, it is fortunate that there is some such mark whereby it may be known; for never did plant assume such Protean forms as does this Clustered Bell-flower. The leaves are usually rough, the lower ones stalked, the upper sessile, frequently clasping the stem; the corolla is often as large as that of the Hair-bell, but narrower, and of a rich purplish-blue. This is the first of our bell-flowers to put forth its blossoms; in favourable situations, as in the damp meadows by the Thames, they expand at the latter end of May or beginning of June; here the plant grows in great luxuriance, attaining a height of from a foot to eighteen inches. The flower-clusters are *terminal*, growing *at the end* of the stem, and the individual blossoms are larger and richer in colour than those found in other habitats. In July, and until September, the same species is found dotted about chalky banks and downs; but "what a falling off is there!" The luxuriant plant of the meadows is represented by a stunted little dwarf, rarely exceeding eight inches in height, with smaller clusters of flowers, which, though often terminal, are not unfrequently *axillary*, that is, growing in the axils of the leaves. A very small form is sometimes mistaken for a Gentian by beginners in botany; and not by them alone, as the late Dr. Withering was thus deceived. In most instances, the Linnæan classification comes to our aid, Bell-flowers having *five* stamens, while Gentians have but *four;* but even this is occasionally at fault, as Dr. Withering found *C. glomerata* with but four stamens. The eye, however, soon gets accustomed to the changing forms of this erratic species. A very pretty specimen, having *pure white* blossoms, was brought us the other day from Keep Hill, near High Wycombe; and both blue and white flowers are occasionally found on the same plant. It appears, from the following extract, that the name "Dane's-blood," commonly applied to the Dwarf Elder (*Sambucus Ebulus*), is also given to this species. "In the little village of Bartlow, in Cambridgeshire, there are four remarkable hills, supposed to have been thrown up by the Danes, as monumental memorials of the dreadful battle fought in 1016, between Canute and Edmund Ironside. The author, some years since, found this Clustered Bell-flower largely scattered about these mounds; and, on asking of some cottagers the name of the flower, was told that it was the 'Dane's-blood,' and so called because it sprang up from the blood of the Danes. On further inquiry of people in the neighbourhood, she found it universally known there by this name, which is, doubtless, a very old local one."*

Our gardens furnish some very pretty foreign species of *Campanula*, and the handsome Pyramidal Bell-flower (*C. pyramidalis*) seems to flourish almost as well in cottage windows as in the green-houses at Kew. Besides those British species which have been already described, we may just glance at two allied plants which were until lately included in the same genus. The Ivy-leaved Bell-flower (*Wahlenbergia hederacea*) is a fairy-like plant, with delicate creeping stems, pale-green leaves, somewhat resembling in shape those of the ivy, and tiny pale blue or pinkish flowers. It grows in great abundance in the bogs of Devon and Cornwall, in company with the lovely pink Bog Pimpernel (*Anagallis tenella*) and yellow Marsh St. John's Wort (*Hypericum Elodes*); but becomes rarer as it gets further north. Its leaves well distinguish it from any other Bell-flower; and its habitat is likewise dissimilar. The Corn Bell-flower (*Specularia hybrida*) is very different from any of its allies: it is an erect little plant, from 4 to 8 inches high, very rough about the stem, and with narrow sessile leaves. The capsule is very long, and the divisions of the calyx extend far beyond those of the small purple corolla. It grows in cornfields, but is not very common, seeming to prefer a chalky soil; the small, upturned flowers are frequently white, and are so little bell-like that their affinity is at first by no means apparent. The Venus' Looking-glass of gardens (*S. speculum*) is very nearly allied to this, of which some authors consider it but a variety. Gerarde mentions having found it in a wild state, and a specimen was recently brought me from a wheat field near Wycombe, but it has no real claims to nativity.

* Pratt's "Flowering Plants of Great Britain."

In conclusion, we may just remark that we have been quite unsuccessful in retaining the original colour in our dried Bell-flowers; they seem to have an obstinate predilection for becoming brown or white; but, perhaps, the method suggested for preserving that of the Speedwells* may prove successful here.

B.

* Science Gossip, ii. 164.

A CHAPTER OF ANECDOTES.

Here are a few stories about animals and their instincts that may, perhaps, please our *younger* friends. I hope there are a good many young people who read Science Gossip, for its pages cannot help being an inducement to them to observe, and perhaps to record, what they see during holyday rambles. Schoolboys have good opportunities of finding out a great many curious facts relating to both plants and animals if they can pass their holyday afternoons in the country, and may find much pleasure themselves, and haply be the means of teaching others, if they will only set to work in earnest; for there is still much to be done, and any one who goes through the world with his eyes open is sure to find out something that even professed naturalists did not know before. I always count it a piece of good fortune that I was sent to school to a kind good man who did all he could to induce his boys to study Natural History, especially on holyday afternoons, and I am quite sure that the seed then sown has much influenced my aims and pursuits in later life—to *my own* happiness, and I hope, now and then, for the pleasure of others for whom I write.

I must crave pardon for this digression at the very beginning of my chapter, and will only say further, that all these stories are quite true, for any facts that have not actually come under my own observation have been told me by very intimate friends whose word can be relied upon, and who were themselves eyewitnesses.

We sometimes read of strange friendships springing up between animals of opposite natures, but I never met with one more incongruous than the following, which happened at my own farm.

There were two pigs in one sty, one of them a young sow, which, after a while, was taken to a separate building previously to having a litter of pigs. Soon afterwards it was observed that the remaining pig had found solace for his loneliness in the companionship of a young chicken, which had, no doubt, at first accidentally got into the sty, but which never afterwards attempted to leave the pig, never even flying on to the top of the pigsty wall. It followed the pig about, as it would have followed a hen. The two fed together from the same trough, and slept together at night, the chicken roosting on the pig's shoulders, or, if the night were cold, lying comfortably snuggled between its fore legs, and it was no uncommon sight to see the chicken taking a ride round the sty on the pig's back. The pig never made the slightest attempt to hurt the chicken, which was the more curious, as most pigs have an especial appetite for chickens that may be so unlucky as to come within their reach.

The friendship remained unbroken for many weeks, till the pig was killed. The next day the chicken, now grown into a fine young cock, moped alone in the sty, evidently missing its departed friend; so it was removed at night, and placed on the perches amongst the other hens, whereat—alas! for the constancy of chickens' attachments—it seemed quite content; and it associated with its own kind until it met the fate of most chickens.

Another instance of these unaccountable friendships happened at the house of my friend and neighbour Mr. L——. The family had been removing to a house very near to the one they were leaving, and took with them a large rough dog and a favourite white pigeon. Knowing the attachment to locality that pigeons exhibit, my friend expected that the bird would very soon find its way back to its old haunts. This, however, was not the case; the pigeon appeared perfectly content with its new home, but, by a strange caprice, immediately began making overtures of acquaintanceship with the dog, who received its visits politely, and soon a complete friendship sprang up between them. The pigeon was accustomed to enter the dog's kennel and sit with him, whilst the dog would lie quietly and permit the pigeon to peck his head.

When I was a boy, two of my aunts left their house in Liverpool to come and live near us in Cheshire. The last of the furniture was packed upon carts ready for removal, and the house was empty, when they were startled by hearing one of the bedroom bells ringing violently. Of course, every one ran upstairs to see who was there and what was the matter, when, on reaching the landing where the bell itself was hung, the wire merely passing through the wall, there stood Master Gyp, a small spaniel, looking up at the still swinging bell and wagging his tail with doggish delight. He had evidently been playing about in the empty rooms, and had jumped up to the bell-pull, and had accidentally rung the bell, and hearing it ring had gone out to look, and the movement of the bell amused him. There would have been nothing very clever or curious, had this been all; but as soon as the bell had ceased to vibrate, the dog ran back into the bedroom, pulled the bellrope a second time, and then ran out as before to watch the bell ringing. Some reasoning process as to cause and effect must assuredly have passed through the dog's mind, for by repeating the action in so marked a manner, the dog had evidently *found out* that pulling the rope would set the bell ringing.

Some years ago I was managing a farm in Cumberland, where there was a little rough terrier, one of the vilest-tempered dogs I ever saw. I am generally pretty clever at making friends with strange dogs, but this one resisted all my efforts at conciliation, flying at me whenever I came into the yard. At length, without any apparent cause, she suddenly became as violently attached to me as she had before disliked me. She was never content unless following me about; she went with me to my lodgings at meal-times, and always remained with me at night, sleeping on an old arm-chair by the kitchen fire; in short, she became to me, and, I think, almost to me alone, one of the most faithful of dogs. Soon, her affection began to manifest itself in a more palpable, and not always convenient manner, for she was not content with the arm-chair for a bed, but at night regularly hunted about for some article of my clothing to sleep upon. The bolt which fastened the knocker to the front door projected about an inch through on the inside of the door, and on this I always hung my great coat. This was her favourite bed; by jumping up and pulling at it, she could generally get it down pretty easily; she would then drag it to the kitchen hearth and make herself comfortable for the night. Sometimes her preference for my great coat was a source of inconvenience, for she did not always manage to secure her prize without tearing it, and as she *would* have it, I was at last obliged to put it out of her reach. Then, as she was not able to get the coat, she would search for something else belonging to me—slippers, caps, scarfs—and my landlady told me that often when dirty clothes were put together at night to be washed the next day, she would rout through the heap and invariably pick out some article of my clothing from amongst many others; in fact, I never knew her to take anything to lie upon that was not mine.

I scarcely know whether to consider the following as an exhibition of instinct or not; if it be, it is very curious. In a recent number of Science Gossip a correspondent speaks of some large brown (or rather black) ants that build their nests of heaps of fallen fir-leaves. I am not an entomologist, and I do not know the scientific name of the insect, but I believe them to be the same kind that I used very often to see in the neighbourhood of Cirencester, where their nests, two feet in diameter and nearly a foot high, may be constantly seen in the fir woods. The ants crawl over these nests in immense numbers, and a sort of buzzing, humming noise that they make may be distinctly heard. Sometimes the whole colony may be seen travelling from one spot to another, and they then march in a narrow column, five or six abreast, extending to, and traceable for, a long distance, perhaps a furlong or more. They seem to follow a leader, and take precisely the same course that he (or she) has done, as strictly as a party of school-boys do when they play at "follow-my-leader." I once happened to fall in with a very large colony of these ants on the march, and occupied myself with watching their movements. Presently they came to a gateway leading into a field; but instead of crossing it upon the ground, every ant, on reaching the spot, climbed up the gate-post, then on to the hinge of the gate, and using the lowest bar as a bridge, walked along the gate, and descending by the other post, continued its journey on *terra firma*. I do not for a moment suppose the ants *reasoned* about the matter, though instinct *may* have prompted them; but they certainly adopted the best course to insure their own safety; for if they had crossed the gateway on the ground; and any cart or any cattle had passed through, numbers of them would doubtless have been crushed; but by crossing upon the gate, they would, if the gate had been opened, merely have been carried with it, and would have remained in safety till it had been closed again.

Birds, and especially Robins, sometimes choose very strange places to build their nests. In Cheshire there is always a small box or cupboard fixed to the front of each cart, in which the carter puts his dinner, or any little matters he may wish to carry when he goes a journey. A cart belonging to a gentleman who lives in Knutsford, had stood for a week or two in the carthouse, but being at last wanted for a journey to Manchester (16 miles off), it was got ready for use. On looking into the cart-box, the carter was surprised to find that a robin had built her nest in it, and was at that moment sitting upon her eggs. He was puzzled how to act, as he did not wish to disturb the bird that had built in so strange a place; but at last he closed the door of the box, shutting the robin in. The journey to Manchester and back was performed, the bird sitting all the time quietly upon her eggs. When the cart was brought back to the shed, the door was again opened, and the prisoner liberated. She, however, did not forsake her nest, but continued sitting, and it is pleasant to add that her parental affection was rewarded, and her young brood hatched in due time.

And now I must begin to draw my chapter of anecdotes to a close, lest the editor should think it too long and too unscientific to be printed in Science Gossip, so I will just give one instance of a remarkable *want of foresight* in a bird. We cannot often accuse the lower animals of want of foresight, for instinct is such a wonderful attribute of the mind, that it is very rarely at fault, but prompts the animals that are governed by its impulse always to act for their own benefit, or that of their offspring, *at the proper time* and *in the best possible manner*. But, after all, the anecdote I am about to relate really shows us the difference between reason and instinct, the former enabling us, by experience, to judge of the probable consequence of any particular mode of action, the latter impelling to the performance of certain acts without the agent in the least knowing what the consequences will be.

In my friend Mr. G——'s garden, a quantity of old pea-sticks are always reared up in a particular corner to be ready for the next year's crop. For many years a pair of thrushes regularly built their nest amongst these pea-sticks; but no sooner was the nest built, and the parent birds had settled themselves to the duties of house-keeping, than the pea-sticks were wanted for use, and the nest was destroyed; but the birds never gained any knowledge by experience, but built their nest year after year with the most foolish pertinacity, although they were never permitted to bring their household arrangements to a satisfactory termination.

Robert Holland.

THE AMŒBA.

We have undertaken to give a short account of a creature often met with amongst the inhabitants of the mud of ponds and ditches. Its shape is nondescript: it has neither mouth, teeth, stomach, claws, eyes, nose, hands, nor feet, yet it is able to perform the functions of each and all of those members most efficiently; or, rather, it is endowed by the Creator in such a manner, that it can dispense with them all, and yet fulfil its destiny in the economy of Nature.

Our subject, an *Amœba*, has no members which would lead one to suppose it was predaceous, yet its powers in this way are by no means to be despised by its more innocent neighbours. It has no mouth wherewith to swallow its prey, which, to use Mr. Slack's graphic words, "it flows over" in order to capture; but it makes short work of this difficulty by forcing the unlucky organism, whether animal or vegetable, into its interior at any part of its body. It is also beyond doubt that the indigestible portions of the food are ejected from its body in the same simple manner that they are taken in, namely, pushed through to the exterior at any point. Again, the absence of eyes or nose, or organs answering thereto in the body of the *Amœba*, would lead one to suppose that the power of discrimination in the selection of proper nutriment was slight; but such is not the case, at least we think so ourselves, for we have watched numbers of them, and could often identify the nature of their food. So far as we can recollect, we have never noticed that they had appropriated stones or sticks, or, in fact, anything else than diatoms, desmids, monads, and spores of algæ, as portions of their diet. The *Amœba* has no legs, no cilia, yet it can traverse the field of the microscope while we watch it, at a slow but steady rate.

We observe with a one-inch power a small transparent gelatinous body of irregular shape, only rendered visible by its refractive property, differing slightly from that of the water surrounding it. Though there may be several individuals on the slide, we should hardly recognize the being we are in search of, unless a practised eye first pointed it out. "When found," however, we "make a note of it," and put on a higher power, say a ¼-inch. Now we see the dim outline of a figure, somewhat oval in shape, filled with moving granules of various sizes, like a drop of jelly containing bubbles, &c. We get out pencil and paper and commence a sketch, but ere we have mapped it out, we find the shape has changed from an oval to a triangle. So we commence again, to be again foiled, for our new acquaintance has assumed a trapezoidal form, which it gradually, but rapidly, exchanges for some other. Now it is long and slender; in a short time it changes its shape to an irregular polygon, and anon it gathers itself compactly together like a pea. All these transformations are but means to an end; simply a mode of progression which more nearly resembles the flowing of a thick fluid on a level surface than anything else we can think of.

Long ago, attention was drawn to these creatures, which were said to be produced spontaneously in water containing small fragments of decaying meat, or in infusions of hay and other vegetable matters, but the idea of spontaneous generation, though tenaciously held still by some, has few advocates of late, and we now know that the amœba is as much a denizen of the ponds and ditches, as are the sticklebacks and the snails, and also, that the germs of microscopic organisms are present in the atmosphere, ready to develop themselves wherever they find a suitable nidus.

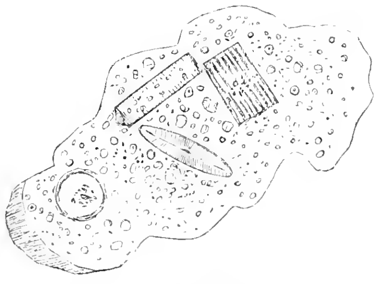


Fig. 208. *Amœba villosa* × 250.

The substance of which the *Amœba* is composed is called sarcode, and it is considered by the most competent observers that the outer portion differs somewhat from the inner. The former (called ectosarc), is "clear, transparent, and colourless, containing, permanently, few or no granules, or foreign bodies of any kind,"* and capable of extension in any direction to a surprising extent, thus forming false feet or pseudopodia, while the latter, which follows the contour of the ectosarc, is filled with a vast number of granules, consisting chiefly of food in course of being digested.† There may also be noticed in the greater number of instances a globular transparent body enclosed in the sarcode, near a villous patch of uncertain nature, often occurring in specimens, and this is believed to be the egg or young amœba. It has been seen in the act of being discharged from the parent—simply pushed through the surface, like the food, but its development into the adult form has never been witnessed. While in the parent's body it sometimes can scarcely be distinguished from the food, which is often present in large quantities, for the *Amœba* has an insatiable appetite, and crams itself with a heterogeneous collection of microscopic organisms of various colours, green, brown, red, &c.

A creature of such low organization as that of which we write, one would think, must be subject to many accidents in the course of its life, and so it is, but it seems to meet them all with indifference. Does it become pierced with a hair, it travels about impaled, apparently none the worse. Does its jelly-like substance become squashed or divided, the remains severally collect themselves into small pellets and creep away each a perfect amœba. By more than one microscopist has it been seen to voluntarily detach portions of its substance, which immediately took their departure to begin life for themselves. Another extraordinary fact, too, has been witnessed with creatures very closely allied to this (*Difflugia*), viz., two individuals have combined so closely as to form but one globular mass,—one of the shells with which these Rhizopods are severally invested being empty, though attached by its mouth to the other, in which the globular mass of sarcode lay.

I remember, some short time ago, while looking at a curious *Rotifer*‡ which I never saw before, seeing an *Amœba* caught up by the currents caused by the ciliated disc, and alternately attracted to and discharged from the centre of the tiny whirlpool many times, till at last the animalcule swung itself round in another direction (fig. 209), and the *Amœba*, apparently none the worse from the rough treatment it had experienced, crept or rolled away on its own business.

According to the size and transparency of the specimens, their activity, and the manner in which they extend their pseudopodia, are they distinguished by names. The utmost doubt, however, hangs on

* Professor Williamson's paper on the Structure of the Amœba, in "Popular Science Review."

† Some observers believe in the existence of a thin pellicle enclosing the whole.

‡ Obtained at Keston, 18th December, 1865.

the identification of the species of such variable beings, as their food, their age, the locality where they may be found, and perhaps also the degree of development to which they have attained, tend greatly to alter their appearance and habits. They are found both in fresh and sea water, and also, as we

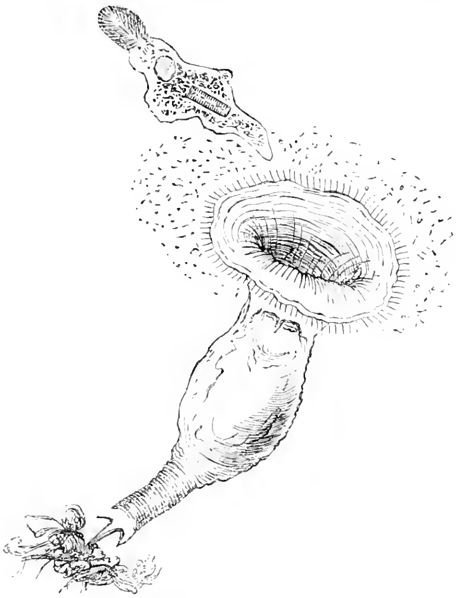


Fig. 209. *Rotifer* and *Amœba* × 250.

have before remarked, in vegetable and other infusions.

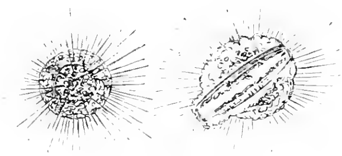


Fig. 210. *Actinophrys Sol* × 50.

The mystery which hangs over the life of an *amœba* is not in any way cleared up by the discovery, that certain vegetable organisms have an

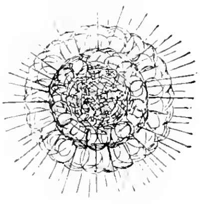


Fig. 211. *Actinophrys oculata* × 40.

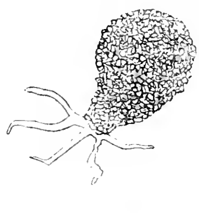


Fig. 212. *Difflugia pyriformis* × 40.

amœbiform state. Pritchard says, "Amœbiform beings are not necessarily of an animal nature, for some have latterly been proved to occur in the cycle of development of the simplest plants." Other observers, too, tell us the *Amœba* has an encysted condition or state of rest. In fact, so many wonderful statements have been made respecting this creature and its relatives, and its study is encumbered with such great difficulties, which seem to elude investigation, that it probably will be a long time ere we know all about it to our satisfaction.

We give figures of other rhizopods, partaking of the nature and habits of our chief subject. Among them is the *Actinophrys*,* or Sun Animalcule, whose partiality for living diatoms we have often witnessed. It generally is seen with the rays or pseudopodia extended, but it can retract them wholly or partially, and does so when appropriating its prey. Other members of the family wear shells, which they carry about on their backs like snails. The foraminifera and the sponges are relations also.

S. J. McIntire.

FAIRY-RING CHAMPIGNON.

Although there is one species of mushroom which is known as the Fairy-ring Champignon (*Marasmius oreades*), it must not by any means be concluded that no other species is found growing in rings, or that all the fairy-rings are caused by this fungus. But wherefore is this termed *Marasmius oreades* or "Fairy-ring Champignon?" Our French neighbours call nearly all fungi by the name of "Champignon," as the Germans denominate them "Pilze" and "Schwamme," and the English, "Mushrooms" and "Toadstools." Why we should call one species by the French term "Champignon," and why this particular species has been selected for that honour we will not attempt to determine. In France, the fungus called by us "Fairy-ring Champignon" is denominated *Pseudo-mouceron*, or "False Mushroom." The *Mouceron* is not that which we call the "Mushroom," but a vernal species, known to mycologists as *Agaricus gambosus*, or the true St. George's Mushroom.

Marasmius is the name of a genus containing nearly one hundred species, of which about twenty-five are British. The pileus, or cap, though continuous with the stem, is of a different texture. The substance is generally of a much drier nature than that of Agarics, and the majority of species delight in decaying leaves and wood, and many are very small, delicate, and elegant. *Marasmius oreades* differs from these in growing on the ground, and is of moderate size, and there are some others which accord with it in habit and dimensions.

The lover of classical history, poetry, and romance, will remember that the Oreades of the ancients were

* See Science Gossip, vol. ii. p. 87.

mountain nymphs attendant upon Diana in her hunting excursions. Homer alludes to them in the parting address of Andromache to Hector, wherein she relates that Achilles, having slain her sire, relented,

> "And laid him decent on a funeral pile;
> Then raised a mountain where his bones were burn'd,
> The *mountain nymphs* the rural tomb adorned."

Ovid, in his metamorphosis of Actæon, describes how Diana and her attendant nymphs,—

> "Panting with heat and breathless from the sport,"

retired to bathe at a fountain, and were discovered by Actæon, who for his presumption was changed to a stag, and worried by his own dogs. These attendant nymphs of Diana were doubtless the Oreades,—

> "Some loosed her sandals, some her veil untied;
> Each busy nymph her proper part undressed,
> While Crocale, more handy than the rest,
> Gathered her flowing hair, and in a noose
> Bound it together, whilst her own hung loose;
> Five of the more ignoble sort, by turns,
> Fetch up the water, and unlade the urns."

The name of the attendant nymphs of the queen of night is, therefore, not unfitly bestowed upon the mushrooms associated in later times with the midnight revels of

> "The nimble elves
> That do by moonshine green sour ringlets make
> Whereof the ewe bites not; whose pastime 'tis
> To make these midnight mushrooms."

Whoever has had the good fortune to reside in the country knows the Fairy-rings. These are green circles of luxuriant grass on pasture lands, sometimes of immense size, and to be seen from a considerable distance. Romance ascribes their origin to the dances of the fairies by moonlight, science to a much more matter-of-fact cause. These circles are the result of fungi, originating at first from a single mushroom. This parent mushroom exhausts the soil beneath it, and nearly destroys the grass by the spawn or mycelium which insinuates itself amongst their roots. When matured, the spores of this mushroom are shed at an equal distance all around the plant, which latter dies, decays, and manures the soil around it. The next season a circle of fungi spring up about the spot occupied by the mushroom of the preceding year, but all within the circle is barren. These shed their spores and decay as their parent had done, and thus year by year the circle increases until rings are formed, in some cases three feet, and at others thirty yards, or more, in diameter. The turf cut from within the ring exhibits a network of spawn interlaced amongst the roots of the grass. Thus the fairy palace is demolished, and the fairy dancers dispersed by the hard-hearted and unpoetical mycologist. Still we have the mushroom left, even although the fairies are banished, and we must turn it to the best advantage.

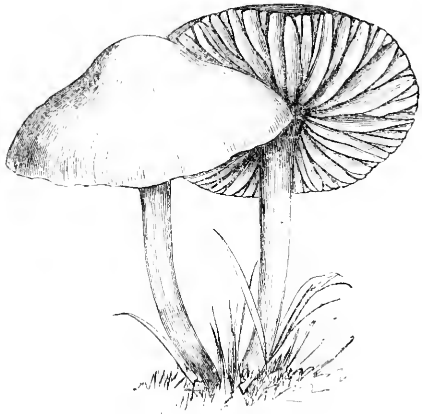


Fig. 213. Fairy-ring Champignon (*Marasmius oreades*).

Has our reader never observed the mushroom delineated in our figure (fig. 213) growing in clusters, or in rings, or parts of rings, in pastures, and by roadsides? It is not at all uncommon in many districts from May to November, and we have seen it flourishing and decaying by basketsful in the midst of a poor population that never tasted meat, except an occasional slice of fat bacon, and yet no one stoops to gather them. The cap or pileus is from less than an inch to more than two inches in diameter, at first more elevated towards the centre, but afterwards becoming nearly flat on the top. The colour of a buffy brown, which fades into that of rich cream. The surface is dry, dull, and neither viscid nor shining as in some other species. The gills are paler than the pileus, with the slightest tinge of straw colour, not close together as in the common mushroom, but with a considerable distance between them. The spores when thrown down upon paper are white. The stem is from one to three inches in height, slender, seldom thicker than a duck quill, tough, and with a whitish mealy coat. In taste and odour, though strong, it is not disagreeable. When a section is cut through the pileus and stem, the substance of the former, though continuous with, is seen to be of a different nature to the latter. The gills reach the stem without being attached to it (fig. 214). Such is the Fairy-ring champignon.

These Fungi are the most delicate eating of any of the edible species found in our islands, and are consumed freely in many of the countries of continental Europe. To preserve them for winter use they may be strung through the stem upon thin twine, and hung up in a current of air till dry, and afterwards packed in tin canisters. Or they may be pickled in vinegar as button mushrooms are pickled. They form an excellent addition to soups, stews, and hashes; for which purpose they may be employed either fresh or dried. When fresh, and of a good size, they may be either fried or stewed with sweet herbs and a chive of garlic. Treated thus they are of easy digestion, delicate flavour, and by some considered far superior to the common mushroom. It is to be regretted that no more zealous effort has been made to cultivate this species; there exists no impediment that we are aware of, and under cultivation it would, doubtless, improve both in size and flavour. The Fairy-ring champignon is of too dry

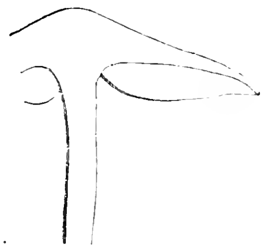


Fig. 214. Section of *Marasmius oreades*.

a nature to afford much ketchup, but what it yields is of excellent quality, and a few of these added to other mushrooms would improve the flavour of the sauce. It should not be forgotten that all fungi are liable to speedy decay and decomposition, and, consequently, internal chemical changes. Some of the fatal accidents recorded from eating mushrooms may probably arise from this cause. What in its fresh state would be excellent food, may become dangerous if kept too long. Although the subject of this paper is less liable to speedy change from its drier nature, it is, nevertheless, always advisable to cook all fungi as speedily as possible after they are gathered to prevent unpleasant effects, unless they are suspended and dried for store in the manner we have indicated. Regard being had to our figure and description, we see no fear, or even a possibility of any one mistaking a dangerous species for the true champignon. The species which resemble it most nearly are not found in the same localities, but in woods and amongst leaves; places where *M. Oreades* would not be looked for. These injurious species it is unnecessary to describe, for if they agreed in one particular with our present description, they would not accord with the others, and the safer plan would be to reject all such as disagreed with the details given. We know full well the potency of the widely-diffused dread and superstitious fear which prevents any other species of fungus, save the common mushroom, from being eaten, except amongst a few enthusiastic mycophagists. Whilst it is true that the error is committed on the safest side, yet we consider it fostered to an extreme. By dint of a questionable duplicity in the first instance, we have succeeded during the past year in practically demonstrating to some of our friends, not only that other species are harmless, but some so delicious that the partakers have not only pardoned the duplicity, but been profuse in expression of their obligations for many a hearty meal to which the rejected species have contributed. Unfortunately the poorer classes in agricultural districts, to whom a cheap food delicacy would be most acceptable, possess in this case the strongest prejudice, which nothing short of actual and repeated demonstration will remove.

Another name is also applied locally to our champignon by which it may be known to some, viz., "Scotch bonnets;" but the resemblance it bears to such an article of northern attire is so remote, or we possess too little of Highland blood, or too scanty a knowledge of Caledonian head-dresses to appreciate the allusion.

From what we have indicated of the history and associations of this little species, it will be admitted to have many claims to our better acquaintance. It appeals to the lover of old traditions, old poets, old poetry, and old poetical associations, as the mushroom of fairy rings in which Oberon held court; and if it is not the only mushroom which is found growing in rings, it is at least the classic one, as its name *Oreades* will testify. To the botanist it is of interest, as affording a good type of the genus, and which, on account of its size, can be better studied than most of its congeners. To the epicure it offers a dainty dish such as an emperor would not disdain. To the poorest peasant, with his "bit o' parsley and a ing-un," it proffers a wholesome and welcome meal; and to our readers, let us hope some little instruction has been communicated by our observations on the Fairy-ring Champignon. M. C. Cooke.

Field Crickets.—On getting well upon the plains, I found every inch of ground covered with field crickets; they were as thick on the ground as ants on a hill; the mules could not tread without stepping on them; not an atom or vestige of vegetation remained, the ground as clear as a planed floor. It was about twenty good long miles to the next water, and straight across the sand plains, and for that entire distance the crickets were as thick as ever. It is impossible to estimate the quantity; but when you suppose a space of ground twenty-seven miles long, and how wide I know not, but at least twice that, covered with crickets as thick as they could be packed, you can roughly imagine what they would have looked like if swept into a heap.—*J. K. Lord's "The Naturalist in Vancouver Island."*

GALL INSECTS.

THE numerous queries which from time to time are submitted to us on the subject of Galls and Gall Insects lead us to the conclusion that a few observations thereon will prove acceptable. In our first volume (p. 59) we gave a figure of the common gall of the oak, which is produced by the little fly known to entomologists as *Cynips Kollari*. Hitherto the male of this insect is, as far as we are aware, unknown; but the female is commonly obtained from the galls. Of this sex we annex a

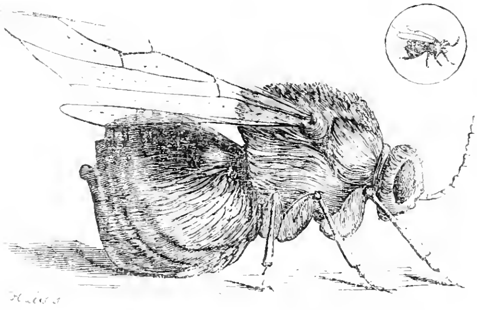


Fig. 215. Gall Insect (*Cynips Kollari*).

figure (fig. 215), magnified about 10 diameters. Mr. J. Wood recently forwarded to us for examination specimens of two insects reared from these galls, accompanied by the following note:—"In September, 1865, I collected at Sydenham, near the Palace, about 150 of the galls that have of late been so plentiful on the oak. I put them in a glass-topped box, and in about a month from 80 to 100 flies had issued therefrom. These were all the ordinary female insects. I took out the insects and the empty galls, and left the remainder until about the

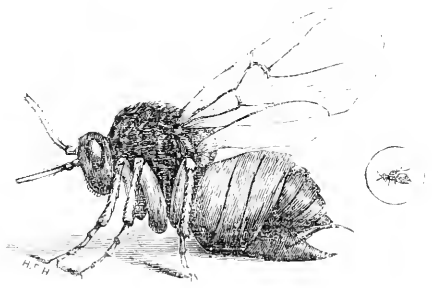


Fig. 216. Gall Insect (*Cynips sp.*)

middle of June of the present year, when I found a few more insects like those which had come out before, and also about a dozen others such as I had not seen before, which I at first took to be the males of the same species. They are smaller, dark brown, and regular little dandies." We submitted these latter insects to the most competent judge with whom we were in communication, and who has devoted considerable attention to the study of their allies. This gentleman states that he regrets his inability to name the *Cynips* (fig. 216), but that both the specimens are females, and there are specimens of it in the British Museum. It is singular, he adds, that this species has not been observed before, as large numbers of the Devonshire galls have been frequently kept for the purpose of rearing the insects from them. At present, therefore, we can give no further information about them. Dr. Kirchner states that *Synergus facialis*, Hart., is a parasite of *Cynips Kollari*., which, however, is very different from the insect here figured.

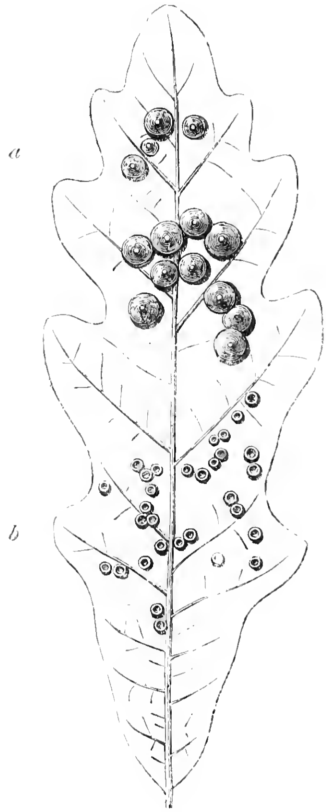


Fig. 217. Oak-leaf galls. *a*, upper portion, with "Oak spangles;" *b*, lower portion, with "button galls."

Two kinds of discoid galls are extremely common on the under surface of oak-leaves, presenting an appearance so singular that persons are continually being puzzled with them, and appealing to us for information. The figure above will perhaps help to clear up the difficulty. One portion (fig. 217 *a*) represents the top of an oak-leaf bearing "oak spangles," and the lower portion bearing "button galls" (fig. 217 *b*). The insect which causes the former of these is *Cynips longipennis*, of which we give a magnified figure (fig. 218); and the "button galls" are caused by *Neurobius Reaumuri*. Dr. Kirchner enumerates twelve species of insects which produce galls on the leaves of various kinds of oaks.

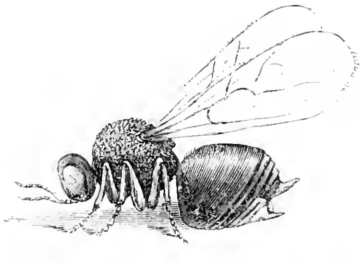


Fig. 218. Insect of Button Gall (*Cynips longipennis*).

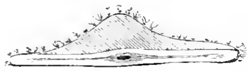


Fig. 219. Section of Oak spangle, enlarged.

Fig. 220. Tufts of hair from the same, more magnified.

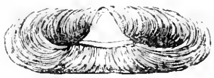


Fig. 221. Section of Button Gall, enlarged.

We have recently been in communication with a gentleman who is pursuing the study of galls, and hopes soon to publish an illustrated work on the subject. This will supply a desideratum which has long been felt, and we cordially wish him success in his undertaking. If any of our correspondents should meet with galls, except of the commonest kinds, or possess specimens of foreign galls (except those met with in commerce), and will forward them to Wilson Armistead, Esq., Virginia House, Leeds, they may assist him in prosecuting his very desirable work.

The Grasshopper.—I lately kept alive for a few days a large green "horsehead" grasshopper, which I brought from West Wycombe, Bucks. When climbing up a smooth surface, it used frequently to put its fore pair of feet to its mouth, apparently to facilitate the ascent by rendering them sticky.—*W. R. Tate, Grove Place, Denmark Hill.*

POISON-GLANDS OF SPIDERS.

The paper by Mr. Richard Beck is very satisfactory as respects the aperture in the fang of the spider, but it yet remains that a few facts should be given in relation to the poison-glands. These I desire to give as briefly as possible. Having killed a large spider with chloroform, I left it in water for seven or eight days. This treatment usually softens the outer skin of insects and causes the viscera to swell, so as to burst through the outer integument, and it is in this state (perhaps) that the poison-glands are most easily discovered and traced to their points of attachment.

Fig. 222. Poison gland of Spider.

I then drew the mandibles from the body, and having placed them with a little water on a slide and covered them with a piece of thin glass, I found that upon the application of pressure, the two glands shot out, and protruded from the bases of the mandibles. I tore open one of the mandibles with needles, so as to disturb the gland as little as possible. The gland then appeared as a closed sac, attached by a hollow cord, about the length of the gland itself, to the base of the fang, where also was a large bundle of muscular fibre. The above can be readily repeated by any careful operator, and the result will completely verify the facts I have given. —*Lewis G. Mills, LL.B.*

The Pink.—Madame de Genlis tells us that it was the good king Rene, of Anjou, the Henry the Fourth of Provence, who first enriched the gardens of France with the Pink, and to this day it remains a favourite flower in the neighbourhood of Toulouse, although it is much less frequent in the vicinity of Paris than formerly.—*Flora Historica.*

ZOOLOGY.

African "Pwai-ngyet."—The very interesting article on the "Pwai-nyget" (p. 199), brought to my mind the following reminiscence of Sierra Leone, where I resided for many years. On the weather-boarding of my quarters in that colony, I have often noticed a construction very like the lower engraving on p. 199 of your serial, only the African specimen was very small; indeed, the tube was about the size of a goose-quill, projecting, perhaps, ¾-inch, and slightly trumpet-shaped, the orifice, also, was quite circular, instead of being elongated as shown in the upper sketch on p. 199. It was composed of a gummy, waxy substance, of a dirty yellowish colour, which was quite malleable, and I have often amused myself by squeezing the mouth of the tube close, and watching the operations of the insects in opening it from within, which they would do without loss of time. These insects appeared to me to be like small-winged ants, only of a rather stout build, very similar to that engraved on p. 252 of S. G., vol. I. Their wings were transparent, and had a beautiful steely-blue sheen. The most remarkable fact is, that the "Pwai-nyget," or "Poonyet," must have been brought from a distance, as it could not have exuded from the boarding, which was old, dry, and thoroughly painted. The structure was usually placed under the window-sill, as if to keep it dry, and over one of the interstices between two boards, and, I always imagined, served as a portico to the dwelling-place of these ingenious little insects, two or three of which were always on guard at the mouth of the tube, pacing backwards and forwards with the regularity of a sentinel. I have been induced to offer the above remarks in the hope that they may prove interesting to some of your readers, and also because my experience (such as it is) of these insects appears to localize them in a different quarter of the globe from that assigned to them by your correspondent.—*N. W. Macdonald.*

The Dipper dipt.—I have frequently watched these birds descend from a rock in the middle of the river Brathay to the bottom of the river bed. They do not *dive*, and the form of their wings, which resemble those of the blackbird, would not permit them to do so, but they seem to sink down with great ease, and, where the water is deep, keep themselves from rising to the surface by a sort of vibratory flutter of the wing, and, walking deliberately along the bottom, feed on any spawn or larvæ they can find there. Some sceptical readers may exclaim, that the ripple in the current of a rapid mountain stream (and the Brathay brings down the waters of Dungeon Ghyll, and the Langdales, into the head of Windermere Lake) might easily deceive the eye of a spectator as to the motions of the bird: but in confirmation of my statement, may I be allowed to add, that spending a Sunday afternoon one day last summer at the Zoological Gardens in company with Dr. Gray, the late lamented Dr. Harvey, Mr. Roget, and others, we watched the water ouzel *walk under water* the whole length of the large glass trough at the end of the Fish-house?—*P. S. B.*

Sagacity of the Dog.—Notwithstanding that anecdotes respecting the instinct of the dog are as numerous as the dogs themselves, I venture to mention the following, thinking that they may possibly afford interest to some of your readers. A gentleman in my parish possesses a fine retriever, which he is accustomed to send daily to the railway-station for his newspaper, the distance being about a quarter of a mile. As soon as the train has arrived, the dog takes the shortest cut across the field to the station, and looks at the station-master in a knowing manner, clearly announcing the object of his errand. The railway official duly delivers the paper to the canine messenger, who forthwith takes it in his mouth and trots back again to his master's house, with a degree of importance which shows that he is fully alive to the trust committed to his charge.

A shepherd in the parish of Hardingham, in Norfolk, is accustomed to leave his dog in charge of his flock during his absence, giving him a coat by way of a bed, and also as a token of his intention to return. It so happened a short time ago, that after the shepherd had left his dog, he was suddenly taken ill, and lost his consciousness for two days. Upon recovery, he asked for his dog, and was informed that the animal had not come home; search was immediately made, and the sagacious dog was found still lying upon his master's coat, faithful to his watch and charge.—*H. Wright, Thuxton Rectory, Norfolk.*

Snails and their Houses.—By some unaccountable oversight in our last number, figs. 188 and 194 were transposed (p. 198), whereas fig. 188 should have appeared as the Hybrid Snail (*H. hybrida*), and fig. 194 as the Zoned Snail (*H. virgata*).

Fig. 223. The Pisa Snail (*Helix Pisana*).

We now furnish a figure (fig. 223) of the Pisa Snail (*H. Pisana*), which we were unable to supply at the proper time. Its trivial name of *Pisana* is said to have been derived from the fact of its first occurrence at the city of Pisa.

The Wood-Pigeon (*Columba Palumbus*).—The question of the utility of the Wood-Pigeon has just been raised. On the one side, a society has been formed for the destruction of these birds, and the members, by circular, call upon their fellow-sufferers to help them to thin the ranks of their feathered foes; but the wisdom of these proceedings has been questioned, and information has been called for. Living in an agricultural and well-wooded district, where the Wood-Pigeon is a very common bird, I have had frequent opportunities of studying their habits, and these opportunities have not been altogether neglected. The Wood-Pigeon is a late breeder; and during the breeding season they go in pairs, dispersing themselves over the country, chiefly choosing the neighbourhood of woods and high hedgerows. The nest is a rude structure of sticks, and is generally overlaid with dry grass roots. The eggs—two in number—are of a pure white. The nest is placed in the fork of a tree (the fir is a favourite), in high hedgerows, in bushes standing singly, and in similar situations. They attend very assiduously to their young ones, feeding them frequently, and from my own observation I should say always on grain; for the crops of several young ones which I examined contained nothing else. In early spring they do great injury to the newly-sown corn, making a clean sweep of the badly-covered grain, and billing up large quantities of it. When the grain is formed in the ear, they begin at it again, and continue to prey upon it until it is carried into the stackyard. When the corn is carried, they feed on the young clover, picking out the centre buds, and doing great injury to the young plants. The autumn-sown corn, like the spring-sown, suffers from their depredations; and during the snow-storms and hard weather they feed on the tops of turnips, and often pick holes into the bulbs, which thus become more liable to be destroyed by the frost. I was present last harvest (1865) when a hen was shot as she came from a field of tares. The shot tore away the whole of her breast, exposing the crop, which was filled with tares. My companion thought there was a good half-pint, and it is recorded that the Duke of Richmond's gamekeeper shot a Wood-Pigeon in whose crop there were 858 grains of barley. In this neighbourhood men are employed to shoot them. They are very shy, and in order to get near them, a hut is built of thorns in the hedgerow of the field they frequent; and in this hut the sportsman waits patiently for his chance, shooting the birds while feeding in the field or roosting in the trees. In this way forty have been frequently shot in a day by one man; and as they can be sold in York for 6*d*. each, shooting them is a profitable employment. Two men employed to shoot them shot at one without doing it more damage than shooting off its tail. This bird was observed to visit the field seven times after that, and on the seventh visit it was shot. I saw this bird opened, and its crop contained half a pint of wheat. It was a hen, and doubtless had a brood in an adjoining plantation. The destruction caused by a pair of these feathered Arabs is considerable; but what must it be when they go into the fields a hundred at once, as they do here? No wonder the farmer is wishful to keep down such pests, and employs every lawful means to do so.—*John Ranson.*

A Prolific Sea-Anemone.—I have not at present access to Gosse's "Actinologia Britannica," or I might probably find an answer to the question I am about to ask. Sir John Dalyell records the history of a long-lived Mesembryanthemum, which had been in his possession upwards of twenty years, and had produced during that time nearly 300 young. That is the only very prolific anemone of which I remember having seen any record. A few days ago a *Sagartia Bellis*, or Daisy Anemone, which has been in my aquarium for about three years, produced at one birth considerably more than 100 young, all of which were attached to the bottom of the tank, near the position of the parent animal. It was a beautiful sight to see them expanding at one time, like a tiny forest of young polypes, and waving their tentacles in their aqueous home. Have any readers of Science Gossip had anemones equally prolific?—*T. P. Barkas.*

Planorbis Lineatus. — The occurrence of *Planorbis lineatus*, as communicated in the following letter, may be of interest to R. Tate:—

"Enclosed are some specimens of (I believe) *Planorbis lineatus*, which, in your recent work, you describe as being the rarest of the fresh water mollusks, and chiefly found in the neighbourhood of London. I have found them quite abundant at Tuddenham, wherever the *Utricularia vulgaris* grows. If I am correct, it will be adding another to the list of mollusks already found in Suffolk."—*A. Mavor Brown.*

Colony of Rats.—On the 6th of this month, being on a short expedition in the country (near Cork), I called on an old friend in the milling trade, from whom I had some amusing anecdotes about his experience at rat-killing. One which struck me most forcibly as being something very unusual was that, a short time since, he happened to observe a rat-track at the foot of an old tree, thickly covered with ivy. He sent a lad up the tree, when down came a regular shower of rats, fully twenty in number, a great many of which he killed with his trusty little terriers. At the top of the tree was a large hole, evidently where they had nested for some time.—*R. R.*

BOTANY.

Pink-flowered Pimpernel.—A few years ago I met with a *plentiful* supply of the *scarlet*, *pink*, and *blue* Pimpernel in a fallow-field at Bucklands, near Betchworth; specimens of which I sent to my late friend Sir William Hooker, and several other botanists.—*W. T. Iliff.*

The Clove-pink.—We learn from Chaucer, the father of the English poets, that the Clove Gillyflower was cultivated in this country as early as the reign of Edward the Third, and that it was used to give a spicy flavour to ale and wine, and from thence it was called, Top-in-wine.—*Flora Historica.*

Four-leaved Shamrock?—I do not know whether the common Dutch Clover (*Trifolium repens*) is still considered by any to be the true "Shamrock of Erin;" but if such be the case, the poet who so enthusiastically declared his readiness to

> "Seek a four-leaved shamrock
> In all the fairy dells,"

might perhaps have employed his time to more purpose by seeking it in other and less romantic localities. A lady friend has recently sent me specimens, not only of *four*-leaved White Clover, but also some with *five*, and *six* leaflets! They were gathered on a lawn in Chelsea, several examples being found, growing with the ordinary trifoliate form.—*B.*

Variations in British Plants.—Besides those previously recorded, the following have been met with in the neighbourhood of Wycombe during the past season:—Windflower (*Anemone nemorosa*) with double flowers; Evening Campion (*Lychnis vespertina*) with *pink* flowers; also white-flowered varieties of the Wild Thyme (*Thymus Serpyllum*), common Vetch (*Vicia sativa*), small Hemp-nettle (*Galeopsis Ladanum*), and Bugle (*Ajuga reptans*). The Chicory (*Cichorium Intybus*) has been found with pink, and white flowers; the Viper's Bugloss (*Echium vulgare*) with red, and white flowers; and the Eyebright (*Euphrasia officinalis*) with bluish-purple flowers. —*B*

The Pæony owes its name to Pæon, a famous physician of antiquity, who is said to have cured the wounds which the gods received during the Trojan war with the aid of this plant, and from him skilful physicians are sometimes called *Pæonii;* and on the same account those herbs which are serviceable in medicine, *Pæoniæ herbæ.*—*Flora Historica.*

"Five-leaved Grass."—This, the *Potentilla reptans*, or Creeping Cinquefoil, is subject to great variation in the number of its leaflets. These are usually but five; but specimens with as many as eleven leaflets are occasionally met with. To seven-leaved examples a magic power attaches, as an old charm assures us that "a five-leaved grass with seven leaves on," placed under the pillow at night, will insure to the sleeper dreams of his, or her, future partner! We have tried the experiment ourselves, but are bound to state that the result was highly unsatisfactory.—*B.*

Heather (*Erica vagans* and *Erica Mackaiana*).—These two rare and beautiful plants grow at Tadmarson Heath, about four miles to the west of Banbury. The former, the Cornish Heath, is found more plentifully there than Mackay's Heath, which is rather scarce. Bentham, in his Handbook of British Flora, gives Cornwall and the South of Ireland as localities for both, and says of the *Erica vagans* that it never penetrates very far inland. I have several duplicates of each gathered on Tuesday, September 11th, 1866, which I shall be pleased to exchange for other rare British plants.—*E. W.*, 21, *West Street, Banbury.*

Tertiary Flora of Brognon.—M. Saporta communicated recently to the Geological Society of France a paper on the flora of a small tertiary basin, at Brognon, north-east of Dijon, in the Department de la Cote d'Or, the following abstract of which is from *L'Institut* of July 25:—"The vegetable remains are referable to 13 species of 12 genera, which are *Flabellaria Quercus* (2), *Migrica*, *Ficus*, *Cinnamomum*, *Andromeda*, *Acer*, *Ilex*, *Zizyphus*, *Xanthoxylon*, *Cercis*, *Pecopteris*. The last genus is allied to two ferns, living in the Brazils and at the Cape; the two oaks have their analogues in Louisiana and Guatemala; the fig has its in Eastern India and in Java, *Cercis* and *Cinnamomum* ally this flora to that of Japan; the jujube to that of Timor; and the *Andromeda* to that of the Isle Maurice. The maple and the holly still live in the Mediterranean region. Floras of a like character are found preserved at Armissan, Manosque, Monod, Œningen, in the 'gypses d'Aix,' and in the Swiss 'Molasses.'"

The author concludes as follows:—

"1st. That during the period when the flora of Brognon flourished, there was in this locality a fresh water lake, very rich in calcareous sediments by the agency of which the remains of plants living on the margins of the lake have been preserved.

"2nd. That the age of the lake may be determined by comparison with analogous deposits; it should probably be placed in the Lower Miocene.

"3rd. That this flora consists of a mixture of tropical and temperate forms, and such that characterize the plateaus of Mexico and Central America; and that the temperature of Europe, during the Miocene epoch, was similar to these regions."—*Communicated by R. Tate.*

MICROSCOPY.

A Hand-glass.—The great objection I have found to the Coddington and Stanhope Lens, &c., which applies equally to the Stanhopescope, is, that the focus is fixed, and so does not suit different eyes nicely, and cannot be altered for the thickness of an object. Now this is prevented by a small instrument I have made for one or another, and which I have found much liked. It consists of a short tube with a little handle. At one end is fixed a plano-convex lens, about ½-inch focus. This tube has another screwed into it, with a similar lens about ¼-inch focus. The adjustment is by the screw. These properly made, and the screw home, both lenses may be used as a single power. The figure is about the size. The focus of the lenses may be altered for increased power.—*E. T. Scott.*

Fig. 224.

A "Finder."—A correspondent in your last number expresses surprise that few microscopists use "Maltwood's Finder" for registering the position of minute objects, or parts of objects upon the slide upon which they are mounted. I must beg to join with him, so far as the need and convenience of *a finder* is concerned; although, in my opinion, the end can be attained in a far more simple manner than by the use of a separate piece of apparatus. So far as my own experience goes also, it can be attained with greater accuracy, without extra apparatus. Your correspondent points out that when "$\frac{1}{5}$th, $\frac{1}{8}$th, or $\frac{1}{12}$th powers are used, the figures alone (on Maltwood's Finder) are not sufficient for immediate re-discovery of minute objects." Now it is precisely with these powers that a proper system of registration and finding is most useful. It is but seldom that we find each frustule of a diatom precisely like its fellow—there is some difference in position or detail; and in testing the definition of object-glasses, or ascertaining the value of different kinds of illumination, it is desirable always to use the same diatom, or portion of one, with which the eye is accustomed. Frequently, too, in slides on which several species are mounted, there are some individuals which are uncommon or even unique, and so small as to be only properly shown by a high power. It is very vexatious to have to spend a quarter of an hour in hunting over a slide for the required specimen; and the method of indicating the neighbourhood of the object by a dot of ink is too uncertain and too clumsy to be trusted. Some years ago the Microscopical Society of London had the question of "finders" under their consideration by a committee, but nothing came of it. At that time I pointed out what I considered to be the simplest method of procedure, and since then I have never found it fail. It is simply to engrave on the stage of the microscope a scale of divisors, say 50 to the inch. This can be done on any instrument. If the stage be provided with motions at right angles, the divisions should be so marked as to measure the amount of motion of the object-plate in either direction. A stud should be planted on the object-plate, and if the slide be touching this, all that has to be done when the object has once been found and placed in the centre of the field is to read off the "latitude" or distance from the side, and the "longitude" or distance from the end, and mark the figures with ink on the label. At any future time, if the index of each stage-slide be made to point to the divisions so registered, the spot will be in the field, or be so close as to be easily found. The same plan can be applied to the plain stage with a sliding-ledge, the edge of which may pass over the scale of divisors, and would register "latitude." Another scale should be engraved on the ledge itself, which would indicate "longitude" by the end of the glass slide. A slide registered by one instrument would read off the same on any other, provided, of course, that the same unit of division was used, and the scales were properly planted so as to read from a fixed distance from the axis of the object-glass, so as to measure $\frac{1}{50}$th of an inch for, say, half an inch in either direction. An observer might then send a slide to any distance to a friend, and direct his attention infallibly to the particular detail he wished. It *is* to be regretted that so simple a method of registering is not generally provided by makers of microscopes. It would cost but a shilling or two to engrave the necessary divisions on the stage-plate, and the convenience would be great.—*W. Hislop.*

Microscopic Camera-obscura.—In all books on the microscope that have come under my notice, the camera-lucida has been the only form put forward as advantageous for drawing the magnified image. I don't know how others find it, but I certainly do not like either the cramped stooping position necessary to its use, nor does it contribute to accuracy of tracing. I have, therefore, for some time past, been in the habit of using the camera-*obscura* in preference; and as some of your readers may be unacquainted with its capabilities when applied to the microscope, the following description may be acceptable:—I remove the cover of the eye-piece, and in place of the usual camera-lucida reflecting-glass, I substitute a right-angled prism fitted in a short tube, so that it can be placed close to or removed from the eyepiece for adjustment. I have had constructed a wooden frame, exactly like a box without a lid. Placing this on a table on end, with the open side next the observer, I pass the tube of the microscope through a slit in front (this opening being covered with a dark cloth, to prevent light entering). I also nail another dark cloth on the top of the box, and allow it to fall over my head and shoulders; this should be large enough to enable one to use one or both hands to adjust the stage, without the annoyance of having each time to uncover the head. This is all I find necessary; and now, placing the microscope horizontal, and putting on the tube so as to throw down a circle of light when the object is illuminated, the image will be seen beautifully defined on a sheet of paper placed in front of the draughtsman, who, instead of having to bend over the end of the microscope, can sit at ease, and with every comfort trace the outline and all details correctly without difficulty. When it is wished to make a coloured drawing, it is well first to trace it, and then, shifting the paper on one side, colour it to correspond with the image which then will be reflected by the side of the tracing. It is difficult to be certain of the colouring being right, either in tint or shade, when put *over* or *on* the reflection. In daylight I have made drawings of diatoms by this plan on a large scale, obtaining much clearer definition of the markings than I can do by the old method. The prism I have now was made for me by Mr. Baker, of Holborn, and is not expensive. Any carpenter can make the box—or almost anything will answer the purpose. The great advantage is that both hands are free, and to make an accurate coloured drawing is quite an easy occupation for any one who can use pencil and brush. I have used the camera in this form for many years, and have often wondered that it has never been generally used. When direct sunlight is obtainable, I use powers as high as $\frac{1}{4}$ inch, and have found my $\frac{2}{3}$ give good pictures with the light of a belmontine lamp. High powers are not necessary, as the size of the reflection can be increased at will by raising the microscope farther from the paper.—*Geo. W. Hart.*

Cups for Maceration.—I have found it very convenient in preparing objects for the microscope to use a set of shallow saucers, which are to be obtained of any artist's colourman. The set I have consists of a little series of saucers of common white ware; the upper surface of each is hollowed out in the shape of a watch-glass, and the under surface to form a lid to the one below, and fits tolerably closely on it. In these, objects can be macerated for some days in any fluid which is not excessively volatile, without drying up; and the whole set of six does not occupy more space than a large watch-glass.—*J. H. McK.*

Dry Mounting.—At the last meeting of the Quekett Microscopical Club, Mr. Burgess read an interesting and amusing paper on this subject, which he illustrates profusely by examples. The chief feature in his process is the adoption of large pieces of glass, varying from an inch to three inches and upwards in one direction, whilst three inches is the "standard" for the other direction. By this means a larger surface is obtained for mounting specimens whole for low powers. The glass employed is thin crown of $\frac{1}{24}$ of an inch in thickness; and the object is placed between two plates of uniform size, with a thin "mount," such as employed for photographic portraits, surrounding the object, and interposed between the plates, so as to constitute a large shallow cell.

Removing Dried Cuticles.—I shall be glad to learn of the best method of separating the epidermis of *dried* leaves from the rest of the tissue. All the books on the Microscope refer to the separation of the epiderm from freshly-gathered leaves; but they omit all notice of performing the same operation on the already dried plant. Having recently carefully examined my Herbarium, with a view to provide materials for microscopic slides, and having already over 1,000 forms of vegetable hairs, I am anxious to elicit the best and readiest means of separating these hairs from the leaves, in order that they may be mounted in balsam for the polariscope. Some of these hairs are of exquisite beauty, and many of their forms I have never seen figured. —*Charles Bailey.*

The Stanhopescope.—I am obliged to your correspondent Mr. Bockett for his candid, though somewhat severe criticism of the Stanhopescope. The instrument, as I stated, is of French manufacture, and very cheap; it was scarcely to be expected, therefore, that each lens would be equally well adjusted so far as regards optical qualifications, and such is the case. About one-half of those that have passed through my hands were very excellent indeed, and although not free from either spherical or chromatic aberration, were, nevertheless, sufficiently flat in the field and prismatic to be of great service to a searcher for either marine or fresh-water diatomaceæ. I have had applications for about twenty-four dozens, and for the first few days I sent stanhopescopes off without special examination, expecting that all were sufficiently good for use; but on close examination, I noticed that about one-sixth were not correctly focussed, and those I returned at once to the dealer. Possibly one of the inferior specimens has fallen to the lot of Mr. Bockett. I anticipate that all those I despatched during the month of August and the latter part of July gave satisfaction to those who received them. I have written to a London optician, asking him to manufacture a lens on the stanhopescope principle, but with more careful attention to optical details, and he informs me that such an instrument could not be made for less than five shillings.—*T. P. Barkas.*

GEOLOGY.

Stones on Mountains.—Mr. Nield suggests (p. 185) that the loose masses of rough sharp stones that cover the sides and summit of Helvellyn are referable to the Pleistocene age, and are the result of glacial action. He writes of similar appearances on Oldham Edge; but we have lived upon it for more than thirty years, and have hitherto failed to detect any appearance of glacial action. But suppose similar appearances *do* exist on Oldham Edge, it does not follow that glacial drift has caused the phenomenon alluded to on Helvellyn! And, moreover, geological facts are against the theory. Helvellyn is 3,055 feet above the sea-level, while the highest point that the glacial drift attained in that locality is some 1,400 feet above the same level, and this occurs where it passes over the Pennine chain at the Pass of Stainmoor. But, while the glacial drift is very local in its character, these loose stones occur, more or less, in detached masses all over the world, irrespective of glacial drift, and in many cases hundreds of miles away from it. Having passed the Pennine chain, this drift seems to have traversed in a southerly direction, "the vale of the Tees to Redcar, and the vale of York to the Humber." And then again it can be traced by Lancaster, and the narrow tract between the mountains and the sea, crossing the basins of the Lune, Ribble, Wyre, Mersey, and the Dee, and spreading into the valleys of the Severn and the Trent; so that the glacial drift in Britain is very local in its character, and confined to the low lands and valleys, while these "loose masses of rough sharp stones" are universal, being found alike on the summits and sides of mountains, on broad expansive plains, as well as in the deep valleys. Then we must look to some other agent as the probable cause of this apparently strange phenomenon, and, in our humble opinion, that agent is the action of the waves. Sir Charles Lyell says ("Elements of Geology," p. 65) that "every portion of the land becomes in its turn a line of coast, and is exposed to the action of the waves and the tides." It is to denudation, then, of which these loose stones are the only remnants, the lighter and less coherent strata of sands, shales, gravels, and clays, having been all carried away by the agent above alluded to. That they do not show evidence of being "water-worn" is easily accounted for in their long exposure to disintegration, produced by air and water, sun and frost, and chemical decomposition. One has only to go to Scarborough to have ocular demonstration that denudation is going on still; for there, at the foot of Castle Hill, and all along the south shore as far almost as Caton Bay, these "loose masses of rough sharp stones" are being produced on a pretty large scale. One will see between Flamborough and Specton, cliffs rising to the altitude of those on the Kentish coast, which have gained for our island the name of Albion, all being indiscriminately washed away, and the *débris*, with the exception of these huge calcareous sandstone blocks, which are left confused and isolated on the beach, being transported into the ravines and the hollows of the German Ocean. And this is the manner in which the mountains, hills, and rough asperities of our earth have for bygone ages been levelled, leaving nought to testify that they have once existed, save these loose solitary and gloomy stones. But for the geologist there are many proofs that the tops of mountains, hills, and high table-lands, have been eroded and washed away to a very considerable extent, by denudation. We have evidence that the tops of the seven hills of Rome once formed the bottoms of valleys. Professor Ramsay has shown ("Survey of Great Britain") that the missing beds removed from the summits of the Mendips in Somerset have been nearly a mile in thickness. Where our own house stands on Oldham Edge, we have proof, by the presence of a fault in the coal-measures, that the surface was once at least 300 yards higher than it is at present. It is these deposits from the ruins of hills and mountains spread so extensively and abundantly over the surface of our globe, that Mr. Nield seems to be confounding with the "glacial drift." The glacial drift has an opposite tendency, and instead of laying them bare, and exposing them to our view, wherever it comes in contact with them, it actually buries them from our sight, so that they are never found in the state we find them on Helvellyn, except in places where the glacial drift has never made its appearance. The greatest number of these "loose masses of rough sharp stones" that we have ever seen in our pedestrian travels, has been on the numerous hills of Derbyshire, and more especially on and in the neighbourhood of Axe-Edge, where we have seen them in numbers so vast, that if collected and piled into a heap, they would form a little mountain of themselves, yet Axe-Edge is 3,000 or 4,000 feet above the reach of the glacial drift, even if there had been any in the whole county, which we believe there is not. Axe-Edge is elevated 3,100 feet above the level of Derby, and it appears like an island in the midst of "a sea of hills," yet there is scarcely one where these loose stones are not to be found.—*James Wild, Pleasant Spring, Oldham Edge.*

Fossil Elephants.—All the great river basins of Germany have, like those of the Neckar, yielded fossil bones of the elephant; those especially abutting on the Rhine are too numerous to be mentioned, nor is Canstadt the only place in the Neckar valley where they have been found.—*Cuvier.*

PHOTOGRAPHY.

Printing in Carbon.—Mr. Swan's new process for book illustrating, the difference between which and Mr. Woodbury's process we cannot discover, has recently been used for putting into circulation some thousands of copies of Mr. D. O. Hill's painting of the "First General Assembly of the Free Church of Scotland." These re-productions are singularly perfect and beautiful, and fully justify the artist in substituting Mr. Swan's beautiful process for that of engraving, by which it was originally intended to be copied. The celerity with which these copies were executed speaks well for the working character of Mr. Swan's process, and we give full credit to the *Newcastle Daily Chronicle*, which asserts "that the field is boundless which lies before the carbon process of our ingenious townsman Mr. Swan."—*J. W. W.*

Photography at the British Association.—Many old jokes are based upon the ease with which the simplest and most common-place things may be surrounded with many-syllabled technicalities, so as to assume an importance comically at variance with their real nature. We fear the long paper read by M. Claudet in section A of the British Association, although advocating what its author designated "the greatest improvement which will have been introduced in photography," may recall some of these old jokes to its readers' memories. This paper described a little obsolete technical "dodge," introduced before lenses were manufactured to do actually and legitimately what M. Claudet's "new process," as it appears, is merely supposed to do. It consists of moving the lens in or out of the camera during the exposure of the plate, so that the various planes of distance represented are alternately in and out of focus. The object in so doing is to distribute the definition more equally and insure greater softness. But M. Claudet appears to have overlooked many objections to such a plan. The impossibility of regulating the degrees of sharpness with sufficient exactness, and that of so dividing the time of exposure as to allot to the in-focus and out-of-focus images their respective degrees of action on the plate, are all we need call attention to, as these in themselves suffice to demonstrate the impracticability of such a scheme. But there is something more to be said on this subject. That the photographic lens in its working should approach as near as possible "the beautiful instrument which gives to man the most perfect perception of all the wonders and beauties of nature," is of course to be admitted, although it must not be forgotten that what we see depends as much upon our powers of perception as upon the possession of sight, and that something more than eyes are required for "the most perfect perception of all the wonders and beauties of nature." Admitting this, we ask, Does the eye see all things near and remote with equal distinctness? No one will be hardy enough to say it does, and such being the case, why should we so alter our lenses as to make them give figures in which all parts are equally in or out of focus? The lens which gives one plane sharply in focus, and all other planes out of focus, is preferable to this, and its images are more nearly related to those seen with the human eye than are images in which every part on every plane of distance is equally out of focus. The concentrated nature of images thrown by the lens undoubtedly originates in photographs that hardness, miscalled sharpness, of which we have heard so many complain. But there should be behind the camera of the photographer, as there is behind the camera of the eye, that power of perception to which the recognition of nature's "wonders and beauties" is truly and mainly due; and where this is the case, with any good lens true and beautiful images may be reproduced without having recourse to the awkward and unsatisfactory shifts M. Claudet recommended in his paper "On a New Process for Equalizing the Definition of all the Planes of a Solid Figure represented in a Photographic Picture."—*J. W. W.*

A New Magnesium Lamp.—In section B of the above-named association, Mr. H. Larkin exhibited a new patent magnesium lamp, which photographers will very gladly welcome, inasmuch as those now in the market are not so satisfactory as it is desirable they should be. The distinguishing peculiarity of the new lamp is, that it burns the metal in the form of powder instead of ribbon or wire; and its chief advantage is, that it renders the unsatisfactory clock-work arrangement hitherto used unnecessary. A large reservoir holds the powder, which falls by its own gravity, like sand in the hour-glass. To insure its burning with a steady continuous flame, fine sand is mixed with the metal in quantity proportioned to the strength or size of the flame desired. After leaving the reservoir, the stream of mingled sand and magnesium flows through a metal tube, into the upper end of which is introduced a small jet of ordinary gas, which being turned on, is lighted, and then these mingled streams escaping from the mouth of the tube together, burn with a powerful light so long as the magnesium lasts. The fumes are conveyed away through a chimney, and at the same time the sand falls harmlessly into a receptacle provided for it. The flow of the inflammable material may be either regulated or arrested by the opening or closing of a valve. The cost of burning this lamp is said to be about twenty shillings an hour.—*J. W. W.*

"Mournful Numbers."—The penny weekly issue of romances about highwaymen and robbers. —*Fun.*

NOTES AND QUERIES.

Self-heating Box-iron.—In last month's Notes and Queries I observe that "M." inquires for a simple apparatus "by which an iron may be quickly heated" for drying plants, "independent of the kitchen fire." There is such an apparatus to be obtained from Mr. Kent, 199, High Holborn (price 6*s.* 6*d.*), called the "Self-heating Box-iron," of which it is said: "It may be heated at pleasure in

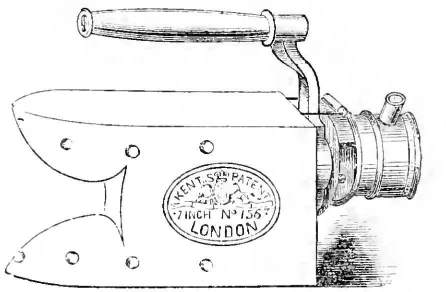


Fig. 225. Self-heating Box-iron.

three minutes without a fire, and will remain hot at a nominal cost for any length of time." Without any explanation of its object and utility, its very name must convey the idea that it possesses great advantages. This will, perhaps, answer your correspondent's purpose.—*W. Q. C.*

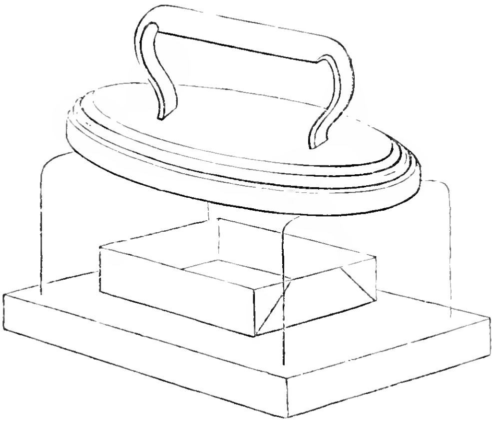


Fig. 226. Contrivance for Heating an Iron.

Ironing Plants.—Enclosed is a drawing of an instrument (fig. 226) made and used by myself for ironing botanical specimens, which will meet the travelling needs of your correspondent "M." The size of the apparatus depends on the size of the iron used, and the best shape is that indicated on the drawing. The footboard—1 inch thick, made of seasoned wood—should be rather longer, and 1 inch wider than the iron. Two pieces of iron wire $\frac{1}{8}$th inch thick should be bent twice at right angles, so that the ends being firmly inserted into holes $\frac{3}{4}$ inch deep, near the corners of the board, the iron may be supported 4 inches at least from the board. A small trough, made all in one piece, of thin sheet iron, serves to hold some spirit or wood naphtha,—a few trials sufficing to ascertain the quantity requisite to heat the iron to the proper temperature. When travelling, the wires are removed, and, with the iron, laid flat on the board; the trough (containing a box of matches) packs under the iron handle. The whole is wrapped up in a stout piece of canvas, secured by a strap. The canvas, when properly folded, serves as a protection to the hand from the hot iron.—*J. B. Spencer.*

Trichinosis—A Suggestion.—The terrible outbreak of the trichinous disease last winter in the town of Hedersleben, in the Hartz, produced, as is well known, a state of dreadful excitement amongst the inhabitants of that and the neighbouring towns—an excitement which extended to our own shores, and indeed throughout Europe. The deadly nature of the disease gave but too just a cause for the alarm and anxiety which prevailed. Death, after a few days' illness, seized upon those persons who had unwittingly partaken of the diseased pork; and a *post-mortem* disclosed the fact that their bodies swarmed in every part with the parasitical trichinæ. The astonishing rapidity also with which these parasites were capable of propagation was incontestably shown by the experiments of Professor Hertwig, who gave small pieces of trichinous meat to young and healthy pigs, and the effect was astounding. In a few hours these pigs all became ill, one of them died, and upon examination it was found that "not thousands but millions of trichinæ were present." The terrible nature of the disease must plead my excuse for venturing to give publicity to the following suggestion, as perchance affording a subject-matter for consideration to the medical practitioner, in case it may not already have been tried. The proposed remedy is Picric Acid, which, as my readers may be aware, is formed by the mixture of carbolic acid with nitric acid—the carbolic acid being a product of coal oil, obtained by distillation from coal tar. Picric Acid is a beautiful substance, crystallizing in light yellow plates, somewhat resembling sliced topazes. It is frequently used by brewers, as it gives the highly-prized bitter flavour to their beer. It has also been tried medicinally as a substitute for quinine, but it is now rarely thus employed—its affinity for animal matter being so great that it imparts a yellow hue to the skin of the patient. This remarkable affinity for animal matter, so powerfully possessed by Picric Acid, has led me to think that it may possibly prove an ameliorative, if not a specific, for the trichinous disease, inasmuch as the trichinæ have pre-eminently their seat in the muscular tissue.—*H. Wright, Thuxton Rectory, Norfolk.*

Where does the Kingfisher Roost?—As regards this question, I may state that I had a *live* bird of this handsome species brought me some time since by a fisherman, who at the same time told me he caught it by hand, and knew of the roosting-places of several others, viz., *under* a railway bridge which crosses the bed of the river. Whether this is their usual roosting-place or not I am unable to say.—*G. B. C.*

Nest of the Bullfinch.—I am inclined to agree with "W. R." about the materials of which this nest is composed. All that I have met with were of small twigs, fibrous roots, grass, and sometimes a few hairs, getting finer towards the completion of the nests. I never noticed either moss or wool.—*H. M., Ipswich.*

The Food of the Nightjar (*C. Europæus*).—This bird appears, as usual, to be rather common here. On the evening of July 31st I shot a pair, with the intention of stuffing them, which I proceeded to accomplish on the following evening. On skinning the first, I was surprised to see the size of its "crop," and curiosity led me to cut it open, when out *flew* two moths, whilst several others *crawled* out of their viscous tomb, after twenty-four hours' confinement. I caught the two which flew out, and secured the others which the crop produced, as follows:—Eleven of the Antler Moth (*C. Graminis*), one of the Yellow Underwing (*T. Orbona*), three *C. selasellus*, and five *C. culmellus*. Seven of *Graminis* were still living; all the others were dead. The crop of the other bird produced three of the common beetle (*G. stercorarius*), and one of the Antler Moth. It is a generally-received opinion of the rustics in this and the New Forest district, that the "Night-hawk" is a bird of prey, destroying any unfortunate "small bird" which happens to cross its path. It is known to many by the name of "Gnat-hawk."—*G. B. C., Ringwood.*

Birds Poisoning their Young.—In support of the observations of "W. P." and Mr. Ullyett, in the August number of Science Gossip, allow me to state that a boy in this neighbourhood had a brood of six unfledged Starlings (*S. vulgaris*) in a cage fed by the old birds for a week, at the end of which period the whole brood was found dead, doubtless destroyed by something their parents had brought them.—*G. B. C., Ringwood.*

Neutral Glass-plate.—I should be very much obliged if one of your numerous correspondents would give me a few directions as to the proper mode of using the neutral glass-plate for making drawings of microscopic objects. I purchased a microscope some time ago, intending to make sketches of all interesting subjects I might see, but I found that, although by using the plate as directed, I could get a very brilliant image of the object on white paper, yet, on trying to draw it, I could not see the point of the pencil at all. I then did away with artificial light, and tried the effect of daylight only, and by substituting a common plate for the paper, I found I could then see the image and the pencil at the same time, although by continuing steadily to look at it, the image seemed gradually to diminish until it appeared only half the original size, and all my attempts have proved equally unsuccessful.—*C. S. Gardner.*

Does the Glowworm Prefer Damp or Dry?—From my little experience I should say a damp situation is preferred, as the insect seems generally to be found amongst densely-grown fern or on hedge-banks; and they are in some instances not unlike young frogs, in their commoner appearance after a shower of rain.—*G. B. C., Ringwood.*

Slugs in the House.—To destroy slugs or snails, let a few handfuls of common salt be taken, and fill all the crevices in the floor of the closet with the salt, pressing it firmly down into the holes. Do the same also to the wall, pasting a strip of strong brown glazed paper over each crevice after the salt has been pressed in. Then sprinkle salt all over the floor to the depth of a tenth of an inch, having first removed every article from the closet. Boys often kill snails in this way by placing them in salt, which half dissolves them.—*H. A. Allbutt, Leeds.*

Whelks' Eggs (*Buccinum undatum*).—Harvey, in his "Seaside Book," p. 64, 4th edit., says: "Each of these little membranous sacs (each about a quarter of an inch in breadth, flat on the inside, and convex on the outside) * * * contains a soft yolk, in which is gradually formed a young univalve mollusc." Is not this an error? On examining a mass of these sacs the other day, I found in each *a number* of little kidney-shaped objects, which I took to be eggs; each sac also was full of water. Thus from each sac would proceed *several* young molluscs, instead of *one* as above.—*C. A. I.*

Wanted to Kill.—Can you or any of the readers of Science Gossip tell me how to get rid of woodlice and armadillos, commonly called sowbugs. I find them very troublesome in my fernery; they get under the blocks of wood and stones in the day, and at night devour the young fronds of the ferns and other plants, several of which they have quite destroyed. They have a particular fancy for *L. cristata*, having killed all my roots of that kind.—*H. M.*

Governing Numbers.—The governing number in Star-fishes is *five*; in Medusæ it is *four*, and in Jelly-fish *four*, or some multiple of four. In endogenous plants it is *three*, or some multiple of three; in exogens it is *four* or *five*, or some multiple of those numbers. These are approximations to rule, but are not without exceptions.

Nidification of Rarer Birds.—Can any of your readers inform me if the common and Honey Buzzard, Marsh, Hen, and ash-coloured Harriers still breed in Great Britain, and where? I have collected British birds' eggs for the last nine or ten years, and have never been able to obtain authentic specimens of any of them, although I have offered in exchange almost any "good thing" from my cabinet.—*J. S.*

Asphalte Varnish.—I have twice made an attempt at making the asphalte and india-rubber varnish recommended by Mr. Davies in his book on mounting, and have used different naphtha each time; but the effect has been each time the same, namely, that the asphalte has swollen up, but has not dissolved. I have used each time half the quantities given by Mr. Davies. Perhaps you or some of your contributors will be able to tell me wherein I have failed. I have brought in the aid of heat, with no better effect.—*J. H. McK.*

Horse Ants.—All ants are particularly attentive to their *pupæ*. Your correspondent "A. Bloomfield" must have seen the Horse Ants (*Formica rufa*) he describes, carrying, not their eggs—for ants' eggs are *very* rare things—but their young *larvæ*. They take them out for an airing in fine weather, and are first-rate judges of atmospheric changes; for immediately they notice a prospect of rain, off they rush with both *larvæ* and *pupæ* to a place of safety. The workers are the nurses, and as perambulators are unknown in Ant-kingdom, these nurses take up their little charges and carry them about. There are some ants that really get up regular forays to carry off the *larvæ* and *pupæ* of other species, make downright war upon their neighbours, and bring up the captives they make as slaves. They are sometimes called Amazon Ants, but are never, I believe, found in Great Britain.—*Helen E. Watney.*

Insect Aquarium.—Being much pleased with "H. R. B.'s" account of her Insect Vivarium in Science Gossip for September, I should like to gain more information on the subject. 1. Would spiders thrive in one? 2. How often is fresh food to be given? 3. How is it to be managed during the winter months? 4. How is it possible to remove the glass for fresh flowers and food without the flying insects going off? 5. Is there a hand-book for the Insect Vivarium?—*E. S.*

Grand Lory.—I believe that the bird called Grand Lory is scientifically known as the *Eclectus grandis*. Wagler puts it in the genus *Eclectus*. It is found in New Guinea, and is most beautifully plumaged. The Lory-birds are members of the Parrot family, but they do not eat the hard nuts and seeds that most parrots delight in. They have a much more slender bill and a softer tongue, showing that their natural food consists of pulpy fruits and the juices of various plants.—*Helen E. Watney.*

Pygmies of Malacca.—Apropos of "the Track of the Pygmies" noted in your July and September numbers, I could wish that some of your readers who may be living near Malacca would give you a brief yet clear account of a race of small men and women who are said to dwell in trees in the interior of the Malacca district, and among whom the labours of a resident French priest have been not altogether without success. When I was a resident in the Straits, some years ago, I heard some particulars, but never got over to see them; and I think any certain facts respecting them by those who can speak with personal knowledge would be interesting at this time. I presume you to be acquainted with the fact that on many of the less easily accessible hills of India there exist to this day numbers of wild races. I could soon count up a score who would seem to have been aboriginal and to have been driven to their present retreats by the advancing wave of the forefathers of the present Hindus. Those of them that I have seen in Arracan are, if I remember rightly, shorter in stature than the average Hindu, yet not deserving the name of dwarf.—*W. T. H.*

A Detonating Fireball.—I am reminded by the perusal of a letter by Mr. Herschel on Detonating Fireballs, of a magnificent phenomenon of that kind which I saw and heard about fourteen or fifteen years ago. Walking on the outskirts of Newcastle, on a late autumnal evening at about eight o'clock, my attention was arrested by the sudden illumination of the entire neighbourhood, and turning rapidly to the left, from which direction the light appeared to proceed, I saw a splendid fireball, in apparent size about one-third that of the moon. It moved with considerable speed from N. to S., parallel to the horizon, and at an altitude not greater than 30°. At the moment of its extinction, it burst into fragments, and within two seconds of the time of its bursting I heard a deafening report, very much resembling that produced by a large cannon when it is fired within a distance of a few yards of a spectator. Not being at the time specially engaged in astronomical or meteorological investigations, I did not collect such evidence as would have enabled me to determine its precise elevation from the earth. It must, however, have been very near, as, judging by the short interval between the explosion and the report, it could not have been more than half a mile from me. I have never had the good fortune to witness a similar phenomenon either before or since that time.—*T. P. Barkas, Newcastle-on-Tyne.*

Sanguinaria.—The following extract is from a paper entitled "Brazilian Sketches," which appeared in *Once a Week*, December 24th, 1864. I should feel obliged if you, or any of the readers of Science Gossip, could inform me what plant is therein referred to, and whether it has yet been introduced into England.

"I was particularly struck with one magnificent shrub; it has bunches of leaves just like scarlet velvet, surmounted by small cup-like flowers of bright orange. I was told that it is called *amor di viura* (widow's love); and I can only say that, if typical of Brazilian widow's love, the latter must be of the most fiery nature. The plant is also called *Sanguinaria*."—*J. F. C.*

Cement for Marine Aquaria.—Can any correspondent inform me how to make a cement for an aquarium that will be proof against the action of sea-water? I have one, the sides and ends of plate glass, and bottom of slate 3 feet long, 1 foot wide, and 1 foot deep; a mahogany frame, with pillars of the same at each corner, grooved to receive the glass, with an iron bolt passed through each to fasten top and bottom securely. It was framed together with putty, and held rain water. But the salt water soon found its way through. I have tried various expedients, one after another, and all without success—viz., pitch, French polish, marine glue, pitch and white wax, mixed, &c. I was at last advised to try a mixture of india-rubber and shellac, dissolved separately; and I did this for three weeks almost daily, and thought surely I was now safe. I procured a nice variety of sea-anemones and some pure sea-water, and was preparing to stick it; when, to my disappointment, last night the water found its way through on to the carpet. The poor anemones are waiting in basins and bottles, waiting till their home is ready.—*F. E. W. K.*

Rat Poison.—M. Cloez reports to the French Academy of Sciences, that bisulphite of carbon has been successfully employed for the destruction of the rats which infest the cellars of the "Musić," and that they speedily die in an atmosphere containing $\frac{1}{20}$th part of the vapour of that compound.—*R. T.*

Epithelium Cells.—The cells which form the scarf-skin or cuticle of the human subject can be obtained in several ways. They are always interesting, and sometimes they form beautiful objects for polarization. Thin sections of a callosity, or thickened part of the cuticle, as also thin sections of *corns*, are of the latter kind. The skin which covers the fluid of a blister sometimes shows not only the cells of the cuticle but the pores of the skin also. The best way of getting individual cells is by scraping the roof of the mouth with a blunt knife. They lie loosely on the surface of the skin, and are easily removed with the small quantity of saliva which is necessarily collected by the knife in the operation. The colour-mixing knife, which has not a sharp edge, is the best for this purpose. Cells obtained in this way are best examined when fresh; but they may be mounted dry, as they preserve their form and character a long time.—*Thos. Brittain.*

NOTICES TO CORRESPONDENTS.

M. F. D.—"Ferns, British and Foreign," by John Smith, published by R. Hardwicke, 192, Piccadilly, will perhaps suit your purpose. A work on Foreign Ferns, giving figures of all the species, could hardly be portable.

N. E. C.—We could not attempt to name a foreign fern from a barren frond. Both your specimens are barren.

A. Y.—You should wash your specimens over with a solution of corrosive sublimate, applied by means of a soft brush, or you will not succeed in keeping insects from them.

A. H.—Consult "Our Reptiles," published by Hardwicke, 192, Piccadilly. We cannot afford space to reply in full.

R. M. B.—See notice, with figures, in the present number.

T. H. G. is referred to a notice which appeared in our last. Facts alone are admissible.

J. M. A.—Only one notice can be inserted at a time from the same individual.

Glass Cells.—Mr. Brittain, Fallowfield, Manchester, offers to procure for any one these cells at 9*d*. per dozen, if stamps are also sent to cover postage or carriage.

W. B.—The plant "Rue" (*Ruta graveolens*) is evidently meant by Scott in the lines quoted. It is often carried at funerals, and thrown upon the coffin, especially in rural districts.

W. D. C.—You had better state what branch of entomology you purpose to pursue. For general purposes, "Westwood's Introduction" would be useful.

J. G.—On rose, an early condition of *Sphærotheca pannosa*. The *Polyporus* at present uncertain. The *Rhizina* is *R. undulata*.

R. P.—"Sowerby's English Botany;" 45 parts are published.

H. G. E.—The Lichen is *Peltigera canina*.

A. D. M.—Herbarium labels for flowering plants were formerly obtainable of Mr. Pamplin; but whether to be had anywhere now, we cannot affirm positively this month.

H.—Hedgehogs are insectivorous—your suspicions are probably right.

T. B.—We can make no pledges.

J. R.—Although our space is too limited for the subjects included, we deem it imprudent to add either to size or price, or the number of our "sections."

F. O.—We know of no improvement on the "vasculum."

Leeds.—If there is a Naturalists' Field Club in or near Leeds, with the secretary, send his name and address to H. A. A., care of the Editor.

Desmids and Diatoms.—H. J. Bacon wishes us to announce that as he had *ninety* applications in response to his offer in our last number, he could not supply all at once. He will endeavour to furnish all who have applied, if they will kindly allow him time to do so.

S. F. C.—Such pugnacity in the blackbird is not uncommon.

T. D. M. is thanked for bottle of rhubarb wine. It would be much better five years hence.

G. E. P.—The muddy appearance of the water is most likely due to an excess of light. It is unsightly, but not injurious to the inhabitants of his tank.—*T. C.*

J. W. L.—It is very probable that some of the illustrations will hereafter be reprinted. The plan you suggest would not pay.

T. G. P.—No. 2 is *Tubercularia vulgaris*. No. 1 is *Stegonosporium cellulosum*.

T. S.—No. 1, an assemblage of imperfect forms, so that it is impossible to say which is intended, or what any of them may become. No. 2 is *Nemaspora crocea*; No. 3 an apparently undescribed *Phoma*, probably not autonomous.

E. T. S.—We can discover no parasite, though we examined every spot on the specimens sent.

Section Machines.—Having received descriptions of four new machines, for which illustrations would be required, we must postpone them for the present. It would be invidious to make a selection where each possesses some advantage.

J. R. B. M.—One group has the authority of one naturalist, and one of another; so that there is no general system such as you allude to.

J. F. C.—The seeds are those of *Abrus precatorius*, common in Asia and Africa.

A. E. B.—The cocoon belongs to *Lasiocampa quercifolia*.

T. H. H.—No. 1 is *Leucania pallens*; No. 2 *Triphæna pronuba*.

E. B.—It is *Calamintha acinos*.—*W. C.*

M. J. P. and J. H.—The Orchis is *Epipactis media*.—*W. C.*

G. M.—The plant is a *Veronica*; but the specimen is too small to name specifically.—*W. C.*

H. G.—Undoubtedly your "last plant from the Land's End" is *Atriplex Babingtonii*.—*N.*

W. L.—The plant is *Thalictrum flavum*, Linn.—*W. C.*

J. B.—Please forward the MSS.

H. S.—Probably it is *Lumbricus minor*, the Marsh-worm, or Red-worm, to which you allude.

W. J. S.—The Entomological Society of London. Subscribers admitted on payment of one guinea per annum.

W. L.—Apparently *Impatiens fulva*.

"*A Subscriber*," who inquires concerning a French work, is reminded that we do not answer anonymous communications.

EXCHANGES.

Minute Star-fish, or "Brittle-Star," in exchange for British Lepidoptera.—J. M. Aston, Stevenage, Herts.

Fly Fungus (*Sporendonema muscæ*). Well mounted specimens offered for other objects (mounted) of interest.—G. W. Webb, 8, White Rock-street West, Derby-road, Liverpool.

Podura.—*Lepisma*, or hair of Seal (mounted), for mounted specimens of Barbadoes Earth, Foraminifera, or other objects of interest.—A. R. Betts, St. John's Park, Upper Holloway.

British Birds' Skins for local specimens of either sea or land Birds' Eggs.—J. Aspdin, Richmond, Yorkshire.

Minerals and Fossils for British Lepidoptera.—J. G. Marsh, jun., 242, Old Kent-road, London, S.E.

Hobby Eggs wanted for British Birds' Skins or Eggs.—J. A. Harker, 12, York-place, Perth, N.B.

Small British Mammals, such as rats, mice, voles, shrews, &c., wanted (in the flesh) for examination.—T. G. P., Museum, Park-street, Bristol.

Silver-washed Fritillary offered for other British Lepidoptera or Beetles.—W. H. O., Stapleton House, Dorking.

British Birds' Eggs and Suffolk Crag Fossils offered for other eggs.—H. Miller, St. Lawrence, Ipswich.

Actiniæ.—The rarer marine species wanted from Menai Straits, Isle of Man, or Irish coast. Would be purchased.—Address at first to A. J., care of the Editor.

Cypræa testudinaria and several species of *Conus* offered for exchange.—G. Potter, 7, Montpelier-road, Kingsdown-road, Upper Holloway.

Cuticles of *Equisetum*, *Aloe*, *Cactus*, &c. (mounted), offered for objects of interest.—G. Moore, Dereham-road, Norwich.

Marchantia polymorpha in flower, wanted by H. J. Bacon, 44, Camberwell-road, London.

Notice.—Our correspondents in this department are earnestly requested to conduct their exchanges in a manner beyond reproach.

Pheasant Eggs.—One silver and two Gold Pheasants' Eggs for British Butterflies.—T. H. Hedworth, Dunston, Gateshead.

Fossils, Minerals, Birds' Eggs, &c., for British Lepidoptera.—J. H. Greenstreet, 8, Finch-lane, E.C.

Privet Hawk-moth.—Pupæ for those of other good species.—W. H. Onslow, Rev. F. Durnford's, Eton College.

Pupæ of *Saturnia pavonia* for Birds' Eggs, or other Pupæ or insects.—H. Miller, St. Lawrence, Ipswich.

Opossum Fur and Llama Wool for mounted objects of interest.—A. L., 61, Buckingham-road, Islington.

BOOKS RECEIVED.

"Notice of the Occurrence of Mammoth and other Animal Remains at Shandon, co. Waterford," by Edward Brenan. Dublin, 1859.

"The Technologist," No. 2, New Series, September, 1866.

"The Remains of Man and Extinct Mammalian Fauna found at Eynesbury, near St. Neots, Huntingdonshire," by George Dawson Rowley, M.A., F.Z.S., &c. London: Trubner & Co., 1866.

"Hooper & Co.'s General Autumn Catalogue of Flowering Bulbs, &c." London, Covent Garden Market, 1866.

"Guide for Travellers in the Plain and on the Mountain," by Charles Boner. London: Robert Hardwicke.

"The Liverpool Naturalist's Journal," Nos. 1 to 4, June-September, 1866. Liverpool: A. Holden.

"Proceedings of the Essex Institute." Vol. IV., No. 8. June, 1866. Salem, U.S.

Communications Received.—C. F. W.—F. H. W.—M. F. D.—N. E. C.—A. Y.—W. T. I.—E. S.—C. A. J.—E. T. S.—W. O. C.—J. S.—A. H.—J. A. P.—J. A.—G. B. C.—J. B.—J. G.—H. W.—H. W.—H. W. M.—L. G. M.—J. M. Aston—R. M. B.—C. S. G.—W. H. G.—J. W.—A. E. B.—T. P. B.—A. B. F.—J. H. F.—C. R.—W. D. C.—W. B.—E. W.—G. W. W.—W. H.—G. W. H.—H. M. M.—A. R. B.—H. G. W. A.—H. J. B.—T. P. B.—H. M.—F. O.—T. W. W.—E. F. B.—E. B.—J. A.—J. R.—J. G. M.—W. J. P.—E. S.—J. F.—E. M. H.—M. J. P.—E. B.—R. P.—T. G. P.—H. G. E.—A. D. M.—J. R.—W. J. S.—W. H. O.—J. Y.—J. S.—W. T. H.—T. B.—C. B.—E. W. A. L.—J. B. S.—J. W.—G. B.—J. H. McK.—S. F. C.—E. J. S. C.—J. S. S.—H. E. W.—G. P.—G. M.—B.—H. A. A.—H. G.—A. B. C.—E. M.—F. E. W.—J. N.—J. B.—H. S.—C. B.—W. L.—R. T.—J. N.—K. R.—J. S.—W. R. T.—J. R. B. M.—J. J. R.—J. M. A.—W. J. P.

THE VIVIPAROUS FISH.

(DITREMA ARGENTEUM.)

WE are so accustomed to associate the production of young fishes with eggs and milt—familiar to all as hard and soft roe in the cured herring or "berries" in the salmon,—that it is difficult to believe in the existence of a fish bringing forth live young, as do dogs, cats, rats, and mice, only with this difference, that in the case of the fish the young are as perfect in every detail, when launched into the water, as the parent, and swim away self-dependent, to feed or be fed on, as good or ill-luck befalls the little wanderer. The wood-cut * represents the female with the young *in situ*, together with others scattered round her, having fallen out when the walls of the abdomen were dissected open. The drawing was made from a female fish I brought from Vancouver Island, now exhibiting in the Fish Room of the British Museum. Another equally fine specimen may be seen in Mr. Frank Buckland's Museum in the South Kensington Gardens.

At San Francisco, as early as April, I saw large numbers of Viviparous Fish in the market for sale; but after all it is an open question whether these fish really arrive at an earlier period of the year in the Bay of San Francisco than at Vancouver Island. I think not. That they are taken earlier in the year, is simply due to the fact that the fishermen at San Francisco have better nets, and fish in deeper water than the Indians, and consequently take the fish at an earlier period of the year.

The habit of the fish is clearly to come into shallow water when the period arrives for producing its live young: they make their appearance in the smaller bays and estuaries in June and July, and remain until September. They have a curious habit of swimming close to the surface of the water, and numbers are craftily taken by the Indians, who literally, and not in mere figure of speech, frighten the fish into their canoes. As shoal after shoal of these fish are seen entering the bays, or making their way up those long inland canals, which, like the fiords in Norway, everywhere intersect the coast-line, the savages craftily contrive to get the fish betwixt the bank or rocks, as it may be, and the coast; then with all their might and main they paddle straight at the terror-stricken fish, lashing the sea with their paddles and yelling like demons. Out leap the fish from the water in their panic to escape what to their affrighted senses is manifestly a terrible monster; and if not out of the frying-pan into the fire, it is out of the sea into the canoes, which, in the long run, I take to be pretty much the same thing.

It appears to be a very remarkable trait in the character of viviparous fish, that of leaping out of the water on the slightest alarm. I have often seen them leap into my boat when rowing through a shoal—which is certainly most accommodating.

The Indians also spear them, using a spear with four barbed points arranged in a circle, but bent so as to make them stand at a considerable distance from each other. With this spear they strike into a shoal of fish, and generally impale three or four at every thrust.

Soon after arriving at Vancouver Island, I commenced investigating the habits and periods of migration of the different species of fish which periodically visit the north-west coast. The sole means then at my disposal to obtain specimens of fish for examination was to employ Indians, or to catch them myself. So it happened some of these fish were first brought me by Indians. Cutting

* We are indebted to the courtesy of Mr. Bentley for this figure. It is taken from "The Naturalist in Vancouver Island and British Columbia," by John Keast Lord, F.Z.S., Naturalist to the British North American Boundary Commission. 2 vols. Bentley. 1866.

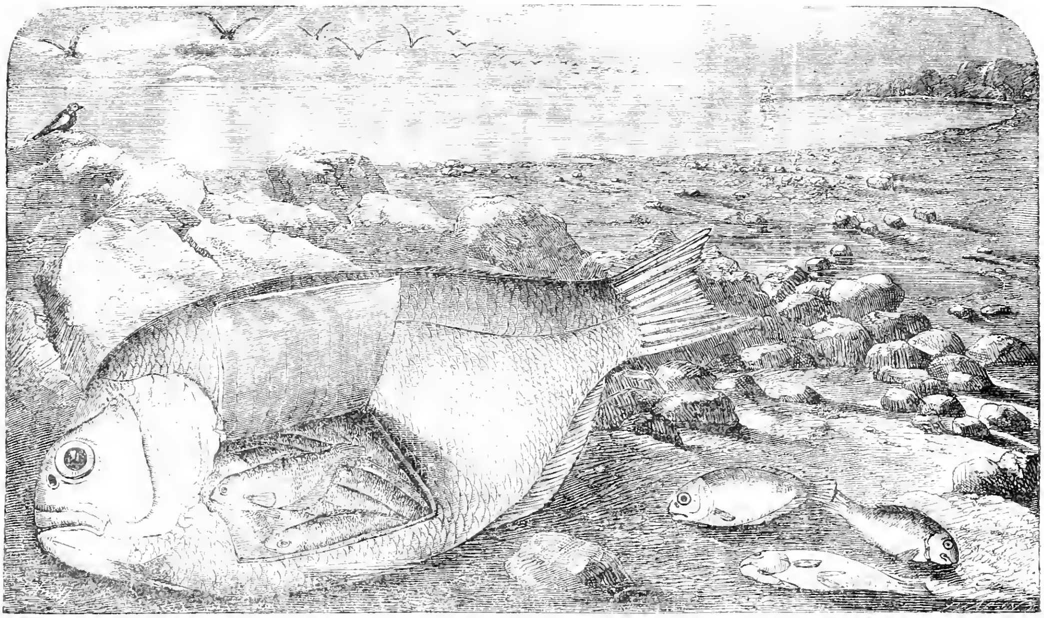


Fig. 227. The Viviparous Fish (*Ditrema argenteum*).

down the side (the plan I usually adopt to skin a fish), to my intense surprise out tumbled a lot of little fish! My wildest dreams had never led me to suppose a fish I then thought a bream, or one of the perch family, could be viviparous. I at once—perhaps hastily—arrived at the conclusion that the greedy gourmand had eaten them. Dropping my knife, I sat in a most bewildered state, looking at the fish.

I soon observed that each little fish was a fac-simile of the larger, and in shape, size, and colour, were exactly alike. From the position, too, they occupied in the abdomen of the larger fish I was led at once to see the error of my first assumption that they had been swallowed. Carefully dissecting back the walls of the abdomen, I discovered a delicate membranous bag or sac, having an attachment to the upper or dorsal region, and doubled upon itself into numerous folds or plaits, and between each of these folds was neatly packed away a little fish. The bag was of a bluish-white colour, and contained fourteen fish. I had no longer any doubt that the fish was viviparous.

Now we come to a ticklish question: How are the young fish vitalized in the abdomen of the mother? I believe the ova, after fertilization, in the first place undergoes the same transformation in the ovarium as it would do supposing it to have been spawned and fecundated in the ordinary spawning-bed—but only up to a certain point; then, I think, the membrane enfolding the eggs, which have by this time assumed a fish-like type, takes on, in some degree, the functions of a placental membrane, and the young fish are nurtured much in the same way as in a mammal.

But a third change takes place. There can be no doubt that the young fish I cut out, and which swam away, had breathed before they were freed from the mother; hence I am led to infer that a short time prior to the birth of the young, sea-water has access to the sac, washes over the infant fishes, thus enabling the gills to assume their normal action, and by-and-by the little fellows are launched into the deep, therein to shift for themselves. There are strong transverse muscles, which act from the abdominal walls, these, I imagine, are in some way concerned in admitting the sea-water. How impregnation takes place I at once confess I do not know. The male is much like the female, but more slim, and the milt just like to that of other fish. It is worthy of remark that the young mature fish are very large when compared with the size of the mother. In a female fish 11 inches long, the young were 3 inches long; the adult fish $4\frac{1}{2}$ inches high, the young 1 inch.

But now for the most important feature in the history of these fish—that of bringing into the world their young alive, self-dependent, and self-supporting, as perfect in their minutest organization as the parent fish that gives them birth. The generative apparatus of the female fish, when in a gravid state, may be defined as a large bag, or sac, over the surface of which a most complicated and strangely-beautiful network of vessels spreads in every direction.

The way this sac is, as it were, folded, and the different compartments made for the accommodation of the embryonic fish, is most singular, and very difficult to discover clearly. The best illustration I can think of is an orange. You must imagine the orange divided into its proper number of little wedge-shaped pieces, and each piece to represent a fish; that the rind of the orange is a delicate membrane, having a globular shape, and easily compressed or folded. You now desire to fit the pieces together again into the original orange-shape. You must begin on the outside of the globular membrane, pressing in with each section a fold of membrane (remember that each represents a fish). when each piece is in its place you will still have the sac in its rounded form, but the rind representing the membrane has been folded in with the different pieces.

If I have made myself understood, it will be seen that there must be a double fold of membrane between each portion of orange. This is exactly the way the fish are packed in this novel placental sac. If it were practicable to remove each fish from its space and the sac retain its normal shape there would be twelve, or fourteen openings (depending on the number of young fish), the wall of each division being a double fold of membrane, the double edges wrapping, or, as it were, folding over the fish. Now make a hole in the end of the bag and *blow* it full of air, and you get at once the globe-shaped membranous sac I have likened to an orange.

Again and again have I dissected out this ovarian bag filled with fish in various stages of development, and floating it in salt water, have, with a fine-pointed needle, opened the edges of the double membranous divisions which envelop the fish (the amount of overlapping is of course greater when the fish is in its earlier stages of development), on separating the edges of the sac, out the little fishes pop. I have obtained them in all stages of their growth, but sometimes (and this not once or twice, but often), have set free the young fish from its dead mother; thus prematurely cut loose from its membranous prison, the young, enjoying its newly-acquired liberty, swam about in the salt water, brisk, jolly, and as well able to take care of itself as its parent.

The most beautiful of all the species (for a detailed list of which *vide* "Naturalist in Vancouver Island and British Columbia," vol. ii. Appendix, page 353) is the sapphire perch (so called by the traders), very plentiful in Puget's Sound. Eighteen exquisitely beautiful mazarine-blue lines mark its entire length from head to tail, and above and below this line are a number of spots of most dazzling blue, arranged in a crescent shape about the eyes and gill-covers. Between these spots the colour changes, as it does in the dolphin, throwing off a kind of phosphorescent light of varying shades of gold, purple, and green. The back bright-blue, but darker than the stripes; the belly white, marked by streaks of golden yellow. J. K. LORD, F.Z.S.

THE GLOWWORM (*Lampyris noctiluca*).

FEW who have rambled through green lanes in the evening can have failed to notice this little light-giver, and wondered at the cause of the flood of radiance emitted by so small an insect; for though the light-producing *Lampyridæ* and the luminous insects of other orders have attracted the attention of many celebrated naturalists, a perfectly satisfactory theory has not, so far as I am aware, been offered to account for this curious phenomenon,* which, though termed phosphorescence, seems, from its steady continuance and the control the animal has over it, to differ from the evanescent shining exhibited by some of the *Acalephæ* (Sea-nettles), and by decomposing animal and vegetable matter. Be the cause of the light what it may, there can be little doubt respecting its object, which is evidently to attract the males—an idea prettily expressed in the following lines by Moore:—

> "Beautiful as is the light
> The Glowworm hangs out to allure
> Her mate to her green bower at night."

Some naturalists have disputed this opinion on the ground that the males themselves are slightly luminous, and they therefore think it has probably some use disconnected with the union of the sexes. But this may be only an illustration of a principle very commonly observed in Nature—that of one sex having rudiments of organs which only reach their full development in the opposite one; for example, the female of the pretty gold-tailed moth (*Liparis auriflua*) has a thick mass of hair at the extremity of the abdomen, which is plucked off by the moth, and used to cover her eggs, and so secure them from rain or excessive heat. This is represented in the male by the elegant fringe of golden hairs which gives the trivial name to the species. It may be worthy of remark that in those species of moths which have apterous or very sluggish females, the males are generally provided with large plumose antennæ, which are evidently delicate organs of sensation, and enable them to discover the females even when separated by long distances. The Glowworm, on the contrary, has very simple antennæ, and may require some other aid to guide it in its amorous expeditions. I have had abundant evidence of their light-seeking propensities when insect-hunting with a lanthorn in some of the Kentish woods, and have frequently seen dozens settle on my clothes, or dash against the glass, in the course of a single evening.

* See "Popular Science Review" for July, 1866.

The larvæ have a general resemblance to the perfect female; they are of a dusky black colour, and composed of twelve segments, to each of the three first of which are attached a pair of short strong legs. They have the power of withdrawing their heads beneath the first thoracic segments, as a tortoise would do—a peculiarity also possessed by the perfect beetles. They are quite carnivorous in their habits, feeding on snails—their stout, sharp mandibles enabling them to make short work of their victims, the shelly houses being no protection against the savage little assailants, who thrust themselves into the soft bodies of the snails, and luxuriate during the autumn and winter on the gelatinous banquet so provided, and are said to be epicures enough not to refuse the feast even when in a very "high" state. They form, however, no exception to the general cleanliness of insects, but are provided with a "peculiar apparatus, composed of seven or eight white radii, capable of being protruded from the anal aperture, beneath the last abdominal segment, and which is employed not only as a point of support, assisting in locomotion, but also as an instrument to cleanse the head and fore-parts of the body from the slime left upon them by the snails while engaged in their repast." Thus the revellers pass the winter; and late in the spring they are transformed into active pupæ, in which condition they remain about a fortnight, and then assume the perfect state, generally appearing about the end of June. The imagos do not despise the food of their infancy, but still persecute the poor molluscs, as does the *Drilus flavescens*, a beetle belonging to the same family as the Glowworm, but which is not luminous, though the large fleshy females (nearly an inch long) are equally destitute of wings or elytra. The Liliputian males, however, have antennæ with deep pectinations, the sensitiveness of which may render them independent of light to guide them to their giant consorts. Mr. Rennie, in his "Insect Architecture," mentions having found, in the summer of 1829, a large snail with three white grubs burrowing in it, and gives the following interesting account of them:—"It appeared to us that they had attacked the snail in its stronghold, while it was laid up for the winter, for more than half of the body was already devoured. They constructed for themselves little cells attached to the inside of the shell, and composed of a sort of fibrous matter, having no distant resemblance to shag tobacco, both in form and smell, and which could be nothing else than the remains of the snail's body. Soon after we took them, appearing to have devoured all that remained of the poor snail, we furnished them with another, which they devoured in the same manner. They formed a cocoon of the same fibrous materials during the autumn, and at the end of October appeared in their perfect form, turning out to be the *Drilus flavescens*, the grub of which was first discovered in France in 1824. The time of their appearance, it may be remarked, coincides with the period when snails become torpid." I believe the male beetle is frequently found in the lanes near Darenth Wood, but the curious female is rarely observed.

W. C.

SERPENTS AT MEALS.

As probably not many of my readers have witnessed the operation of feeding the reptiles at the Zoological Gardens, perhaps a short account of what was seen during a visit a few weeks ago may be interesting. It must be premised that the sight is not altogether an agreeable one; but, notwithstanding, it seemed to exercise a sort of fascination over the spectators, and some ladies, who kept expressing their horror and disgust, were nevertheless as eager as any to see all that was going on. One might go there many times without seeing the operation, as these creatures are only fed once a week; or, as the keeper said, "all Fridays in the year except Good Friday."

It was quite by accident that I happened to enter the Reptile House a few minutes before the feeding commenced, which was late in the afternoon. Before beginning, the keeper locked the door, apparently to prevent persons crowding in, as not many can see well at the same time. He then brought supplies of the different kinds of prey, and cast them into the serpent's dens, the doomed animals being young rabbits, young mice, white mice, ducks, fowls, sparrows, and frogs, which were distributed to suit the size of the various snakes, except the frogs which were provided for the aquatic species. The large Boa Constrictors, into whose case three rabbits, grown specimens, were introduced, seemed the principal attraction, but their mightinesses were in no hurry to dine. As is generally the case after long watching, I was looking at something else when there was an exclamation, "He's got it!" and I found one of these large snakes was coiled round a rabbit. The latter, I thought, struggled a little, but it might be fancy; all remained quiet for a few minutes, and then the huge reptile uncoiled himself, and the rabbit lay perfectly dead. The Boa showed no inclination to eat its victim, but glided about in a languid manner after the other rabbits, who showed little sense of their danger. It was curious to see them in happy ignorance sniffling at their dead companion, or putting up their noses to a hand held near the glass. Two ducks were introduced into the den of another large Boa; or, rather, I believe it was a Python, which is the Boa Constrictor of the Old World, and similar in size and habits.

He moved slowly after the birds, which showed more fear than the rabbits, but made no attempt to seize them. While leaning over the bar to observe better, two or three loud thumps sounded on the glass front near my head, and some bystanders expressed fear lest the glass should be broken. The attack was so sudden that it was only when the keeper requested me to keep farther back that I was conscious that the big snake preferred me to the ducks. The blows sounded like those of a man's fist, and would probably throw a person down if they took effect. By the quick repetition of the strokes it seemed the reptile was slow to learn that the plate glass was too strong for its efforts. I regretted afterwards not having estimated the size of this Python at the time, but from memory should imagine it to be nine or ten feet long. Next to these large snakes, the venomous kinds seemed to attract most attention. Some rabbits, so young as to be almost helpless, were dropped into the cases of the Rattle-snakes and Puff-adder. They were soon struck, but the venom was much slower in its action than I should have expected. The bite of both these species is said to be fatal to man, yet these small animals survived about twenty minutes. The bites were effectively given, as in one instance blood oozed from the punctures, and in another it flowed from the nose and mouth. I paid particular attention to the act of striking, having understood that our English Viper does not, strictly speaking, *bite*—that is, does not close the jaws, but with the mouth wide open drives in the fangs by a downward stroke of the upper jaw, like the blow of a hammer. The Puff-adder, however, appeared to seize its prey with a momentary grip, leaving go immediately.

A half-grown rabbit was given to another venomous species—I think a "horned viper;" but, though the poor little animal was repeatedly pushed up against the reptile, the latter would not strike. Every effort was made to irritate it, and it frequently turned round vengefully, hissing like a small steam-engine all the time, but it would not use its weapons. The "Glass-snakes" appeared more ready to feed than most of the others; mice were provided for their refection, and one of them disposed of two or three in rapid succession. Shortly after, happening to pass the Python's den, a bang on the glass apprised me that my Ophidian friend was still bent on making closer acquaintance.

A stout gentleman, who frequently expressed his antipathy to the whole Serpent tribe, took occasion by this fresh attack to utter some words of warning, reminding me of the keeper's request to keep back from the case, and remarked that the glasses I had on at the time were probably the attraction. I replied that the reptile was apparently in a state to strike at anything that came within reach, and two minutes had scarcely elapsed when my friend, with his little boy, crossed in front of the den, when the Python made a similar blow at him. His alarm was ludicrous: with an exclamation of intense horror he staggered back half a dozen paces; but I fear his activity would have availed little but for the stout plate-glass between. The evident desire of this monster to get a human victim, while it ignored the ducks within its reach, seemed to indicate a longing for larger prey. It was difficult to imagine that the snake could really swallow a man, but the peculiar structure of the jaws in the Boa tribe and their immense power of expansion enable them to get down animals of a bulk much exceeding their own. When these creatures were gliding about their dens, great play of muscle was observable through the skin.

During these performances a large box was brought in by two labourers, It had apertures for ventilation, and contained some large Rock Snakes. The keeper raised the lid, and touched one of the reptiles which were in a half-torpid condition. This excited the curiosity of one of the workmen, who inquired anxiously, "They be'ant alive, sir, be they?" "Alive! yes," said the keeper; "do you want to have one out?" "Oh no, sir," was the quick reply; and he and his companion were gone in an instant. The Cobra appears to be one of the most irritable species; the glass front of its case is partially white-washed, to hide approaching objects from it; but, notwithstanding, it strikes against the glass so frequently that its muzzle was quite raw.

I took the opportunity of asking the keeper if he had ever observed the Boas lick their prey before swallowing it, as they are popularly believed to do. He replied as expected, that in several years' experience he had never seen it done. It is not improbable, I think, that, while the Boa is examining its recently-killed prey to commence the swallowing operation in the most convenient manner, it may keep flickering its tongue in and out as most serpents are in the habit of doing, and this might give an inaccurate observer the idea that it was licking the prey. I fear this account may appear tediously minute, but I send it on the chance of interesting some who have never been present at the Serpents' dinner-hour. GEORGE GUYON.

ON MOUNTING IN FLUID.

WHILST reading M. Chevalier's excellent little work, "L'Étudiant Micrographe," with the perusal of which I was lately favoured by a friend, I met with an account of a method of mounting objects in fluid, communicated by M. Belleroche, of Antwerp, of which, as it may be new to many of your readers, I beg to hand you a translation, omitting some portions for the sake of brevity. I will only add that I have satisfied myself of the capability of this method to give excellent results, whilst its simplicity and the *minimum* of apparatus required, must recommend it to all.

After stating his opinion that the preservative liquid recommended by Dr. Schacht for vegetable preparations is not sufficiently concentrated, M. Belleroche advocates a mixture of one part of chloride of calcium to three of distilled water, as not altering the colours of such preparations, except with desmids (which it changes to a delicate olive) and then proceeds:—

"In the method I employ to make my vegetable preparations (using always a square cover for the object), I make use of no other instruments besides a pair of metal forceps, so as not to touch the cover with the fingers after having cleaned it; a scalpel extremely thin at the point, to raise the cover if occasion should arise; a brush, sufficiently fine to use with the cement; and some blotting-paper to remove the excess of liquid from the glass slip.

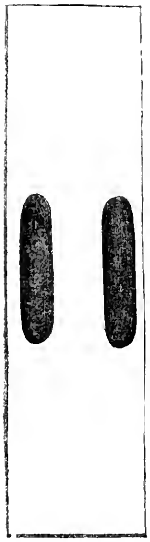


Fig. 228.

"I trace upon the slide with the black varnish, two parallel bands in the direction of its length, somewhat longer than the cover, having consideration also as to its width, as represented in fig. 228.

"You will observe, Sir, that I leave the two ends open. The thickness of the object to be prepared determines the number of coats of varnish to be superposed in order to get the requisite depth; it is but rarely that this exceeds three layers, which have sufficed with me for the greater number of mosses, &c. A greater thickness would exclude the employment of certain objectives, requisite however for details of objects which require, as a whole, only a low magnifying power. Finally, this thickness never prevents the closing of the two ends after putting on the cover.

"Before using the cover I moisten the surface of the cement with a last and very thin coat of the same substance. To insure adhesion I place between the two bands a pretty large drop of (the preservative) liquid, next the object to be prepared, giving the latter time to soak; then I let the cover fall flat upon the liquid, having found that this is the best method for driving out the air which might otherwise remain in the preparation. The cover being fixed by the requisite pressure, I add some of the liquid (if necessary) by capillary attraction, and if the liquid overflows at either or both of the ends, I remove the excess by means of blotting-paper. The liquid being perfectly concentrated between the two glasses, and the surrounding part properly dried, I close up the two ends with the brush, and finish the first closing-in (*encadrement*) with the cement; and on the following day, when this coating is dry, I apply a second to it, to complete the operation, giving to the cement a thickness sufficient to make it level throughout, and to finish the edges neatly.

"If the operation has been properly performed there will be no air; but if, by too much precipitation, it has been badly done, and if there remains a little air, the cover should be gently raised with the aid of the scalpel at the side nearest the bubble, and after having liberated the air, as much liquid should be added as it will absorb, but *on the opposite side*, so as to avoid the chance of producing other bubbles by shutting the air in. It will be understood that in this case it will be necessary to exercise a fresh pressure, and again have recourse to the use of the blotting-paper.

"Glycerine, treated in the same manner, however, offers a little more difficulty, for that which runs over on the slide is not so easily removed as the calcium, and unless it is completely dried up, the cement does not adhere to the glass.

* * * * *

"It is not always an easy matter *to complete* the quantity of liquid between the two glasses by capillary attraction. If as the result of the preliminary operation it is no longer to be feared that the object, already immersed in the liquid, is in immediate contact with air bubbles, it is none the less possible that during the infiltration blank spaces may be formed around the object, a difficulty which necessitates the raising of one end of the cover, which we should always endeavour to avoid. We succeed by taking care that the liquid applied for absorption be in very small quantity at a time, and by frequent repetition, and that the application be made at any point of the two extremities, where the liquid touches the edge of the square glass. My sketch (fig. 229) will give a correct idea of this.

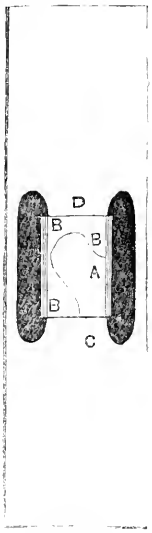


Fig. 229.

"The cover has just been put on, and the pressure necessary to insure adhesion exercised; the ends C and D are still open; B represents the void which remains to be filled up; A is the liquid by which the object is perfectly surrounded, it touches the edge at C. It is there then that we must place successively, and until filled up, the drops of the liquid to be absorbed.

"Success is much more certain if, before applying the cover, care is taken to spread the liquid in the middle between the two bands of cement, so that it may touch them. . . . . It is a very important point to give as much liquid as the glasses will absorb, and to allow sufficient time for perfect absorption, even to *satiety*, as I have already said; because if this precaution were neglected, the cement subsequently applied at the two ends, would in a measure pass between the two glasses, and would spoil the look of the preparation. The cement necessarily remains on the outside (especially if it is pretty thick) when no blank exists between the two glasses."

I have two remarks to make upon the above. First, that when using glycerine, the superfluity can be readily *washed off* with a camel-hair pencil and water, without danger of reducing the quantity already between the glasses. Second, that the plan of putting the glass cover flat upon the object is a good one, and according to my experience much more likely, when mounting in balsam, to prevent entrapping air-bubbles, especially if the cover is first moistened with a little diluted balsam. This is, I know, contrary to the advice contained in treatises on mounting, where we are recommended to make "a wave of balsam" by putting the cover on gradually, but, *practically*, the first is much the better plan. E. M.

THE EDIBLE TURTLE (*Chelonia mydas*) AND THE FIMBRIATED TORTOISE (*Chelys fimbriata*).

MR. W. ZEPPENFELDT, the proprietor of an oyster-cellar and refreshment-rooms in Hamburg, and an importer of living turtles for soup purposes, frequently obtains specimens weighing from 300 lbs. to 400 lbs., and he keeps them sometimes for three or four months, but these large ones never eat anything during that time. About ten months since, however, he got two small ones, one weighing 30 lbs. and one 18 lbs., and finding that these took food, and were unusually lively, they were not killed, but preserved for curiosity's sake. The larger one of the two Mr. Zeppenfeldt himself kept, and the other he kindly sent to the Hamburg aquarium; but I had no proper accommodation where it could swim about without stirring up the water too much, and accordingly I transferred it to a small open-air pond, where it lived with some water-birds, till in a few weeks it died. Its food was raw cabbage and other green stuff. Mr. Zeppenfeldt kept his turtle in a very large, open, shallow wooden tub of fresh water, which in summer was changed daily, and in cool weather every other day. In the middle was a large stone forming an island, on which the animal rested for some hours daily when not swimming or floating. It was kept in the open air, but out of the sun, in fine warm weather; and at night and in cold seasons it was removed within doors. It was fed on raw cabbage, and on lettuces and other salads, carefully given by hand, and all unconsumed fragments were taken out of the tub when the animal had had enough. It took food so freely, indeed, that it increased in weight about 2 lbs. during the nine or ten months of captivity, when it died. I do not know of any specimen having lived so long in confinement as this one. I have often had small ones, and have seen them in the Regent's Park aquarium, but their life has always been measured by a few days, or a week or two at most. Mr. Zeppenfeldt's success was undoubtedly owing to the great care he took of his animal, and by the fact of its being kept in a vessel in which the creature was easily accessible to be fed and cleaned. Much importance was attached to the state of the turtle's eyes, and if not carefully sponged every day with tepid water, they became grown over with a kind of slimy mucus, which caused sickness and loss of appetite.

For the sake of the bearing it has on natural history, it may be just named that Mr. Zeppenfeldt makes Chinese bird-nest soup so frequently that the dish always stands in print on the dinner *cartes* of the house, and it is retailed to customers at the rate of four shillings sterling a plateful! I do not know of any place in London or Paris where this scarce article is thus common. The nests themselves, the produce of a swallow (*Hirundo esculenta*), are shown before being dissolved, and are cup-shaped, or rather boat-shaped, masses of greyish-looking gelatine, having no very decided taste.

I may as well mention that about a year ago I had under my care a rare tortoise, *Chelys matamata*, or *C. fimbriata*, having a much corrugated and strongly ribbed carapace of about sixteen inches long and twelve inches diameter. It was remarkable for the very curious and long appendages with which its much-extended neck, head, and chin were furnished, giving it a most grotesque appearance. Its upper jaw greatly projected beyond the lower one, and it formed a kind of proboscis, at the end of which were placed the nostrils. Its habits were very monotonous and slow. It remained constantly with its body under water, and when it wanted to breathe, it, with much deliberation, brought its nostrils to the surface till they projected about a quarter of an inch above the water, and then, having expelled some old air and taken in a fresh supply, it quietly sank to the bottom. It had a widely-opening mouth, but I always saw it closed till after its death, which took place in about a month after its arrival here. I do not know whether it took any food during this time, but unfortunately I did not watch it at night. It came from some river in South America. In the natural history division of the "English Cyclopædia," vol. i., pp. 1001–2 it is tolerably well figured, and it is stated that a female lived some months in Paris, and laid three eggs, one of which was hatched, and the young animal preserved in the Paris museum.

Hamburg. W. ALFORD LLOYD.

STAR-SHAPED HAIRS.

HAVING been lately engaged with the microscope in examining vegetable hairs, I have come across some rather interesting and curious forms, of which the following is a brief summary:—

In star-shaped hairs (I call those star-shaped which have no stalk, or a very short one only, and the branches all starting from one common centre), those found on the stem and leaf of the common

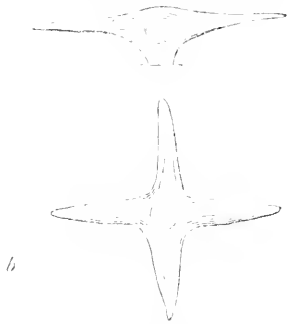


Fig. 230.

Virginia Stock are interesting: on the stem they are as represented in fig. 230, *a*; on the leaf they are of two sorts, mixed, as shown in fig. 230, *a b*, one being a double of the other. A hair similar to this is also found on the stem and leaves of the Hop (*Humulus lupulus*), fig. 231. This is a very curious hair, and can be

Fig. 231.

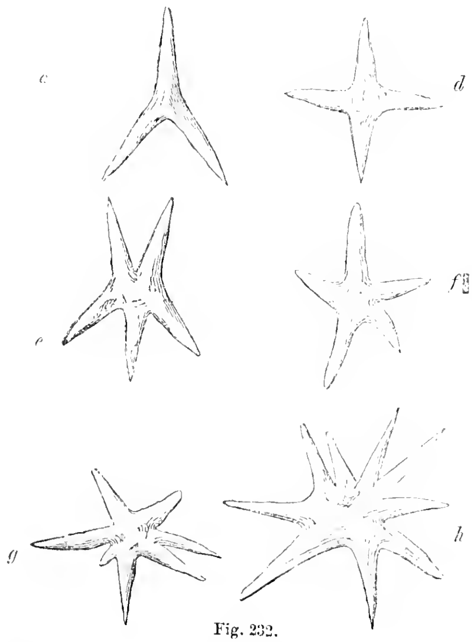


Fig. 232.

plainly seen with the naked eye. In another plant, which I have not yet been able to name, but which seems to be a species of *Acacia*, the hairs on the under side of the leaf are as represented in fig. 232 (*f g h*). These have six, seven, or eight branches; but on the upper side of the leaf they have only three, four, or five branches (fig. 232, *c d e*). The calyx of

Fig. 233.

Abutilon venosum gives us another example of the same sort of hair, and they seem to grow direct from the surface of the cuticle without any stalk (fig. 233).

Fig. 234.

In the Mealy Guelder Rose (*Viburnum Opulus*), the branches of the hairs all start from a short stalk, or knot, and vary a good deal in their number (fig. 234).

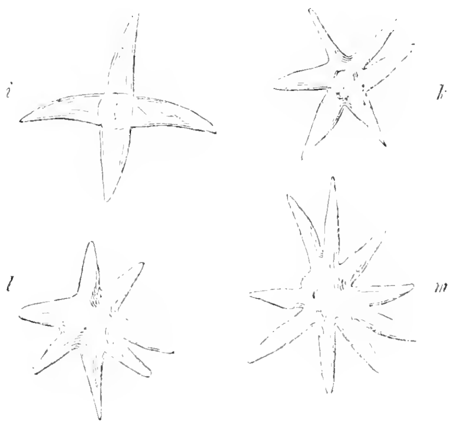


Fig. 235.

The hairs on the leaf of *Deutzia gracilis* (fig. 235) are a very well-known example of the same sort; but are interesting from the variety displayed in the number of branches, which show very plainly the gradations a hair goes through (*i* to *m*). This latter had evidently been broken; but if one was to search attentively, a perfect example of a hair with ten branches, regularly disposed round the centre, could, no doubt, be found. I have never seen one with more than this number.

Thus much for star-shaped hairs. At another time I hope to give a description of some interesting examples of simple and branched hairs.

ARTHUR B. COLE.

GASTRIC TEETH OF INSECTS.

THE first volume of SCIENCE GOSSIP contains most interesting papers under the title of "What do crickets eat?"

One of the impressions which these papers are calculated to leave upon the mind of the reader is, that crickets must possess wonderful digestive powers to enable them to feel comfortable after a meal of such material as leather, &c. They have, indeed, good digestive powers, and they have an efficient organization for the purpose.

Besides the cutting instruments connected with the head, crickets, and some beetles, have second stomachs or gizzards.

The gizzard is situated immediately below the ordinary stomach, and in many cases it is furnished with strong teeth, very curious in their structure, and effective for the thorough grinding of food prior to its passage into the digestive canal.

The structure of the gastric teeth of the cricket is well known to microscopists, few cabinets being

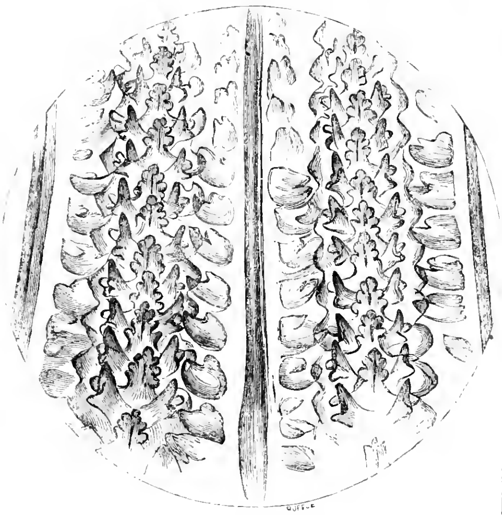


Fig. 236. Gastric Teeth of Cricket × 30.

without the very attractive object which they afford. As they have not been frequently figured in handbooks, for the sake of the general reader I give a camera lucida sketch of two sets of teeth out of the six rows of which the entire gizzard is composed (fig. 236).

Some beetles have gizzards, and these are worthy of a careful examination, on account of the beauty and variety in the arrangement and structure of their gastric teeth. A few simple instances will serve as illustrations.

The gizzard of the common cockroach (*Blatta orientalis*) contains five strong horny teeth: these are not very remarkable for their beauty, but if the gizzard be examined before it be slit down and spread out, and while the teeth are in their natural position, the walls will appear of a yellow colour and the teeth of a rich brown, the whole not unlike the appearance of a small artificial flower.

There is a ground beetle, very common, about half an inch in length, and of a shining black colour (*Pterostichus niger*). The gizzard of this beetle, although interesting, does not contain teeth of any appreciable size; and when it is considered that some very small beetles have comparatively large

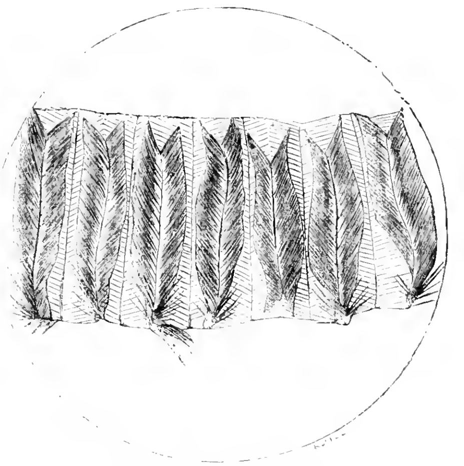


Fig. 237. Gastric Teeth of Weevil × 30.

gastric teeth, the suggestion strongly impresses itself upon the mind, that with the study of the structure of gastric teeth there should be associated that of the formation of the mouth and the nature of the food, as these three things evidently bear a close relation to each other.

A few years ago, the rose-trees of a large garden in this neighbourhood were much injured by a brown weevil of about a quarter of an inch in length, and which I take to have been *Otiorhynchus picipes*. The gizzard of one of these (fig. 237) forms a beautiful object. The teeth are in seven rows; they are of a deep red colour, and are composed of stiff hairs. Each row is parted in the centre and laid down to the right and left, and the teeth, if such they may be called, are set in a striated membrane.

There is a small beetle, the name of which I cannot give—I can only say that it is about a quarter of an inch in length, has burnished brown elytra, and five joints in the tarsus. The gizzard of this beetle when opened is scarcely as broad as a fine thread somewhat flattened; on this narrow gizzard there are three brown specks, one of which, when greatly magnified, is found to consist of a number of teeth curiously arranged. Although I cannot name the beetle, I give a drawing (fig. 238) from the mounted specimen which I possess, as it affords an interesting example of the variety of structure to be found in the gastric teeth of beetles.

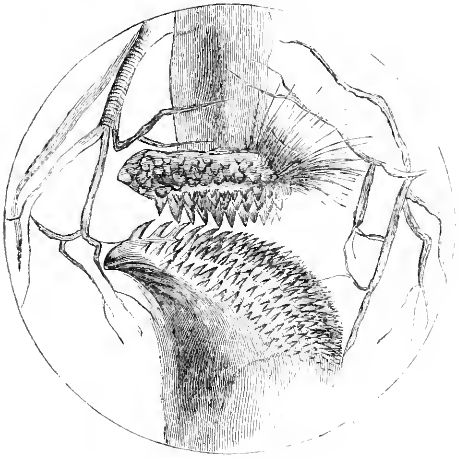


Fig. 238. Gastric Teeth of Beetle × 120.

Examples of other forms might readily be given; but since this paper is intended to be suggestive rather than explanatory, it only remains that I should give a few simple particulars relative to the dissection and mounting of gastric teeth.

The insect having been killed with chloroform, I place it in a porcelain dish or saucer in water. I hold it down firmly with a pair of tweezers, and with the back of a dissecting-knife I draw the head steadily from the body. The head, when separated, brings with it the stomach, gizzard, and the chief portion of the digestive tubes. All these I lay on a glass slide, and place them under a simple dissecting microscope: the gizzard being just below the stomach and darker in colour, is easily distinguished, and may be separated by two cuts with the knife: it then forms a short tube, the teeth being inside. The opening out of this tube, especially if it be small, is a work of some nicety, and requires delicate handling: if the point of a fine knife can be fairly inserted, then one firm cut downward upon the glass will lay open the gizzard. Care should be taken on this point, for a false cut, or a repeated effort, only mangles the structure and destroys the object. Sometimes it may be well to put a fine needle up the tube, and to cut down upon the needle, and so open the tube.

In the case of any small weevil, the whole gizzard is so minute, and the membrane in which the teeth are set is so delicate, that the most careful operator will many times have to regret that in endeavouring to open and display the structure he has made a mess of a beautiful object; yet, if he have a real love for the work, these failures will only add zest to the pursuit, and enhance the pleasure of the success that will finally attend upon his persevering endeavours.—*Lewis G. Mills, LL.B., Armagh.*

FOSSIL WOOD.

THE lower group of the Lancashire coal formation gives character to the whole country round the borders of the basin, rising up in long low ranges of green hills that flank the slopes of the Pennine chain; "and as they crop out" on the hill-sides, or in the valleys, they are reached by a perpendicular shaft of a few yards in depth only, or by horizontal openings, locally called "Breast hees." In the whole of this series there is, perhaps, no seam so easily recognized as the "upper footmine." Sharing, as it does, to some extent, the family likeness common to the whole group—mineralogical composition and identity of fossil remains,—it is yet quite unique in some of its features. Most of the seams possess some peculiarity which distinguishes them from the rest, and which serves the practical miner as a finger-post to guide him in his labours. On none is the inscription more legibly written than on the foot-mine. The feature that gives it its peculiarity is the great number of concretionary masses, locally known as "bullions," which are invariably associated with it. Nodules are to be met with in greater or less abundance throughout the entire formation, interspersed irregularly in the shale *above* the coal, while the bullions in the seam of which we speak, thickly stud the roof, and in many cases press *in* and *through* the coal, to the great detriment of the miner, turning him aside in his work of excavation, and in some instances rendering his labour unremunerative. Indeed so serious a barrier do they sometimes present, that he is often compelled to abandon the attempt to recover the grimy treasure, and to leave it locked in the unyielding folds of the "safe" where Nature had hoarded it untold ages ago. These nodules are of clay iron-stone with a slight admixture of lime, and are so hard as to yield only to repeated blows from a geological hammer of four or five pounds in weight. The fossils they contain are Goniatites, Orthoceratites, Pectens, Mytilli, a few Ferns, Calamites, fragments of fossil wood, &c. These stony remnants of extinct organisms are in a good state of preservation, well defined in outline, full and round in form as when they swarmed the estuaries or clothed the verdant slopes and dense jungles of the Carboniferous period, in the full enjoyment of that life which was meted to them by the great Creator. Let us now speak more particularly of the fossil wood alluded to above. These stems are extracted from their matrix with difficulty, and require some care and the exercise of a well-practised eye in their selection for microscopic purposes; but when secured in good condition, with all their parts complete, they well repay the labour bestowed on them. When cut into thin sections and mounted on a slide, they are valuable to the phyto-microscopist in assisting him to carry his botanical researches backwards through epochs dim and hoary with age, and in comparing the internal structure of the oaks, elms, beaches, pines, palms, cycads, &c., of the present period with the Lepidodendrons, Sigillarias, Ulodendrons, Bothodendrons, Knorrias, Calamites, and others, whose dubious forms are links in the long chain of vegetable being evolved since that "beginning" when God said, "Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit, after its kind." The nature and habits of these denizens of primeval forests, as well as their exact position in the vegetable kingdom, are involved in much obscurity, many palæontologists believing them to have been of low organization. Certainly, if apparent simplicity of structure be evidence of lowliness, the assumption has some foundation in truth, many of the specimens showing little more than an aggregation of cellular tissue; others, however, in addition to this cellular tissue, possess more complexity, and exhibit vessels, or ducts, in considerable variety. In thin cross-sections of some specimens are seen regular alternations of loose cellular and compact vascular tissue, variously marked and arranged, and presenting a stem-within-stem appearance—an internal arrangement of parts quite anomalous, and puzzling alike to botanists and geologists. Probably they have no analogues in existing types. The accompanying sketch (fig. 239) represents one of the more humble forms, simple in structure and decidedly endogenous. It is therefore possible, that, not only as to species but as to genus, they have become quite extinct, and have left no legitimate heirs to their wide estates. It is tolerably certain, however, that they are allied to the more humble organisms of our present flora,—our reeds, equisetums, ferns, lycopodiums, palms, and pines.—*John Butterworth, 5, Bridgewater Street, Oldham.*

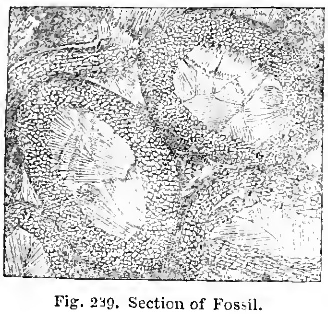


Fig. 239. Section of Fossil.

THE TEACHING OF NATURAL SCIENCE.

THE following is an abstract of a paper read before the Social Science Congress by Mr. John Angell, of Manchester.

The author advocated the teaching of natural science as a fundamental part of juvenile education on the following grounds:—1. Because of its relation to the structure and organization of the human mind. 2. Because it supplies that knowledge upon which human well-being, to be secure, must be based. 3. Because its proper study constitutes the best juvenile training for the actual business and duties of life; that is, it forms the best instrument for cultivating and strengthening the observing and judging faculties, upon the power and efficient operation of which mainly depends our progress in life. 4. Because it puts us into practical possession of the natural forces, the proper application of which supplies us with that abundance of the physical means of well-being which is absolutely necessary to the cultivation of our higher nature, constituting, in fact, a means by which the lower forces of heat, light, electricity, and chemical and mechanical force, are transmuted into the higher form of mental force. 5. Because it puts us into possession of that comparative superabundance of the personal means of physical well-being and of leisure which are necessary for the elevation of the feeble and depraved among our own civilized race, and to the civilization of the savage or barbarous races, that is, to the successful accomplishment of the true objects of philanthropic missionary enterprise. 6. Because it tends eminently to enlarge and liberalize the mind, to give it faith in the power of truth, and in the moral government of the universe, even in little things, and in the ultimate progress of the human race. 7. Because natural science is God's own exposition (revealed to us through the researches of the human mind) of the powers and agencies by which He regulates His providence in this world. In regard to the first point, he argued that the structure, organization, and qualities of the human mind bear a similar relation to the forces which regulate the physical, intellectual, and moral world, that the bodily structure and organization of one of the lower animals bear to its particular habitat in this world; and that intellectual and moral education, in its large and philosophical sense, consists in the conversion, under the influence of that divine gift, the human soul, of the various physical forces, including heat, light, electricity, and chemical and mechanical force, into the higher forms of vital, nervous, intellectual, and moral force. The fourth proposition he illustrated by showing the evil effects of sparse diet upon both the mind and the body, and the advantages to health, intellectual and physical well-being, which accrued from the application of natural science. History recorded no instance in which a people, permanently ignorant and destitute, had proved virtuous and happy. It was the duty of science to discover and invent, and that of commerce to multiply and diffuse the gifts of science among mankind. The question arose, what branches of natural science should be more especially taught, and how? The three branches of science whose immediate training and practical value were the greatest, were, in his opinion, chemistry, animal physiology, and social economy. On the data furnished by the two latter sciences might also very easily be taught or established a system of moral philosophy, which would do much to implant in the youthful mind an intelligent conviction that a selfish, untruthful, immoral, or sensual course of life, cannot, under any circumstances, prove to be of real profit to the individual, or conserve his ultimate happiness, however powerful or influential he may become. In regard to chemistry, he urged that the proper way to teach it was not by books, but by introducing the chemical bodies to the notice of the pupils, and causing them to ascertain by their own observation, and express in their own unaided language, the result of such observation. He believed it to be a great mistake to suppose that young children are relatively deficient in reasoning power. The flood of questions with which they meet every new circumstance or phenomenon which is brought before their notice, should be sufficient to dispose of this error.—*Journ. Soc. Arts.*

LICMOPHORA FLABELLATA.

THIS—to my mind the most beautiful of, at all events, the British Diatoms—seems rather local in its habitat, though in some works I see it mentioned as generally found along our coasts. My own experience, however, does not confirm this.

During the year 1863 I was fortunate in finding (through the kindness of a friend who informed me of its whereabouts) a very fine gathering; but during 1864–5 the most careful search, during at times almost the whole year, failed to secure me any.

This year it seems rather abundant and extremely fine, but entirely local, by which I mean confined to certain pools; though, during 1863, I found traces of it on various parts of this coast, within half a mile of the principal pools. Seen from the surface of the water, it resembles a quantity of golden wool, which, on being placed in a bottle, glistens like spun glass.

With a moderate power, or the usual hand-magnifier, the regular fan-shaped fronds can be easily made out, more particularly on account of their deep amber colour.

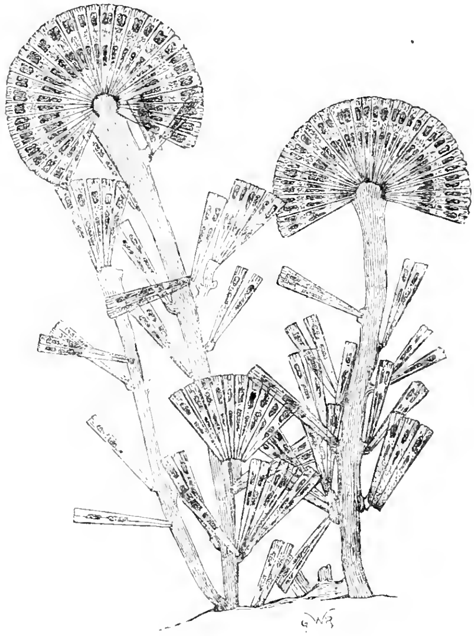


Fig. 240. *Licmophora flabellata.*

Unfortunately, there seems a degree of uncertainty attending the permanency of mounted specimens,

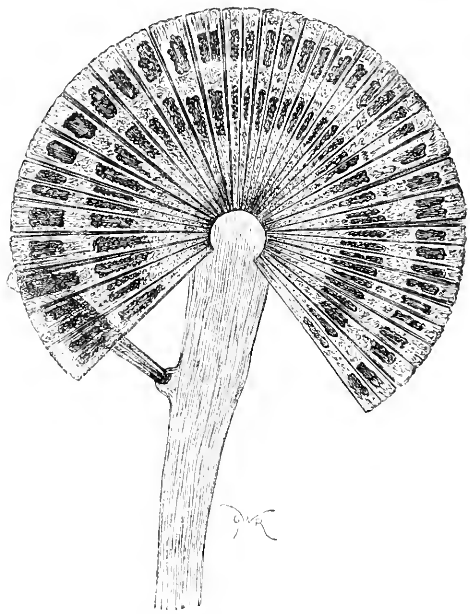


Fig. 241. Fan of *Licmophora.*

which I suppose accounts for the scarcity of slides to be met with; but it may be safely put up in glycerine jelly (if done so as soon as it is gathered), though this renders the subject rather transparent.

On first finding it I immediately mounted six dozen slides, and had the mortification of losing about five dozen, the fans having broken away from the stalks, caused, I imagine, from the diatom still growing, though inclosed. The specimens which remained perfect were clearly those which had attained their maximum growth, and had the endochrome divided into spots, and not over the entire frond, as in young growths. Some of these are now in my cabinet as perfect as when put up three years ago—in fact, the photographs sent are from one. I have, however, adopted a plan (suggested by the same friend who directed me to its neighbourhood) for mounting the slides or keeping a stock of the "raw material." It consists of well washing each tuft (as soon after it is gathered as possible), and then plunging it into water just on the boil for about half a minute, which kills the diatom; it can then be kept as stock or mounted at once. I generally use ⅓ spirits to ⅔ water for mounting, which does not render it so transparent as the jelly.

H. E. Ledger.

THE CROWN ANIMALCULE.

(*Stephanoceros Eichornii.*)

Of all the strange and beautiful forms which the Rotifers assume, none can surpass the Crown Animalcule. It is the great object which all young students of microscopic life eagerly pursue, and are often for years pursuing in vain. I lately inquired of an excursion party, which was wending its way to Totteridge Ponds, what they hoped to find there, and the reply was "Stephanoceros." On another occasion, the route being in a different direction, I ventured a similar question, and lo! I obtained the same reply. Riding with a party of microscopists in a railway carriage, the subject under discussion was the same—"where to find the *Stephanoceros.*" One recommended Highgate, another the Serpentine, another the Regent's Canal. It will sometimes be found adhering to plants of *Myriophyllum*, and at others to the rootlets of willows which have pushed themselves through the bank into the stream; but certainly the same locality is not always equally productive, and probably any spot cannot be relied upon for more than a year or two.

Our concern, however, is now more particularly with the Rotifer itself, than with its homes and haunts. The figure given will illustrate its external appearance; and a few observations may lead the reader to seek fuller and more complete information in the chapter on this subject contributed to the *Popular Science Review* (vol. I., No. 1, p. 26) by Mr. P. H. Gosse, a most excellent authority on this and other Rotifers.

The genus to which this animalcule belongs, and that of *Floscularia*, already illustrated (Science Gossip, vol. II., No. 18, p. 132), constitute a family of *Rotatoria* by themselves, which have been called "Flower animalcules." The present genus contains only one thoroughly recognized species, which attains one-sixteenth of an inch in length, and

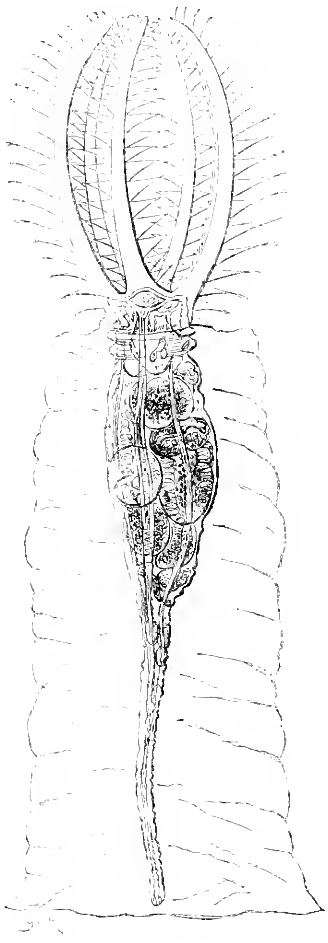


Fig. 242. The Crown Animalcule (*Stephanoceros Eichornii*).

may therefore be seen by the naked eye. The five arms which constitute the crown are long, slender, and curved inwards, their surface being clad with whorls of elongated setæ. Beneath the crown is a kind of broad head, attached by a neck or collar to the irregular cylindrical body. The lower portion of the body is attenuated into a slender foot, by means of which the animal is permanently attached to its supporter, which latter is generally the stem of some aquatic plant. A gelatinous envelope incloses the body, as in a transparent case, which reaches upwards to the neck and downwards to the extremity of the foot, around which it is] also attached to the support of the animal.

The expanded arms with their setæ form a kind of cup of network, contracted at the mouth. "Both arms and setæ are commonly held motionless," writes Mr. Gosse; "yet there is a manifest vortex in the inclosed area, for small *Infusoria* approaching are presently drawn in and are driven about in the space. They can enter readily at all parts between the arms, but cannot get out; for if one approaches the arms from within, it is seen instantly to be shot back towards the centre. I perceived, after some careful watching, that the motion was caused by the setæ; a minute, tremulous, and, as it were, spasmodic wave, being seen to run along the nearest pencils at the instant. It is clear, then, that the setæ crossing each other, serve as a living net, which admits the prey to enter without resistance, but, if touched from within, vibrates in such a way as to jerk the touching body with considerable force towards the centre of the contained area. When once the prey passes down below the area into the mouth-funnel, which is formed by very contractile walls, a slight constriction takes place in the neck, which has the effect of forcing the monad down to the mouth of a capacious crop, which lies all across the upper part of the body. Here a sort of swallowing motion is seen, and the prey passes with a gulp down into the cavity."

The *Stephanoceros* is a voracious feeder. Mr. Gosse mentions having seen it capture and devour scores of *Infusoria* in quick succession; and on one occasion he observed one feeding on the young of *Floscularia*, which were being hatched in considerable numbers in the same water. M.

Rare Fish.—Two specimens of the Anchovy (*Engraulis encrasicolus*) were caught here [at Bridlington] on Oct. 17, and brought to me as a rarity. As neither Mr. Couch nor Yarrell mentions its having been found on this coast, perhaps some of your readers who, like myself, take an interest in Ichthyology, might care for the fact being recorded. Both the above-named gentlemen speak of the Atherine (*Atherina presbyter*) as also very rarely, if ever, found on the east coast. I have obtained many specimens, especially out of a dam erected for the new pier works. During the last week in August five Sunfish (*Orthagoriscus Mola*) were caught in this bay, three of which were brought to me. They were mostly of small size.—*H. H. Knocker, Commander R.N.*

We are very sheep in our gregariousness in error. When one bold or stupid mutton takes a leap, all leap after him. It is rare to find men doubting facts, still rarer to find them doubting whether the facts be correctly co-ordinated.—*G. H. Lewes.*

ZOOLOGY.

Horse-Head Grasshopper.—Mr. Tate, in the October number of Science Gossip, mentions having kept one of these insects alive for a few days; he may therefore be interested in knowing that I kept one for more than a week in a glass globe, and gave it its liberty at last, having satisfactorily proved that when in confinement these insects are carnivorous, for it devoured raw beef with great relish.—*H. E. Watney.*

Want of Instinct in the Robin.—In my garden I have two Sparrow-hawks (male and female) in a large wire cage, and for some days past I have noticed a Robin hopping about on the outside. On Friday, September 28th, poor bobby ventured inside the cage, and was instantly caught and devoured by the Hawks. It is the more singular because the Hawks (although well fed) have made repeated efforts to catch it when perched on the outside. Yesterday I observed that another Robin was hopping about risking his life in a similar manner to the other.—*H. Tasker.*

Large Snakes.—In the last number of Science Gossip, snakes a yard in length are spoken of as fine specimens, and Professor Bell is quoted as giving four feet as the maximum. I do not know whether it is worth mentioning that on the 14th of July one was brought to me just 3 feet 10 inches long, or two inches short of four feet; it was four inches in girth at the thickest part, and weighed 1 lb. 2½ oz., but appeared much heavier. The body was thickest about ten inches from the tail, which had a slender, rat-like aspect. The Snake was killed while crossing the high road about half a mile from my house at Ventnor, Isle of Wight. I may add that this species is less common in the district than the Viper and Slow-worm.—*George Guyon.*

Death-watch.—Since reading Mr. Noble's remarks in the April number of this Journal, on what was said by Mr. Smith at p. 34 in the February number about the Death-watch, I have been taking notice of the insect, of which there are numbers in my house. I have heard the ticking for some years, but never could make out the insect that made it, and always supposed it must be some kind of beetle or spider in the old walls. I am now convinced that the sound is caused by the little *Atropus* (Science Gossip, vol. I., p. 111, fig. 82), and for the following reasons:—One night I heard the ticking noise proceed from a picture, and, after examining it, I found one of these little insects running about on the frame. I had placed my ear to the place, and heard the noise quite close to me; and I found, on placing my finger near the insect, the ticking ceased instantly, but was afterwards resumed. I noticed this particular picture-frame on another occasion, and found the insect still there making his ticking noise; but, being still anxious more fully to satisfy myself, I waited until I could hear the sound from some other place, and a very few evenings after heard it coming from a bookcase; and, after listening with my ear close as before, soon found a lively specimen from whom the sound came. How the noise is made, whether by the mouth or by tapping, I cannot tell; I only know that this insect makes it. I think the sound is made as a signal or call to the mate, because the insect is on the run the whole time, as if in search of something.—*E. Bailey.*

Pensile Spider's Nest.—Whilst engaged in the garden a few weeks since, my wife observed an object somewhat resembling the case of a caddis worm, suspended from the under side of a raspberry-leaf. Upon a near examination, it proved to be a pensile nest, from which a large number of juvenile spiders issued on removing it from the leaf. The nest consists of a tube, not quite two inches in length, and about the diameter of an ordinary lead-pencil; the materials of which it is composed being small pellets of garden mould, minute pebbles, &c., united by silken threads, or rather interwoven in the meshes of the netted structure—the interior not appearing to be lined with a finer or softer web. The filament by which it was suspended is not of a silky nature, but is evidently a human hair, or so closely resembles one, even under a high magnifying power, that I cannot distinguish the difference. As I do not possess a similar object in a rather large collection, and cannot find any description of it in such works on entomology as I have perused, or in "Homes without Hands," perhaps some friend, who may be acquainted with the object, will kindly describe the little architect. The young spiders were so small, that I could not recognize them from a mere casual observation.—*E. H. R.*

An Old Cat.—On looking over the number of Science Gossip for last March I see 16 years given as the greatest age of a cat; however, I can state with perfect certainty that a cat, belonging to some intimate friends of mine, died about two weeks ago aged 22 years.—*William S. Green, Youghal.*

Hairworm.—Reading an article in Science Gossip, vol. I., p. 107, on the "Hairworm," reminded me of one of my boyhood days, when, with one or two of my companions, I was playing by a small brook and looking in saw something just like a hair in size and appearance moving, or rather swimming, about; too slender for a young eel. I caught it between my fingers, when it gave me a sharp sting (or, at any rate, a stinging sensation) which very soon made me let it go again. I have no doubt about its being the *Gordius aquaticus*, and the circumstance was impressed and never forgotten by the very acute pain it occasioned, though only momentary. As Mr. Bailey made no mention of this, nor the others who have communicated on this subject, I thought that they might not have experienced it. Perhaps it may be new to them.—*Charles Delaney.*

The Dipper.—The following extract from Mr. Lord's "Naturalist in British Columbia" deserves attention from all—the angling fraternity more especially—who persecute the Dipper without thinking or perhaps knowing that they are injuring a friend. If it were not for the above error, we might have this cheerful bird on many rivers where now it is scarcely known. From the few specimens I have dissected I have not been able to gather any evidence against the Dipper. Perhaps some of your correspondents who have facilities for examination would send their experiences.

"Believe me it is not with any felonious intent that the Dipper visits the spawning-beds. He would not give a chirp to breakfast on the daintiest fish-eggs that speckled trout or silver salmon ever laid. Fat larvæ, plump and savoury water-beetles, and delicate young fresh-water molluscs, are his delight, and he knows well the weakness such robbers have for new-laid eggs, and, like a sensible bird, goes where the eggs are to find them—an obedience to instinct that often costs him his life. I have opened the stomachs of dozens of dippers when collecting for the purpose of natural history . . . and never in a single instance did I discover other than the remains of insects and fresh-water shells."

The above is conclusive enough for anything.—*H. Smith.*

White Puffin.—On the 14th of June last a puffin was shot at Skomer Island whose plumage was pure white, with the exception of three black feathers. I brought it to London and had it stuffed by Mr. Gardener, of Holborn. A white puffin, doubtless the same bird, had been seen about the same part of the island the preceding summer.—*E. K. B.*

The Grey Phalarope.—About the middle of September last, during the stormy weather which then prevailed, a grey phalarope, *Phalaropus lobatus*, made its appearance on a pond close to the house at Caldy Island, Pembrokeshire. It was very tame, but kept apart from the swans and ducks which frequented the pond, remaining there for several days, and was never seen but on the water. It swam with ease and dexterity, but with a "jerky" motion, constantly nodding the head, and caught flies on the surface of the water with great rapidity. If approached too closely, it would take wing, uttering a sort of chirp, or whistle, and alight a few yards further off.—*E. K. B.*

BOTANY.

The Glastonbury Thorn.—"It is handed down that when Joseph of Arimathea, during his mission to England, arrived at Wearyall Hill, near Glastonbury, he struck his travelling staff into the earth, which immediately took root, and ever after put forth its leaves and blossoms on Christmas Day, being converted into a miraculous thorn. This tree, which had two trunks, was preserved until the time of Queen Elizabeth, when one of the trunks was destroyed by a Puritan; and the other met with the same fate during the Great Rebellion. Throughout the reign of Henry VIII. its blossoms were esteemed such great curiosities and sovereign specifics, as to become an object of gain to the merchants of Bristol, who not only disposed of them to the inhabitants of their own city, but *exported* these blossoms to different parts of Europe. There were, in addition to these, relics for rain, for avoiding the evil eye, for rooting out charlock and all weeds in corn, with similar specifics, which were considered at this time *the best of all property*."—*Notes and Queries*.

Than-hmo, or Worm-Mushroom, grows in Burmah, where bamboo clumps have been burnt down, an accident which often happens in the forests from friction, as well as from other causes. The fungus is found in large pieces, of a pink hue, paler inside, pithy, and somewhat solid; smells when fresh like edible mushroom. It is cut in slices, and preserved in honey; and a teaspoonful given to a child for three mornings, and castor oil on the fourth, which is said to bring away the dead worms. My old friend Mr. Parish, of Moulmain, who I see is in correspondence with you, would give you a more accurate account.—*W. T. H.*

The Lily appears to have been a favourite flower with the ancient Greeks, and in the wedding ceremonies of the modern Greeks the priest is supplied with two chaplets of lilies and ears of corn, which he places on the heads of the bride and bridegroom as emblems of purity and abundance. All the wedding-party are then crowned with flowers, and as they pass by the houses of their acquaintance, flowers, nuts, and cakes are strewed from the windows.—*Flora Historica*.

Mignonette.—The *Reseda odorata* first found its way to the south of France, where it was welcomed by the name of *Mignonette*, Little-darling, which was found too appropriate for this sweet little flower to be exchanged for any other. By a manuscript note in the library of the late Sir Joseph Banks, it appears that the seed of the Mignonette was sent, in 1742, by Lord Bateman, from the Royal Garden at Paris, to Mr. Richard Bateman at Old Windsor; but we should presume that this seed was not dispersed, and perhaps, not cultivated beyond Mr. Bateman's garden, as we find that Mr. Miller received the seed from Dr. Adrian van Royen, of Leyden, and cultivated it in the Botanic Garden at Chelsea in the year 1752. From Chelsea it soon got into the gardens of the London florists, so as to enable them to supply the metropolis with plants to furnish out the balconies, which is noticed by Cowper, who attained the age of twenty-one in the year that the flower first perfumed the British atmosphere by its fragrance. The author of the "Task" soon afterwards celebrates it as a favourite plant in London:—

> ——"the sashes fronted with a range
> Of orange, myrtle, or the fragrant weed."

Flora Historica.

Double-flowered Pimpernel (*Anagallis arvensis*).—A specimen of this was recently forwarded me by a lady, who had received it from the neighbourhood of Kelvedon, in Essex. The plant appeared to be of the usual size; but the corolla was double, instead of single.—*B.*

Drying Succulent Plants.—I have succeeded in drying succulent plants and orchids in a very satisfactory manner, by plunging them first into boiling water, which arrests any further growth; and I have never been disappointed by finding the leaves fall off when dried, as is the case with specimens not treated in this manner; and, moreover, the colour remains unimpaired for years.—*E. Capron*.

Dane's-blood.—In your last number, in an article by B. on "Bell Flowers," there are two mistakes which I should wish to correct.

1st. He states that the name "Dane's-blood" is commonly applied to the Dwarf Elder (*Sambucus ebulus*). This plant is called "Danewort," not "Dane's-blood"; no plant could ever have been called by this latter name unless the flower had been of a black purple or crimson colour, which might give the idea of blood, and it is evident that the *Sambucus ebulus* has no such characteristic belonging to it.

2ndly. The plant on the Bartlow Hills formerly called by the people in that neighbourhood "Dane's-blood" was not the *Campanula glomerata* (which does, however, grow not only there, but all over that part of Cambridgeshire), but the *Anemone pulsatilla*. I doubt if this plant grows there now, for it was very scarce on those hills forty years ago. I was very intimate with the former Rector of that parish, and when staying with him at the Rectory in the year 1827, knowing that I could procure specimens of the roots in other parts of the neighbourhood, as in the Devil's Ditch on Newmarket Heath, and the Gogmagog Hills and elsewhere, he requested me to spare the few plants at that time left on the Bartlow Hills, as, he said, so many persons got up the roots and took them away as memorials of the spot, that he feared the plant would soon become extinct there. I have no doubt it has long since ceased to grow there. In the year above named I did not see more than half-a-dozen plants, if so many. Now, the villagers having long been accustomed to get up the plants for visitors as "Dane's-blood," would naturally, when they had eradicated the plant, not be willing to tell fresh visitors that the true "Dane's-blood" no longer grew there, but would endeavour to persuade them that the *Campanula glomerata*, which they would see growing there, was the "Dane's-blood." The usual name for this plant, as every one knows, is the "Pasque Flower;" but growing, as it did formerly, on the site of the burial of the Danes at Bartlow, and being of a deep reddish-purple, it was called by the villagers "Dane's-blood."

Professor Babington, in his "Flora of Cambridgeshire," remarks on the great number of plants in that county, chiefly, however, marsh plants, from reclaiming the fens, which had become extinct since the days of Relhan. As the "Pasque Flower" is not a marsh plant, I hope this has not become eradicated, but it was not very commonly met with even at the time I speak of.—*T. Salwey.*

MICROSCOPY.

Dissecting Troughs.—In your August number is a cheap dissecting-trough by Mr. Gedge. Being in want of one myself this spring, I made mine of a piece of kamptulicon, by merely turning up the edges and fastening with the Indian rubber cement. It is very light, and holds the pins even better, and obviates the necessity of the loaded cork.—*John Davis, Stowmarket.*

Illumination of Opaque Objects.—I have lately adopted a new and, I think, improved method of illuminating opaque objects. I simply take an ordinary slide, bind the edges, and gum a piece of red paper on one side, and a piece of *lightish* blue on the other. On a similar slip I fasten white and black on either side. My opaque objects are mounted like transparent ones, that is, with a circular hole in the top and bottom covering papers. By placing one of the covered slides on the stage, and the object over it, and illuminating in the ordinary way, a very pleasing result is obtained, especially if the colour complementary to the object be used. In this way the palate of the whelk (mounted dry) and most pollens, especially that of the Hollyhock, are very good with the blue background. The *Aetea anguina* on the red weed with the blue slide is very pleasing; a double contrast being obtained, the white zoophyte on the red weed and that on the blue background. By using the white slide, many "transparent" objects (illuminated as opaque) are seen very well, the appearance being similar to that when the white cloud illuminator is used. The black paper must, of course, be "dead." By alternating these slides the appearance of an object can be varied at pleasure. A revolving disc would answer this purpose. —*John Davis, Stowmarket.*

Removing Dried Cuticles.—The simplest and best manner is by ordinary maceration, which will be very easily accomplished. The plan I have adopted is as follows:—The leaves are placed in common soft water, in any kind of vessel that will allow of their being covered; they are then left for a week, or perhaps a fortnight, and if at the end of that time are not much more flexible, should the water be discoloured, I change it for fresh, and again leave them, looking at them from time to time to see how they progress. As soon as the leaves have the appearance of being "soaked" *through* with water, you will do well to try how far the process of maceration has gone on, which can be done thus:—Put your finger and thumb into the water, and, holding a leaf between them, begin gently to move the finger and thumb in contrary directions. If the object of maceration has been attained, it will now be found that the cuticles rub backwards and forwards, and at once you find that they are separated. If not, put them back into the water, and leave them again till you find they part from each other when rubbed as above described. The next process is to cut the leaf across the middle, and, by means of a sharp penknife, scalpel, or pair of fine scissors, cut open the edge, which is done in a manner somewhat in the fashion in which a new book is cut open. If they do not separate completely, they must be returned again to the water until they do. When separated (and the separation is best done in the water, and if the cuticle is a very thin one, it is almost an impossibility to divide the cuticles unless they are done underneath the surface of the water), if they are put in a large-mouthed bottle, and gently shaken about, the cuticle will often be found to require no further cleaning; but sometimes the inner tissues will stick to internal parts of the cuticle, and then it is necessary to gently float it out quite flat on a white plate or piece of glass; and then gently raising one end, so as to allow the water to leave it, a fine camel's-hair brush is very gently used to remove the decayed tissue adhering to it, which, with care, can be done. It is now rinsed in water several times, to get it quite clean, and finally floated on to the glass slide in scrupulously clean water, and left to drain quite dry, when a glass cover can be put over it, if dry-mounting will suit it; or any other style of mounting can be adopted, as the circumstances of the case may require. I have not had much to do with very old cuticles; but I imagine they only require more time and a greater amount of care. About six years ago, I had a leaf of one of the Cypripediums (*C. venustum*), which I intended for dry-mounting, and so put it in a drying-book to prepare it for mounting. Early this year I took it out, and, drying it in a cool oven for some evenings in succession, rendered the leaf *perfectly* dry. I now changed my mind; and, as most of the fine living colours were gone, I decided to get the cuticles instead. I found a very long time was required* to get these cuticles, and also more trouble to clean them; but at last I succeeded, and so, I presume, this will serve as a sample of what may be done with thoroughly-dried leaves; but it must be always borne in mind, some cuticles are very thin, and in those cases great care is required in the handling, as well as more patience in watching them during the process; for, in thin cuticles, it is best not to leave them in the water any longer than just to allow of the cuticles being separated, whereas in thicker kinds it is of no special consequence if the cuticles are left long after they are ready for mounting; although, as a matter of course, it is better not to do so. I have often felt great surprise that so simple a process should be so little known, and hope the few hints I have thrown out may be of service to young beginners.—*N. Burgess.*

Magnified Electricity.—At the last meeting of the Quekett Microscopical Club, a paper was read by Mr. Lewis on the "Microscopic Appearance of the Electric Spark," wherein it was shown that in passing a spark through paper or card, the orifice had a distinct pentagonal shape, more or less geometrical according to the direction of the spark.

GEOLOGY.

The Shale-heap.—Upwards of twenty years, to my knowledge, have gradually passed away since the hammer and chisel were first employed in foliating the black shale of our coal measure, to lay open to view the mutilated remains of fossil fish with which it is so pregnant. During this time many have directed their attention to this branch of geological science, but very little more than an elementary knowledge of it has as yet been obtained. To the enterprising scientific explorer who has time and opportunity at command, is opened a wide field for study in this branch of science. Although we cannot all be discoverers of new things, yet every one who has any taste for the subject may profitably spend part of his time in splitting this shale, for it offers the same advantage now as when it was first opened out. It is true a visitor may come to one of our shale-heaps and split away for almost a whole day without meeting with anything particular as a reward for his labour, but the next day might be amply repaid for his trouble.

I have carefully examined this shale, not only at this, but at most of the neighbouring collieries, and have found always the same kind of fossils. Sometimes they may be found in abundance, at others they are rare, thus proving beyond a doubt that the fish must have perished in shoals. It has been asserted by some that it can easily be known by looking at a piece of shale whether or not it contains any fossils. Than such a statement I think nothing can be more absurd; as well say, that by looking at the outside of a chest, its contents may be known. Nature is not so lavish of her secrets; if we wish to hold converse with her, we must open her leaves, or, in other words, split open the shale before we can know what fossils she has concealed there.

While examining through the microscope some polished sections of bone that I have taken out of this shale, I have detected teeth so very minute that to the naked eye they would have been quite invisible. Others that I have found and kept for my cabinet are about $1\frac{1}{4}$ inch in length, but those are exceptional ones; for it is a much easier task to find 100 small ones than to find one the length I have stated. All those teeth, when the shale is removed from them, present a most beautifully dark and shining appearance, showing very clearly their enamelled surface. I have found some very curious teeth in our shale heaps, with a large piece o enamelled-like substance at the point, which, when ground and polished, become an object of great interest to the microscopist. Jaws, Spines, Gancia Scales, or Scales with a hard and bright surface, and long pieces of bone, should always be taken; for a visitor to the shale heap may rest assured that they are not always to be found.

In a short time I shall be glad to exchange those fossils with any who may be desirous of doing so. In different parts of the country there may be a variety, and I shall most willingly "give and take" from any one who may feel disposed.

West Cramlington. John Sim.

Sandstone Markings.—Resting immediately above the Millstone Grit series, in the Pennine chain of hills, about four miles due east of Oldham, and displaying itself in the bed of a brook, is a stratum of dark argillaceous sandstone. This rock is thin-bedded, and very fissile. On the foliations are numerous labyrinthine "markings," that are evidently the work of an Annelid. I think they are not "worm-borings," in the meaning of that term as now understood—unless Palæozoic Worms had

* I think over three months, by far the longest time any cuticle ever took me to clean, *Yucca gloriosa* alone excepted.

different habits to their representatives of the present day; the direction of these borings being not at right angles to, but parallel with, the line of bedding. They are not, I think, mere "worm tracks" analogous to those we find on the last stratum of silt deposited by a recent freshet, or which cross our path in our country walks, after a night's rain. Certainly, their course is quite as intricate as the latter, and as difficult to unravel and follow. But here comes another important difference. These "markings" are in bas-relief; and a broken line shows, at the point of fracture, a compressed circle. Are they worm "casts"? They certainly bear some resemblance to the whorled heaps of earth which we see sometimes so conspicuous in our gardens. Or, are they still more nearly related to those numerous and beautiful rope-like coils of sand which seem so mysterious to the excursionist, when, for the first time in his life, he walks the wide-spread sea-beach, and which fall to atoms at his touch, leaving him wondering whence they came, and whither they are gone, and what strange law in Nature gave them being without organic structure, and form without flesh, blood, or bone? Can any of the readers of SCIENCE GOSSIP give me any clue to their ultimate relationships, or refer me to some work where their probable nature and character is described?—*Jas. Nield, Oldham.*

PHOTOGRAPHY.

A NEW PROCESS has been announced by Mr. William Firling, of Dorchester, by which a new kind of photograph is produced in porcelain clay. Gelatine plays a conspicuous part in this, as it does in nearly all the photographic improvements more recently introduced.—*J. W. W.*

A NECESSARY WARNING.—Mr. Carey Lea has called attention to a source of impaired health amongst photographers not hitherto noticed. All the blame is generally attributed to the fumes of cyanide of potassium; but when these are got rid of, as they can and always should be got rid of, there still remains an evil not so easily disposed of in the effects of collodion, the ether of which acts upon the system as a very powerful sedative, and in the course of time lowers the whole tone of the nervous system. In the process of coating a plate, nearly the whole of the ether in the surface of collodion escapes, and the remainder is afterwards given off, from the silver bath in which it is sensitized. The photographer's dark room must therefore be very soon filled with vitiated air, exercising a most injurious influence upon his health. The remedy is in a thorough system of ventilation, by which such mischievous vapours can be quickly and thoroughly carried away.—*J. W. W.*

PERISCOPIC PHOTOGRAPHY.—This name is given to a new invention recently introduced in Paris. Two portraits of one person are pasted together back to back, and being placed in the middle of a small angular cabinet, the interior of which is lined with mirrors, combine, so as to give a figure having apparent solidity. At present the published particulars are meagre, but the idea is, if well carried out, a very good one.—*J. W. W.*

AN INGENIOUS CONTRIVANCE.—The Hon. Mrs. Wood, in her elegantly illustrated little work on the wonders of the microscope, explains a mode of using the eye of a beetle for the purpose of observing the multiplied images of objects which are formed by being passed through the numerous lenses of the eyes of insects. At a microscopical conversazione held at Newcastle-on-Tyne, one of the most attractive objects exhibited was a portrait of Shakspere reflected through the numerous lenses of a beetle's eye. For the purpose of enabling the readers of SCIENCE GOSSIP who have not already tried the experiment, to produce a result analogous, which attracted so much attention, I shall describe as briefly as possible the arrangements necessary to produce the effect. An ordinary microscope, with a ¼ or ½-inch object-glass, is to be placed at an angle of about 45°, and on the stage of the microscope in an ordinary manner, place a well-prepared slide of a beetle's eye, showing the numerous facets. Focus for the object in the usual manner. Attach to the under side of the stage a kind of box resembling a stereoscope-case in shape, but open at that part in which the lenses of a stereoscope are fixed, the open end to be placed under and close to the stage of the microscope. At the other end of the stereoscopic case, where the obscured glass is generally fixed, place a sheet of glass with the portrait or design intended to be exhibited upon it; behind the portrait, and at a distance of about two or three inches, place a bull's-eye condenser, and behind the condenser place a lamp; the object being to throw as much light as possible on the portrait already referred to. Having got the apparatus so arranged, images of the portrait will be formed by each lens of the compound eye of the insect on the stage of the microscope. The images will be a little distance above the surface of the slide, and in order to see the multiplied images, draw the microscope slowly back until the numerous portraits formed through the eye of the beetle enter into the focus of the microscope, and then, instead of seeing the facets of the eye, the observer will perceive the images the illuminated portrait formed by each section of the compound lens within the field of view. Any kind of object may thus be exhibited increased one hundred-fold—portraits, views, chromatropes, &c.; and thus an endless variety of interesting objects may be introduced to our microscopic *soirées* during the ensuing winter.—*T. P. Barkas.*

NOTES AND QUERIES.

The Marine Aquarium.—About a year ago I started a Marine Aquarium, the water still remains bright and unchanged, but the pebbles are getting black. Will some one kindly tell me how to obviate this, and how I can clean them again? At first the anemones were difficult to feed, all not being expanded at once; but I got over this by "stroking" them to "wake" them up, and also by passing a stream of water into the tank through a garden pot half-filled with broken charcoal, and with a piece of flannel in the hole; the rejected particles of food (the flesh of an oyster or mussel well washed), the dust from the surface, or any sediment, or loose weed, I remove with a tube and pass the impure water through this little filter; which is placed on two sticks on one corner of the tank. One of the anemones has split pieces off itself several times, until it barely exceeds in size some of these pieces, since become anemones, and now it has moved quite out of the water on the top of the rockwork: if this is a bad sign I should like to know its remedy. I use pumice-stone for rockwork, cemented with Portland cement to a piece of limestone to keep it down, as it looks so rugged and is so light, and is very favourable to the growth of weed.—*C. A. J.*

Mounting in Balsam.—I find with Canada Balsam I am not much troubled with air-bubbles, which are generally considered the pest of the tyro in mounting, but I do find great difficulty in getting the balsam to harden. Some slides mounted in May were not to be trusted in this respect in September. Davies does not touch on this subject, and Wood, in his "Common Objects," seems to think that a night or two is sufficient to harden the preparation. The former author does not mention spirits of turpentine, but merely turpentine for soaking objects; but as the latter says spirits of turpentine I have always used it. May this have something to do with it? I bought the balsam at Steward's, in the Strand, last September. I may mention also that some gold size bought at the same time seems to have much the same qualities in the way of drying.—*James W. Impey.*

Cement for Marine Aquaria.—In answer to "F. E. W. K." in last month's Science Gossip, I can recommend the cement composed of white-lead, red-lead, and litharge mentioned in the February number of the Science Gossip. This will resist the action of salt water. Putty is by no means a good cement, and I fancy that, had the fresh water been allowed to remain in the tank some time longer, it would have found its way out as the salt water did.—*A. B., Glasgow.*

"As Dead as a Herring."—Why *a herring?* Do the members of this family die very quickly when taken out of the water?—*W. F.*

Scarcity of Lepidoptera.—I have found this season a very unprolific one in the above order of insects, and continually receive complaints of the same from my correspondents. How can we account for such a paucity?—does it arise from the continued rains of last winter, or was the temperature of the past summer not high enough to bring many to perfection? Many of the *Hymenoptera* require a high temperature for their development; and the Lepidoptera, in some respects, resemble their stinging relations.—*G. B. C., Ringwood.*

Cats and Young Birds.—It is commonly thought that cats *abstain* from taking young birds out of the nest till they are just ready to fly, that so they may have a larger, if not a choicer meal. This *may* be so, but is it not more likely that the young birds in their efforts to fly *discover themselves* to their enemies? I have heard of cats visiting nests every day, till they thought it unsafe to wait any longer; but being rather sceptical as to the self-denial of cats, I shall be glad if any of your readers will give me the results of their experience.—*W. F.*

"Wanted to Kill.—If "H. M." will cut a few large potatoes in half, scoop out the centre, and place the cups so formed inverted in the places frequented by the woodlice, I think he will find good sport whenever he examines them.—*W. T., Suffolk.*

A similar plan is recommended by "W. K. Bridgman" and "W. B."

Nidification of Rarer Birds.—In answer to "J. S.," the common and Honey Buzzards, as well as the Marsh and Hen Harriers, breed in the New Forest *sometimes;* but I have never been able to obtain eggs of either species. The ash-coloured Harrier also has been shot or trapped; but I never heard of an instance of its breeding there. I know a gentleman who obtained one egg and one young bird of the Honey Buzzard last season. I have occasionally seen a mature specimen of the bird, which makes a sort of quick whistling noise as it flies, which it generally does at a considerable altitude. I was informed by a gamekeeper some time ago, that they had received orders to protect both birds and eggs of all the Buzzards; but whether the statement is correct or not, I am unable to say.—*G. B. C.*

Probable Hybrid.—The other day, a gamekeeper brought me an animal which he called "a curious rabbit," and which he had trapped the night before. It is rather larger than a full-grown *wild* rabbit, and is of a pale *yellowish-brown* colour, with head rather large, and ears small in comparison. I suppose it to be a hybrid of a rabbit and a hare. Is such a thing of common occurrence?—*G. B. C.*

Taxidermy.—To a lover of ornithology, it frequently happens that a practical knowledge of Taxidermy is of great use and benefit. I am a mere beginner of both, consequently have very much to learn; and knowing that some of the readers of Science Gossip are "old and well-experienced hands" in the art of preserving specimens, and also acting upon the theory that "a fellow-feeling makes us wondrous kind," I beg to ask my older brethren the following questions:—If *moths, mites,* or "acari" attack a bird after it is stuffed, how can they be *effectually* destroyed, or is it possible to preserve the bird so that those insects will not attack the feathers? I have seen uncased specimens of birds which for years have been quite exposed to moths, &c., but they were in as perfect a state of preservation as when first mounted. How is it done?—*G. B. C.*

Mounting Objects.—Would any of your correspondents be kind enough to inform me as to how to mount objects for the microscope in Canada Balsam, which have been previously steeped in liquor potassæ, without the milky appearance which is produced on the application of the object to the balsam, as I have tried washing in clean water and all other ways that I can think of to do away with it, but without any effect.—*T. B. N.*

A Recipe for Murder.—"H. M." must get a few flower-pots, fill them with moss, and invitingly introduce a few pieces of raw carrot into them; the woodlice will go there to feed, for they prefer this vegetable to all the fern-roots in creation; and all "H. M." will have to do, will be to take a kettle of *boiling* water out in the morning to his fernery, and give his pests an efficient hot bath. Should it be possible to pour boiling water under the blocks and stones of the fernery, without injury to the ferns, it would be advisable to do so.—*H. E. Watney.*

Pygmies of Malacca.—I think "W. T. H." will find all he wants in a work published by Murray, and entitled "Our Tropical Possessions in Malayan India," by Cameron. The wild and dwarfish tree-dwelling race which he speaks of as inhabiting the interior of the Malayan peninsula is probably the aboriginal race of the country, and a branch of the Alforas, Negrittos, or Oceanic Negroes, as they are sometimes called. This black race is spread over a vast area, extending from the Andamans in the west to the Fiji archipelago in the east. It is, or was, found in the interior of the large islands of Luzon, Ceram, Celebes, Papua, Australia, Tasmania, and New Ireland, as well as in the smaller archipelagos of Melanesia and Western Polynesia; seemingly driven from the shores of the East Indian islands by the superior ferocity and prowess of the Malays. Of course the Fijians, Papuans, and Australians are very different from the physically-weak and diminutive Alforas proper; but all these are, as a rule, of a colour very nearly black, and probably derive their superior stature and courage from a slight admixture of Malayan blood. The extent of territory covered by this race, in all its ramifications, is far wider than seems apparent at a cursory glance. We can hardly imagine that the dwarfish savages of the Andamans, and the black tribes in the islands of Hainan and Formosa, in the China Sea, established themselves in these seats by conquest, and in the face of the powerful and semi-civilized Hindus, Chinese, and Burmese. We seem then irresistibly forced to the conclusion that they are a remnant of the original population; in short, that the Oceanic Negroes, at a remote epoch, formed the population of South-eastern Asia. Again, it is not generally known that the missionary Taylor has discovered in the legends of the Malayan Maoris most positive proofs of a prior occupation of the three islands of New Zealand by a black people—a branch of the Alforas—now only surviving in the Chatham Islands, at a short distance from their coasts. This important fact, tending to connect the original population of New Zealand with those of Australia, the East Indian islands, and Southern Asia itself, he records in his interesting work on "New Zealand and its Inhabitants." The islands of Eastern Polynesia are now exclusively inhabited by tribes of Malay origin; we may premise, therefore, that the Alforas never reached so far eastward as this, or else have been exterminated, as is happening in Luzon, Ceram, &c., at the present time. A rather curious field for conjecture is opened at this point by the fact recorded by the Spanish conquerors, that they found a sooty-black, taciturn, and forest-dwelling race, utterly dissimilar to the typical copper-coloured American of both continents, dwelling in Paraguay and Chili, at the time of the conquest. Unfortunately, these Charruan Indians, as they were called, have been entirely exterminated, so that we cannot ascertain, for certain, whether the Oceanic Negroes did not extend into South America itself!—*F. A. A.*

Snakes in Yorkshire.—The common snake is to be found in great abundance in some parts of the East Riding, and is met with frequently, by those who seek it, in the North Riding. I had two brought to me this year: they had been beaten to death by sticks. A few years ago, in pulling a manure-heap to pieces, a barrow-load of eggs was obtained. The heap had stood some years in a private lane, and would contain 300 loads of litter. —*Jno. Ranson, Linton-on-Ouse, York.*

Hybernation of Toads.—A few years ago, in removing the trunks of some felled trees, I found some toads in a state of hybernation. They had hollowed a small hole in the soil, which was lined with grass, and a quantity of dried grass had been heaped over the hole, and into that the toads had crept, being completely covered with it. Last year, one hybernated in a hole in an old stump, the mouth being covered with dry grass; and another under a tile in my garden. They invariably, as far as my experience goes, make a slight depression in the soil in which they lay. Sometimes their backs are below the surface of the ground.—*Jno. Ranson, Linton-on-Ouse, York.*

Flint Flakes.—I have collected in various localities around Belfast some very excellent specimens of the now celebrated flint flakes. In some places, as at Toome Bridge, on the river Bann, co. Armagh, they are found in great quantities and very well formed. I have found them also in the gravel on the banks of Lough Neagh, near Lurgan; and also in the raised beach gravel at Larne. They occur in several other places, and may be collected in the fields under cultivation. I shall be very happy to exchange specimens with any other collector.—*William Gray, Mount Charles, Belfast.*

Cement for Aquaria.—"S. S." recommends Collins's Patent Elastic Glue for securing glass sides of marine aquaria.

Ticks on Puffin.—In June last I shot, at Skomer Island, Pembrokeshire, a puffin with a number of large ticks, similar in size and appearance to ordinary dog ticks, firmly attached to the side of the head. Is this a common occurrence? I have seen many hundreds of puffins, but never observed it before.—*E. K. B.*

A parasite of this bird, named *Docophorus celidoxus*, is given in "Denny's Monograph," p. 77. —*Ed.*

Cynophallus caninus.—I do not know if this fungus has been *generally* noticed this year, but my old friend John Lloyd sent me some beautiful specimens of it, gathered by him in the neighbourhood of Wandsworth. I shall not despair of seeing this rare fungus in our garden; the other (the larger and more common) species we have here already, and it is more or less abundant in the neighbourhood every year.—*W. P. Llandderfel.*

It appears to be more common than usual this year.—*Ed.*

New Condensor.—Mr. W. Hislop has produced a new condensor, which, we are informed, is everything that a microscopist can desire, and performs its work admirably.

CROSSBILLS (*Loxia curvirostra*).—During the month of August I obtained four specimens of this curious bird, shot within a short distance of this town; two males, one female, and one a young bird of this year.—*J. W. L., Kington, Herefordshire.*

NEST OF THE BULLFINCH (*Pyrrhula vulgaris*).—Your correspondent W. R., in No. 21 of SCIENCE GOSSIP, says, rightly, "There seems to be a strange uncertainty amongst ornithologists respecting the nest of the Bullfinch." The Rev. J. C. Atkinson, in "British Birds' Nests and Eggs," says: "The nest is made of twigs and roots and moss, rather loosely constructed." Bewick gives "moss." Hewitson says, twigs, with a lining of wool and hair. Bechstein, twigs covered with moss; your correspondent, W. R., "small twigs lined with fibrous roots, and occasionally a few hairs." Newman, "the dried stems of cleavers, fibrous roots, &c.; very slovenly in structure." The &c., which is very unsatisfactory, is not mine. In a note on this description (*Zoologist*, 7,640), Mr. Crowley, of Croydon, writes: "Most—I believe all—I have seen are well lined with horse-hair. I have one, the outer structure of which is almost entirely sheep's wool." Martin, in "Our Song-Birds," says: "The nest is composed externally of the stems of grass, wool, moss, and the *deserted cocoons of insects;* internally it is lined with fibre and hair." Dr. Latham says: "She rarely uses moss." Within the last few days,—indeed since the publication of your September number, I have carefully examined four nests,—two in the cabinet of a friend and two of this year's nests fetched out of the wood. In three the foundations of the nests were twigs of the larch, and in the fourth twigs of birch, both of which are common here. Upon the foundation is a basket-worked nest made of grass roots (chiefly bent), of a slovenly construction. In none of the four was there the least trace of wool, moss, hair or feathers; and the whole were lined with fine grass. The whole of the nests were slovenly built, and had an unfinished appearance, being very slightly hollow, so much so as to entitle them to be classed with the platform-builders. The two plantings from which these nests came are surrounded by fields in which horses and sheep graze; and in the hedgerows and brambles, locks of wool often hang for weeks; so there is no lack of these materials. I have seen nests with both wool and hair in the lining, but feathers never. — *John Ranson, Linton-on-Ouse, York.*

GRAND LORY.—Several species of parrots receive the name of Lory; but the *Lory, par excellence,* which is probably the bird referred to, is the *Lorius domicilla,* a native of the Moluccas. A detailed description and figure of this bird may be found in "Knight's Cyclopædia of Natural History," vol. iv., article "Psittacidæ."—*T. G. P.*

BLUE BIRD OF GALILEE.—H. G. inquires as to this bird, mentioned by Renan. The bird that learned author probably refers to is *Cinnaris osea,* the Sun-bird or Honeysucker of Palestine. — *T. G. P.*

CEMENT FOR AQUARIUM.—In answer to F. E. W. K., I can inform him that I had an aquarium for sea-water which leaked a good deal, and I used Roman cement, and was not troubled afterwards. After it has hardened, a little fresh water should be put in for a few days.—*E. T. Scott.*

NAMES OF BIRDS.—Can you give me any information about books containing the history, haunts, and habits of the following birds:—"Cordon-blene," "Wax-bills," or "Avadivats?"—*H. M. M., Boulogne.*

NEUTRAL TINT REFLECTOR.—This contrivance is undoubtedly the most comfortable, as well as the cheapest, instrument for making drawings of objects under the microscope. It has the difficulty mentioned by your correspondent C. S. Gardner, in common with the camera lucida and other instruments of the kind, of rendering both pencil-point and drawing invisible, unless certain precautions are taken. My own practice is to use *two* lamps, one for the illumination of the microscope, the other for the drawing-paper, which I prefer in the form of a block or solid sketch-book. The illumination of the object should be as slight as possible, only just enough to render it visible; the paper, on the contrary, should be well lighted: this will generally render the process of tracing the outline very easy after a little practice. No more should be attempted with the reflector than to sketch the outline and main points; the detail must be executed afterwards by free-hand drawing. These remarks apply to drawing instruments in general as applied to the microscope. The tinted reflector I use is supplied with several glasses of different shades, which can be changed at pleasure, as I find that work can be done more easily by such an arrangement: the darker glasses give a more brilliant image; the paler ones allow a clearer view of the pencil-point and drawing. The distance between the reflector and eyeglass should be as small as possible; otherwise, with deep eye-pieces, the field will be much cut off, a very common fault in this instrument as usually made. I also employ a right-angle prism, sliding into the place of the tinted glasses: this gives a total reflection, and enables the detail to be finished by free-hand drawing without moving the microscope. The view obtained by the prism is nearly as perfect as that by direct vision. It also prevents the embarrassment felt upon using the microscope after the tinted mirror has been removed to finish the drawing, caused by the reversal of the object, as the tinted reflector has not, as the camera lucida, a double reflection giving an erect image. Mine was designed and made by Mr. Bailey, 162, Fenchurch Street, E. C. It is also made by Mr. Collins, 77, Great Titchfield Street, W. The camera lucida is somewhat more trying to the eyes, but is perhaps to be preferred on account of its more brilliant reflection when drawing from an object illuminated by reflected light or the parabola; for objects illuminated by transmitted light, I decidedly prefer the neutral tint or Beale reflector.—*W. T. Suffolk, F. M. S. L.*

NIDIFICATION OF RARER BIRDS.—In reply to your correspondent "J. S." respecting the common and Honey Buzzard, Marsh Hen, and ash-coloured Harriers, I beg to say they all frequent this part of the New Forest, although their eggs, with the exception of the common buzzard, are extremely rare. The eggs of the common and honey buzzard are taken in this neighbourhood nearly every year. I have a female honey buzzard and two young birds, not fledged, preserved, together with four eggs, all taken in this neighbourhood this year. I also have a fine living specimen of the female Hobby, very tame, taken here this season.—*F. W. Haydon, Fordingbridge.*

Migration of Swallows.—In your number of June 1, 1865, I asked a question about the advent of Swallows to Europe, which has not been answered as yet by any of your correspondents, but which I am able now to reply to myself, and this extract from the *Jersey Times* will satisfy your readers as to the return route of the Hirundines Africawards; whilst, as to their advent in Europe, I may state that, on the 2nd April of this year, I saw flights of Swallows high up in the air wending their way across this island to the same point of the compass (Hampshire) as that from which they were evidently coming when on their exodus route thence on 27th October, ult., as stated in the newspaper paragraph by me. As these two observations of mine are of very great importance to all Ornithologists, I hope you will give this a place in your serial, for it tends to clear up a good deal of the mystery hitherto attaching to the migration of Swallows annually.—*H. E. Austen, Lieut.-Colonel, Unattached, and M. B. M. S.*

N. B.—The total distance to be travelled by the Swallows, from the Isle of Wight to Timbuctoo by the route suggested here by me, is 2,350 English miles.

"The Swallows from England returning to Africa.—It was my good fortune last spring to see the advent of the Swallows, as they crossed over Jersey Englandwards; and it was equally my good luck, last Thursday afternoon, to witness a long and large flight of Hirundines just about to cross the sea at St. Clement's Bay in their flight towards France. It was raining at the time, and my wife and I were taking shelter there from the shower, and happening by mere chance to look up at the clouds, to see what probability there was of their clearing off, we perceived, at a great height, and above the stratum of nimbus apparently, a long straggling flight of Swallows, all following in one and the same route, at the rate of 30 or 35 miles an hour, in a course due S.S.E., as I verified by a rectified compass-bearing subsequently. Now this course I have traced on a map of France, on a large scale, and I find it would lead these emigrant Swallows over that belt of French country comprised respectively between Nantes and Saumur, on the Loire, Fontenay and Poitiers, Cognac and Bellac, Toulouse and Rodez, and, finally, between Perpignan and Narbonne. Here, I fancy, they would turn the Eastern flank of the Pyreneean chain, at Ceret and Port Vendre, and thence, skirting the Spanish shore, wend their course towards that part of the African coast which lies between Oran and Algiers, and so reach, finally, their winter quarters, south of the Atlas range, amid those genial oases of intertropical Africa, where they will build nests, and rear another brood, as well as moult, before these sweet harbingers of the European summer revisit our shores again. The late very heavy and continuous rains in the West of England have, no doubt, accelerated the exodus of these birds, and I expect to find that the Jersey Swallows will follow suit next week.—*A Field Officer and M. B. M. S.*"

Sanguinaria.—The "Sanguinaria" of the "Brazilian Sketches" (p. 239 of Science Gossip), is probably *Poinsettia putcherrima*, a magnificent plant common enough in our stoves, and flowering through the winter. I expect to have at least half a dozen in full glow in about a month from this time. The branches are terminated by a flat radiating crown of ovate leaves (bracts) of glowing scarlet, the whole as large as the area of a dinner-plate, or larger. From the centre of this disc proceeds a cluster of small orange-coloured flowers, which may be compared to cups. Poinsettia, too, is a genus of tropical America.—*P. H. Gosse, Torquay.*

Asphalt Varnish.—I also have tried to make the asphalt and India-rubber varnish as recommended by Mr. Davies in his book, but with no better success than "J. H. McK." I did, as Mr. Davies tells us, procure the best asphaltum and the best mineral naphtha I could obtain, and used the same quantities he gives. I first pounded the asphaltum and put it into a stoppered bottle with the naphtha, and let it stand for two or three days, but the naphtha merely got discoloured; I then submitted it to heat—in fact, almost boiled it,—but with no better result. I have had some in a stoppered bottle for about four months, and there is no appearance at present of its being dissolved. I have, since I failed in that experiment, tried one of my own, which has answered my purpose very well for mounting in fluid. I dissolve the asphaltum in turpentine, and the India-rubber in mineral naphtha, and mix; if it gets too thick in working add turpentine. It makes a very adhesive cement, and, with baking a short time, sets very hard. If "J. H. McK." will send me his address I will forward a slide put up with my varnish, when he will be better able to judge of its quality.—*J. R., 2, East Cottages, Willington Road, Clapham, S.*

For Dissolving India-rubber, *coal* naphtha must be used, as the common wood naphtha is useless for the purpose.—*W. K. Bridgman.*

Asphalt Varnish.—If "J. H. McK." will break up his asphaltum into a fine powder, put the bottle containing it and the naptha into a water-bath, and heat it up to about 190°, the asphaltum will readily dissolve. The difficulty I experienced with Mr. Davies's receipt was to dissolve the India-rubber, which baffled all my efforts, only swelling to a jelly-like mass, and compelled me to procure it in a dissolved state from the makers of India-rubber goods. Mr. Davies has written a very useful book; but how to make up such compositions as the above requires a little further instruction. Nor would it be easy to dissolve arsenious acid in water, as named in another place.—*E. G. M.*

Mounting in Balsam and Chloroform.—Can any readers who have had some experience in the matter say if the majority of objects mounted in balsam and chloroform keep as satisfactory as if mounted in balsam only? If so, all need of heating-apparatus is at an end, and mounting in balsam made easy, the convenience of using it, thinned with the chloroform, being very great. Two or three delicate objects may even be laid, side by side, on a slide, the cover put on, and the mixture (a drop being put on one side of the cover-glass) allowed to flow under by capillary attraction, without disturbing the arrangement of the objects. My experience of mounting in balsam confirms the remarks of your correspondent, "T. B.," pages 175 and 209. Following the directions there given, there is little fear of air-bubbles remaining after the slides have been mounted a few days, particularly if the balsam is thin enough to use cold, as advised by Mr. Brittain. Unfortunately, however, it will not remain long in this state, but soon gets too thick; but if it may, without disadvantage, be thinned with chloroform, the great desideratum is gained.—*E. G. M.*

NOTICES TO CORRESPONDENTS.

J. S. S.—We do not imagine that any different process is required to anatomize poppy capsules or other seed-vessels from that employed for leaves, except a little additional patience and perseverance.

J. A. is advised for the future to adhere to his own initials, as we have a particular objection to false names or initials, or fancy signatures, as they occasion us so much trouble to trace to their owners in the event of our desiring to communicate with them at a future time.

L. S.—The Coccus is a species of *Lecanium*. The descriptions of the species of *Coccidæ* are in general very slight, and in most cases it has not been ascertained whether one species feeds on different kinds of plants. No species has been mentioned as feeding on the *Helianthemum*. This *Coccus* may be named provisionally *Lecanium Helianthemi*.—*F. W.*

W. M. C.—Stainton's Manual, at 10s., is partly illustrated. The Butterfly Number, often alluded to by us, gives woodcuts of all the British Butterflies; and many of the Moths are figured in subsequent numbers of "Young England." Otherwise, there is no thoroughly cheap work with all the species figured. One good book is of more service very often than several cheap ones.

J. H. C.—Letter addressed to you 18, Buccleugh-place, returned "not known."

Y. Y., C. B., A. L., T. H. W., Ryde.—Correspondents must submit to the inconvenience of not having their queries answered, if they reverse their initials, or employ imaginary ones. We cannot keep a register of signatures, and it is essential that *we* should at any time be able to recognize the name and address of a writer from his initials.

J. B.—There is no recent work such as you name on "British Mosses." It is a desideratum.

A. L.—The works named are scarcely of any service.

Leeds Field Naturalist's Club.—Address, W. Todd, Hon. Sec., 31, Fenton-street, Leeds.

E. F. W.—Probably of Mr. King, Portland-road.

A. B.—Entomological pins may be had of How, Foster-lane; Cooke, 513, Oxford-street; Gardner, 52, High Holborn, &c. You must state what branch of Entomology you intend to study before we can name the work.

W. A.—Because your lenses are not achromatic, for which the only remedy is to replace them by achromatic lenses.

M. A.—"Record of the Great Exhibition, 1862," in "Practical Mechanics' Journal," p. 578; "Popular Science Review," No. 12, 1864; contain accounts of Aniline Dyes.

G. C.—It is *Thelephora laciniata*.

M. D.—No specimens of British Sphæriacei are published, except those contained in Fasc. II. of "Fungi Britannici." Others will appear in a future Fasciculus.

S. S.—We cannot insert your "Exchange."

G. R., A. B.—We cannot afford space to offer for exchange objects so easily obtained.

E. W.—Peeling it for their nests.

R. F. B.—We do not venture guesses. Send specimen.

E. F.—We cannot give so much space as an answer to your queries would require.

W. H. H.—We received the letter, but not the specimen.

E. D. B.—Your wasp is *Crabro cribrarius*, one of the aculeate Hymenoptera.—*F. W.*

Fairy-rings.—"W. R." doubts the cause of Fairy-rings, as stated in our last number. We respect his doubts, but are not convinced.

W. R.—A young state of *Phallus impudicus*, on heather—*Diderma vernicosum*.

H. G. W. A.—No. 1. *Nectria cinnabarina*. 2. *Tubercularia vulgaris* and *Nectria coccinea*. 4. *Stilbum aurantiacum*.

B. (Melle.)—Evidently an omission. All orders or communications relative to supply should be addressed to the publishers. Science Gossip is *now* "registered for transmission abroad" as a newspaper.

R.—No. 1. *Dothidea Ulmi*. No. 2. *Hendersonia Oreades*. No. 3. *Uredo Potentillarum*.

M. C. S.—No. 1. *Clavaria cinerea*. 2. *Clavaria inæqualis*. 3. *Agaricus laccatus*. 4. *Geaster hygrometricus*.

C. F. W.—It is of no use to insert the observation, unless the species is first determined.

A. W.—The moss is *Mnium undulatum*, Hedw.

W. W. D. (New York.)—No. 29. *Uredo solidaginis*, Schw. No. 30. *Sclerotium scutellatum*. No. 32. *Rhytisma acerinum*. No. 44. *Puccinia Circeæ*. No. 46. *Polythrincium trifolii*. No. 49. *Dothidea graminis*. No. 50. *Uromyces scutellata*. No. 51. *Uromyces Arisemæ*.

G. B.—The stalked eggs of the lace-wing fly.

J. G. T.—Your fly is *Eristalis tenax*, order *Diptera*, family *Syrphidæ*.—*F. W.*

J. A.—The Blindworm hybernates like other reptiles, and will therefore require no food in winter.

R. M.—The fungus is *Spumaria alba*. See "English Flora," vol. v. p. 309; Sowerby's "Fungi," plate 280.

E. T. S.—On oak leaves, a species of *Septoria*.

E. B.—Naming would not be satisfactory without rearing the perfect insects.

Wrong Address.—Mr. J. G. Marsh complains that we inserted his address with a wrong number: it should have been 842. If any one wrote for exchanges, they will please accept this as a reason for receiving no reply.

E. G. W.—The Hepaticæ number may still be had. Your water-flea may differ from *Daphnia pulex*; but we would not venture an opinion from a rough sketch, in which some important features are scarcely indicated.

H. P.—"Knight's English Cyclopædia," Bailey's "Central America," &c.

G. S.—"Ward on Growing Plants in Closed Cases" is published by Van Voorst, at 6s.

Rare Birds.—A letter for J. S. awaits his address, which has been mislaid. Communicate with the Editor.

H. H. B.—The grass is *Digitaria sanguinalis*.—*W. C.*

W. H. T. N.—The ferns are:—1. *Lastrea dilatata*; 2, 6. *Cystopteris fragilis*; 3. *Lastrea spinulosa*; 4, 5. Seedlings of *Lastrea filix-mas*.—*W. C.*

Herbarium Labels.—If A. D. M. will apply to Dulau & Co., 37, Soho-square, he will obtain what he requires.

W. W.—"Gardner's Taxidermy" is 1s. 6d., and may be had at 52, High Holborn.

EXCHANGES.

Clear-wings.—*Sesia tipuliformis* offered for any other British species, except *S. bembeciformis*.—G. T. Porritt, 8, Clare-hill, Huddersfield.

Saxifrages.—*Saxifraga cernua*, *rivularis*, *hirta*, *elongella*, or *palmata*, wanted for Alpine or Pyrenean plants.—T. Howse, Garrybank, West-hill, Upper Sydenham.

Foraminiferous Sand from the Adriatic.—Send stamped envelope to J. H. C., Royal Infirmary, Edinburgh.

Flying-fish Scales.—Send stamped envelope to J. A. Perry, care of the Editor, 192, Piccadilly.

Tongues of Limpet (*Patella*), unmounted, for any other objects of interest.—W. Spicer, Itchen Abbas, Alresford.

Maiden-hair Fern.—Fronds sent on receipt of stamped envelope.—A. Badger, 1, Grange Cottage, Eccleshall.

Foraminiferous Sand from Turkish coast.—Stamped envelopes to T. Armstrong, 88, Deansgate, Manchester.

Deutzia scabra (leaves) for hair of Bat or Otter.—J. R. C., Westfield Cottage, the Mall, Newport, Isle of Wight.

Mollusca, British land and freshwater, offered for other species of the same.—W. H. G., Verum Cottage, Thornhill-road, N.

Microscopic Objects (mounted and unmounted), offered in exchange. Hairs especially wanted.—Send lists to G. Potter, 7, Montpelier-road, Kingsdown-road, Upper Holloway.

Small Red Sea-weeds wanted for mounting for microscope. Good slides offered in exchange.—Thos. Sharp, Ackworth, near Pontefract.

Injections, rare ferns, and hairs (mounted) offered for mounted Polycystina, Foraminifera, or Diatoms.—G. H. Betts, M.D., St. John's Park, Upper Holloway.

Minerals offered for fossils or sea-fowl's eggs.—R. J. Johnson, Howard House, Harrow-on-the-Hill.

Minerals and Fossils for British Lepidoptera.—J. G. Marsh, 842, Old Kent-road, London.

British Birds' Eggs and British Ferns and Lycopods for other Eggs and Ferns.—James W. Lloyd, Bridge-street, Kingston.

BOOKS RECEIVED.

"Journal of the Transactions of the Victoria Institute." Vol. i. No. 2. Hardwicke, 192, Piccadilly. 1866.

"The Popular Science Review." No. 21, October, 1866. London: Hardwicke.

"Notice sur les Collections Scientifiques et sur le Musée, Commercial-industriel, Maison de Melle, Belgique. Gand. 1866.

"The Quarterly Magazine of the High Wycombe Natural History Society." No. 2, October, 1866.

Communications Received.—N. B.—W. E.—T. H. W.—G. T. P.—J. B.—G. B. C.—H. H.—F. S.—M. A. C. P.—H. E. A.—W. W.—J. McI.—E. T. S.—J. B.—H. T.—H. E. W.—P. H. G.—W. T.—W. T. S.—J. R.—F. A. A.—A. B. C.—E. F. W.—T. P. B.—A. B.—J. L.—J. M.—E. M. H.—E. D. B.—T. H.—J. H. C.—G. G.—T. G. P.—F. F. M.—W. A.—G. C.—F. T. M.—E. P. C.—E. H. R.—W. J. P.—J. B.—J. N.—J. J. R.—J. A. P.—C. A. J.—C. D.—W. S. G.—B. (*Melle.*)—T. B. N.—W. R.—W. F.—T. S.—W. S.—H. C. B.—S. S. L.—S. H.—A. B.—R. F. B.—W. R.—P. A. J.—Ryde (no name or address).—E. F.—P. S. B.—J. G. T.—W. H. H.—C. B.—T. A.—W. S. S.—W. H. G.—M. C. S.—E. B.—H. P. A.—H. S.—C. F. W.—G. S. A.—E. G. M.—J. R.—J. D.—J. R. E.—A. B.—W. P.—M. B.—A. W.—J. W. E.—W. K. B.—G. P.—T. B. W.—H. S.—T. R.—H. H. K.—J. N.—G. E. B.—H. W. K.—G. B.—G. S.—W. B.—E. K. B.—W. G.—T. S.—A. L.—E. G. W.—G. H. B.—F. W. H.—H. P.—R. J. J.—J. A.—J. G. M.—W. C.—M. M.—A. J. S.—R. R. L.—A. M. P.—R. S. O.—J. P. (nothing uncommon).—T. B. R.—C. F. W.—E. S.—J. P. (Manchester.)—J. W. L.—C. S.—M. H.—W. P.

THE EMPTY CHAIR.

"There is no flock, however watched and tended,
But one dead lamb is there!
There is no fireside, howsoe'er defended,
But has one vacant chair."

LONGFELLOW.

THERE was an old custom, still extant in some remote localities, when the family and friends assembled around the Christmas hearth, to place an empty chair in honour of any one of the number accustomed to meet together at that season, who had gone to "the silent halls of death" since the last annual gathering. The course of time has brought us towards the close of another year, and it behoves us to look about us and see what friends are missing; and we would fain, although it may be in sorrow, arrange for the absent one an "empty chair." It may be that some of us will have to wipe away the starting tear as we attempt to perform this last office for some missing member of our own household. But there is a larger family which concerns us most in our editorial capacity, and, forgetful of personal friends and ties of kindred, it becomes our duty to gaze around that larger circle in which the bond of kindred pursuits has united us, and ascertain for whom it is that we must place the "empty chair."

In recounting the losses which Natural Science had sustained at the close of last year, we had to grieve over a long array of names well known and highly esteemed—the representatives of veterans who had finished the fight and gone to their rest. On the present occasion the number is less; and we have to congratulate ourselves that in the foremost ranks of scientific men, in our own country at least, death has been less busy than in the preceding year. There are, nevertheless, two or three whom we cannot fail to remember; and for them we may, in imagination, place the "empty chair."

On the 15th of May Dr. W. H. Harvey, the eminent authority on seaweeds, finished his career at Taunton. "From a very early period he manifested an ardent love of plants; and the fact of his father's family frequently spending a portion of the summer at the seaside, generally at Miltown Malbay, on the coast of Clare, Ireland, afforded him great opportunity for the indulgence of his taste for natural history. This bold and picturesque coast, open to the mighty roll of the Atlantic, abounded in those marine plants which in after life became his special study."* At first he pursued almost simultaneously the study of seaweeds, mosses, insects, and shells. Whilst still a youth, he discovered a new freshwater shell in the mountains of Killarney and a habitat for the rare little moss, *Hookeria lætevirens*. The latter circumstance brought him into correspondence with the late Sir William Hooker; and encouraged by that lamented botanist, he devoted himself thenceforth almost exclusively to the study of plants. A government appointment at the Cape of Good Hope in 1836 enabled him to prepare himself on the spot for a work on the "Genera of South African Plants;" and on his return to England he ultimately became Professor of Botany in the Royal Dublin Society, an office which he continued to hold till his death. In 1849 he visited the United States and Canada, and in 1853 Ceylon and Australia; and in 1856 was

* *Gardener's Chronicle*, June 9, 1866.

appointed Professor of Botany to Trinity College, Dublin. The most important of his works are "Phycologia Britannica," "Phycologia Australica," "Flora Capensis," and "Nereis Boreali-Americana." He also produced other useful books, and many valuable contributions to periodical scientific literature. We could also add much concerning the excellent personal qualities which endeared him to all who knew him. May a double portion of his spirit descend upon his successors!

Another good workman in Cryptogamic Botany has been lost to us in Dr. R. K. Greville, who for more than forty years contributed largely to our literature in Fungi, Algæ, and other of the lower orders of plants. In 1823 the excellent "Scottish Cryptogamic Flora" was commenced, and its faults are those which are more to be attributed to the imperfect condition of microscopes in those days than to any shortcomings in the author. In 1824 his "Flora Edinensis" was published, and during his later years the earnest and indefatigable manner in which he applied himself to the study of the Diatomaceæ may serve as a lesson to more sluggish spirits. The facility with which Dr. Greville could employ the pencil increased the value of his communications, and enhanced his fame. Whoever has had the opportunity of examining his drawings prepared for the "Scottish Cryptogamic Flora," and the exquisite delineations of Diatoms which were the work of forty years later in his life, will admit that the power was not in the least diminished by age. His large and valuable collection of Diatomaceæ, including the typical specimens, and a few original drawings, have been added to the Botanical Department of the British Museum, where they are associated with Professor Smith's Diatoms, and constitute a rich and rare collection of these curious organisms.

On the Continent, Botanical Science has also suffered many severe losses. Of these we may name Dr. Camille Montagne, a most indefatigable French Cryptogamist; Don Vicenze Cutanda, Professor of Botany in the University of Madrid; Dr. Von Siebold, the Japanese Traveller; Dr. Gasparrini, of Naples; Dr. Mettenius; and Dr. Schlechtendal, for many years associated with the "Botanische Zeitung" and the "Linnæa." It is a fact worthy of notice that the mortality amongst Botanists of celebrity has been greater of late than amongst any other scientific men.

And, in conclusion, we cannot refrain from adding another name—of one who, as an honest and earnest worker, may well be placed in connection with men of greater pretensions and wider fame. To some, perhaps, the name of Richard Beck is unknown, or known only as a "maker of microscopes." In such a character others may soon fill his place; but as a patient and unassuming labourer with the microscope, he lived respected and died lamented. The contributions scattered through the *Quarterly Journal of Microscopical Science* represent but a very small portion of his work, since one continually meets with acknowledgments by other writers of valuable observations for which they were indebted to him; and when his labours "ceased in death," the structure of spiders was a subject to which he was devoting his energies. The last communication which appeared in print under his name was "On the Poison Fangs of Spiders," in this Journal (p. 201). It is well known that Mr. Beck was a strong advocate for the examination of objects by reflected light; and no one acquired a larger collection of apparatus and contrivances for the observation of opaque objects than himself, in which direction much of his ingenuity was employed. Those who knew him best appreciated him most, and amongst others the Quekett Microscopical Club reserves to his memory an "empty chair."

ANALOGY OF FORM.

THE study of Natural History is, I am led to believe, pursued by different minds in different ways.

Some men observe and collect various animals, plants, and stones, regarding them simply as certain links in a systematic chain more or less artificial, as individuals representing the abstract ideas wrapped up in the Latin names which a Linnæus or a Cuvier conferred upon them. They look but on the outer crust or shell, as it were, without investigating the organs and their functions. This I should call the *mechanical* mode of study.

Some men regard animals and plants only as far as they are of service in commerce, as yielding *produce*—in fact, as merchantable commodities; this I should call the *utilitarian* mode of study. Some men, going further than either of these, examine the works of nature, on the one hand, both in their relation to classification and their mercantile value; but, on the other hand, they do not neglect the study of the organisms as organisms—they anatomatize the various parts, and inquire into their functions. This I should call the *practical* mode of study.

Other men, however, look above and beyond all of these. While acknowledging the value of system, of agriculture and of anatomy, they regard the study of animals and plants as tending to something higher, as a means to an end; seeing in the observing of the created works a method by which they may contemplate the mind of the Creator; passing from inquiring into the functions of organs, to inquiring what are the laws which govern them; endeavouring to correlate the so-called vital forces with the purely physical agencies; ever striving to obtain a glimpse, however faint, of the great purposes for which the various created organisms exist and have their being. This I should call the *philosophical* mode of study.

Of the many curious fields of thought which this latter mode opens out to the inquirer, not the least remarkable is that connected with *form*.

Resemblances or *analogies of form* in nature are sometimes very interesting, and not a little startling. Many instances of this analogy will doubtless at once occur to my readers. For example, the remarkable resemblance various genera of the *Mantidæ* and *Phasmidæ* (Orthopterous insects) bear to portions of plants, which has procured for them the

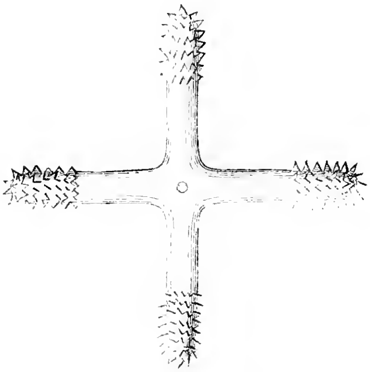


Fig. 243. Sponge spicule.

popular names of "walking-sticks," "walking-straws," leaf-insects," &c., &c. These, and other cases of analogy of form which might be cited, are no doubt designed by a beneficent Providence with

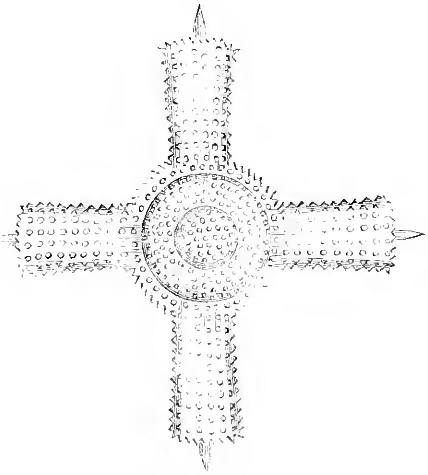


Fig. 244. *Astromma Aristotelis.*

the view of preserving the insects from certain of their enemies.

Other cases, however, occur of no less perfect resemblances, in which there is no apparent reason why such should exist. A familiar example is found in the branchiæ of the Æolis, which are somewhat like an oak-leaf, and also the resemblance which some of the foraminiferæ bear to the nautilus, so great as to induce our older naturalists to class them with the mollusca. The annexed illustrations give instances of curious analogies. In fig. 243 we have a sponge spicule bearing a close resemblance to one of the Polycystina (fig. 244) *Astromma*

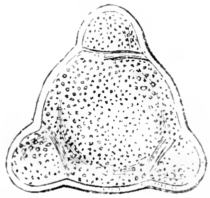


Fig. 245. Pollen of *Œnothera biennis.*

Aristotelis; and in fig. 245 we have the pollen of a flower, *Œnothera biennis*, with a strong likeness to a diatom (fig. 246), *Triceratium castellatum.*

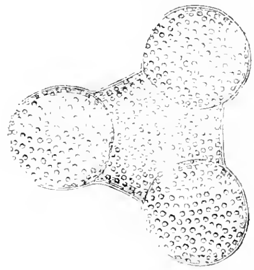


Fig. 246. *Triceratium castellatum.*

Ascending higher in the scale of creation, it will be found that similar instances of analogy occur. Many species of Orchids, for example, so much resemble animal forms that the names Bee Orchis, Fly Orchis, Butterfly Orchis, &c., have been given to them. The most remarkable of these, perhaps, is the Butterfly Orchis (*Oncidium Papilio*). The likeness is in this case very complete. Another instance is that of the resemblance of the shell of the Chitons, a family of gasteropod Mollusca, to the carapace of the Isopoda or Wood-lice, and even, in fact, to the carapace of the Tortoises.

The subject is a wide one, and more examples of analogy of form might have been adduced; but I preferred giving these few only in order that my readers might perhaps be induced, by what has been said, to enter on this field of inquiry, and to see, correlate, and think for themselves. It has long been one of great interest to me, and I doubt not if they will pursue it that it will prove no less so to them. G.

ELECTRIC FISHES.

THERE are some remarkable instances of the generation of electricity in living animals, to whom the power seems principally to be given as a means of defence. Of these animals, the *Torpedo Raia* appears to have been noticed at a very early period, since we find a description of its properties in the writings of Pliny, Appian, and others. It inhabits the Mediterranean and North Seas; its weight, when fully grown, is about eighteen or twenty pounds.

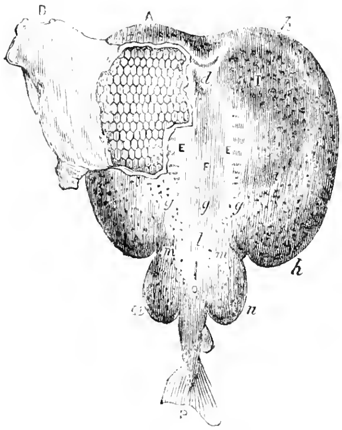


Fig. 247. The Torpedo.

Fig. 247 is a representation of a female Torpedo, the skin B having been flayed from the under-surface of the fish to show the *electric organs* A. The mouth, having the form of a crescent, is shown at *d*; the branchial apertures, five in number, at E; *g g g* the place of the anterior transverse cartilages; *h h* the exterior margin of the great lateral fin; *i* its inner margin on the confines of the electrical organ; *l* the abdomen; *m m* the place of the posterior transverse cartilage, which is single, united with the spine, and sustains the smaller lateral fins *n n* on each side; *o* is the anus, and *p* the fin of the tail. Each electrical organ is about 5 inches long and about 3 inches broad at the anterior end, and $\frac{1}{2}$ an inch at the posterior extremity. Each organ consists wholly of perpendicular columns reaching from the upper to the under surface of the body, and varying in their lengths according to the thickness of the parts of the body where they are placed. The longest column is about $1\frac{1}{2}$ inch, the shortest about $\frac{1}{4}$ of an inch, and their diameter about $\frac{2}{10}$ of an inch. The figures of the columns are irregular hexagons or pentagons, and sometimes have the appearance of being quadrangular or cylindrical. The number of columns in the fish examined by John Hunter was 470 in each organ; but in a very large fish, $4\frac{1}{2}$ feet long and weighing 73 pounds, the number was 1,182 in each organ. The number of partitions in a column 1 inch long was 150.

The Torpedo must be irritated to cause it to give a shock, in the delivery of which it moves its pectoral fins convulsively; the shock is felt on touching the fish with a single finger, and it can give a long series of shocks with great rapidity. When the Torpedo is placed on a metallic plate, so that the plate touches the inferior surface of the organs, the hand that supports the plate never feels any shock; though another insulated person may excite the animal, and the convulsive movement of the pectoral fins may denote the strongest and most reiterated discharges. Direct contact with the electrical organs of the fish is indispensably necessary for the reception of the shock, but the Torpedo has not the power of directing its electrical discharge through any particular object.

By passing the discharge from a Torpedo through a spiral of copper wire enclosing a steel needle, the needle becomes magnetized in such a manner as to show the direction of the current to be from the back to the under part of the belly. Heating and chemical effects have likewise been obtained. According to the experiments of Matteucci:—1. All the dorsal parts of the electrical organ are *positive* to all the *ventral* parts. 2. Those points of the organ on the dorsal face which are above the nerves which penetrate this organ are *positive* relatively to other points of the same dorsal face. 3. Those points of the organ on the ventral face are negative relatively to other points of the same ventral face.

The Gymnotus.

This electrical fish is a native of the warmer regions of America and Africa. There are several species of the Gymnotus, but only one is electrical. In general aspect it very much resembles an eel—the body is smooth, and without scales (a peculiarity of all electrical fishes). The electric organs consist of alternations of different substances, and are most abundantly supplied by nerves; their too frequent use is succeeded by debility and death. The electric organs may be removed without injury to the fish.

Fig. 248 is a copy of Hunter's engraving of the Gymnotus, and fig. 249 is a correct representation of a fine specimen which was for some time in the possession of the proprietors of the Royal Polytechnic Institution. In Hunter's engraving the skin is removed to show the structure of the fish; *a* is the lower surface of the head; *c* the cavity of the belly; *b* the anus; *e* the back where the skin remains; *g g* the fin along the lower edge of the fish; *e e* the lateral muscles of this fin removed and laid back with the skin to expose the small organs; *l* part of the muscle left in its place; *f f* the large electrical organ; *h h* the small electrical organs; *m m m* the substance which separates the two organs; and *n* the place where the substance is removed. These organs form more than one-third of the whole fish. The two electrical organs are separated at the upper part by the muscles of the back, at the lower part by the middle partition, and by the air-bag at the middle part.

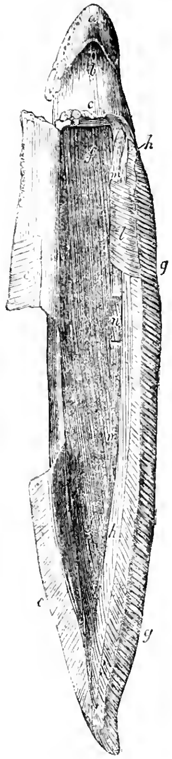


Fig. 248.

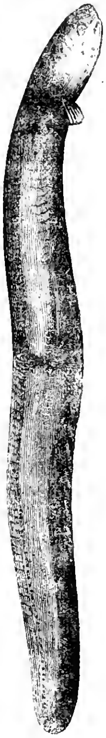


Fig. 249.

The electrical organs consist of two parts, viz., flat partitions or septa, and thin plates or membranes intersecting them transversely. The septa are thin parallel membranes stretching in the direction of the fish's length, and as broad as the semidiameter of the animal's body. They vary in length, some of them being as long as the whole body. The very thin plates which intersect the septa have their breadth equal to the distance between any two septa. There is a regular series of these plates, from one end of any two septa to the other end, 240 of them occupying a single inch.

The electric organ of the Gymnotus depends entirely on its will. It does not keep its organs always charged, and it can direct its action towards the point where it feels itself most strongly irritated. When two persons hold hands, and one touches the fish with his free hand, the shock is commonly felt by both at once. Occasionally, however, in the most severe shocks, the person who comes into immediate contact with the fish alone receives it.

A fine specimen of this remarkable fish was for some time in possession of the proprietors of the late Gallery of Practical Science in Adelaide Street, and was made the subject of some interesting experiments by Faraday (*Ex. Researches*, 15th series, 1838). This fish was 40 inches long. It remained in a healthy and vigorous condition till March, 1842, when it died from the effects of a rupture of a blood-vessel.

1. *The Shock.*—This was very powerful when one hand was placed on the body near the head, and the other near the tail. It was like that of a large Leyden battery charged to a low degree; and great as was the force of a single discharge, the fish was able to give a double and even a triple shock with scarcely a sensible interval of time. From some comparative experiments, Faraday thought it may be concluded that a single medium discharge of the fish was at least equal to that of a Leyden battery of fifteen jars, containing 3,500 square inches of glass coated on both sides, and charged to the highest degree.

2. *The Spark.*—Through the upper cap of a glass globe a copper wire was passed, a slip of gold leaf being attached to its extremity; a similar wire terminating in a brass ball within the globe was passed through the lower cap. The gold leaf and brass ball were brought into all but actual contact, the fish being provoked to discharge through the wires, the gold leaf was attracted to the ball, and a *spark* passed.

3. *Chemical Decomposition.*—Polar decomposition of iodine of potassium was obtained by moistening three or four folds of paper in the solution, and placing them between a platinum plate and the end of a platinum wire, connected respectively with two saddle conductors grasping the body of the fish. The middle of the fish was found to be *negative* to the *anterior* parts, and *positive* to parts towards the tail.

4. *Magnetic Effects.*—By causing the fish to send powerful discharges through an instrument of no great delicacy, a deflection of the needle amounting to 30° was produced; the deflection was constantly in a given direction, the electric current being always from the anterior parts of the animal, through the galvanometer wire to the posterior parts. When a little helix, containing 22 feet of silked wire wound on a quill, was put into the circuit, and an annealed steel needle placed in the helix, the needle became a magnet, and the direction of its polarity in every case indicated a current from the *anterior* to the *posterior* parts of the Gymnotus through the conductors used.

When a number of persons all dip their hands at the same time into the water in the vessel in which the Gymnotus is confined, they *all* receive a shock of greater or less intensity when the fish discharges, proving that all the conducting matter round the fish is filled at the moment with circulating electric power, resembling generally in disposition the magnetic curves of a magnet. The Gymnotus feeds on other fish, which it kills by giving them a shock; this it does by forming a coil round the fish, so that it should represent a diameter across it. Living, as the Gymnotus does, in the midst of such a good conductor as water, it seems at first surprising that it can sensibly electrify anything; but, in fact, it is the very conducting power of the water which favours and increases the shock by moistening the skin of the animal through which the Gymnotus discharges its battery.

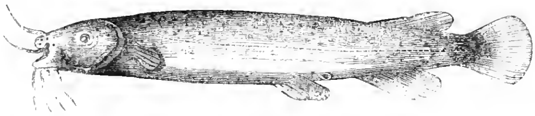


Fig. 250.

The Silurus electricus.—This fish is shown in fig. 250. It is found in the Senegal, the Niger, and the Nile. It is about 20 inches long. The shock is distinctly felt when it is laid on one hand, and touched by a metallic rod held in the other. Its electrical organs are much less complicated than those of other electrical fishes. Other known electrical fishes are the *Tetraodon electricus*, found in the Canary Islands, and the *Trichiarus electricus*, which inhabits the Indian seas; several others have been met with, but not hitherto accurately described.

[The above account has been taken from "The Student's Text Book of Electricity," by H. M. Noad. London: Lockwood & Co.; and the woodcuts from the same work were kindly lent by the publisher.—*Ed.*]

PUFF-BALLS.

ONE of the many amusements of country schoolboys, of which boys in town are innocent, is, or used to be, "when we were boys together," to puff in each other's faces the fine, brown, snuffy dust which fills the interior of ripe "puff-balls," or as they are called by some, with more of terseness than elegance, "devil's snuff-boxes." During the past autumn we took a stroll for a few miles into the country with a friend, when all of a sudden he stopped, and looking intently at some object at his feet shouted, in apparent delight, "Why here's a bulfer!" Here we must pause also, to inform our readers that in Norfolk these "puff-balls" are invariably called "bulfers." It was evident that our friend, doomed to a city life, had not seen a puff-ball for many years. Perhaps he had scarcely recognized one since his boyhood, and, as he afterwards confessed, the thing and its provincial name were so associated together that he pronounced the latter at once as though it were classic, and immediately afterwards came the reflection that it was only a provincialism, which he had scarce heard since he went to school. Never had we suspected that our city friend was an East Anglian, until this one word told the tale, and henceforth a closer bond was knit between us by the confession, "and I'm Norfolk too."

The true "puff-balls" are a genus of fungi which bear the scientific name of *Lycoperdon*. They belong to a family in which an outer covering or *peridium* encloses a mass of dusty spores more or less mixed with delicate threads. In their early stage they are pulpy or gelatinous, and when ripe not unlike snuff. Of this genus the following seven species are found in our islands.

First of all there is the "smooth giant puff-ball," *Lycoperdon giganteum*, sometimes as large as one's head, and at first whitish or of a parchment colour, and with an outer covering as soft to the touch as a kid-glove. Internally the substance is firm and of a creamy whiteness, but not hard like some others in an allied genus. The end of the finger makes, and leaves its impression, almost as readily as on a lump of fresh "putty." With the progress of growth the interior gets discoloured, assumes a greenish tint, which darkens into olive, and finally, when mature, the whole internal substance, except the spongy base, resolves into a greenish dust. In its young and fleshy state, whilst still of a creamy whiteness, it furnishes a dish which an epicure might envy. Many a time and oft, has our latter end been prophesied by astonished and alarmed villagers in rural districts, when we have informed them that we intended to eat the great white puff-ball, as big as a loaf, which we carried under our arm. Many a time have we made a similar meal, and the prophecy is not yet fulfilled. By dint, in some instances, of a little deception at the first, and in others by commencing the gastronomic attack, and protesting in favour of its harmlessness, we have introduced "fried puff-ball" to the breakfast-tables of many personal friends, but in no single instance was deception or protestation needed after the first experiment, for they have all become even more enthusiastic in its favour than the introducer of the article.

There is also a "rough giant puff-ball" (*L. cœlatum*) which almost vies with the above in dimensions, but the surface is rough and the interior is filled when ripe with a mass of dingy yellow spores. This often forms large rings, or parts of rings in pastures, and, as far as we are aware, is in no phase of its existence edible, although we are informed by a gentleman to whom we introduced the smooth puff-ball as a breakfast relish, that he has also eaten this species, as well as *Lycoperdon gemmatum*, in its young and pulpy state.

It is not very common to find a puff-ball which attains six inches in height, of which the lower portion forms a stem, and the upper portion, when mature, contains the dust-like, dingy spores. In this species the stem occupies at least two-thirds of its height, and it should be called the "long stemmed puff-ball" (*Lycoperdon saccatum*). The receptacle or peridium is flattened, with regular depressions at the top of the stem, around the base of the peridium, so as to give a somewhat fluted appearance. The spores, moreover, when examined under the microscope, are rough or spiny; in which feature they

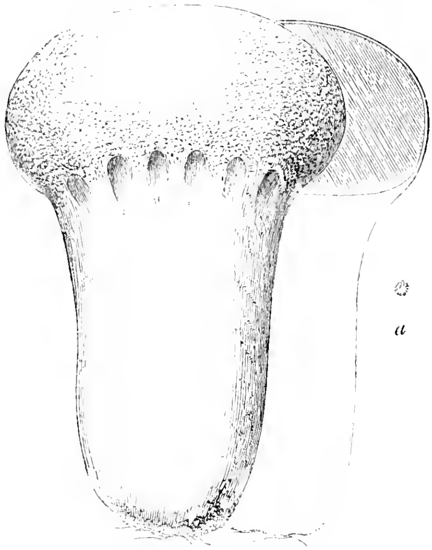


Fig. 251. *Lycoperdon saccatum*. *a*. Spore.

agree with only one other British species. At Albury in Surrey we met with hundreds of specimens in one wood during last October, but only an occasional solitary specimen elsewhere.

Fig. 252. *Lycoperdon atropurpureum*. *a*. Spore.

The other species with rough or echinulate spores is rarer still. We have never seen but one or two specimens. It occurs in pastures and has scarcely any stem, being nearly pear-shaped; this is named *Lycoperdon atropurpureum*. The mass of spores is of a dark, purple-brown colour, whereby it may be distinguished from all the others by the naked eye, and the spores are larger than in *Lycoperdon saccatum*, or indeed any other British species.

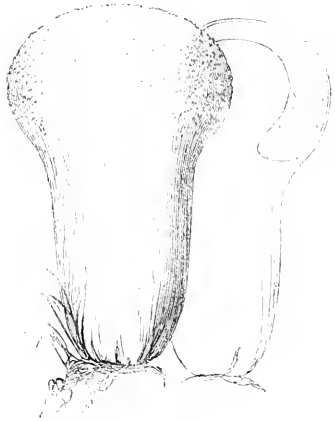


Fig. 253. *Lycoperdon gemmatum*.

The commonest puff-ball is the "mealy puff-ball," *Lycoperdon gemmatum*, which has its surface covered with mealy warts, and when these are rubbed off the scars are seen to be symmetrically arranged in hexagonal forms. This puff-ball is at times borne upon a long stem, but more commonly it is only narrowed downwards, and in size varies from one inch to three inches in diameter. If a section be cut through a specimen lengthwise before the spores are quite mature, a kind of column may be seen projected upwards in the centre, and which is not to be found in *Lycoperdon saccatum*. The spores, moreover, are yellowish, or almost of the colour of "Scotch snuff," small and smooth under the microscope.

Fig. 254. *Lycoperdon pyriforme*.

The "pear-shaped puff-ball," *Lycoperdon pyriforme*, delights most in old decayed stumps. As its name indicates, it has somewhat a pear-shape, and its surface, though at first covered with minute scurfy scales, is not scarred by them, and is quite smooth when they fall away. As in the common or mealy puff-ball, this species has a projection rising up in the centre of the receptacle, which in this instance has a conical shape. The spores are greenish-yellow, small and smooth.

One other species, and we have done. This is the "little puff-ball," *Lycoperdon pusillum*, which is found in pastures, or on hedge-banks, but which we are fain to believe is not at all common. It does not exceed an inch in diameter, is almost globose, or perhaps top-shaped, and has olive spores.

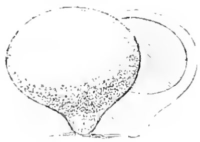


Fig. 255. *Lycoperdon pusillum*.

There are other fungi very much like the puff-balls which we have enumerated, to the untaught eye, belonging to the genus *Bovista*, but as a general feature we may observe that the peridium is more papery-like in its consistence, its outer bark peels off, and whereas in *Lycoperdon* there is more or less a barren spongy portion which occupies the lower or basal part of the peridium (and forms the stem, in such species as possess a stem), no such barren stratum is to be found in the species of *Bovista*, the external colour of which is also leaden or nearly black when ripe.

M. C. C.

THE RED HOUSE-ANT.

(*Diplorhoptrum molesta*.)

UNFORTUNATELY I can give no new information respecting the little ant which has been sent me, and which, I am told, has recently made its appearance in vast numbers at Hastings, Brighton, &c., and also in the metropolis. I suspect it has never been absent from London since the period when it was first noticed here, or perhaps, rather, when its appearance was first recorded, which was in 1828. Some stir was made about it in 1836, when the late Dr. Bostock brought the subject before the Entomological Society, his house, in Upper Bedford-place, Russell-square, being annoyingly infested by it. So great was the inconvenience he suffered from the incursion of these little pests, that he was induced to go to considerable expense in his endeavour to extirpate them by removing the ranges and wainscotings in his kitchens, &c., but, I believe, without avail. In the discussion that ensued at the time in the Society, I was applied to by the President for an opinion as to the locality of its probable origin, if not indigenous. Being then much engaged upon the Hymenoptera, and not having noticed it, at large, in my entomological excursions, although I had for some time frequently observed and admired the pretty little creature indulging, in ones and twos, amongst my coffee sugar of a morning, I hazarded the opinion that it was an exotic, and very likely a native of the West Indies, led to this surmise by my own experience. That it is American is confirmed by the fact of its abounding in the Brazils, where it is a greater pest than with us, existing there in enormous profusion everywhere, both in-doors and out of doors. It appears to have streamed thence—assuming that that country is its metropolis—upwards through the isthmus to the United States, reaching as high as Boston, in Massachusetts, where Thomas Say, the celebrated American entomologist, was as much annoyed by it as we are; but he has suggested a remedy which may help to curb, if not completely to check, its diffusion. I described it, with other small exotic ants, in Charlesworth's "Magazine of Natural History," in the year 1838, by the name of *Myrmica domestica*, and where its description will be found at page 626. I was not then aware that Say had before described it as *Myrmica molesta*, in the "Boston Journal of Natural History for 1834," page 293,—a specific name suggested by the inconvenience he had suffered from its intrusion. He there tells us that "it is called 'the little yellow ant,' and that it is frequently found in houses in great numbers. They sometimes eat vegetable food, and some of my garden-seeds have severely suffered from their attacks. They also devour grease, olive-oil, &c. Their sting is like the puncture of a very fine needle. I placed a piece of meat on a window-board frequented by these little depredators; it was soon absolutely covered by them, and thus enabled me to destroy thousands every few hours that I returned to examine the bait, for several days, during which time their apparent numbers scarcely diminished."

Similar means might be resorted to with us in houses where they abound; and if the bait were placed near the spots whence they are observed to issue, very great numbers might be annihilated by pouring a little boiling water over them. I am, however, afraid that no radical cure can be effected without the destruction of the nests which contain the embryonic progeny. Their nests being constructed within or behind walls or wainscoting, or under hearthstones and behind ranges, they are difficult to get at. They swarm, I have no doubt, externally, and in the air; and although the time when this takes place has not been observed, I expect atmospheric influences operate as powerfully upon them as upon the rest of the tribe, and that it therefore occurs during sultry, still days in the summer and early autumn, when the air is charged with electricity. This should be especially noted by those who wish to eradicate them; for the greater the number of winged females that can be then destroyed, the greater will be the decrease of their propagation, as every winged female that survives becomes the founder of a fresh colony, which readily explains their abundant and wide distribution. The females are more than twice the size of these small neuters, being two lines long, and are larger than the males, and like them have four transparent wings. No trouble need be taken about the latter, as they speedily die—indeed, immediately upon the exercise of their exclusive function.

The majority of exotic ants are extremely eccentric in structure and remarkably diverse in form; but these little aliens are conformable to a type common to these islands. They are congeneric with our own species of the section *Diplorhoptrum*, of the genus *Myrmica*, that section being without spines to the metathorax, a spined metathorax being the character of the more typical forms. The females and neuters are armed with stings; the club of the antennæ has three joints, and the abdomen two nodes. The habits of our own species of this subdivided genus differ very considerably from each other, therefore it would be perilous to jump at conclusions from one to the other. A prominent characteristic embracing all is that the pupæ are naked; namely, that they are not enclosed in cocoons. In illustration of this dissimilarity of habits, I may add that some of the species live habitually in society with ants of a very different genus and division of the tribe; others in close contiguity to such as are equally distinct; whilst others, again, live totally apart, and away, and by themselves.

W. E. Shuckard.

"SAWS" OF THE SAW-FLY.

The apparatus with which the saw-flies are provided for depositing their eggs is well worthy the notice of microscopists.

The following notes are not by any means to be considered as exhaustive of the subject; but are simply intended to direct observers to a class of objects exceedingly beautiful, and offering a wide field for study and comparison.

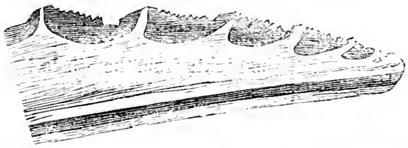


Fig. 256. Portion of Saw of *Tenthredo* × 160.

The saw-flies (*Tenthredo*), which, by the way, derive their name from the apparatus with which the females are provided, belong to the order of hymenopterous or membranous-winged insects, all having their abdomen terminated by an apparatus, which in the saw-flies, ichneumon-flies, and gall-flies, serves for the deposition of their eggs; and in the ants, bees, and wasps, is connected with a poison-gland, constituting the sting, with which many of us are but too well familiar.

The ovipositor in the Tenthredo consists of two saws, every tooth being itself serrated. These saws are worked alternately; and to support them when

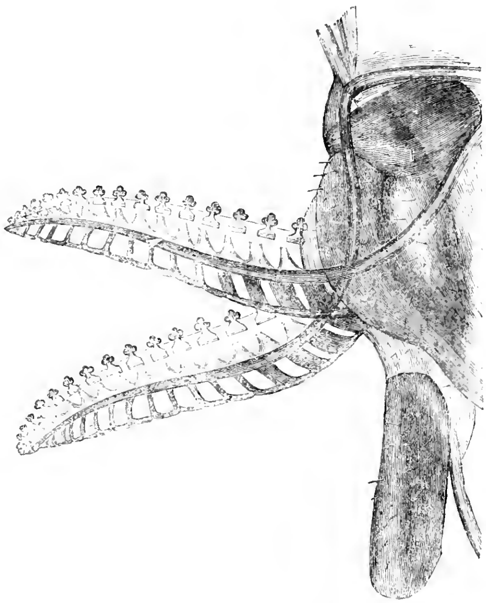


Fig. 257. Saws of *Allantus aterrimus* × 40.

in action, they are each furnished with a "back," which serves to strengthen them, much in the same way as the "back" of a tenon-saw strengthens and preserves the rigidity of its blade.

There is this difference, however, that whereas in the tenon-saw the blade is set in a deep groove of the back to the whole of its length, and immovable, the "saws" of Tenthredo are themselves grooved to admit of a prominent ridge of their respective backs, and slide forwards and backwards with the greatest facility.

The "saws" figured are those of *Allantus aterrimus*, and a more highly magnified portion of a saw only, without its back, of the Tenthredo. It will be noticed that the character of the serratures is different in the two. J. J. R.

Among the innumerable beings which crowd this world not one is idle: all are actively employed, each in its separate sphere of usefulness; and though they blindly do the work imposed upon them by their Great Creator, ignorant of other's ways, the grand result is perfect harmony.—*Prof. Rymer Jones.*

SHOOTING-STARS.

There are few who witnessed the meteoric display on the morning of November 14th, but must have felt a wish to know something of the nature of the objects which swept in such numbers across the heavens. The very fact that the display had been *predicted*—that these apparitions, silently but swiftly streaking the sky, were known to be *due* on that day, and at that hour—gave an interest and significance to the phenomenon, which would have been wanting to a fortuitous display, however brilliant.

The questions which one would like to have answered are such as the following:—How far off are these bodies? What are they made of? How large are they? How heavy?—and so on; questions, to some of which it might seem hopeless to seek for an answer, so far at least as meteors which do not reach the earth are concerned. Let us see whether astronomers have anything to say on these points.

As respects the *distance* at which shooting-stars appear and disappear, the following results have been attained:—Father Secchi, of the Collegio Romano, Prof. Newton in America, and Mr. Alexander Herschel in England, estimate the average height of shooting-stars at the moment of *appearance* to be 74½, 73½, and 70 miles, respectively; and the average height at *disappearance* to be 49½, 50½, and 54 miles, respectively. These results accord so closely as to leave no doubt that on an average, and within very narrow limits of error, 73 miles and 52 miles are the distances separating the earth from shooting-stars at the moments of appearance and disappearance, respectively.

It is not very easy to determine the apparent size (or, thence, the true size) of a shooting-star, on account of the suddenness of its appearance and the rapidity of its motion. We may note, however, that it has been estimated that meteorites (which belong to the same family as shooting-stars) vary in diameter from about 100 feet to 13,000 feet.

The velocity with which shooting-stars move has been determined in many instances. It results from these estimates that they move at an average rate of about 35 miles per second—a velocity more than twice as great as that of the earth in her orbital motion round the sun. In some cases, however, they attain a much greater velocity—even, it has been asserted, to 100 miles per second.

It would not be easy to explain in brief space the method by which the weight of a shooting-star may be determined. It will be sufficient to say that Mr. Alex. Herschel, by a method founded on just scientific principles, has shown that the average weight of shooting-stars is very little over two ounces. A similar method applied to the largest meteor seen in 1863 showed its weight to be no less than 224 lbs. Hence it may be concluded that shooting-stars have very much smaller dimensions than their "big brothers," the meteorites.

Science has enabled the physicist to learn the constituent elements of shooting-stars. The most wonderful aid to physical research ever yet invented, the spectroscope, serves us in this inquiry. We thus learn that some of the shooting-stars are incandescent solids, but that the majority are reduced by intense heat (at the time and during the interval of apparition) to the gaseous state. Conspicuous among the substances thus converted into gas is the metal sodium. It is to be noted, further, that the salts of this metal have been found in the meteorites which fell in August, 1865, near Aumale. So far as the August meteors are concerned, we have the opinion of Mr. A. Herschel, that their condition is exactly that of "the flame of a spirit-lamp, newly trimmed, and largely dosed with a supply of moistened salt." Meteorites which reach the earth are found to contain many elements known on earth, but no new elements, and only one or two new compounds have ever been discovered in them.

Observation has shown, also, a very remarkable circumstance concerning the apparent paths followed by shooting-stars. It is found that these paths, prolonged backwards, all pass (on any the same occasion) through or near one point on the celestial sphere. No matter whether this point be just rising above the horizon, or passing its highest point on the southern meridian, or setting, the same peculiarity is observable. But for different showers, that is, for showers occurring at different seasons, different "radiant points" (so astronomers have named these centres of divergence) are exhibited.

I have left to the last the most wonderful fact of all; namely, the recurrence of showers at certain epochs. We have, for instance, the shower of August 9th or 10th, the shower of November 13th or 14th, and the shower of October 20th or 21st. These are, in some respects, the most remarkable showers. But many, perhaps, will be surprised to learn that the number of known recurring epochs of star-falls is no less than fifty-six! Each of these is well distinguished from other showers by its radiant-point, by the character of the stars composing it, by the extent and brilliancy of the display, by its regular recurrence year by year, or by regular or irregular intermittences. It may be noted, in this connection, that the nights from the 8th to the 15th of December are likely to exhibit to the patient observer trainless meteors, individually much finer, perhaps, than the shooting-stars of November 14th.

Three theories have been suggested in explanation of the phenomena we are considering. It has been suggested, first, that shooting-stars are mere atmospheric phenomena, and that even aerolites and meteorites are generated in the upper regions of air. Secondly, it has been supposed that we owe the visits of shooting-stars to volcanoes in the moon, having sufficient ballistic energy to hurl these bodies within the sphere of the earth's attraction. Lastly, it has been urged that observed facts cannot otherwise be explained than by considering these bodies as existing freely in the inter-planetary spaces, whence they are drawn by the earth's attraction, when she approaches near enough to them; that, in fact, they are—

"Sucked from out the distant gloom,"

to be kindled into momentary splendour upon the confines of our atmosphere. Of these theories, the first two have long since been felt to be untenable. It is true, indeed, that certain appearances resembling shooting-stars, occurring in particular states of weather, may be explained by the former theory. The theory, also, of a lunar origin, fantastic as it may appear, has seemed to have enough of probability to attract the notice of such mathematicians as Laplace and Olbers. But the *planetary* rapidity with which shooting-stars move, the regular occurrence of showers, and the phenomenon of *radiant points*, point very decidedly to an origin other than terrestrial, other than lunar, in fact to a *cosmical* origin. It may be considered as established beyond a peradventure, that there exist numerous zones of small bodies (pocket-planets Humboldt has called them), travelling independently round the sun. Some of these zones travel in the same direction as the earth, others in a retrograde direction; the same zone also may be variable in richness in different parts. Thus when the earth is traversing different zones, showers varying in character are exhibited; and in successive passages of the same zone, similar variations, or even periodic intermittences, may be observed. The annual recurrence of the first-named variations, and the periodic recurrence of the last-named, serve at once to mark the cosmical origin of the phenomena, and to enable the astronomer to predict (in general correctly) the nature and extent of each display.

Richard A. Proctor, B.A., F.R.A.S.

GREEN SPLEENWORT

(*Asplenium viride*).

Bright beautiful little fern, with light green *leaflets* and yellowish green stalks, how lovely you look in your native home, the wild rocky mountains of Wales. Not, be it understood, I pray, that I mean to imply by this remark the *Asplenium viride* to be uncommon, in England, or confined to Cambrian soil; on the contrary, it is found throughout Europe; but I have never seen it grow so luxuriantly as in Wales.

I was wandering with one who—

"Knew the names,
Long learned names of agaric, moss, and ferns,"

and who first pointed out to me the difference between the green spleenwort and the wall spleenwort. The main *root* of the green spleenwort is a dark brown colour, and more like a carrot in shape than the wall spleenwort. It has many more rootlets also than the latter, and the whole of the upper portion of the stalk is *green*, while the wall spleenwort's stalks are black. This dissimilarity in the stalks is the chief distinctive character between the two ferns.

The top of the root has a tuft out of which the *fronds* spring. They sometimes grow to the height of ten inches in moist, favourable situations, but often do not exceed three. The ends of the *fronds* are occasionally branched, and the *leaflets* vary considerably in form—some are egg-shaped, others spear-headed, but usually tapering gracefully towards their stalk, which is always very slender.

The mid-vein of the green spleenwort produces side veins, and they are generally alternate and often forked. The fructification occurs in masses, varying from two to six on each *leaflet*. The colour is a much more yellowish brown than in the wall spleenwort, and lies more in the middle of the *leaflet* than it does in the just-named fern. These masses finally run together, and cover the whole of the back of the *leaflet*, with the exception of a narrow border, which presents a singular appearance when seen round the ripe *spores* in August.

Some of our botanists have distinguished as a variety the branching frond, but as this peculiarity is not permanent, even in the same plant, one hardly feels satisfied in accepting it as such, even though Linnæus deemed it such. Stagnant water and impure air are very hurtful to this fern; it is also difficult of removal from its native places, eccentric in its likes, and cannot be successfully cultivated without much trouble.

Helen E. Watney.

The Hellebore.—The species of this plant called Christmas Rose has been named Black Hellebore from the black colour of its roots, and *Melampodium* in honour of Melampus, a celebrated physician, who flourished at Pylos, in Peloponnesus, about a hundred years after the time of Moses, or 1,530 years, or thereabouts, before the birth of Christ. Melampus travelled into Egypt, which was the seat of science at that period, to study medicine. He afterwards cured the daughters of Prœtus, king of Argos, of mental derangement, with hellebore; and from this circumstance it became so celebrated a medicine for mad people, that *naviga ad Anticyram* was a common proverb used to hypochondriacal persons, which meant "sail to Anticyra," an island in the Gulf of Corinth, where the Hellebore flourished in great abundance.—*Henry Philips.*

A WHEEL ANIMALCULE.

(*Stephanops lamellaris.*)

SOME time ago one of our correspondents sent for identification a very characteristic sketch of a strange Rotifer, which for some time remained unnamed; simply because no figure which we had seen resembled it enough for us to give the name with confidence. At length an opportunity presented itself, and it was submitted to a most excellent authority on the subject, so that not only are we enabled to furnish the name for a correspondent, but to give a figure of the animal for the benefit of

Fig. 258. *Stephanops lamellaris.* *a*, front view; *b*, side view. From Drawing by P. H. Gosse, Esq.

any one who may hereafter capture it. Before proceeding to give its name and character, it is but just that we should acknowledge, that the sketch alluded to being somewhat deficient in detail, we are indebted to Mr. P. H. Gosse for the loan of a drawing from which our woodcuts have been engraved.

The genus of animalcules to which our species belongs has the front of the lorica expanded into a hood or shield. In a side view this hood gives a very eccentric character to the present species, so that it looks a very caricature. Leydig affirms of *Stephanops lamellaris* that the eye has a distinct hemispherical lens, and thus the little animal receives additional dignity, and becomes invested with an importance shared only by one or two others in the same family.

Only one other species is recorded in the list of British Rotifers, and the chief differences appear to be that while *Stephanops muticus* has the lorica unarmed posteriorly, that of *Stephanops lamellaris* has three posterior spines.

ZOOLOGY.

Keyhole Wasp (*Pelopæus spinolæ*).—A fossorial wasp of the family of the *Sphegidæ*, which is distinguished by its metallic lustre, enters by the open windows, and changes irritation at its movements into admiration of the graceful industry with which it stops up the keyholes and similar apertures with clay, in order to build in them a cell. Into this it thrusts the pupa of some other insect, within whose body it has previously introduced its own eggs; and enclosing the whole with moistened earth, the young parasite, after undergoing its transformations, gnaws its way into light, and emerges a four-winged fly.—*Tennent's Ceylon.*

Cats and Young Birds.—In reply to the query asked in the November number of your magazine, respecting cats and young birds, I beg to give you the following incident, for the truth of which I can vouch, as I was an eye-witness of the fact:—A few summers ago I observed our old favourite cat basking in the garden walk near the hedge, closely attended by a hedge-sparrow, which kept hopping and twittering around him, within what was certainly a very unsafe distance. As this state of things continued for several mornings, I determined to search the hedge, where I discovered a hedge-sparrow's nest with four young birds. I did not at the time suppose that our cat had any sinister intentions towards the young birds, for I did not believe that he would risk the chance of pricking his feet by climbing the thick-set thorny hedge. Having, however, at length missed from the nest one of the fledgelings, I determined to watch; when I saw the cat climb up the hedge, crawl towards the nest and seize upon one of the young ones; and this feat was repeated the same day, till the entire progeny fell a prey to the feline enemy, in spite of the cries and agitation of the parent birds, and our endeavours to keep the cat from the nest. May we not draw the conclusion that the cat deliberately watched the nest day after day, till instinct told him that the young birds were in a fit condition to suit his palate?—*H. Wright, Thuxton Rectory, Norfolk.*

Fishing Gossip.—A short time ago, as a gentleman was fishing for trout, with one of Eaton and Deller's artificial minnows, he was surprised to see a gudgeon rise at and take the bait. A few weeks afterwards, as he was fishing with the same bait for perch, a pike of about six pounds in weight also rushed at and seized the bait. That pike feed on minnows is a circumstance well known to fishermen, but that gudgeons will take minnows is perhaps a fact not so generally known.—*H. W.*

The Grey Phalarope (*Phalaropus lobatus*).—Forty-one specimens of this elegant little bird were shot here during the latter part of October. The Grey Phalarope was formerly so rare in Britain, that Pennant says he only knew of its occurrence twice in his time; and even now it is by no means a common bird, though it is not unfrequently seen during its migration from the Arctic regions (where it breeds) to its southern winter quarters. Its winter plumage is chiefly grey and white; whilst in summer the prevailing tints are yellow, black, and white, with "reddish orange-brown" breast. "The species feed on small crustacea and water-insects, gnats, and their larvæ. The eggs are usually four in number, of a stone-colour, with a tinge of olive, and spots and specks of dark brown. The note is likened by Meyer to the word 'Pick, pick,' uttered quickly, and in a high tone." Its length is about 8 inches, and the wings expanded measure a little over a foot. The Phalaropes appear to be very tame, six of those mentioned above having been shot one after another, without the slightest attempt on the part of the survivors to take flight; in fact, they witnessed the slaughter of their comrades with the greatest possible indifference.—*W. L. Hall, Eastbourne.*

The Grey Phalarope, &c.—On the 20th of September last—a period of very heavy storms—I saw a Grey Phalarope on a small fresh-water pond at the Manor House, Piddletrenthide, swimming about, and taking occasional flights, when alarmed, into the adjoining garden. It was picked up dead the next morning in very poor condition. On that day, the 21st, another of these pretty little birds was seen by me about four miles to the eastward, on an exceedingly small pond, formed by the excavation of clay for bricks, at Ansty, in the parish of Hilton. Both of these places are, by the Ordnance Map, twelve miles from the sea-shore. Within the next two or three weeks, specimens of the Golden Oriole and of the Glossy Ibis were seen also near Kimmeridge Bay, in the Isle of Purbeck. The latter was secured by my friend, J. C. Mansell, Esq., and is now in the stuffer's hands.—*C. W. Bingham.*

Little Bittern in Scotland.—A fine specimen of the Little Bittern, *Ardea minuta*, Linn., flew on board a vessel while entering this port on the 21st of October last. Can any of your correspondents inform me if it has been previously captured in Scotland?—*G. S., Aberdeen.*

Dr. Fleming mentions one shot in the Orkneys in 1805, and M'Gillivray says, "I am not aware of its having been obtained on any part of the mainland of Scotland."—*Ed.*

Spiders at Work.—It has, I believe, often puzzled naturalists to make out how the spider contrives to fix the different points of the main threads upon which its snare is suspended, those points being often widely apart, and so situated that it is impossible that the spider could pass from one to the other, *except by flying*, and that such is the case I have no doubt. The facts recorded by Kirby (who was my near relation) and Spence, in their chapter on the "Motions of Insects," are abundantly sufficient to prove this point, and to these I beg to be allowed to add an observation made by me on Sunday morning last. My attention was attracted by the barking and leaping of my dog (upon a grass-plot at a distance from the house and from any trees) at some object directly over its head, which I at first supposed to be a large fly, but soon perceived that it was one of the common brown spiders which at this period infest all our gardens. The creature was executing aërial movements, vertical, lateral, and horizontal, with the utmost facility, and with great rapidity. Sometimes it soared to a height of 15 feet, then darted swiftly downwards nearly to the ground, then swayed and swung itself hither and thither in every possible direction, much after the manner in which flies perform their mazy dance in our rooms or in the deep shadows of trees. I watched its evolutions for ten minutes, and could distinctly see, whenever it approached me, that it was busily manipulating the threads from its spinnets, though I was unable to see the threads themselves, and it seemed to be constantly elevating and depressing its body, or rather anus. The atmosphere was very humid, and there was scarcely any breeze. Could the length of web darted forth be so supported by the humid air as to counterpoise the weight of the body? At all events, I cannot, after witnessing the movements of this spider, have any doubt as to the manner in which the main beams, if I may so term them, of this snare are fixed, viz., by the animal's darting or flying from point to point. I presume that the reason why the operation itself is so seldom seen, is that the spider is very shy, easily disturbed, and a night-worker.—*J. M. Rodwell.*

Red-breasted Pipit.—A specimen of the Red-breasted Pipit (*Anthus montanus*) was killed by my father on the 22nd of March. It was in company with some Meadow Pipits (*Anthus pratensis*).—*S. L. Mosley, Almondbury Bank, near Huddersfield.*

The Rev. F. O. Morris, in his "British Birds," figured a Red-breasted Pipit, said to have been obtained in Scotland, and which he names *Anthus montanus*, Koch. The specimen above alluded to, which is the second recorded to have occurred in Britain, should be carefully examined and compared, and not taken for granted as a new British species. It is, at the least, doubtful.—*Ed.*

Shore-collecting.—At the October meeting of the Quekett Microscopical Club, Mr. S. Highley read a paper on this subject, in which the dress to be worn and the implements to be used were minutely described. This was succeeded by an account of the zones of oceanic life, the objects to be found, and how to capture them. The whole formed an epitome of the outfit of a shore-collector; accompanied by such instructions and cautions as a novice would require, interspersed with hints of a useful character for the practised collector.

The Common Shrimp.—I kept for a long period a couple of the common Shrimp (*Crangon vulgaris*) in an ordinary bell-glass aquarium, the water of which was aërated by a large piece of that beautiful green seaweed, *Ulva latissima.* My shrimps soon became accustomed to the tank, and showed unmistakable signs of recognition whenever I approached, invariably rising to the surface of the water in expectation of receiving the small pieces of beef with which they used to be fed. On tendering a small piece, it was instantly taken from my fingers, and a most interesting struggle would take place for possession of the prize, each of the shrimps retaining their hold, and being in turn dragged round the tank by the other. On one occasion my attention was arrested by seeing the shrimps, as I thought, fighting; but on looking closer, I was much surprised to find that one of them was in the act of shedding its coat, an act which it appeared to be performing with difficulty, and in which it was being assisted by the other, who, with remarkable instinct, was retaining hold of one end of the shell, whilst its companion gently disengaged itself and escaped at the other.—*W. H. Congreve.*

Camberwell Beauty.—While at Caversham, in Berks, the latter end of September, I saw a very fine specimen of the Camberwell Beauty on the wing. It came twice within my reach; but having no net, I was afraid to strike it with my hat, and after following it for about half an hour, I was forced to give up the chase, as it did not settle. I was also shown some good specimens of the Clifden Nonpareil (*C. Fraxini*), taken this year, by an entomologist.—*W. T. H.*

Mollusks.—*Planorbis lineatus,* Walker (*Plan. lacustris,* F. & H.).—In addition to the neighbourhood of London, as given by R. Tate, and Tuddenham (Suffolk), by A. Mavor Brown, as habitats of this local species of our freshwater mollusks, I may add that, ten years ago, I observed it in *great abundance* in a sluggish stream at Heigham (environs of Norwich), of somewhat more than the average growth. *Helix sericea* (Müll) was plentiful amongst the damp grass and moss not far from the same locality. A stream fifty yards' distance yielded good specimens of *Paludina vivipara* and *Pal. Listeri,* and a ditch at a similar distance produced *Succinea elegans* (Risso), *Valvata cristata,* and remarkably fine *Planorbis marginatus* and *Bythinia tentaculata,* and in the river Yare, close by, I dredged up scores of *Pisidium amnicum,* where also abounded dead specimens of *Valvata piscinalis.*—*Jno. H. Ashford, Scarborough.*

Death Watch.—Some of your readers may be interested to learn that the doubts expressed by some entomologists respecting the "tapping" of *Anobium* have been set at rest by the observations of Mr. Doubleday, and by the following communication, obligingly sent to me by the Rev. Leonard Jenyns, in reply to an inquiry which I had been led to make concerning a passage in his "Observations on Natural History:"—"I am quite sure of the correctness of what I have stated respecting the tapping of *Anobium tessellatum,* having witnessed it repeatedly. With regard to *A. striatum,* I do not recollect now (it is so many years since) whether what I have added in reference to that species was stated on the ground of having *seen* it make the noise in question, or only having heard it." I make this quotation from the "Proceedings of the Entomological Society" for March last.—*W. H. Groser.*

Flying Fish.—In the uncomfortably calm Pacific, where I watched the Flying Fish every day, and often all day long, I had ample opportunity to observe its so-called "flying." The species that tenant the two oceans are very nearly allied, *Exocetus volitans* being the one common to the Pacific; but it is of habits I wish to treat, not of minute specific distinctions—that can be settled in the studio. It seems to me that the distance traversed when the fish leaps from the sea, and the length of time it remains out of the water, are much over-estimated in books on Natural History. Ten or twelve seconds may be taken as the average time of its flight, and eighty yards the maximum distance traversed when the water is perfectly tranquil; if aided by a breeze of wind, or propelled from the crest of a breaker, the distance accomplished would necessarily be greater; but the fins have no power to raise the fish a single inch above the level of its leap, and simply aid in its support, as the extended skin of the flying squirrel bears it up in its spring from bough to bough. I have never seen the fins vibrated or flapped, as all wings invariably are, but stiff and rigid, are extended and still, until the fish plunges into the sea. Numbers, beyond all computation, were constantly seen by us in the air together, when chased by predatory fish. The Flying Fish, as a rule, is about twelve inches in length.—*J. K. Lord's "Naturalist in Vancouver's Island."*

Late House-Martins (*Hirundo urbica*).—On the 13th of November I saw from twenty to thirty active specimens of this bird flying about at Bourne-mouth. The last of the swallows I saw were a pair of belated individuals flying languidly about the streets of Blandford on the 9th November.—*W. G.*

Strength of the Sexton Beetle.—So strong and persevering are these insects, that a single beetle succeeded in burying a mole in two days. Now, the mole is at least forty times as large as the beetle, so that we can estimate the strength and perseverance of the beetle by calculating the labour which would be necessary for a man to inter, in two days, an animal forty times as large as himself.

Ravages of the Shipworm (*Teredo navalis*).—The ravages committed by this creature are almost incredible. Wood of every description is devoured by the shipworm, whose tunnels are frequently placed so closely together that the partition between them is not thicker than the paper on which this account is printed. As the *Teredo* bores, it lines the tunnel with a thin shell of calcareous matter, thus presenting a remarkable resemblance to the habits of the white ant. When the *Teredos* have taken entire possession of a piece of timber, they destroy it so completely, that if the shelly lining were removed from the wood, and each weighed separately, the mineral substance would equal the vegetable in weight.—*Rev. J. G. Wood's "Homes without Hands."*

GEOLOGY.

Fossil Spider.—Dr. Rœmer has recently described and figured a very perfect specimen of a spider from the coal formation of Upper Silesia. It is called the *Protolycosa anthracophila*, a name that implies a near relation in general habit to the modern *Lycosa*. The body is about an inch long.—*Ann. Nat. Hist.*, vol. xviii. p. 428.

Geological Importance of Dreissena Polymorpha and on its Presence in the Delta of Danube, as also in the Lakes and Lagoons in that Region.—The centre from which this remarkable bivalve has dispersed itself, now distributed in nearly all the fresh waters of Europe, is the depressed area situated between the Black and the Caspian Seas. It there inhabits, in myriads, the running and stagnant fresh waters, and even the brackish waters strongly impregnated with salt, as those of the Lake Babadagh, the lagoon of Rasim, &c. It occurs in a fossil state in the "drift-loam" of Bessarabia, associated, as in the living state, with the same species of *Cardium*, *Didacna*, and *Adacna*. According to Captain Spratt, the *Dreissena polymorpha* abounds in the "loam" near Ismail, upon the borders of Lake Yalpuk, where it is associated with *Didacna crassa*, Eichwald (which, according to that author, is not found living in the Caspian), a *Cardium* not essentially distinct from *C. rusticum*, Chemnz, and a number of species of gasteropods inhabiting at the present day these regions. These deposits of loam, the stratigraphical position of which is undoubtedly proved by their elevated position, as well as by the great number of terrestrial mollusks, characteristic of the diluvial deposits of the Danube, and the remains of *Elephas primigenius* and other terrestrial mammals which are contained in them, clearly point to the remote origin of *Dreissena polymorpha*, and at the same time prove that they constitute a link between the present conditions prevailing in that region and the beds with *Dreissena* in the Danubian basin, the most recent of the deposits of the Miocene epoch. A comparative examination of an extensive series of specimens in the Imperial Museum of Vienna has resulted in the association under one specific title of the *Dreissenæ* of the Miocene period with *Dreissena polymorpha*. Besides some living forms which have received specific names, as *D. cochleata*, Kickx, of the Antwerp basin, and several types not separable from *D. spathulata*, Partsch, and especially the small *Dreissenæ* of Bisenz, and Garga (Moravia), associated with *D. triangularis*, *Melanopsides*, and other species characteristic of the beds with *Dreissena*, are specifically identical with *D. polymorpha*; even *D. spathulata*, *D. Basteroti*, and *D. subcarnata* very greatly resemble distorted individuals of this species from the lagoons on the shores of the Black Sea. The Zebra Mussel lives at the present day in fresh-water basins, with slightly brackish water bottom; it may be therefore inferred that the Miocene beds with *Dreissena* had been deposited from fresh-water accumulations and brackish bottoms. The east of Europe and the west of Asia alone present these conditions, and from these regions the fauna has moved towards the west, as far as the Vienna basin, proofs of which have long since been furnished by many celebrated Austrian geologists. Not a single species of the genus is met with in those fresh-water basins of the Miocene epoch, which were not in direct communication with the brackish water areas of the East; and the recent diffusion of *Dreissena polymorpha* over Central and Western Europe is due to transport by movements of navigation.—*Abstract of a Paper by Dr. Peters, read before the Academy of Science at Vienna. Communicated by R. Tate, F.G.S. &c.*

Chalk Markings.—Since making an inquiry on the above subject, at page 202 of Science Gossip, I have met with the following passage in Mantell's "Geological Excursions," page 130:—"The only metallic substances observable (in chalk) are oxide of manganese in *the state of dendritical or arborescent markings* in the chalk and flints, and sulphurets and oxides of iron." This description agrees so well with the appearance about which I inquired, that I gladly accept it as an explanation of what has puzzled me for years.—*W. F.*

BOTANY.

Danes'-blood.—The Rev. T. Salwey, in your last, corrects two "mistakes" into which he supposes me to have fallen, with regard to the application of the above name to the dwarf elder (*Sambucus Ebulus*). May I be permitted to show that my "mistakes" may be, after all, nearer the truth than his corrections?

1st. Three or four of my botanical works speak of *S. Ebulus* as "Danes'-blood;" but I have nowhere seen the name applied to any other plant, save by Miss Pratt, who claims it for *Campanula glomerata*. In its Buckinghamshire localities, *S. Ebulus* is thus named by the villagers, not because its blossoms in any way give "the idea of blood," but because it is supposed to have sprung up from the blood of the slaughtered Danes; and Ray, for the same reason, calls it "Danewort," "*quia e Danorum occisorum sanguine ortum fabulantur.*" Merrett also, in his "Pinax" (1667), speaks of *S. Ebulus* as "Danewort or Danes'-blood;" so that the latter name is, at any rate, by no means a new one.

2nd. A further investigation has convinced me not only that *S. Ebulus* is called "Danes'-blood," but that it at least *was* known by that very name at the Bartlow Hills locality, and that at a much earlier date than can be claimed either for *Anemone Pulsatilla* or *Campanula glomerata*. Camden, in his "Britannia" (1753), as quoted in Gibson's "Flora of Essex," says: "The Wallwort, or Dwarf Elder, that grows hereabout (the Bartlow Hills) in great plenty, and bears the berries they (the country people) call by no other name but Danesblood, from the multitude of Danes that were slain there."

I trust I have shown satisfactorily that *S. Ebulus* not only *could be*, but *was*, and *is*, called "Danes'-blood," even though its flowers are *not* "of a black purple or crimson colour."

Mr. Salwey will be glad to learn that *A. Pulsatilla* is not yet exterminated from the Gogmagog Hills locality, as a kind friend lately sent me specimens of that and *Muscari racemosum* gathered there last spring.—*B.*

The Crocus appears to have been first cultivated in our gardens during the reign of Queen Elizabeth; as Gerard observes that "that pleasant plant that bringeth foorth yellow flowers, was sent vnto me from Robinus of Paris."—*Flora Historica.*

Electric Flowers.—Flashes of light have been seen to be emitted from many flowers, soon after sunset on sultry days; this phenomenon was diligently studied by Zawadski: he noticed that it occurred most frequently in the months of July and August, and he observed that the same flower discharged a number of flashes in succession.—*Noad's "Student's Text-book of Electricity."*

Dane's Blood.—Sir W. Hamilton lays it down as a principle that if we are not entitled on the one hand to assert as *actually* existent except what we know; neither are we, on the other, warranted in denying as *possibly* existent what we do not know. If T. Salwey had acted upon this principle, he would have hesitated to call B.'s name for *Sambucus Ebulus* "a mistake." Both names, "Danewort" and "Dane's blood," belong to the plant. Thus in Warsae's "Danes and Norwegians in England" we read, "The so-called dwarf elder or Danewort is said to have germinated from the blood of the fallen Danes. It is therefore called Dane blood or Danewort, and flourishes principally in the neighbourhood of Warwick, where it is said to have sprung from and been dyed with the blood shed there when Canute the Great took the town." And as to the argument "that no plant could have ever been called by such a name, unless the flower had been of a black purple or crimson flower, which might have given the idea of blood," the old folk lore of many counties does attach the idea of blood to this plant, white though its flowers be. Thus Mr. Lees, in his "Pictures of Nature around Malvern," tells us that a long patch of it grows near Lower Wick, in Worcestershire, and there "the first blood" is said to have been spilt in the contest between Charles I. and the Parliament. Similarly in Wales, the idea is that this plant can *only* grow where the ground has been moistened by the blood of man shed either in battle or by murder. "*Llysau gwaed gwyr*," "Plants of the blood of man," say the Welsh.—*Lester Lester, Monkton Wyld.*

The Cladoniei (Lichens).—In the *Annals of Natural History* for November the Rev. W. A. Leighton has published a re-arrangement of this group of lichens as tested by hydrate of potash.

Clathrus cancellatus.—It may gratify such readers as are interested in fungi to record the occurrence of the very rare *Clathrus cancellatus* in Teignmouth. I gathered it this afternoon growing on the hard earth of a perpendicular bank under the shade of trees. I inclose you a sketch of the plant of the size when gathered. Since being placed in Thwaites' fluid for preservation, it has enlarged very much. The external skin is of a bistre brown, one portion, after bursting, adhering to the top of the plant, the other to the slight stem which is wholly concealed in the ground. The plant itself is a bright orange, darker towards the edges of the cancelli, the whole plant rugose—the interior surface covered with good-sized papillæ, of a deeper orange than the outside, changing to a dull green in ripening. The scent of the whole plant is most offensive. I believe that this is the second time that this rare fungus has been gathered in same grounds this year.—*R. Cresswell, Teignmouth.*

MICROSCOPY.

Scalariform Ducts.—A short time since a friend of mine showed me some very fine scalariform ducts from ferns, and he said they had been obtained by prolonged maceration (a year or so) in hydrochloric acid. As I have found out a much shorter method of preparing them, I send it, thinking it may be useful to many who have neither seen them nor yet know how to get them. I simply boil the fern-stalks, cut into short lengths, in a solution of *caustic* soda (about 30 grains to the ounce of water) for a quarter of an hour or so; then take them out and crush them *well* in a mortar, replace them in the solution, and boil again for five or ten minutes, when they will be found to have become quite soft. The cuticle can then be picked out and thrown away. Allow all the fine fibres to settle, and pour off the dark-coloured fluid, and boil them three or four times in water, adding to the last water a few drops of hydrochloric acid, which whitens the mass considerably. On crushing a little of this fibre in a live-box, the scalariform ducts may be easily seen, their position noted, and, on removing the cover, picked out. In this manner I have obtained them from fern-stalks cut at Woking in the early summer, which had become as dry and hard as wood. Some of the ducts I have isolated in this way are $\frac{3}{10}$ of an inch long. The ladder-like markings are best seen when mounted in fluid. Care must be taken in pouring off the various waters, as I have found some of the best ducts in them, on allowing time for settling. The same process will answer equally well for preparing the fibre from flax, New Zealand flax, &c., as well as obtaining the spiral vessels from rhubarb, &c. Although microscopists are credited with great patience, yet twelve months is a long time to wait for a result, so I hope this paper may be the means of adding an additional object to many cabinets.—*John Davis, Stowmarket.*

Gun-Cotton Muslin.—A piece of Gun-Cotton Muslin (*i.e.* muslin converted into tri-nitro cellulose) forms a very pleasant polariscopic object, especially if the "red and green" selenite is used. It must be mounted in balsam.—*John Davis.*

Movements of Diatomaceæ.—I was reading the other day a paper in the *Popular Science Review* on the movements of the Diatomaceæ, which does not altogether satisfy me, and upon which I shall be glad of further information. I have for years thought they moved by means of some part of the body which they could protrude something like a snail; but not from the raphe, at least in the Pleurosigma. The shell of this, I think, is bivalve, as I have occasionally found the two sides apart; one instance of which I met the other day, of which I send a sketch, as it appeared partly turned round. Seen on the flat side, there was, of course, no appearance of any separation; and seen edgeways, there was merely an angular opening like No. 2. I have also now and then, when looking at the Pleurosigma sideways, seen a curious movement along the edge of the shell, as if it opened at one end, gradually extending to the other, and closing again as it went on. This I attributed to the undulating movement of the foot. There is evidently something protruded from the shell, as, watching some small species the other day, when the pointed end approached a small body, before it quite touched it, it drove it on before it; and that it could fix itself was shown by its drawing a foreign body with it when it moved backward. This moving a piece of anything before it, and drawing it after it, without the shell touching, I saw in numerous instances, but it did not take place when the edge of the shell approached anything.—*E. T. Scott.*

New Zoophyte.—The Rev. Thomas Hincks, while dredging last autumn in Swanage Bay, found a new zoophyte, belonging to the *Sertularidæ*, which he refers to a new genus, under the name of *Ophiodes mirabilis*. It was not uncommon in from five to eight fathoms water. One peculiarity noticed is the webbed tentacles, a character which had only hitherto been observed among the *Campanularidæ*. Technical description and figures are contained in the "Annals of Natural History," for November, 1866.

Coloured Tracts of the Ocean.—On an average sixty-four animalcules of one kind were found in every cubic inch of water submitted to examination, and on the supposition that they were equally numerous throughout the body of coloured water, Mr. Scoresby computed that a surface of two square miles, and fifteen hundred feet deep, contained no less than twenty-three thousand millions of millions of animalcules belonging to one species. And, in order to form a more definite idea of this vast multitude, he remarks that the number of years required for eighty thousand persons to count them would be equal to the period that has now elapsed since the creation of the world.—*Brocklesby's Microscopic World.*

Pollen Granules.—In a single blossom of Dandelion, I counted no less than 243,600 pollen granules; a flower of Pæony gave on an average 3,654,000, and in an entire Rhododendron plant the pollen grains amounted to the wonderful number of 72,620,000.—*Dr. A. H. Hassall, in Ann. Nat. Hist.*

Poduræ.—At the November meeting of the Quekett Microscopical Club, Mr. S. J. McIntire read a paper on this subject, which created considerable interest, three or four species of these curious creatures being exhibited alive.

NOTES AND QUERIES.

Preserving Birds, &c.—The only method of preserving birds, &c., effectually from the attacks of moths, &c., is that invented and employed by the late Chas. Waterton; viz., completely saturating every portion of the plumage in solution of corrosive sublimate, taking the greatest care that no part, however small, escape the action of the solution. Mr. Waterton recommends, in order to insure this, that the bird be completely immersed previous to being skinned. This I have found to answer admirably. When the bird is dry after immersion, the skinning may be proceeded with in the ordinary manner, and the interior painted over with the same solution. Moths or mites will never attack specimens prepared like this, and I have no doubt but that the uncased specimens mentioned by "G. B. C." were prepared in this manner. Two drachms of corrosive sublimate in one ounce of spirits of wine, is, I think, the proportion. Put the former into a bottle of the latter, and let it stand twenty-four hours, when draw off the clear portion, and it is fit for use. The solution may be applied to the feathers with a camel-hair brush; but this is not nearly so effectual as complete immersion.—*J. S., Jun.*

Ticks on Puffin.—Both the Razor-bill and Guillemot (which are the birds usually called Puffins on this coast) are much infested with ticks; nor is the true Puffin better off. Out of scores of specimens, I have seldom found one that had not some of the parasites on its head or neck, but never any other part. On the neck of the Shag, too, I have seen ticks fully as large as an ordinary waistcoat-button. They closely resemble the common dog-tick; but I cannot say whether the species is identical.—*J. S., Jun.*

Confervoid Growth in Slides.—Could you inform me of a means of preventing confervoid growths among diatoms prepared for mounting? I have treated a pure gathering with sulphuric acid and chlorate of potash, and washed with distilled water; but however quickly the operation is performed, these troublesome growths appear, and spoil my slides. I have tried benzole, creosote, and spirits of wine, shaken up in the water, but without success. I shall be very much obliged if you can aid me in this matter. The growths, I may add, show themselves in the water in which the diatoms are washed, and do not arise from damp on the slides *after mounting*.—*J. M. S.*

Asphalte Varnish.—When Mr. Davies's work came out two or three years since, I prepared several of his receipts; amongst others, the Asphalte Varnish, which several correspondents have had a difficulty in making. Having succeeded in my first attempt, I will describe the process for the information of the less fortunate. In the first place I procured a lump of *genuine* india-rubber (not the black squares usually sold), and cut it in very thin slices, dipping the knife in water, which makes the operation much easier. These slices I put into the *mineral* naphtha, placing the bottle in the sun inside a window, frequently shaking it, and in ten days it formed a clear solution, to which I added the asphalte (which must be pure) in small lumps, and by shaking the bottle frequently it was quite dissolved, and formed an excellent varnish in less than a week.—*J. J. Orley, Yarmouth.*

Common Prawn.—Is there any parasite that attacks the common Prawn? I was very much amused the other day in watching one of my Prawns cleaning himself. Besides the performances usual on such occasions, I observed him suddenly seize hold of one of his antennæ with his two large claws and hold it perfectly firm, while with the smaller pair he rubbed and scratched, and finally pulled portions off a black spot on it that appeared no larger than a pin's point. Seeing him near the surface of the water some days after, I perceived that the spot still remained, and that the antenna was notched through half its thickness. Soon after this he exuviated, when it broke in half at the diseased place, and it has not grown since.—*John D. Richardson, Jun.*

Taxidermy.—In answer to your correspondent G. B. C., I would suggest that he tries a weak solution of corrosive sublimate with camphorated spirits of wine, and after his specimen is set up, to paint it over with the solution with a camel-hair brush. It dries immediately, and does not affect the colours.—*H. H. Knocker.*

Mounting.—Your correspondent in Science Gossip, "James W. Impey," says he finds difficulty in getting the balsam to harden when mounting objects for the microscope. Perhaps he uses the balsam too thick, and puts too much of it on. I thin mine with spirits of turpentine, and use as little of it for each object as possible. I let them lie under the clips for three or four days, or some a week, if the object is thick, and then lay them flat on a board for three weeks or so, when I always find the balsam on the outside hard enough to scrape off, and allow of the slide being cleaned and papered, which prevents any future injury, and I never find any trouble with them of that sort at all.

Again, "T. B. N." wants to know how to mount objects which have been steeped in liquor potassæ without the milky look they have when put up after merely washing in water. If the objects are thick, the best way is to give them a good squeeze between two glasses before washing, then wash in clean hot water to get rid of the potash, and then lay them under pressure between pieces of fine clean blotting-paper till dry; then wash or soak in turpentine as it may be needful, and mount in thin cold balsam as usual. If your correspondent takes this plan, he will have no further trouble with them.—*F. Fletcher, New Street, Wakefield.*

Raphides.—I have never seen any mention made of the effect of Raphides upon the skin. I believe Raspail says the circular ones are composed of phosphate of lime. If this be so, then their effect on the skin must be owing to their sharp points. Some time ago I was looking at them in the bulb of the hyacinth, and happened to touch my face with my hand. It soon began itching and smarting, and at last swelled up, and looked very much as if it had got erysipelas. The small bodies in the milky juice of the common Euphorbium produce the same kind of irritation, but they have rounded ends. The Raphides in the fruit of the Bryony are very large.—*E. T. Scott.*

Carmine for Injections.—Can you tell me how to prepare the carmine for transparent injections? I have tried carmine diffused in strong ammonia, but find that the gelatine does not set well, and the colour is apt to exude and tinge other parts.—*J. B. B.*

Scarcity of Insects.—B. C. Ringwood complains of the scarcity of Lepidoptera this season. I can re-echo his complaint in this particular; but I do not think the causes that militated against them hindered, in any way, the development of the Hymenoptera, which were in this neighbourhood (within ten miles of Oxford) extremely plentiful. My own notion is that the cause is due, as your correspondent suggests, to the excessive rainfall and the low summer heat combined.—*F. R.*

"As Dead as a Herring."—In answer to your correspondent "W. F.," all authors on Ichthyology mention especially that the Clupeidæ (the Herring family) die almost immediately when taken out of water, as also do the Scomberidæ (Mackerel family), and Salmonidæ (Salmon tribe), but the Herring appears to die soonest. The mackerel midge (*Couchia glauca*), Mr. Couch says, dies *immediately*. This fish belongs to the Cod family (Gadidæ). The general law received is, that fish having a high degree of respiration, low muscular irritability, and require much oxygen (called surface-fish), die and decompose soon; whereas bottom fish, which have the contrary nature, remain long alive, and do not decompose rapidly when taken out of their element. —*H. H. Knocker*.

In reply to "W. F.'s" query, it may be remarked that, except in the immediate vicinity of fishing towns, people are not generally familiar with the Herring in its living state; comparatively few have seen it alive. The prevalent idea of the fish is therefore confined to its dried condition, as the red herring, in which it is undeniably *dead*. Probably this has given rise to the simile. Many fish die more quickly than the Herring, but these are equally little known in their living state.—*L.*

Dead as a Herring.—It is pretty clear that your correspondent loses the point of the quotation by the omission of the context. As long as I remember the comparison it has stood thus—"As dead as a *herring that's red*.—*G. T. S.*

The Blue Bird of Galilee.—Will T. G. P. allow one who has lately been reading Tristram's "Land of Israel" to suggest that the Blue Bird of Galilee is most probably the Blue Rock-thrush (*Petrocincla cyanea*), and not the Sun-bird (*Cinnaris osea*)? The habitat of this latter bird is the Ghor or deep valley of the Jordan and Dead Sea, more especially about Jericho, and not the rocky hills of Galilee.—*Lester Lester*, *Monkton Wyld*.

Cordon bleu (Science Gossip, p. 262.)—The Cotinga cordon bleu is *Ampelis Cotinga*, from Guiana, &c.—*B.*, *Melle*.

The Swallows and the Cholera.—A curious fact happened this year among the swallow tribe. In the middle of July, when there were some traces of the prevailing disease in the atmosphere, they left their homes and sometimes their young ones, in many places, and went to take refuge in the woods or in parts of the province where the cholera had not made its appearance. Immense swarms were seen in a village where, neither this year nor in 1857, was there any invasion of the sickness. On the 12th, 13th, and 14th of August, a general return took place in our neighbourhood, as well of the swallows as of the martins and swifts.—*B.*, *Melle, near Ghent*.

Queenapple.—Can any reader inform me what kind of fruit the "Queenapple" is; or if it be a district name for the Guava?—*E. W.*, *Manchester*.

Scrawl.—What fish or other animal does Tennyson mean by "the scrawl," in his poem of "the Sailor Boy"?

"In thy heart the scrawl shall play."

M. M.

Cement for Fossils.—The fossil remains of reptiles, &c., in the British Museum are embedded in a cement resembling in colour the rock from which they have been disinterred; the bones also appear to be coloured and slightly varnished to make them stand out in bolder relief. Will any of your obliging correspondents be good enough to inform me what kind of cement is used—say for lias fossils; likewise the varnish for same, as well as other fossils which require to be shown up more distinctly than they appear when first cleaned out?—*L. F. R.*

Mounting in hard Balsam.—For several years I have been in the habit of mounting objects in balsam by hardening the balsam previous to putting on the glass cover. Either hold the slide with the object in balsam over a paraffin or spirit lamp, or place it on a support before the fire, until the fluid has so far evaporated from the balsam that it sets quite hard on cooling. I then take a thin glass cover, holding it with a pair of forceps, and drop on it a *little* balsam diluted with spirits of turpentine, carefully place it over the object, and expose the slide for several hours to a very gentle heat to incorporate the hardened and fluid balsam.—*J. B. B.*

Dyeing Grass.—Can you inform me with respect to the best materials and method of using them for the purpose of dyeing moss and grasses to be introduced into a case of stuffed birds?—*J. H.*

The Swallows.—While in charge of a trading station at the mouth of the Niger, about the beginning of November, last year, I noticed during all one day innumerable swallows flying overhead in a northerly direction, that is, from seawards inland. Amongst them and accompanying them in their flight were several hawks. I did not then think of the occurrence in connection with their annual migration, but the several notices in this journal on this subject, from time to time, brought it to my recollection. Flying as they were from southwards, where could they have come from; from America? They would not, I should think, begin their return to England so soon as November.—*E. J. L. Simmonds*.

Shell-money.—According to the relation of a recent voyage, transactions are performed, in Soudan, by barter, or by means of small shells picked up in the Niger, and called there *ouddas* or *woodahs*. Could any one tell me the scientific name of those shells? They cannot be the cowries (*Cyprea moneta*), these being marine shells.—*B.*, *Melle*.

Entada.—I shall feel greatly obliged if any reader will tell me how to distinguish the seed of *Entada pursætha, D.C.*, from that of *Entada gigalobium*; both are used for making snuff-boxes, &c.—*B.*, *Melle*.

L'Envoi.—And so I end this little book, hoping, even praying, that it may encourage a few more labourers to go forth into a vineyard, which those who have toiled in it know to be full of ever-fresh health, and wonder, and simple joy, and the presence and the glory of Him whose name is Love.—*Glaucus*.

NOTICES TO CORRESPONDENTS.

T. R.—The supposed fossil is a nodule of iron pyrites.

J. H. G.—We could not expend time in the examination of an object in which you can find "no structure." Single slides are best sent by post in the small black cases sold by opticians.

B. T.—The slides would be acceptable, and may be sent to the Secretary, 5, Hanover-square, W. We have heard nothing of the supplement you allude to.

H. H. K.—The small crabs are *Pinnotheres pisum*.—*J. E. G.*

E. F. B.—The parasite of the prawn is *Bopyrus crangonus* Latr.—*J. E. G.*

J. G.—No. 1, *Salsola kali*; 2, *Salicornia herbacea*; 3, *Chenopodium murale*; 4, *Parietaria diffusa*; 5, *Corrigiola littoralis*; 6, *Lepigonum marinum*.

J. H. C. informs us that he has had 170 applications for Adriatic sand, as announced in Science Gossip.

H. W.—Cases for yearly volumes of Science Gossip may be had of the publisher at 1s. 6d. No other cases are published.

A. B.—Much more handsome cells are turned out of wood.

J. P.—No better than English oak. We cannot insert trivial exchanges which will bring credit to no one.

J. W.—No improvement on the ordinary section machine, and could not be made by an amateur.

W. E. M.—Had you read carefully, you would have observed that E. T. Scott stated he *made* the glass himself.

J. A., Jun.—If you signed your name in full, you would have no occasion to complain of us. The remedy is in your own hands.

A. L.—The colours of caterpillars vary much after their eastings.

C. A. J.—We cannot name a plant from mere leaves, without either flower or fruit.

W. H. B.—The Sowbread (*Cyclamen*) flowers in autumn.

Wood, Robert.—The eggs of the insect.

C. C. W.—We know of no microscopical club in London which professes to admit lady members.

H. Y. J.—We can see no parasite.

J. B.—It is probably the Long-eared Bat (*Plecotus auritus*), but your figure does not give the character of either nose or eyes.

H. E. W.—Dried plants are not usually mounted in books, except Ferns, for which albums are sold at 192, Piccadilly.

W. L. H.—The attempt to preserve fungi in solution has been tried, without much success. You must describe what kind of bottles you allude to before we can answer.

H. P. A.—The spider is *Salticus scenicus*, as far as we can judge from its dried condition.

W. T. H.—A species of *Ichneumon* parasitic on the Buff-tip Moth.

E. J. S.—"Lindsay's British Lichens," 7s. 6d., published by Routledge & Co., London.

C. P. S.—We have not seen the pollen of *Monstera deliciosa*.

E. G. V.—On cabbage-leaves.—*Macrosporium Brassicæ*.

P. A. J.—A piece of recent coral, too fragmentary for identification, possibly *Meandrina*.—*R. T.*

C. D.—The cocoon of one of the *Cimbecidæ*, of the order *Hymenoptera*.—*F. M.*

C. B.—The eggs of a spider.

E. B.—Caterpillars of a Lepidopterous insect, but, being dead and shrivelled, could not be identified.—*F. M.*

R. S.—The best book we know of for your purpose is "Noad's Student's Text-book of Electricity," just published by Lockwood & Co.

C. P. S.—Why attempt to *improve* upon Nature? Let the poor creature have its wintry sleep.

J. G. B.—Ecclesiastes ii. 14. Science Gossip, vol. ii., p. 228, figs. 217–219.

E. H.—Flowers of *Cruciferæ* have a tendency to become double.

L. M. P.—*Thelephora laciniata*.

T. R. (Portsea).—The marine diatom is *Actinocyclus subtilis*.—*F. K.*

M. E.—If you keep plenty of camphor in your drawers, all will be well. No objection to the corks you name.

H. T.—The common European tortoise (*Emys lutraria*). Mr. King, Portland-road, London.

E. W.—When we depend upon others, we cannot always be prompt.

J. G. O.—An experienced conchologist will "offer no opinion."

E. H. C.—Silkworm gut is chiefly imported from China and Italy.

A. G.—Slide broken up, and contents nowhere to be found.

Q. M. C.—The next meeting of the Quekett Club will be held on 28th December. Paper by M. C. Cooke on "Contributions to Microscopical Science during 1866."

EXCHANGES.

Polycystina (mounted), or leaf of Deutzia, for other good objects.—G. E. Cox, 9, Mincing-lane, E.C.

Eggs of Guillemot, Herring-Gull, Kittewake, and Razorbill, for eggs of Reeve, Dunlin, or Whimbrel.—John H. Ashford, Scarbro'.

Moose-Deer Hair for other objects.—W. H. Reid, 12, Bonaccord-lane, Aberdeen.

Plants of Algeria, Spain, France, Switzerland, and the Pyrenees, for those of other European countries.—G. M., 4, Lawn-villas, Wood-green, London, N.

Plants.—*Dianthus prolifer*, *Alopecurus bulbosus*, and *Scirpus Savii*, for mounted Diatoms or Raphides.—J. W. White, 80, St. Mary-street, Weymouth.

British Birds' Eggs for British Birds or other Eggs.—W. M. Cole, 93, St. Helen's-street, Ipswich.

Bramble Brand, or Rose Brand.—Send stamped envelope or Meadow-sweet Brand to G. E. Q., 109, Long-lane, Southwark.

Corallines in exchange for other objects.—F. S., Post-office, Rugeley, Staffordshire.

Perch Scales, unmounted, for other objects of interest.—J. H. C., Royal Infirmary, Edinburgh.

Soundings of Atlantic Telegraph Expedition of 1865 (mounted) for *Arachnoidiscus* or *Isthmia*.—W. Freeman, 2, Ravensbourne-hill, Lewisham-road, Greenwich, S.E.

Skins of British Birds and British Birds' Eggs for other Eggs.—John M. Hartley, 60, Elmwood-street, Leeds.

British and Foreign Mollusca for other species. West African Land and Freshwater Shells for rare British or Foreign.—E. L. Simmonds, 8, Winchester-street, S.W.

Rare British Seaweeds, Flowering Plants, and Ferns, or cuttings of good greenhouse plants.—Miss Gifford, Minehead, Somerset.

Pollen of *Cobæa scandens*, mounted opaque, for Diatoms or Polycystina.—E. W., 21, West-street, Banbury.

Carboniferous Fossils (named) in exchange for Minerals or named Fossils.—Send lists to J. R. S. Hunter, Carluke, N.B.

Pleurosigma Formosum.—Twelve good slides of British and Foreign Diatoms offered for a good gathering of this species by B. Taylor, 57, Lowther-street, Whitehaven.

British Birds' Eggs for others.—F. Horton, Powick, Manchester.

BOOKS RECEIVED.

"The Technologist." No. 4 (New Series), November, 1866. Kent & Co., London.

"The Student's Text-book of Electricity." By Henry M. Noad, Ph.D., F.R.S., F.C.S., &c. With 400 Illustrations, post 8vo., pp. 519. London: Lockwood & Co.

Communications Received.—W. H. B.—R. H.—J. W.—C. A. J.—C. S. G.—F. F.—W. M.—A. L.—C. W. B.—G. E. C.—J. G. O.—J. H.—J. J. F.—E. B.—H. E. W.—G. S. (Aberdeen).—T. C.—G. S. (Crail).—J. A.—H. H. K.—W. E. M.—E. T. S.—W. M. C.—W. H. G.—J. W.—B.—J. M. R.—J. P.—J. B.—H. W.—A. B.—E. G.—J. J. O.—W. R.—H. W.—L.—F. R.—P. S. B.—J. B.—F. R.—W. M. C.—E. G.—W. B.—F. A. A.—V. F.—J. S., Jun.—J. D.—W. H. C.—W. T. H.—J. D. R.—E. N.—H. E. W.—E. K. B.—W. L. H.—F. G. P.—A. M. C.—A. B.—E. J. S.—C. P. S.—E. G. W.—J. C. D.—E. L. R.—C. B.—J. G. B.—T. S.—W. F.—G. E. Q.—T. S. W.—R. G.—E. H.—L. L.—A. D. M.—E. W.—W. F.—G. T. S.—B. (Melle).—W. J. S.—J. H. C.—F. S.—L. M. P.—A. H.—M. E.—W. G.—E. G. (Matlock).—J. B. B.—G.—H. T.—E. L. S.—A. J. J.—J. P.—J. H. H.—E. G. W.—W. J. S.—E. H. C.—H. J. B.—J. R. S. H.—E. W.—J. W.—B. T.—A. W. D.—H. J. B.—H. S.—W. R.—F. J. B.—W. J. S.—T. L. N.—T. N. B.—J. T. B.—W. R. T.—J. H. G.—T. R.—G. S. R.—J. G. P.—C. C. K.—W. G. D.—W. A. S.—J. H. G. T. P. F.—M. D. P.—F. A. H.—J. H. C.

Flying-Fish Scales, sent on behalf of J. A. Perry to C. A.—H. A.—A. A.—G. E. B.—G. H. C.—J. F. C.—G. E.—J. H. G.—G.—W. G.—C. H.—W. H.—J. C. H.—C. A. J.—C. E. L.—W. T. L.—R. H. M.—W. E. M.—P.—D. R.—H. T. R.—J. S.—G. E. S.—A. S.—W. S.—E. W.—J. W.—F. W.—T. E. W.—J. T. Y.—A. B.—J. H. B.—F. B.—A. B. (Glasgow).—W. F.—J. C. H.—T. M. H.—J. J. A.—J. H. M.—J. M.—J. N. M.—C. T. N.—Miss N.—S. W. N.—W. P.—T. R.—J. T.—J. S.—J. S. (Bedford).—J. S. (Lincoln).—E. G. T.—H. W.—C. B.—W. B.—R. G.—G. T. P.—E. G. W.—H. P. A. J. B.—W. B. (E.C.).—D. (Laleham).—E. G.—J. H.—T. N.—H. W.—F. W.—J. B.—T. B.—W. B.—J. B.—T. B.—H. C.—F. W. C.—W. J. D.—J. R. E.—C. S. G.—W. G.—W. G., Jun. —W. H.—H. (Sheffield).—D. H.—J. H. K.—J. L.—T. M.—R. M.—J. P.—G. E. Q.—W. T. R.—Dr. S.—F. S.—W. W. S. —T. (Newark).—W. (Liverpool).—T. W. W.—E. A.

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