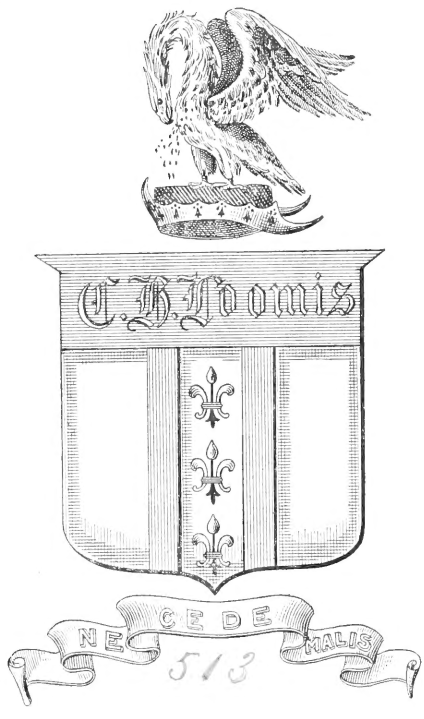
SCIENCE
GOSSIP.


C. H. Loomis
NE CEDE MALIS
513

HARDWICKE'S

SCIENCE-GOSSIP

For 1865.

HARDWICKE'S

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," THE "BRITISH REPTILES," ETC. ETC.

LONDON:

ROBERT HARDWICKE, 192, PICCADILLY.

1866.

COX AND WYMAN,
ORIENTAL, CLASSICAL, AND GENERAL PRINTERS,
GREAT QUEEN STREET, LONDON, W.C.

AVANT-PROPOS.

DURING the "eventful year" just drawing to a close, we have studiously avoided thrusting ourselves and our "hobby" before our subscribers. Twelve monthly numbers of GOSSIP have regularly made their appearance, and now we think the time and opportunity has arrived to congratulate ourselves upon the success which we have achieved. That we *do* congratulate ourselves there is not the slightest doubt, and we congratulate our subscribers also. The cause for congratulation in the latter case, as well as in the former, lies in the fact that HARDWICKE'S SCIENCE GOSSIP has proved a decided success, even beyond our most sanguine hopes, when we first planned its constitution. We have no doubt that our readers rejoice with us in this consummation, since our success proves that we have produced just that sort of companion which they desired. Whilst, however, we shake hands with ourselves, and feel good-humoured towards everybody, as all successful people do, we by no means wish to flatter ourselves into the belief that our work has been perfect. Any one desirous of being critical, may turn over these pages and point out defects which might have been remedied, or omissions which might have been avoided. Good-natured friends will make allowances for a few failures in execution, where the general intention has been in the right direction. We have had much to learn, and we hope that, from our experience of the past, we have profited for the future. It has been our good fortune to secure the kind offices of many scientific friends, without whose valuable aid we could not have hoped to have rendered our "Notes and Queries" and "Answers to Correspondents" so complete. Although we have no permission to quote the names of those to whom we refer, and who possess a European reputation in their own special branches of Natural History, we cannot refrain from according to them our thanks. Should there be any of our numerous contributors who feel aggrieved that their communications have not been inserted, or their queries answered, we trust at this genial season, when friendships are cemented, and follies and failings forgotten, that they will extend to us full and free pardon for offences which have been unintentional. So sudden and almost overwhelming did the correspondence speedily become, even before the machinery could be brought into working order, that we are more surprised at not oftener hearing the voice of complaint, than we should have been at a postman's deluge of angry letters. Let this volume be accepted as an earnest of our anxiety to supply month by month a healthy four-penny-worth of "Gossip;" and with the assurance that it shall be our aim to progress and improve, we cordially wish our friends, contributors, and subscribers, all the world over—

"A Happy New Year!"

INDEX.

LIST OF ILLUSTRATIONS.

SCIENCE-GOSSIP.

WHAT'S YOUR HOBBY?

Every good man has his Hobby, and every hard-working man should have one.—*Athenæum.*

RATHER a vulgar question, and withal a somewhat impertinent one; but we hope that the reader really has his "hobby," and, in that case, he is sure to grant us a free pardon. By a "hobby" we mean some study or pursuit which is his own free selection, and to which he devotes himself in his moments of leisure; something in which he takes delight after the toils and labours of the day are over,—when the rough struggle and mechanical routine are past, by means of which substance is earned to supply the wants, wishes, or luxuries of life; a something which comes "like sunshine after rain," to brighten an otherwise monotonous career, to supply food for reflection, and give zest and interest to a country stroll. They deserve little respect who can lay their hands upon their hearts and affirm that they have no "hobby;" that all besides "daily work" in their life is a blank. It may be that the "hobby" is one the name of which may scarcely be quoted: it may supply no food for the mind,—nothing for reflection,—no lasting pleasure,—yet it is a hobby nevertheless. Our present object is to induce all whom we have the good fortune to address, to answer for themselves the question we have propounded; and if they cannot do so with satisfaction to themselves or their friends, to set about acquiring a "hobby" at once.

To enable all who may desire a scientific hobby of their own to make such a choice, we will volunteer one or two suggestions. Let it be remembered that whilst we do so it is by no means with the desire of depreciating good hobbies of another kind. A man may be an amateur artist, mathematician, linguist, engineer, or devote himself to the study of history, poetry, philosophy, logic, or many other subjects equally as praiseworthy, as effectual in supplying food for the mind, and as certain to elevate his intellectual character, as aught we may have to suggest. Such, and such, we heartily wish "God speed." But if you have *no* hobby, it is cheap and easy to acquire one. Ask of some friend, who has been in the habit of strolling away from your side whenever you have walked ten miles into the country together, and come suddenly upon a quarry or a chalk-pit, what he thinks of a little geological knowledge as an experiment, in the way of furnishing food for reflection, that shall supply material on which it can exercise itself, it may be, during the merely mechanical operations of daily life. He shall be your evidence that the toil is lighter, and the day shorter, because the intellectual as well as the physical man has received food. He will probably finish with the inquiry, "What is *your* hobby?"

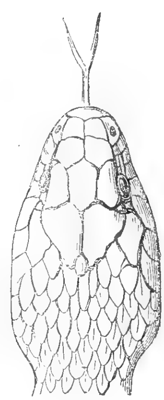
It may be, that instead of seeking "sermons in stones," your friend has been led aside by the unknown whistle of some bird, by the eccentric gyrations of some unknown insect, by the desire to explore some silent, muddy puddle, or ditch half-choked with weeds. Ask of him whether there is any solace, any mental enjoyment, any feeling of manhood elevated in the pursuit of ornithology or entomology, and he will answer you with a smile, as if he doubted whether any one could ask such a question in earnest; and immediately, as he answers, he inquires, "What is *your* hobby?"

Should you have a friend addicted to the habit of bringing home bits of wild flowers in his hat, mosses in his pocket, or occasionally be caught with a flat, brown, japanned sandwich box, when you know that he never carries sandwiches out in it, but will be seen to bring home many strange things in it,—ask of him, as he plucks petal from petal—as simple girls are wont to do, in the hope of unsolving thereby some hidden mystery of the future—ask of him whether the pursuit of his study of plant-life, of wild flowers, of mosses, does not give an interest to every half-hour's stroll along a hedgerow or into a wood, which it would not otherwise possess; whether it has not given to him a new sense; whether it has not unfolded to him a new world; whether, in fact, he is disposed to relapse again into inanition; and the chances are that he will ask you, good-humouredly enough, in return, "What is *your* hobby?"

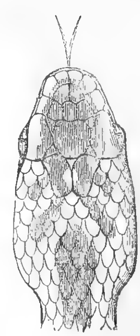
But, above all, can you not purchase for yourself a Microscope? One that will answer all your purposes can be supplied you for a moderate sum. What you *will* do with it depends much upon yourself and your own inclinations. What you *can* do with it, is more than we have space to tell. Within that instrument lies the revelation of a world equally variable and populous,—nay, even more variable and populous,—than that which is revealed to the unaided eye of man. If you only know as much of the world of nature as you can see with your naked eyes, you have never seen half what you might have seen, and really know nothing of the greatest marvels in all Nature's handiwork. Some of the wonders of minute life, as seen through this medium, will continually be presented to the readers of these pages; but all that we can ever hope to do, will be but as a drop of water from the ocean, and can only serve to indicate the direction which those may pursue who are in search of a "hobby."

If already these, or any similar pursuits employ your moments, few though your moments of leisure may be, you will need no solicitation on our part to continue such a course. The pleasure derived from the pursuit of knowledge; the power obtained by the possession of knowledge; the vigour imparted to the mind, the recognition of an object in life, besides the mere toil for "daily bread," all exert their influences in one direction. And, unless we are much mistaken, few indeed are the instances in which, having mounted a hobby of his own, the rider is disposed to be unhorsed. This is especially the case where the "hobby" costs but little to keep, and when it partakes of a mental character.

VIPER OR SNAKE?



SNAKE.



VIPER.

EVERYBODY involuntarily shudders at the name of a *snake*. Very few possess courage enough to attempt staring one out of countenance, or staying to count the number of scales on its head. Fancy oneself deeply intent, with nose unusually low, seeking the ruddy wild strawberry on a sunny hedge-bank, and even whilst smacking the lips with the relish of the tart little fruit but lately conveyed there, about to pluck another yet larger and redder, when lo! beneath our very fingers glides the sleek, attenuated form of the reptile—ay, within ten inches of our depressed nose. Under such circumstances, should we be surprised at finding ourselves starting back; at feeling a slight and momentary sensation, as of a drop of water trickling down our back; or at forgetting to observe whether the intruder was really a viper or a snake?

"Viper or snake, *snake* or *viper?* And is there a pin to choose between them?" inquires a voice at our ear. To this query we will attempt an answer, because it is a presentiment we have, that there is more romance amongst us, and less sound knowledge, with regard to reptiles, than any other of the objects of natural history. Under the term *reptiles* we include lizards, slow-worms, snakes, vipers, frogs, toads, and newts. The latter perhaps better known since aquariums and vivariums have become fashionable than ever they were before. All reptiles are cold-blooded. They possess a heart, it is true; but, as compared with higher organisms, an imperfect one, inasmuch as it has but one ventricle: the result of this is that respiration is imperfect, and as respiration gives heat to the blood, which in turn sustains the heat of the body, it follows necessarily from their organization that the temperature in reptiles should be very low. Let a frog leap upon your hand, or take a newt between your fingers, and the chilly, smooth, apparently slimy appeal to the sense of touch, will carry conviction far swifter than argument.

Of reptiles possessing the snake-like form we have but three species indigenous to this country, and one of these, the little "slow-worm," differs sufficiently in a scientific sense, as well as in its general size and appearance, to be excluded from our present consideration. The other two species are the common snake, and the viper or adder. Although we may have heard, in youthful days, of red vipers, blue-bellied vipers, and black vipers, and adders, yet there is but one species of reptile to answer to all these synonyms.

It is well known that of the serpent race there are some that are venomous, and others that are not; each of these groups has its representative in Britain, one being perfectly gentle and harmless, the other dangerously, even if not fatally, poisonous. It is a firmly-rooted belief in some districts that the bite of the adder, however slight, is certain death to the victim; whilst amongst naturalists there remains a doubt whether the fatal terminations are not very exceptional. Notwithstanding the dread of the common snake which is shared equally with the viper, it cannot be dangerous or injurious, because it possesses neither the glands for secreting, nor fangs for injecting the poison. Only schoolboys, we should think, entertain the notion that the slender forked tongue, so swift in its movements, possesses the sting.

Without attempting to set forth, in scientific form and terminology, the generic and specific characters of snake and viper, we may nevertheless endeavour to point out the features by which one may be distinguished from the other. The common or ringed snake (called *Natrix torquata* by scientific men) grows to the length of three or four feet; the general colour above is of a greyish olive with rows of black spots, it is of a greenish-yellow or lead colour beneath, marbled with black. At the back of the head are two brightish yellow spots, behind which are two black spots or bands, which sometimes become confluent. The scales on the head are nine in number and large. It is found all over Britain, especially in the neighbourhood of water, and in damper situations than the viper. This reptile is easily tamed, and Mr. Bell states, in his "History of British Reptiles," that he had one which knew him from all other persons; and when let out of its box would immediately go to him, and crawl under the sleeve of his coat, where it would lie perfectly still and enjoy the warmth. It was accustomed to come to his hand for a draught of milk every morning at breakfast, of its own accord, but would fly from strangers, and hiss if they meddled with it.

This snake, in common with others, changes its skin at intervals, but not, as has been stated, at regular periods, or once a year; but sometimes four or five times during the year, and often less, according to circumstances. In this "sloughing" process the reptile bursts the cuticle about its neck, draws out its head, the old skin is thrust back, and the snake crawls out. In this process the skin is turned inside out, and left on the grass to scare unwary females into the belief that they have seen a snake, little dreaming that they have only been shuddering at its old clothes.

What does the snake eat?—Undoubtedly it delights in frogs, young birds, birds' eggs, and even mice. Imagine the little shudder and start in which we indulged in boyhood, on putting our hand, with felonious intent, into a bird's nest (we couldn't see into it), and finding our fingers come in contact with the smooth cold folds of a coiled-up snake! It was the last time we *felt* for eggs before *seeing* them. That was an experiment too satisfactory in its results to require repetition. The author already quoted gives an interesting account of a snake's meal:—"If it be a frog, it generally seizes it by the hinder leg, because it is usually taken in pursuit. As soon as this takes place, the frog ceases to make any struggle or attempt to escape. The whole body and the legs are stretched out, as it were, convulsively, and the snake gradually draws in first the leg he has seized and afterwards the rest of the animal, portion after portion, by means of the peculiar mechanism of the jaws, so admirably adapted for this purpose. When a frog is in the process of being swallowed in this manner, as soon as the snake's jaws have reached the body, the other hind leg becomes turned forwards; and as the body gradually disappears, the three legs and the head are seen standing forwards out of the snake's mouth in a very singular manner. Should the snake, however, have taken the frog by the middle of the body, it invariably turns it, until the head is directed towards the throat of the snake, and it is then swallowed, head foremost." The frog is not only alive during the above process, but often after it has reached the stomach. Mr. Bell says, "I once saw a very small one, which had been swallowed by a large snake in my possession, leap again out of the mouth of the latter, which happened to gape, as they frequently do immediately after taking food."

This species is truly oviparous. Its eggs, from sixteen to twenty in number, attached together by a glutinous secretion, are deposited in some favourable locality, as a dunghill, and are hatched by the heat developed, or that derived from direct exposure to the sun. In this circumstance it will be seen to differ from the viper, to which we must now return.

The common viper (*Pelias berus*) is so variable in minor features, especially in colouring, that its varieties have been described as new species. It is more common in Scotland than the snake, and is everywhere abundant in heaths, dry woods, and banks. In many parts of England it is called the adder, for between the adder and viper there is no difference. Its general colour lies between an olive and a red-brown. There is a mark between the eyes, and a zigzag black line running the whole length of the body, with a row of irregular triangular spots on each side. The scales or plates on the head are smaller, and those of the upper parts of the body longer than in the snake.

The great difference exists in the possession by the viper of poison and fangs, and facility in using them. In the upper jaw, instead of a double row of teeth, as in the snake, this reptile possesses two or three long curved fangs, with a tubular passage down them, communicating with the glands that secrete venom at their base, and open at the apex. When not in use these fangs recline backwards upon the jaw, but are instantaneously erected, when required, by the aid of a small muscle. The poison is a tasteless, yellowish fluid, innocuous when swallowed, but venomous when it enters the blood through a wound. When the viper strikes its victim, the pressure on the tooth forces a small drop of the poison from the reservoir at its base, along the tube into the wound. It is well known that if venomous serpents of this kind are irritated and caused to strike at a stick, or some other object for a few times, the store of venom becomes expended, and that afterwards their bite is comparatively harmless, until a new supply of venom has been secreted. If the snake can be regarded as our miniature representative of the boa, the viper deserves to be considered as a little apology for the rattlesnake; the rattle, of course, being excepted.

Like many other poisonous reptiles, the young of the viper are matured in the egg whilst still in the uterus of its parent, and the thin membrane which enclosed them is ruptured at their birth, so that the viper seems to be truly viviparous, as the eggs are never excluded entire. There is a firm belief extant amongst country people, who make no aspirations to science, that the young of the viper, from twelve to twenty in number, when alarmed, rush to their mother, and glide one by one down her throat for security, whence they emerge again when the danger is past. This has been so often and so seriously affirmed, that, however much we may feel disposed to doubt, we are not in a position to deny.

As neither vipers nor snakes are to be seen during the winter months, it is but reasonable to expect that some explanation of this circumstance should be given. Reptiles do not generally like cold weather, therefore they proceed to winter quarters—

> Roll'd up like a ball
> In their nest snug and small,
> And then they come out in the Spring, poor things.

Vipers and snakes hybernate in company, coiled up and torpid, in hollows at roots of trees, without food or requiring any; and in the spring resume life and activity. During the winter the venomous species secrete no poison, and if aroused and driven to the use of their fangs, appear to be powerless for mischief.

As the aim of our present chapter is to

point out the features whereby the venomous may be distinguished from the harmless species, the *viper* from the *snake*, it will be well, in conclusion, to repeat what we have advanced on this subject, in as concise a manner as possible.

It is the *snake* that is harmless, and the *viper* that is venomous; the latter being innocuous also in winter, and most dangerous in the hottest weather. The snake is commonly the larger of the two, and is found in the dampest situations, generally in near proximity to water, in which it delights to bask. The snake has large plates, or scales, upon its head, few in number; in the viper they are numerous and small. The snake has no continuous line of a darker colour running along its body, but is spotted all over; the viper has a continuous line, zigzag and blotched, running down its entire length. The head in the snake is more depressed and acutely pointed in front than in the viper, which latter has a characteristic blotch something like the "death's head and thigh-bones" of the "death's-head moth," on the top of its cranium. Whether or not its venom is fatal, we would strongly advise our readers not to permit the viper to make an experimental dart at their shins. It is better to indulge in a shudder when only a harmless snake crosses our path, than make the mistake of hugging a viper to our bosom.

DUCKWEEDS.

UPWARDS of two thousand years ago, there flourished in Greece a certain philosopher, who, like Pliny and Aristotle, devoted a portion of his time and talent to the study of Natural History. The Grecian sage to whom we refer was Theophrastus, who wrote a treatise on plants somewhere about B.C. 300. This same Greek was acquainted with a certain aquatic plant, to which he gave the name of *Lemna*;* but what the precise plant was to which he gave that name is now uncertain; it might have been a "duckweed," and it might have been something else. In more recent times this name has been adopted for a group, or genus, of aquatic plants, known to every child, old enough to float a mimic boat in a mud-puddle, as "duckweed." It is to these plants—small, insignificant, and uninteresting, as they appear to be—that we propose adverting, with the view of pointing out wherein they differ from each other. Because, though many, perhaps, never looked at them with sufficient care or interest to recognise more than one form, others have detected variations to such an extent that they are enabled to point out three or four types, with distinct features of their own. Some may learn for the first time that four species of "duckweed" are found in Britain, others, cognizant of this fact, may wish to know more about them. In the first place, let us see in what points they all agree, or, as botanists would say, let us make out their generic character. All are floating plants, in no way attached to the soil, like the majority of plants, but vegetating and sailing like little boats on the face of the water. There are no real stems, and no real leaves, but the whole plant consists of little green fronds which look like leaves, and which are either separate, one from another, or cohere two or three together. One, two, or more little threads hang down from the under side of these fronds into the water, after the manner of rootlets, but they do not attach themselves. These fronds are multiplied by young ones growing out of the edges of those that are mature. The flowers, which are very simple, and equally rare, are produced from cracks or fissures in the edges of the fronds. These flowers consist of a little bract enclosing two stamens and a small ovary. In these points all the four species which inhabit this country agree.

To render our remarks on these species more comprehensible we have given figures,

FIG. I. FIG. 2.

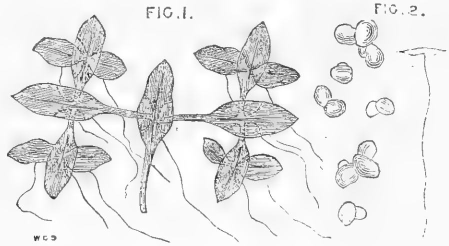


Fig. 1. Ivy-leaved Duckweed (*Lemna trisulca*)
Fig. 2. Lesser Duckweed (*Lemna minor*).

of which the first four represent the plants in their actual size, *i.e.*, The Ivy-leaved Duckweed (*Lemna trisulca*), the Lesser Duckweed (*Lemna minor*), the Greater Duckweed (*Lemna polyrrhiza*), and the Gibbous Duckweed (*Lemna gibba*).

* LEMNA itself was probably suggested to Theophrastus by the little island of *Lemnos*, in the Ægean sea, apparently floating on the water (to compare large things with small), like the leaf of a water-plant.

Such students of Botany as may be willing to devote time and attention to these small plants, will find that there is much to be learnt respecting them. One species, the Greater Duckweed, has never been seen in flower in this country; and two others, the Ivy-leaved and Gibbous Duckweeds, flower but rarely, whilst the fourth, or Lesser Duckweed, is more often met with in flower than any other species; but if we may judge from our own experience, this occurs only under rare and exceptional conditions. This extreme rarity in flowering has compelled us to go to other sources than nature herself for details of the floral organs, to meet with more or less imperfection or dissatisfaction.

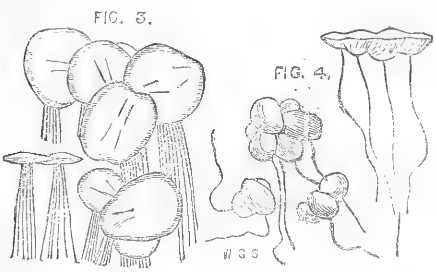


Fig. 3. Greater Duckweed (*Lemna polyrrhiza*).
Fig. 4. Gibbous Duckweed (*Lemna gibba*).

This is true to such an extent of the Greater Duckweed, that we have been compelled to adopt, probably the only drawings in existence of the flowers of this particular species, made in the first instance by poor artists from very indifferent sketches, but we must take such as we can get and "be thankful."

These four species are to be found, more or less abundantly, in this country, and the resident in London has the advantage of being able to find them all in plenty, without going out of sight of town. There is at least one other species, to which we have not alluded, closely resembling the Lesser Duckweed, which may yet be found in Britain, though its occurrence has not at present been recorded.

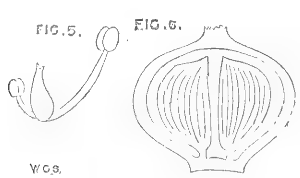
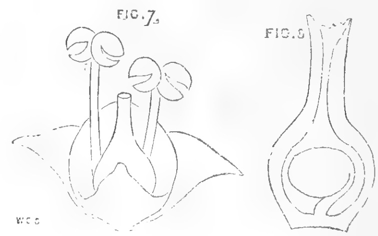


Fig. 5. Flower of Ivy-leaved Duckweed (*Lemna trisulca*), from Sowerby.
Fig. 6. Details of fruit of the same, from Nees von Esenbeck's "Genera Plantarum."

The Ivy-leaved Duckweed has fronds of a very different shape from those of the other species, and thinner. They are nearly half an inch in length, not quite half as broad, narrowed towards one end, and attenuated into a little stalk at the other, with a single fibre produced from the under surface. This also occurs plentifully in all the ditches in the neighbourhood of Tottenham, and elsewhere.

The Greater Duckweed has fronds larger than in any other species, nearly circular, rather thick, and with a cluster of fibres proceeding from the under-surface of each frond. Though said to be *rare*, it grows in abundance in the Hampstead Ponds, and in all the ditches and still waters bordering the Lea at Tottenham, and the surrounding district.



Figs. 7, 8. Details of flower and fruit of Lesser Duckweed (*Lemna minor*), from Nees von Esenbeck.

The Lesser (or common) Duckweed has small ovate fronds, cohering three or four together, with one fibre proceeding downwards from the under surface of each, the ovary contains but a single ovule; at least such is the character given by those who have examined the fruit. Of course, this species occurs in still water everywhere.

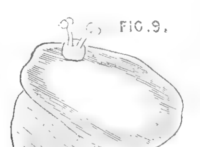
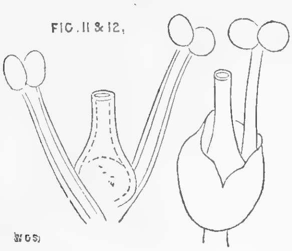


Fig. 9. Flower of Greater Duckweed (*L. polyrrhiza*), from Reichenbach's "Flora Germanica."
Fig. 10. Flowers of the same species, from Lamarck's Encyclopædia. (We know of no figure of the fruit of this species.)

The Gibbous Duckweed has fronds shaped like those of the Common Duckweed, but thicker and rather larger, flattened above, and convex beneath. Each frond has a single rootlet. The ovary is said to contain two, or more, ovules. This species is probably not of such common occurrence. It may, however, be more common than is generally supposed, as it is likely to be overlooked.



Figs. 11, 12. Flowers of Gibbous Duckweed (*L. gibba*), from Sowerby (fruit not given).

It is more especially with respect to the last two species that our remarks will henceforth apply. After a little observation and practice in distinguishing these two plants in the water, it will be noticed that the Gibbous Duckweed has a more luxuriant appearance, a brighter green colour, and a more polished surface than its lesser neighbour. It will be seen to display a more convex face, and its habitat is quite different, for whilst the Lesser Duckweed can be found only in tolerably clear water, the Gibbous Duckweed affects those localities where one might expect to find typhus fever and cholera morbus rampant. The amateur in search of the latter species must look for a pestilent and loathsome ditch, rich with the putrid remains of dead dogs and defunct cats. In such a place the Gibbous Duckweed grows and *fattens*, for, be it noted, this is probably the sole cause of its *gibbosity*. If the said ditch is followed towards one of its extremities, where the water may be purer, it will certainly be found that the *Gibbous* soon becomes mixed with the *Lesser*, and, at last, in the pure element the Lesser Duckweed reigns supreme. The above circumstances first became known to us by accident. Knowing the Gibbous Duckweed to be rare, and the "rarity" having at length been found, three or four hundred fronds were collected, and placed in an aquarium, covered with a flat glass to induce flowering to take place, without the least effect. In the course of three or four days, a botanical friend was shown the plants of the Gibbous Duckweed, and lo ! they were no longer *gibba*, but were all *minor*. The experiment was repeated time after time, and invariably with the same result, for, whenever the Gibbous Duckweed was taken from its unclean element, and placed in purer water, it immediately put the Banting process into operation, and got rid of its superfluous fat, ultimately becoming a Lesser Duckweed. This would tend to show that these two species are one and the same, the particular habitats causing the species to become either bloated or thin. It is necessary to see how far this idea can stand the test of investigation. The only trustworthy difference between the two species is in the ovules; for whilst in the gibbous form, two or more are said to be produced in each ovary, those of the Lesser Duckweed produce but one. The difficulty, therefore, is reduced to this,—can a plant, which has normally a one-seeded ovary, occasionally bear two ovules or seeds? In *both* species the ovules are probably always suspended, as in the Lesser Duckweed (fig. 7), whilst in the Ivy-leaved Duckweed the ovules are erect. We think that it is in the experience of every botanist that a one-seeded ovary, under certain conditions, will bear two ovules ; and, if so, where is the line of demarcation between these two species? The only way to decide it would be to reduce the gibbous form in pure water, and *force it to flower*, if possible, and see if, under the altered conditions of the fronds, one ovule or two would be produced.

A very economical aquarium may be extemporized for these little plants in a tumbler, a fish-globe, in fact any open glass vessel, and there will always be something to study, often something to learn. The mode of growth of the fronds is very interesting, and can be seen best in the Ivy-leaved Duckweed: an enlarged figure, drawn from nature, is given (fig. 13).

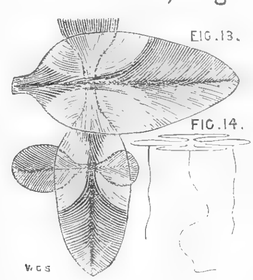


Fig. 13. Fronds of Ivy-leaved Duckweed (enlarged), showing mode of growth.
Fig. 14. Section of frond of the same species.

If a single frond be taken, it will be found that nearly the only part solid throughout is where the midrib would be, if the frond were a leaf. The leaf-like expansion on either side consists of two plates, one at the top, and one at the bottom, with a fissure between them (as shown in the section, fig. 14). Within this fissure, on either side, grow secondary fronds, each with similar lateral fissures, from which again grow other fronds, and so on *ad infinitum*. The method of growth in the three other species is precisely similar, and can be clearly seen in all under a magnifying power.

Had it been the intention of this paper to embrace any account of other living organisms in the aquarium, a description might have been given how the tadpoles were continually biting off the rootlets of the Duckweeds; how the great beetles seized the tadpoles, and bit *their* tails off, so that they could not rise to the surface; how the tadpoles again in their turn attached themselves, six or eight at a time, to the sides of the carp, where they hang for days together, going round and round with the fish, sucking their juices, and becoming veritable parasites; how the fish were continually gulping down fronds of duckweed, and as quickly disgorging them; how, when the tadpoles were dead, because the aquarium and the beetles would not let them become frogs, the snails were the objects of the beetles' fury; and how, at length, the beetles gave themselves up to unmitigated cannibalism, and "did each other eat." Such a description would doubtless be instructive and entertaining enough to induce us to return to it on some future occasion.

W. G. S.

WHY OBJECTS APPEAR LARGER THROUGH THE MICROSCOPE.

WHY objects under the microscope appear so much larger than when seen by the naked eye, is an inquiry that would naturally suggest itself to the mind of an intelligent lad or adult, who for the first time in his life peered through the tube of his friend's microscope. The answer to such an inquiry will, we believe, reveal to us the principle on which the microscope itself is constructed. A mere speck, undistinguishable either in form or colour, is placed before us. Our friend transfers it to the stage of his microscope, adjusts the tube, and invites us to take a peep. We do so. Astonishment seizes upon us. Every part of that object is clearly mapped out; every member of its body duly displayed, and even a portion of its internal organization is distinctly revealed. We depart to our homes mentally asking, By what means such an addition of power is obtained for the eye?

In what, then, does magnitude consist, that at one time an object should appear large, and at another time small? Let us endeavour to unravel this mystery.

It will readily be admitted that we judge of size by comparison—we compare one object with another—and thus form an idea of the extent it occupies in space. But had we nothing with which we could make the comparison, it would be impossible to judge of size at all.

It will be found that the apparent size of an object varies with the distance it may be from the eye of the spectator. Thus, a balloon at a great altitude, or a castle at a distance, both appear vastly diminished in bulk by reason of their remoteness; and had we no other means of judging their magnitude than those furnished by the eye, we should unhesitatingly believe the first to be no larger than a boy's top, and the latter a fitting residence for a child's twopenny doll. Even the sun himself, under similar circumstances, would be dwarfed to the size of the crown of one's hat. Fortunately we have other means at our disposal for correcting our visual impressions.

If the aëronaut at our bidding suddenly quitted the clouds and descended at our feet, we should observe his balloon gradually expand in every direction until it assumed the dimensions of a house. A small portion of the balloon contained within one of the lozenge-shaped meshes of the netting would appear at this short space even larger than the entire machine when seen from a distance. So also with the castle. If we travel towards it, we shall perceive it looming out larger and larger, as the distance decreases between it and ourselves. At last we stand beneath its walls. We now see but a very small portion of the building. It has so rapidly increased in size that a single stone covers with its image a larger space on the retina of the eye than the whole structure when seen afar off. If, then, the magnitude of an object depends on the distance the eye of the spectator may be from it, it ought to follow that the nearer the eye the larger the appearance of the object; and this we think will be found to be the case. There is, however, a limit to the eye in this direction. In an ordinary healthy eye ten inches is considered to be the distance at which small objects can be most distinctly seen, and this may be termed its natural focus. When objects are brought nearer than this they become indistinct and hazy. They are then out of focus. The eye is so constructed that it cannot accommodate itself to a shorter distance than its natural focus and see distinctly that which is submitted to it. But we have every reason to suppose that if the eye could be brought within an inch of a small object, and see it clearly, it would appear much larger than it does to the unassisted eye at the ordinary distance.

The balloon and the castle as they came nearer to the spectator kept increasing in size, according to a well-known law, and would have continued to do so had they not been stopped by the inability of the eye to see them distinctly at a lesser distance than its proper focus. There are, however, strong-sighted persons, whose eyes, having a much shorter focus than their neighbours, are able to look more closely into some matters than their less-gifted brethren. Such may be seen reading a favourite author with their noses in contact with the page. Their vision is, in fact, microscopic. They see everything on a larger scale than ordinary folks. Try them with the minutest specimens of caligraphy or printing, and they excite your envy by reading with ease that which you can barely decipher by the aid of a lens. Whence this power? It will be found, if we mistake not, in the difference of the organization of such an eye. Our friend the physiologist here comes to our aid: by the light he has thrown upon the subject we perceive that the cornea of the short-sighted eye has a deeper curve than the cornea of the ordinary eye, and this may also apply to the crystalline lens. Such a departure from the normal form tends greatly to increase the refractive power of the eye, and thus to shorten its focus. But whilst an eye of this description has an advantage in being able to see objects distinctly at a short distance, and consequently much magnified, it labours under the great disadvantage in being unable to distinguish a friend from a lamp-post on the opposite side of the street. Without the aid of concave glasses to elongate his vision it would be impossible for a short-sighted person to realize the poet's expression—

'Tis distance lends enchantment to the view.

As we who possess ordinary eyes cannot alter their natural organization, it is pretty clear, if we wish to increase their power, that we must seek for the material wherewith to do so in the region of optics.

Ordinary objects are seen by the light they reflect from all points of their surfaces. Thousands of such rays emanate from the objects that are round about us, each ray bearing the form and colour of that particular spot from whence it has proceeded. These enter the eye through that small hole—the pupil—and, in the aggregate, form on its retina a perfect miniature picture. Such, however, is the result only when the eye is at a proper distance from an object; when it approaches too closely it fails to perceive it. There is no distinct vision, owing to the light's rays diverging at too great an angle. Many of them do not enter the eye at all, but shoot by it; while those rays that do gain an entrance are still too divergent for the eye to bring them into a proper condition for forming a perfect image on the retina. Now as the mind can receive no true idea of the form and colour of external objects except through the instrumentality of the eye, it will necessarily follow that distinct vision depends on the accuracy of the picture formed on its retina. Where the image produced is hazy and indistinct, the mental impression will be equally obscure. Knowledge is said to be power. It certainly is so when applied to optics. By our researches we become acquainted with the fact that when a ray of light, in an oblique or slanting direction, enters a transparent medium denser than that through which it has previously travelled (such as water or glass), it suffers refraction; that is, it is bent out of its original course. Taking advantage of this fact, we procure a piece of clear glass, give to each of its surfaces a curve like that described by a bent bow, and then highly polish them. This is termed a convex lens, and when mounted on an arm, or in some kind of handle, it becomes a hand-magnifier, or simple microscope. The action of such a lens on rays diverging from a brilliant point (if that point be in its focus) is to render them parallel, or if the point be nearer to the lens than its true focus, the divergent rays will be rendered less so. If parallel rays be transmitted they will come to a point at some distance beyond the lens. This is its true focus for parallel rays, and any small object placed here and properly illuminated would be more distinctly seen than in any other position. By giving to our piece of glass a deeper curve, or by selecting a denser medium than glass, such as a diamond or ruby, we obtain a lens still more powerful in its refractive properties. We have thus the means of providing ourselves with lenses of longer or shorter foci, and of different degrees of magnifying power. All lenses of high power have short foci, and must be held very close to an object in order to see it; in some instances almost in contact with it. Now observe how cunningly that animal, man, takes advantage of his own contrivance. He has by his skill constructed an artificial eye with a focus considerably shorter than his own. He makes use of it by placing his own living eye behind it, and looking through it at that which is beyond it. His own eye is thus brought much closer to the object than it could be without the aid of his lens—the result being an enormous accession of enlarging power. Be it observed, however, that the lens does not augment the size; it only enables the eye to be brought nearer, for could the eye see at a similar short distance without the help of the lens, the result would be precisely the same as that attained by the use of the lens. The real service that our piece of convex glass renders to us is this—it takes the divergent rays which emanate at all points from an object situated nearer to the eye than its natural focus, and brings them into a proper condition to be received by the eye, which is then competent to deal with them in forming a perfect image on its retina. Without the lens this could not be accomplished: the image would then not fall on the retina, but at some distance beyond it.

Let us now apply this principle to the optical part of the compound microscope. At each end of a brass tube some 10 inches in length and $1\frac{1}{2}$ inch in diameter are placed the lenses which produce such marvellous results. At one end of the tube nearest to the eye of the observer is placed the eye-piece, at the opposite end is the object-glass, so called from its proximity to the object. We will first deal with the latter: it may be a lens or combination of lenses of high or low magnifying power. By the mechanical aid of rackwork and pinion we contrive to bring the lens into focus with a small object placed on the stage of the microscope. The light transmitted or reflected from this object enters the object-glass and at some distance in the interior of the tube produces a faithful copy of the object greatly increased in size. For the sake of illustration we will consider the copy, or image, thirty times longer, broader, and deeper than the original. Now, although the eye is not present at the spot where this image is formed to receive it, yet we very well know that it is actually there, and placed, too, in a most convenient position to be seen by looking at it through the eye-piece. If the latter had the power of doubling the size of the first image, the result would be a second image twice the size of the first, and sixty times larger in length, breadth, and depth than the object itself. And this is what really takes place in the compound microscope. We have, as it were, two simple microscopes. The first deals with the object, and the second with the enlarged image that object forms. It is in consequence of this compound arrangement that the modern microscope has received its present name.

It is greatly superior to its predecessor, the simple microscope, which labours under the disadvantages of being more limited in its range, the result of producing but one image, and the necessity forced on the observer to have both eye and lens almost in contact with the object he may wish to investigate. The compound microscope, while it preserves us from these drawbacks, secures for us a double advantage. Its magnifying power is much greater in consequence of its ability to produce two images instead of one. And this is secured to us, while the eye remains at the ordinary distance of ten inches from an object.

We have endeavoured to show in a simple manner, without going into optical technicalities, why objects appear so greatly enlarged when seen under the Microscope, and that magnitude, or increase of size, depends on the distance of an object from the eye—that the closer the eye can approach to it and see it, the larger it will appear, and that the lenses employed in the construction of our Microscopes are only helps to bring about such a result. T. K.

A DEAD FLY ON THE WINDOW.

WHO will prescribe for an unhappy fly? We were led to ask this question in all simplicity the other day, by seeing one of these disturbers of our usual afternoon nap apparently in the agonies of approaching death. As we regarded his rotund and inflated body, vague notions of the veterinary art and even of Mr. Banting flitted through our mind, but help seemed beyond the insectile reach. Its beautiful arrangement of feet to climb glass and walk in an inverted position over our heads, its delicate wings of prismatic hues, its minute spiracles so constructed for breathing as to render a nose a useless appendage, and its numerous eyes which enable it with equal readiness to see a dainty morsel or a sinister enemy, all were about to cease their functions, for disease had arrested its playful gambols and thieving propensities; the sugar basin would "know it no more," and our afternoon nap would be disturbed by one intruder the less.

Still the death of a fly under these circumstances is not without its interest to those who are observers of nature, in its minute and more obscure forms, and who, amidst the busy cares of life, have been content to leave for a time the ceaseless anxieties of £ s. d. and contemplate the world which is around them.

In the month of September last, the weather having been exceedingly humid and oppressive for several days, we observed, as the dusk of evening approached, that an unusual number of unhappy flies had come to an untimely end in various parts of the house, not on the windows only, but, as a closer examination showed, they were tightly fixed to the wainscoted walls and other smooth and polished surfaces. Varnished and glass-like objects had been generally selected, although rarely rougher surfaces had sufficed, the smoother being evidently preferred as being probably better adapted for adhesion. We could remember the time when we had seen dead flies sticking to the windows, surrounded by a little cloud, which in our ignorance we then thought was only dust; but the time arrived when we learnt that the so-called dust was a vegetable growth, and we were now aware that these flies had died in consequence of the overpowering attack of a fungus, to which they had succumbed. The curiosity which at times had possessed us so strongly as to make us look with longing eyes at the victims on our neighbour's windows, and wish we might be allowed to cut out a small piece of his glass, say 'three inches by one,' induced us now to investigate a little more closely than hitherto the humble subjects of our remarks.

A diligent search rewarded our endeavours, for after some time had been spent in watching our small friends, we perceived one which was not so lively as its companions, but rather in a semi-torpid condition, which had extended its proboscis and by aid of its two fore feet appeared to be clutching the glass with a spasmodic effort. Here then, at last, was an opportunity of obtaining a good specimen for further examination. One minute sufficed to fetch a slip of glass, and then, carefully placing the fly on the centre of it, we were gratified at beholding the victim again extend its proboscis, and, with the assistance of all its legs, resume the position in which we first saw it. For security we placed a large bell-glass over it and resumed our hunt. Another "incurable" quickly met our fond gaze, and in its turn was placed on another glass slide. It proved as docile and tractable as its fellow, and readily adhered to the glass. Feeling we were now sufficiently supplied, we proceeded to watch with some attention, but were not enlightened by any movement on the part of the patients. Unlike the Davenport Brothers, they were evidently unable to release themselves from the bonds which restrained them, so we left them quietly for an hour, and at the end of this period observed a dulness on the glass, though it was so slight as not to be easily discernible. At the end of two hours, another peep revealed the fact that what had appeared as only a dulness before had now developed to a distinct white cloudiness, which extended for a short space from each side of the abdomen, and gave evidence of forthcoming work for the microscope, as soon as the slides might be safely moved, without risking the somewhat fearful calamity of disturbing the innocent subjects of our notice. We therefore left them for the night, full of hope that the returning day would reveal a further development of this interesting parasitic plant.

With the "cock's shrill clarion" we awoke on the following morning, and no follower of the chase ever left his bed-chamber more eager for the sport than we were to ascertain the state of our prisoners; nor were we disappointed in our hopes as to the result of the last eight hours. The flies were dead; but we did not grieve, on the contrary, we rather preferred it, for it promoted the object of our inquiry, by rendering the vegetation of the plants more complete, as was proved by the first glance we took at the glasses. The white dust now extended to the edges, although not at all in a regular and even film, but seemed radiated in waves more or less opaque, while the flies had maintained their original position and consequently had all the appearance of life.

Desirous to see the end of this parasitic growth, we refrained from disturbing it until more than a week had elapsed, when we submitted one of the slips to examination under the microscope. We then perceived that what appeared to be a white dust, consisted of innumerable small disc-like spores or seeds, which were flat and circular, each having a nucleus and a few markings or rays extending from the centre to the edge, so that they might be familiarly compared to cart-wheels in appearance. The fly itself also proved an interesting subject for examination, as the hairs which covered it in all directions were beautifully decorated with snow-white globules, like bunches of grapes. The wings, legs, and proboscis were likewise dotted with similar spores, while they were abundant at the less horny parts, between the plates of the abdomen.

The house-fly is not the only insect which is subject to the attacks of this mould, the common dung-fly being equally liable to it. The mould which attacks the silkworm (*Botrytis bassiana*), producing the well-known disease, *muscardine*, has been the subject of earnest investigation by those cultivators who to their cost have suffered the visitation. The fly-mould, however, belongs to a simpler and lower organization than the *Botrytis*, and bears the name of *Sporendonema muscæ*. The first of these is the generic, or name of the genus, to which the fly-mould belongs, and is derived from a combination of three Greek words: *sporos*, "seed," *endon*, "within," and *nema*, a "thread." The structure of the moulds themselves suggested this compound name, as the genus is characterized by pellucid tubular threads, containing at first within them the sporidia arranged in rows. This particular species is called *muscæ*, from *musca*, "a fly." The threads are simple, glued together into somewhat lobed white tufts, which assume a shape that we have already described as resembling a cart-wheel. Some observers have considered this fly-mould to be the accompaniment of a disease, and only developed after death; but more recent investigations have undoubtedly established the fact that the mould is the true predisposing cause of death. Two other names have been given to this mould by more recent authors, consequent on referring it to other genera.*

Such is a brief account of the troubles of a fly, which, having partaken of our choicest dainties uninvited, sipped our divine nectar, stolen our sugar, and escaped the perils of the milk jug, at last pays the penalty of nature, by exchanging the gambols of a merry life for the tetanic embraces of a *mouldy* death.

W. M. B.

* *Empusa muscæ*.—Cohn, in Hedwigia, 1855.
Entomophthora muscæ—Fresenius, in Botanische Zeitung, 1856.

FOUR YEARS' ACQUAINTANCE WITH A TOAD.

FOUR years last September, as I was wandering through the meadows at Hastings, near the spot called "Lover's Seat," I captured a young frog and also a young toad, and brought them both, for the first time, on a visit to the Great Metropolis. These creatures I placed in a small conservatory, but poor Froggy soon died. Toady, however, survived, and soon appeared to have become acclimatized. I occasionally saw him, but found that one of his propensities was to get out of sight. About November of the same year, I lost him altogether, and for some time grieved over the absence of my pet. Imagine my astonishment, one fine morning, in the latter part of March, whilst at breakfast, to observe my old friend creeping over some moss, greatly increased in size and ugliness during his four months' absence. He would afterwards occasionally absent himself for weeks, so that I ceased to be alarmed for his welfare, even though I might not have caught sight of him for a month. In this manner we went on, leaving Toady to take his holidays as he pleased, until the spring of last year. During one of his temporary vacations, I was watching the movements of some small insects, and it appeared that my pet was watching them also, for on their approaching within reach of his tongue, that organ was instantaneously thrust forward, and an insect disappeared. Thus while losing sight of a new acquaintance I became aware of the presence of an old friend. I also derived fresh satisfaction in observing his choice of food, and mode of taking it. Thenceforward I became diligent in supplying him with the same kind of food, so that he soon lost all appearance of shyness, would come out of his hiding-place regularly, day by day, until late in November, 1863, when he again disappeared as the frost set in. At this time the weather was very severe for so early a period: the aquarium was frozen, the fish were killed, the glass was broken, and all its contents became a solid mass, plants, animals, and everything, embedded, as it were, in a large transparent crystal. Again, I was agreeably surprised, one beautiful spring day in the early part of April, to observe my old friend moving about, as if to inform us that he had returned again from his unknown place of retreat. He had again grown fatter and uglier than he was in the autumn, his skin was blacker and coarser, and dark spots covered the whole body. Yet his eye seemed more brilliant and thoughtful. He came direct to the same spot on which I had fed him when last we met, more than four months previously. He was supplied with what we term "garden-hogs," woodlice, worms, and the lively little black ant. None of these would he touch, if dead, or did not show unmistakable signs of active life. Then would he fix his calculating eye, until the object came within reach of his tongue; this he would dart at them, and in an instant the object was gone. When satisfied, he would return again to some quiet nook, out of sight.

This summer being long, and dry, I have had some difficulty in providing him with his necessary food. One day I placed him in a large hole at the bottom of the garden, where I collected the sweepings and rubbish, and he literally became a "toad-in-a-hole." This was some fifty yards from the house, and I left him to shift for himself amongst the insect life of the rubbish. I afterwards sought him to convey him back to his old neighbourhood around the house, but he was nowhere to be found, and this time I gave him up for lost. Four days after, what was my surprise, whilst seated at supper, to see Toady come tumbling heels over head down the step into the room, on a visit to his old friends? The most remarkable feature in this last freak is, the circuitous route he must have taken before he arrived, and the obstacles he must have encountered in his way. Certainly this little creature has not been endowed by nature with the most fascinating exterior, but he has, in compensation, received a beautifully brilliant eye, thoughtful, calculating, and full of power. I think that, were he better known, he would be less despised, and instead of "familiarity breeds contempt," we should have to write, "know me, and love me;" or, if not, we should be less prejudiced, and give him credit for his merits. E. D.

THE INTELLIGENCE OF THE STARLING.

Dear Sir,—The writer has a pet starling (*Sturnus vulgaris*), a short account of whose tameness, &c., may interest, perhaps, some of your readers. Our pet—whose adopted name is Brilliant—is a bird of great observation and intelligence, but, like many persons of talent and genius, has a temper peculiarly his own. We have accustomed our feathered favourite to be placed at the breakfast table, &c., at which time, in addition to his regular diet of meat, bread, and seeds, he is given a spoonful or two of milk, and other suitable food; these he is much pleased with, and shows his approval of, by a merry song or cheerful whistle, and utters "Meat, meat, good, good," and often will he call out "More, more," "Piggy," "Yes, yes," and many words of one syllable, &c. Brilliant is quite a practical entomologist; for he delights in examining insects, and pays particular attention to all moths, flies, and spiders brought under his notice, and they soon disappear after being placed within his reach. Brilliant shows a great dislike to beggars and persons poorly dressed; and when they approach the house he utters a harsh repeated note, calling out "Tramp, tramp, tramp," and shows other signs of extreme indignation; neither does he agree with Exeter Hall proclivity, or abolition principles, for he cannot bear the sight of a negro, and when he has seen one (which has been the case several times) he goes to the extremity of the cage, and makes a sound that can only be compared to a hiss. To any member of the family this bird is very tame and affectionate, and delights to see us all assembled together, and to listen to a lively conversation, and also always joins in the talk. The appearance of the baker, grocer, and butcher is an occasion of great pleasure, for then he expresses "Good, good," "Come, come." When let out of the cage (in a suitable room) Brilliant generally examines every article in the room, and takes great interest in the mirror, standing before it for some minutes, viewing his reflection in the glass, and perhaps reflecting on his aërial dignity, calling out at the same time, "Oh," "Old boy," &c. After satisfying his curiosity he will alight on the heads of all present, if not strangers, and then return satisfied to his cage and begin a cheerful tune.

Of course a bird with these acquired qualities soon becomes a "pet" with those fond of the feathered tribe. This is but one of the many instances that give evidence that birds and other animals may, by attention and kind treatment, become very docile and most affectionate. Kindness to the mute creation is an attribute of a noble nature, while brutality towards them shows a selfish and cowardly disposition. If we really worship Almighty God, let us be humane to all His creatures.—Yours truly,

W. E. W.

Eagle-Killing Extraordinary.—In Norway the golden eagle is common, and, with the sea eagle, is so numerous, that from a statistical account of the sums paid each year by the Government for the destruction of beasts and birds of prey, it appears that, in the five years ending December, 1850, there were paid for, altogether, no less than 10,715 eagles! The Sutherlandshire expedition of naturalists mention the number of eagles that had been paid for between March, 1831, and March, 1834, to have been 171, besides 53 nestlings or eggs. * * In the south-west of that country a clever gamekeeper trapped 15 eagles in three months of 1847, and about as many in the winter of 1850-1, almost all of them being mountain eagles.—*Ootheca Wolleyana.*

ZOOLOGY.

THE COMMON SHREW (*Sorex tetragonurus*).—I kept one of these pretty little animals for a few days in a box with moss. It would eat almost any animal substance, but seemed to prefer insects and earth-worms: the former it seized with a spring, and it would eat seven or eight house-flies at a time; if more were given it hid them in the moss. Small worms were caught by one end and munched slowly without being bitten through. On giving it a large one (about four or five inches long), it gave it a sharp bite, then sprang back, then flew at it again, until the worm was half dead, when it ate about half and hid the rest. It slept during the middle of the day, rolled up among the moss, but always waked up at once if worms or flies were put into the box. I believe that, when pressed for food, shrews will kill and eat frogs, but when a large one was placed in the box the present specimen did not seem inclined to prey upon it, although it now and then gave it a slight bite on the hind leg; after they had been together for some hours the poor frog was taken away. The shrew seemed to be very cleanly, constantly dressing its fur and "washing" its face with its fore paws, as rabbits do. It soon died by an accident.—*E. R. Alston in the Zoologist.*

A MOA'S EGG.—The *Nelson Examiner* states:—"A moa's egg is now being exhibited at Messrs. Bethune and Hunter's offices. It is about ten inches long and five inches in diameter, of a dirty white colour. It was found at the Kaikoros, in the middle island, under singular circumstances. A labourer in Mr. Fyffe's employ, who was digging the foundation for a house, came upon the egg, and, unfortunately, with his pick broke some portions of the shell. It was found in the hands of the skeleton of a Maori, who was buried in a sitting posture, with the egg resting in his hands and held opposite to his head. The egg has been placed in a box of rimu, and protected with a sheet of glass on the top. In a drawer beneath, securely covered with glass, are the fragments of the shell, which have been carefully preserved. The injury, as the egg is placed in the box, is not perceptible, and it appears to be perfect."

GULLS LOOKING OUT.—Gulls hover about ships in port, and often far out at sea, diligently watching for the waste of the caboose. While the four great fleets, English, French, Turkish, and Egyptian, were lying in the Bosphorus, in the summer and autumn of 1853, a young lady of my family called my attention to the fact that the gulls were far more numerous about the ships of one of the fleets than about the others. This was verified by repeated observation, and the difference was owing no doubt to the greater abundance of the refuse from the cook-rooms of the naval squadron most frequented by the birds. Persons acquainted with the economy of the navies of the states in question, will be able to conjecture which fleet was most favoured with these delicate attentions.—*Marsh's Man and Nature.*

ANECDOTE OF A STORK.—Birds do not often voluntarily take passage on board ships bound for foreign countries, but I can testify to one such case. A stork which had nested near one of the palaces on the Bosphorus, had, by some accident, injured a wing, and was unable to join his fellows when they commenced their winter migration to the banks of the Nile. Before he was able to fly again, he was caught, and the flag of the nation to which the palace belonged was tied to his leg, so that he was easily identified at a considerable distance. As his wing grew stronger, he made several unsatisfactory experiments at flight, and at last, by a vigorous effort, succeeded in reaching a passing ship bound southward, and perched himself on a topsail yard. I happened to witness this movement, and observed him quietly maintaining his position as long as I could discern him with a spy-glass. I suppose he finished the voyage, for he certainly did not return to the palace.—*Ibid.*

ANECDOTE OF THE SWIFT.—Mr. Yarrell mentions an instance of a sparrow accidentally hanging itself in a noose from its own nest, and I was the other day witness to an incident of a somewhat similar nature, though fortunately less tragic in its termination. A pair of swifts (*Cypselus apus*) had built their nest in a crevice under the eaves of a house, and the aperture was so narrow that they could with difficulty squeeze themselves through. My attention was one morning attracted by a loud flapping of wings, and on hastening to the window to ascertain the cause I perceived that one of the birds had, by some means or other, caught one of its feet either in a chink of the brickwork, or in some portion of the materials of its nest (the height was too great to see which), and was held a prisoner just at the entrance. Its struggles were violent, and continued without intermission for nearly three-quarters of an hour. Sometimes the poor bird would hang for a few seconds with its head downwards, as if dead, and then again it would renew its efforts to escape. At length, after a longer pause than usual, by a sudden and vigorous exertion, it succeeded in casting itself free. I passed the building several times in the course of the day, but never saw either of the birds near the place. The following morning, however, they were going in and out as usual.—*W. Weld, in Naturalist's Scrap Book.*

ENTOMOLOGY.

TO KILL INSECTS IN GREENHOUSES.—Mr. W. W. Saunders stated, at a recent meeting of the Entomological Society, that for some years he had used spirits of wine in his greenhouses for cleansing plants and clearing them from insects; he mixed the rectified spirits and pure water in equal proportions, and this mixture, which was found to answer better than undiluted spirit, was applied with a brush. It was very efficacious in the destruction of the common mealy bug (especially when young) and other common pests, and he recommended it as worthy of application in the greenhouse generally.

SMALL TORTOISESHELL BUTTERFLY.—"The larvæ of this insect (*Vanessa Urticæ*), and, I surmise, of the genus *Vanessa* in general, are remarkably exempt from the attacks of Ichneumons. Thus I collected (at random from various places), last July, about forty nearly adult larvæ of this insect. Every one of these became a pupa, and emerged in due time. I observe that in rearing butterfly larvæ, if from insufficient or inappropriate food they have not attained their due size when they enter the pupa state, they make their appearance thereafter with the wings perfect, but are of diminutive size. With moths, on the contrary, under the like circumstances, the wings are shrivelled and imperfect."—*The Entomologist.*

DEATH TO FLIES!—A grocer in Cathcart-street, Glasgow, being annoyed at the superabundance of the fly tribe in his shop, and being of a speculative turn of mind, invested in a halfpenny fly-paper, which he placed in the window, on a plate and a little water. After it had lain thus for a week, on the usual turn over of the window on Wednesday afternoon, an immense number of dead flies were collected from it. Astonished at the result, curiosity led the young man to put them in the scale, when he found their combined weight to be two ounces and a quarter. He thereafter tried two drams weight, and on counting them found there were 600 in it. Thus upon calculation it appeared that the two ounces and a quarter would contain 10,800 dead flies. Besides these, it is considered that nearly half as many more would be dusted out of the window during the week, making a grand total of 15,000 of the tribe slaughtered in a week by this housewife's benefactor. — *Glasgow Morning Journal.*

GALLS.—At the meeting of the Entomological Society, held November 7th, Mr. W. W. Saunders exhibited some galls which he had recently found on the roots of an oak tree, at a depth of four feet below the surface, and from which had since emerged a number of specimens of a Cynips (*C. aptera?*), the whole of which were females. Also three other kinds of gall, which he had found in Switzerland, two of them upon species of willow, and the third formed on the leaves of the beech. Mr. Stainton also exhibited a gall of a woolly texture, found on an oak near Bath.

SHEEP-ROT OR LIVER-FLUKE.—The *rot* in sheep is but too well known as one of the most destructive pests connected with what may be termed the animal economy of agriculture. Its ravages have been in some seasons so extensive as to produce a scarcity in the kind of stock which constitutes the most general and wholesome kind of our ordinary animal food, as well as a very important medium in carrying out the necessary rotation of crops. A writer in the Edinburgh *Veterinary Review*, quoted by Dr. Cobbold, says, that "in the season of 1830-31, the estimated deaths of sheep from *rot* was between 1,000,000 and 2,000,000. Supposing," proceeds our author, "the number to have been 1,500,000, this would represent a sum of something like £4,000,000 sterling. . . . As instances of its disastrous effects upon the revenues of agriculturists, we may cite the statements of Duvaine, and also individual cases recorded by Simonds. 'In the neighbourhood of Arles alone, during the year 1812, no less than 300,000 sheep perished, and at Nîmes and Montpelier 90,000. In the inner departments, during the epidemic of the years 1853-54, many cattle-breeders lost a fourth, a third, or even three-fourths of their flocks.' . . . On the estate of Mr. Cramp, of the Isle of Thanet, the rot epidemic of 1834 swept away £3,000 worth of his sheep in less than three months, compelling him to give up his farm. Scores of cases are on record where our English farmers have lost three, four, five, six, seven, and even eight hundred sheep in a single season, and many agriculturists have thus become completely ruined." It is superfluous to inform our readers that all this wholesale and ruinous mischief is the effect of the existence of the "liver-fluke" (*Fasciola hepatica*) in the liver of the animal. The number of flukes inhabiting a single sheep's liver is sometimes very considerable. "Bidloo obtained 800, Leuwenhoeck about 900, and Duprey upwards of 1,000 specimens. The bile contained in the liver-ducts is loaded with flukes' eggs. In some cases there cannot be less than tens, or even hundreds, of thousands."—*Athenæum, on Dr. Cobbold's Entozoa.*

HEROIC NAMES OF BUTTERFLIES.—"In the vast multitude of butterflies, the greatest part of which are foreign and extra-European, and to whose food and manner of life we are utter strangers, it was impossible to give significant trivial names. Linnæus, therefore, by way of simile, has taken the names of the Equites from the Trojan history. They consist of two troops or bodies; of which one contains the sable, and, as it were, mourning nobles, having red or bloody spots at the basis of their wings. These receive names from the Trojan nobles; and the most splendid among them bear the name of Priam. The other body, ornamented with a variety of gay colours, are distinguished by the names of the Grecian heroes; and, as in both armies there are kings as well as officers of an inferior rank, those elegant butterflies whose hinder wings resemble tails are distinguished by some royal name. Thus when Paris is mentioned (knowing that he was a Trojan, and of royal blood) we look for him among those of the first section; *i.e.*, those of a sable colour, spotted in the breast with red, and having their hinder wings resembling tails. When Agamemnon is named, we at once find him among those nobles which have variegated and swallow-tailed wings. But when Nereus is spoken of, we readily know him to belong to the last section, having wings but no tails." The *Equites* are the first of the six classes into which naturalists divide the *genus Papilio;* the others being 2nd, *Heliconii;* 3rd, *Parnassii;* 4th, *Danai;* 5th, *Nymphales;* 6th, *Plebeii.* — *Translator's Note to Hoffmeister's Travels in Ceylon.*

FISH TATTLE.

Fish-Ladders on the Thames.—Two ladders have already been erected, one at Moulsey and the other at Teddington. Mr. Buckland thus describes them:—" Two walls are constructed from the top to the foot of the weir (on its slope). Slabs of iron or stone (the stops) are then fixed at right angles into these walls, reaching about four-fifths of the way across the passage. The slots (or passages for the fish between the wall and the end of the stop) come alternately to the right and left, so that when the water runs down the ladder it describes a zigzag (or rather serpentine) course; the fish nosing about the foot of the weir like timid foxhunters galloping up and down a severe bullfinch in search for a gap, are attracted to the foot of the ladder by the current coming down it; they then make a rush through the lowermost opening into the first box or step, then into the next, and next, and so on till they get to the top. If they are tired, they can rest as long as they please in the eddies between each of the stops. It is found, however, in practice, that it does not answer to make the ascent of the ladder too easy, as, if the fish find themselves too comfortable in the eddies, they will stay there, and be liable to become a prey to poachers, as a reward for their laziness."

Angling for Tench.—Bustling men, who cannot work and wait, may sneer if they will at the silent patience of the angler; what know they of the still charm which creeps over the senses, helping them to take in with half-unconscious appetite the blessed influence of evening, when the coolness of the earth meets the sinking fire of the sunbeam, and sends an equal pulse of life through every blade and leaf? Then the watcher who stands beside the pool receives into his being that calm which marks the brethren of his craft. He is angling, it is true; he speculates on the indecision of the fish, which—may be, even now deep in the cool water—are circling with suspicious hunger round his bait, loath to swallow, still more loath to leave, the luscious worm. Yet meanwhile, he gathers in, through open senses, store of Nature's truth; he sees and marks, with tenacious observation, countless traits of life—the persevering industry of the insect, the sociable intelligence of the bird, the short history of the summer plant, the steady progress of the growing tree, the shifting architecture of the clouds, the ceaseless machinery of all around that dies to live and lives to die in perpetual succession. But, look! there is a bite. See, the float is uneasy—makes little rings in the water. Now it moves slowly off—and dips a quarter of an inch—now it rises up, and lies on its side: that is sure symptom of a tench. Draw in your slack line, lest you hit your rod against an overhanging branch. Now, strike! Yes, you have him. He is a fine fellow, too. See how he rolls the water up with his tail, like the blade of a revolving screw; down again, head first! Give him play, but by all means keep him in the midst of that clear spot. Ah! he is yielding to the—to him—mysterious power from above. Another last dive, and then he can barely keep his head below the surface. Be quick, but gentle, with the landing-net; tow him within its open mouth. There; he is safe—at least, in our view of his position. No, poor fellow, that muscular curving of your strong back is of no use to you in the new element to which you are transferred; your slimy life among the weeds is over now; you have swallowed your last mouthful, and must play an altogether passive part throughout your next appearance at a feast.—*Jones's Holiday Papers.*

Salmon in Australian Colonies.—The young salmon deposited some time since in Badger's Creek, a tributary of the Yarra, are doing well, and are now about three inches long. We have not heard lately how the Hobart Town portion of the great naturalization experiment is getting on, but by last advices it was proceeding prosperously.

Salmon in Asia.—It is a remarkable fact that no trout or salmon inhabit any of the rivers that fall into the Indian Ocean. This widely distributed order of fish (*Salmonidæ*) is, however, found in the Oxus, and in all the rivers of Central Asia that flow north and west. The central Himalayan rivers often rise in Tibet from lakes full of fish, but have none (at least during the rains) in that rapid part of their course from 10,000 to 14,000 feet elevation; below that fish abound, but invariably of different species from those found at the sources of the same rivers. The nature of the tropical ocean into which all the Himalayan rivers débouche, is no doubt the proximate cause of the absence of *Salmonidæ*.—*Hooker's Himalayan Journal.*

BOTANY.

SHEEP SORREL IN NEW ZEALAND.—One of the greatest pests of this country (on the cultivated lands) is the common English Sheep-sorrel (*Rumex acetosella*), called by the natives the red sorrel, and said by them to be a native of Tasmania. This plant spreads with singular rapidity, its roots forming a perfect mat, and the smallest fragment throwing up a stem. Where it is present in the ground scarcely any of the ordinary crops can be obtained. All the usual processes of cultivation, such as fallows, &c., utterly fail even to mitigate the evil, and farmers were in despair, until it was found, that in the "struggle for existence," even this weed could not make head against the greater vigour of the white clover. I have seen hundreds of acres of broken-up land so completely overgrown with this plant, as to appear like a uniform red patch in the landscape, but upon which, at the end of two years, after it had been "laid down" with white clover and Italian rye-grass (which by itself would have done no good), scarcely a specimen of the sorrel could be found.—*Travers, in Natural History Review.*

MOST PERFECT PLANTS. — Those plants are most perfect, in which the organs discharging different functions are most distinct both in position and structure. The thalloid fronds (of Cactaceæ) and the hypoblastoid embryos of Endogens indicate a lower degree of organization. Plants which have the stamens and pistils either naked or in the axil of an unmodified leaf (*Naias, Hippuris, Callitriche*) are inferior to those whose flowers are never complicated. Diclinous flowers are lower in position than those which are hermaphrodite; ternary verticils lower than quiniary, spirally arranged floral organs lower than those which are verticillate, polypetalous flowers lower than gamopetalous, apocarpous ovaries lower than syncarpous, atropous ovules lower than those which are inverted, homogeneous embryos lower than those which are fully developed. Trees and shrubs are more common among imperfect plants. In the lower orders flowers are very numerous, in the higher the number of seeds produced by each flower is very great. Yellow and green colours in the flowers of the lowest rank are changed into red or white in those of a higher order, and in the highest plants the colour of the flower is generally blue.—*J. G. Agardh. Theoria Systematis Plantarum.*

A HORSE-CHESTNUT TREE.—Dr. Davy read a paper at Bath on *the* horse-chestnut; will any one read a paper on *a* horse-chestnut? The tree stands on a flat stone. Its *root* grows *up* through the air for 7 feet, turns over a wall, and descends 7 feet into the earth. So that the root passes for 14 feet through the air before it enters the earth. The celebrated Dutrochet, by experiment, convinced the still more celebrated De Candolle, and all European vegetable physiologists, that roots will only grow straight downwards. On this, I set to work to show that they will grow in any direction in which they can find food. If any one doubts this *fact*, let him inspect my tree, which is now twenty-one years old. In imitation of Dutrochet's beautiful experiment, I placed a great variety of seeds (single as well as double) in flower-pots, suspended them upside down on wire-work, and watered them from above. Each seed sent a tap-root down into the air, which died; but the *branch* roots (as I have named them) and the plants grew, and corn ripened in this way. But *cuttings* placed upside down, though they grew and bore fruit for years, showed no root below. I thus blundered on the fact that every seedling has a tap-root, whose downward determination nothing can pervert, a *provision* and *contrivance* for the fixing of the plant, and a beautiful proof of the *design* of a Creator. But the downward tap-root is as peculiar to the seedling as the "seed-leaves" are, and all *branch* roots will grow in all directions. I preserved one horse-chestnut by placing it on a flat stone, and replacing the flower-pot with a chimney-pot full of earth, and, by degrees, raised a column of chimney-pots. I then built up a column of earth on the opposite side of the wall, turned the roots into it, and when they were established in the ground, I took away the two columns of earth. I think that Virgil's tap-rooted Esculus is the horse-chestnut. Virgil mentions it as distinct from the *quercus* and *castanea*, and Ovid as distinct from the *fagus* and *ilex*. It is, then, a feat to make its radix *tend* to heaven instead of to Tartarus. With regard to the name from Esca, it is true that neither man, horses, nor pigs will eat horse-chestnuts, but sheep, cows, and deer are ravenously eager for them.—*Col. Greenwood, in Athenæum.*

PLANTS ROOTING IN THE SOIL. — Plants themselves send down their roots naturally to a depth which, strange to say, is so little known as scarcely to be credited. In the case of beans, turnips, and red clover, we are familiar with the fact, that their roots penetrate to double the depth of ordinary ploughing; we raise up the turnip on drills to help it, and we expect the pulse and grass crop to perforate and deepen the soil to help us. But there is not a cultivated plant which does not naturally send down its roots beyond 9 inches. The cereals on which our agriculture mainly depends are, indeed, endowed with the power of forcing their roots deep and far into the solid earth in search of food, and as the investigation of drainage obstructions has lately shown, it is impossible by any process short of actual tracing, to fix the distance to which the roots of trees and hedge plants will penetrate; so is it found that wheat and our other cultivated grasses extend their roots much further into the soil than is at all generally supposed; Johnston, in his drainage lecture, says that deep-rooted plants, such as lucerne, often fail, even in moderately deep soils, because an excess of water, or the presence of some noxious ingredient which deep drains would remove, prevents their natural descent in search of food. "Even plants," he adds, "which, like wheat or clover, do not usually send down their roots so far, will yet, where the subsoil is sound and dry, extend their fibres for three or more feet in depth, in quest of more abundant nourishment." But, I repeat, it is not thoroughly understood how deeply the roots even of wheat and clover descend. The Earl of Macclesfield, in a letter to the Society of Arts, mentions that a few years ago, Mr. Badcock, a shrewd, sensible, observing, and very considerable farmer, at Pyrton, Oxon, having occasion to dig the foundation of a building on a field under wheat, was much surprised by observing the small fibres of the roots of the wheat much deeper in the earth than he had any idea of. Endeavouring to trace how deep they really went, he had the ground opened close to some plants, dug perpendicularly down to the depth of 6 feet, and having fixed a narrow board close against it, proceeded in the same manner on another side of the plant, and so on till he had secured the earth to that depth between four boards firmly lashed together. He then had it placed upon an inclined plane, and carefully removing the boards, with great caution and perseverance washed away all the earth adhering to the root and its very small fibres, and was much surprised at their extent. He repeated the trials on several other wheat plants, and traced their depth to within 5 or 6 feet. The late Mr. Fane, M.P. for Oxfordshire, had one of these plants, now presented by Lord Macclesfield to the Society of Arts, secured in a close glass tube. My friend Dr. Atkin and myself have traced the roots of wheat in Berwickshire, to 5 or 6 feet of perpendicular depth in garden soil.—*Wallace Fyfe, Lecture at Royal Agricultural College.*

CHINA GRASS.—The French Minister of Agriculture and Commerce has ordered over a quantity of China-grass seed (*Bœhmeria nivea*) from its native country, in order to distribute it to all agriculturists who may apply for it. If unsuccessful in the efforts to acclimatise it in France, it will probably succeed in Algeria. It may not be generally known that this plant (which is a large nettle) yields a beautifully soft, strong, and glossy fibre, applicable for the manufacture of linen fabrics.

ABNORMAL DEVELOPMENT IN THE PIMPERNEL.—Dr. Marchand, in a recent contribution to botanical science on *vegetable monstrosities*, gives a curious account of abnormal forms in the common pimpernel (*Anagallis arvensis*), which is thus summarized by M. J. B. in the *Gardener's Chronicle*:—

"We will take that instance first in which the parts of the flower departed least from the more normal condition, and then the others in their proper order. In all the parts there was a greater or less tendency to assume a green tint; in some they were entirely green, in others the brighter colours were confined to the more recently developed parts.

"1. In the first case, then, the sepals and petals were in their normal position, though rather more dilated than usual; the anthers were fertile, the principal change existing in the ovary, the upper part of which was wanting, so that the ovules were exposed seated on the central placenta.

"2. In the next step the calyx, more developed than usual, was separated from the corolla by a long peduncle; and the ovary, which was ovate, contained instead of a placenta a sort of plumule or young shoot.

"3. In this case the corolla and calyx were distant from each other; there was no trace of stamens, but the axis was continued from the centre of the corolla, and ended in a leaf-bud.

"4. The calyx and corolla nearly as before, but instead of stamens a whorl of little leaves was developed, in the centre of which the axis was continued, bearing at its tip two whorls of leaflets alternately three and three.

"5. In this case two out of the five stamens were normal, the other three changed into leaves, showing clearly the origin of the leaflets in the last case, which took the place of the stamens.

"6. The ovary varied in different flowers. In some the placenta was crowned with ovules; in others the ovules were replaced by a single whorl of leaflets; in others there was every shade of change from ordinary ovules to perfect leaflets; while in others, again, every ovule was converted into a leaf with a long petiole.

"7. We now come to another form in which shoots were developed in the axils of the sepals, or on the face of the petals between the point of their insertion and that of the stamens, and, what is most curious, in the interior of the ovaries round the foot of the placenta.

"8. Here, again, we have a very singular condition: the calyx and corolla separated from each other, the stamens partly developed, the axis continued beyond the corolla, branched and bearing normal leaves so as exactly to resemble an ordinary stem, while in consequence of the calyx and corolla being bent down to the ground, adventitious roots were developed from the axis on the under side above each of them. In another case, where the calyx and corolla were approximated, the ovary was open above and sent out six shoots from within, perfectly developed, clearly representing the central placenta and five axile buds, and each giving out a number of adventitious roots at its base."

HERMAPHRODITE CATKINS IN SALIX AURITA.—I have this year gathered two species of willow, namely, *Salix fusca* and *S. aurita*, in which a gradual transformation of stamens into pistils, that is, male into female flowers, is apparent. The normal state of the plants we know is dioicous. The bushes of *S. aurita* from which my specimens were collected, grow at the south end of the Gillbrook, in a *very* moist, boggy place, and altogether spread over some four or five square yards. All the catkins are more or less hermaphrodite, from those fully developed to those just emerging from the protective scales. There are many bushes of the female plant growing near, which present no unnatural variation. A careful examination has enabled me to select a long series (nearly thirty) of different conditions, showing the stages of metamorphosis from one extreme to the other. It appears from these, that the change is very various in its character and extent in individual flowers; almost all, however, range themselves under one of the forms mentioned below. No change was perceptible in the scale or gland.

1. Filaments distinct, one bearing an ordinary anther, the other having at its summit an ovarium, sometimes with, and sometimes without, a small mass of pollen on one side, in either case containing ovules of less than the ordinary size. The anther-bearing filament withers away.

2. Filaments united in the lower portion, dividing about two-thirds up into two arms, each bearing a small ovarium instead of an anther; one of these when more developed is grey and silky, and in shape resembles the ordinary lanceolate germen or carpel. Its fellow apparently does not enlarge. Ovules contained. The stigmas dark brown.

3. Filaments united through their whole length, short and thick, surmounted by a downy green ovarium, cleft from the apex half or two-thirds of the way down. On the inner face of one side pollen is sometimes seen. There is perhaps in this form more appearance of the union or cohesion of *two* ovaries in their lower portion, than of actually being *one* and cleft as stated above.

4. Filaments united at the base, one stamen is transformed into an ovarium, the other is not enlarged, but terminates in a kind of stigma.—*F. M. Webb in Naturalists' Scrap Book.*

NEW BRITISH LICHENS.—In the *Annals of Natural History* the Rev. W. A. Leighton describes and figures three species of lichens new to this country. They are named respectively *Thelocarpon Laureri*, *Lecidea Caradocensis*, and *L. Friesii*. The first was found on a decorticated larch rail at Middleton, in Shropshire. The second has been found in Shropshire, Herefordshire and Leicestershire, on oak palings, &c., and third on old oak trees and stumps in Cleveland, Yorkshire.

STARRY PUFF BALL (*Geaster hygrometricus*).—The Rev. H. H. Higgins exhibited a specimen of this curious fungus at a meeting of the Liverpool Literary and Philosophical Society, Nov. 14. It had been recently found on a bank at Rainhill, growing upon a portion of a decayed root of a birch tree. It was remarked that all the larger species of earth stars, or starry puff balls, were uncommon. This constitutes the fourth species of *Geaster* found in the neighbourhood of Liverpool.—*The Reader.*

GEOLOGY.

WHAT ARE FOSSILS?—Fossils are the actual remains of animals and vegetables, or other certain indications of their existence, found on examining the rocks of which the earth's crust is made up. The time has been in the history of science when the presence of the shells of marine animals, or the teeth or bones of quadrupeds or fishes in rocks, has been actually denied, despised, or explained away. When, indeed, the number of recorded examples of such fragments was few, and the places where they were found distant, this mode of escaping from a great difficulty in natural history was thought fair and reasonable; but now that almost every limestone, and a large proportion of all sandstones, clays, and gravels, are found to multiply evidence on the subject; when the microscope is daily discovering fresh proof of the former existence of life in every direction; and when no country is without large and remarkable collections of strange and unfamiliar forms of various animals, obtained, not from the species actually living now in the country, but from the soil and rock beneath man's feet; it would be folly to waste time in proving the interest and importance of a subject so brought home to the senses. We now regard it as an admitted fact that almost every rock contains some fossils, and it remains only to consider what are the conditions in which these occur, the kind of animals or vegetables to which they belong, the nature of the group which the species found in certain localities or certain similar rocks may afford, and the circumstances under which the organic beings in question have lived, died, and been preserved for future investigation.—*Ansted's Elementary Course of Geology.*

LEIODON AT NORWICH.—Mr. T. G. Bayfield has recently called the attention of geologists to certain fossils discovered in the chalk at Norwich. The pit which yielded them is called the Lollard's Pit, whence a great quantity of chalk is annually removed. In 1858 a few vertebræ of *Leiodon anceps* were discovered, and identified by a tooth which was in their immediate proximity. In October, 1864, a number of bones of the same skeleton were found, including six vertebræ, a hundred fragments of other bones, and two of the large cultrate two-edged teeth, with two of the smaller kind from the inner part of the mouth.

DEVILLINE.—A new mineral found in Cornwall with laugite, from which it differs in its lighter colour, its lamellar structure, and its silky lustre. From its composition it appears to be a hydrated subsulphate of copper, containing about 8 per cent. of lime, and nearly 3 per cent. of protoxide of iron.

THE ILFORD MAMMOTH.—A remarkably fine fossil head of *Elephas primigenius* has been found in the Pleistocene sands and clay at Ilford. The upper molars remain in place, and both tusks have also been preserved, one still in the socket, but seemingly having been twisted round by the weight of the head, when the fleshy tissue of its attachment had decomposed, and before the skeleton was finally embedded in the soil. The tusks are of spiral curvature, and measure along their medial line above 10 feet 6 inches in length. No such perfect skull of the true Mammoth has ever been found in England, nor anything comparable with this important example, so far as we are aware, except it may be the fine fossil elephant in the Chichester Museum, a specimen of which we have heard, but have not seen. The present specimen in scientific value can only be classed with the famous one at St. Petersburg, and we are glad to add that it has, by the promptitude of Mr. Waterhouse and the trustees, been obtained for our National Collection; while to Mr. Davis, who was despatched by the Museum authorities to extricate this gigantic fragile mass from the rough loose earth of the quarry, too much praise cannot be given for the successful manner in which he has accomplished that difficult task.—*Athenæum.*

HYMENOPHYLLUM TUNBRIDGENSE AND WILSONI.—Great difficulty is sometimes experienced in getting these tender ferns to grow in closed cases. A piece of muslin placed at the *top* of the case to arrest some of the light has great influence.

MICROSCOPY.

THE INVISIBLE WORLD REVEALED.—To an intelligent person, who has previously obtained a general idea of the nature of the objects about to be submitted to his inspection, a group of living animalcules, seen under a powerful microscope for the first time, presents a scene of extraordinary interest, and never fails to call forth an expression of amazement and admiration. This statement admits of an easy illustration; for example, from some water containing aquatic plants, collected from a pond on Clapham Common, I select a small twig, to which are attached a few delicate flakes, apparently of slime or jelly; some minute fibres, standing erect here and there on the twig, are also dimly visible to the naked eye. This twig with a drop or two of the water, we will put between two thin plates of glass, and place under the field of view of a microscope, having lenses that magnify the image of an object 200 times in linear dimensions. Upon looking through the instrument we find the fluid swarming with animals of various shapes and magnitudes. Some are darting through the water with great rapidity, while others are pursuing and devouring creatures more infinitesimal than themselves. Many are attached to the twig by long delicate threads (*Vorticellæ*); several have their bodies inclosed in a transparent tube, from one end of which the animal partly protrudes and then recedes (*Floscularia*); while numbers are covered by an elegant shell or case (*Brachionus*). The minutest kinds (*Monads*), many of which are so small that millions might be contained in a single drop of water, appear like animated globules, free, single, and of various colours, sporting about in every direction. Numerous species resemble pearly or opaline cups or vases, fringed round the margin with delicate fibres that are in constant oscillation (*Vorticellæ*). Some of these are attached by spiral tendrils; others are united by a slender stem to one common trunk, appearing like a bunch of hare-bells (*Carchesium*). Others are of a globular form, and grouped together in a definite pattern on a tabular or spherical membraneous case, for a certain period of their existence, and ultimately become detached and locomotive (*Gonium* and *Volvox*); while many are permanently clustered together, and die if separated from the parent mass. No organs of progressive motion, similar to those of beasts, birds, or fishes, are observable in these beings; yet they traverse the water with rapidity without the aid of limbs or fins; and, though many species are destitute of eyes, yet all possess an accurate perception of the presence of other bodies, and pursue and capture their prey with unerring purpose.—*Dr. Mantell's Thoughts on Animalcules.*

THE MICROSCOPE INDOORS.—For amusement and instruction with the microscope, we need scarcely stir out of our rooms. The very hairs on our head may be made objects of interesting investigation; and especially if we compare them with the hairs of other animals, and the appendages generally of the skin. The fine outer coating of the skin is composed of minute scales, which are flattened cells, and may be easily observed by scraping a portion of the skin on to a glass slide, with a drop of water on it. The nails, the hairs, and other appendages of the skin, are composed of the same kind of scales or cells. These cells are developed in little pits, or follicles, from which the hair is projected, as it were, by their growth from below. Under a low power the cells of the human hair cannot be observed. It presents, however, a well-marked distinction between the outside, or *cortical layer*, and the interior, or *pulp*. The latter, by a high power, especially if the hair has been first submitted to the action of sulphuric acid, will be found to contain cells more or less spherical, whilst the former contains cells more or less flattened. These project a little beyond the edge of the hair, so that its sides are not quite smooth. By placing a hair between two pieces of cork, fine transverse sections of it may be made by means of a sharp razor. If these are put under the microscope, the pulpy portions will present a dark appearance in the centre. The hairs of animals offer a great variety in the disposition of the cells of which they are composed. The hairs of the mouse present a series of dark partitions running across the hair between the cells. In the younger hairs, these partitions are single, whilst in the older ones they appear double. The hairs from the ear of the mouse present these dark partitions very distinctly. Such hairs stand intermediate between true hair and wool. A piece of flannel, or blanket, will afford a good illustration of the latter. In this case it will be seen that the scales, or cells, of the cortical part, project beyond the surface, and render the wool rough. This roughness of the outside is supposed to render such hairs fitted to be used in the process of felting; the rough sides of the hairs adhering together. The chemical composition of the hair has also something to do with this process. Human, and other smooth hairs, will not felt.—*Dr. Lankester's Half-hours with the Microscope.*

THE SCALES OF INSECTS.—The fine dust upon the wings of moths and butterflies, which is so readily removed when handled carelessly, is what is generally called *scales*. To these the wing owes the magnificent colours which so often are seen upon it; every particle being what may be termed a distinct flat feather. How these are placed (somewhat like tiles upon a roof) may be easily seen in the wing of any butterfly, a few being removed to aid the investigation. The form of them is usually that of the "battledore" with which the common game is played, but the handle or base of the scale is often short, and the broad part varies in proportionate length and breadth in different specimens. The markings upon these also vary, some being mostly composed of lines running from the base to the apex, others reminding us of network — bead-like spots only are seen in some—indeed, almost endless changes are found amongst them. These scales are not confined to butterflies and moths, nor indeed to the *wings* of insects. The different gnats supply some most beautiful specimens, not only from the wings, but also from the proboscis, &c.; whilst from still more minute insects, as the podura, scales are taken which were at one time esteemed as a most delicate test. The gorgeous colours which the diamond beetles also show when under the microscope are produced by light reflected from minute scales with which the insects are covered.

In mounting these objects for the microscope it is well to have the part of the insect from which the scales are usually taken as a separate slide, so that the natural arrangement of them may be seen. This is easily accomplished with the wings of butterflies, gnats, &c., as they require no extraordinary care. In mounting the *scales* they may be placed upon slides, by passing the wings over the surface or by gently scraping the wing upon the slide, when they must be covered with the thin glass. Of course, the extreme tenuity of these objects does away with the necessity of any cell excepting that formed by the gold-size or other cement used to attach the cover. The scales of the podura should be placed upon the slide in a somewhat different manner. This insect is without wings, and is no longer than the common flea. It is often found amongst the sawdust in wine-cellars, continually leaping about by the aid of its tail, which is bent underneath its body. Dr. Carpenter says:—"Poduræ may be obtained by sprinkling a little oatmeal on a piece of black paper near their haunts; and after leaving it there for a few hours, removing it carefully to a large glazed basin, so that, when they leap from the paper (as they will when brought to the light), they may fall into the basin, and may thus separate themselves from the meal. The best way of obtaining their scales is to confine several of them together beneath a wine-glass inverted upon a piece of fine smooth paper; for the scales will become detached by their leaps against the glass, and will fall upon the paper." These scales are removed to the slide, and mounted as those from the gnats, &c. When the podura has been caught without the aid of the meal, it may be placed upon the slide, under a test-tube, or by any other mode of confinement, and thus save the trouble of transfer from the paper before mentioned. Another method is to seize the insect by the leg with the forceps and drag it across the slide, when a sufficient quantity of scales will probably be left upon it. These scales are usually mounted "dry;" but Hogg recommends the use of Canada Balsam as rendering their structure more definite when illuminated with Wenham's parabolic reflector.—*Davies on Preparing and Mounting Microscopic Objects.*

Illumination of Objects magnified by very high Powers.—Successful observation with very high powers is mainly dependent upon illumination. Indeed, by ordinary means it is not possible to obtain a light sufficiently intense to illustrate an object magnified 3,000 diameters. I have tried with greater or less success many different plans, and have used prisms, concave mirrors, and various kinds of condensers. I have, however, arrived at the conclusion that the most satisfactory results by far are obtained by the use of Kelner's eye-piece as a condenser, as suggested by my friend Mr. Brooke. By this means I can obtain a light sufficient for a magnifying power of 10,000 linear. I have tried the lime light, but have not found that it possesses any advantages over the belmontine or paraffin lamp, while the glare from it is much greater.—*Dr. Beale's "How to work with the Microscope."*

Microscopic Mites on Stones.—A gentleman having forwarded a packet of small stones covered with very minute white objects and acari, to Mr. Westwood, received the following reply:—"The minute white objects on the stones, are the eggs of the mite *Trombidium* (*Tetranychus*) *lapidum*, first figured by Hammer in Hermann's Mémoire Apterologique (pl. 7, fig. 7-8), with the eggs which were discovered in similar situations. Hammer's correspondent found with the eggs minute red-coloured *six-legged* mites which had been hatched from the eggs, and which ran very quickly. Accompanying these mites (with six legs) were always found others, two or three times larger, of a brown colour, and with *eight legs*, but these latter wanted the long *setæ* at the end of the four anterior legs of the small individuals. Hammer thought these constituted two distinct species, and that they were not varieties, different in stage or sex, because no metamorphoses had been noticed in these insects, and no individuals intermediate in size had been observed. He also inclined to regard the so-called eggs in consequence of their comparatively large size to that of the insects, as a kind of crysalid enclosing the mite in a sort of nymph state. From what has since been observed of the changes of these mites, however, there can be no doubt that the large specimens are full-grown individuals which had previously borne the appearance of the smaller ones. All this is the more necessary to be explained, because, in his note, Mr. Weatherhead states that the eight-legged mites were produced from the eggs. This, I believe, must be a mistake. Unfortunately I cannot make out the number of legs, the specimens in the small phial having been so battered by the particles of stone, that some of the legs may have been, as some certainly have been, detached in the journey from shaking about. I suppose also that this species is *six-legged* in the larval state. The eggs are beautiful microscopic objects."—*Entomologist's Monthly Magazine.*

REPORTS OF SOCIETIES.

Entomological Society, *Dec.* 5.—Mr. J. Weir exhibited some microscopic preparations of the spiral tongues of butterflies, for the purpose of showing the variation in the striation of the tongue in different species, and in the papillæ which exist at the end of the tongue.—Mr. Bond exhibited a coloured drawing of the larvæ of *Acronycta strigosa*, and a photograph of a remarkable negro variety of *Abraxas grossulariata.*—Mr. F. Smith exhibited a particoloured wasp's-nest, constructed by two species of wasp, the *Vespa Germanica* and *V. vulgaris.*—Mr. W. F. Evans sent for exhibition a box full of fragments of a Lamellicorn beetle, which had been picked out of some New Zealand wool: the insects proved to be *Pyronota festiva*, and it was conceived that, in the course of their flight, they had come in contact with the sheep and became entangled in the fleeces so as to prevent their escape.—The President exhibited some globular spiders' nests from South Australia, which were remarkable for their resemblance to the fruit of Leptospermum, the tea-plant of Australia, whilst the spiders themselves were described as looking like the excrement of a bird.—Mr. S. Stevens exhibited several pairs of *Cheirolasia Burkei*, one of the rare Goliath beetles of tropical Africa; he also read a letter from M. Du Chaillu, dated Fernand-Vaz River, Aug. 20, 1864, in which the writer announced the despatch to England of a large collection of insects.

Anthropological Society, *Dec.* 6.—Mr. S. Laing exhibited an interesting collection, and read a Paper on "The Pre-Historic remains of Caithness." Mr. C. C. Blake also read a paper by Mr. Roberts on the discovery of a large Kistraem in the Muckle Hoeg, in the island of North Shetland, with notes upon the human remains discovered therein. An animated discussion on these Papers followed, in which Professor Owen and others took part.

Royal Geographical Society, *Dec.* 12.—A Paper by Mr. J. Cameron, of Singapore, containing "A Description of the Islands of Kalatoa and Puloweh, north of Flores, in the Malay Archipelago." The former of these islands was said to be uninhabited, the latter to contain a population of 5,000, whose daily life was a repetition of the various stages of intoxication, and that every evening ended in a drunken brawl. Dr. Hector next read a paper on "An Expedition to the West Coast of Otago, New Zealand, and the Discovery of a practicable Route over the Mountains to the Goldfields and the East Coast." Mr. Albert Walker also gave an account of a hazardous journey which he performed, in company with two other young men, along the West Coast of the Middle Island, New Zealand.

THE ETHNOLOGICAL SOCIETY, *Dec.* 13.—Mr. S. Laing exhibited an interesting collection of human remains, stone implements, and other articles which had recently been obtained in some extensive excavations which he has been carrying on at Caithness, and which are believed to date from a very remote period in the history of man. Mr. Laing gave an account of his explorations and described the various articles which had been found, and a lively discussion followed, in which Professor Huxley, Dr. Thurnham, and others took part.

MICROSCOPICAL SOCIETY OF LONDON, *December* 14, 1864. — Various presents were announced, amongst which was Mr. Bridgeman's mahogany rotating-table, a simple and ingenious contrivance, whereby several persons may use the same microscope without leaving their seats. It consists of a stout board, sufficiently large to hold a microscope and lamp, a heavy pivot of iron is fixed beneath at one end, and at the two corners of the opposite end two castors at such an angle as to cause the board to rotate freely. It is very steady, and offers considerable advantages to those who are indisposed to incur the expense of an ordinary rotating-table.

Notice having been given of a subject for discussion, viz., "The most advantageous means of illuminating objects under the microscope," the president explained at considerable length his experience in the matter, and confined himself more particularly to—1, sources of light; 2, condensed or uncondensed light; 3, histiological subjects; and 4, minute structures, diatoms, &c. Having tried gas, napthalized gas, camphine, and the other volatile oils, he considered Belmontine to possess a greater amount of those properties so very desirable for microscopic work, than any of the others he had named, as it gives a white light, burns steadily, and does not readily carbonize. He likewise generally approved of oblique rays. One member strongly advocated direct rays, whilst another referred to the frequent advantage of diffused light. Mr. Shadbolt disapproved of the Belmontine of the present day, but spoke favourably of "Diamond Crystal oil." Mr. Glaisher stated he had used gas and camphine, but both had been set aside in favour of "Carbonile," a recent invention, which after a three months' trial, he thought superior to anything he had hitherto used. Mr. Tomkins exhibited a small working model of the necessary arrangement for obtaining this light, by passing ordinary coal gas over the "*carbonile*" contained in a vessel constructed for the purpose. The effect was magical, and the light dazzling, the flame being solid and white compared to the common gas flame, which in comparison was pale, thin, and vapoury. It was stated that it gives three times the ordinary light by an equal consumption of gas; consequently those who are content with their present amount of light can, by means of "carbonile," obtain it at one-third the cost for gas. Mr. Slack was announced to read a paper on the "Vinegar Plant" at the next meeting.

SOCIETY OF AMATEUR BOTANISTS (*London*).—The Second Annual Meeting of this Society was held at 192, Piccadilly, on Wednesday evening, Dec. 21st, when the President delivered an Address embodying a Report of the Society's Proceedings during the past year. He stated that the excursions on Saturday afternoons had taken place during the favourable weather, with more or less success. The annual excursion, to which a special day was devoted, was this year taken to Darenth Wood, in Kent. The interchange of specimens had hitherto been confined nearly exclusively to members, but it was hoped, at no very distant period, to extend it to other societies having similar objects. Papers had been read with tolerable regularity, and some of these had been deemed of sufficient importance and interest to be solicited for publication in the Journal of Botany, in which two or three had appeared. The Library and Herbarium were gradually increasing in extent and usefulness. The aggregate number of members was reported to be forty-seven, of whom fifteen had been elected during the year. The Treasurer presented a balance-sheet, showing a balance of upwards of £5 in favour of the Society, which, considering the very low rate of annual subscription, was admitted to be highly satisfactory. After the usual complimentary resolutions of thanks to the Officers, they were unanimously re-elected for the ensuing year, and a Council of four members was constituted to conduct the business of the Society, so as to leave the entire evenings of meeting, for the future, free for the consideration of the subjects brought forward by members in their papers.

MANCHESTER FIELD NATURALISTS' SOCIETY.—The Report of the Committee for the year 1863 proves this Society to be in a flourishing condition. The aggregate number of members is 537; there is cash in the bank, property which it has been considered advisable to insure for £300, and evidence of good work done. The Saturday afternoon excursions have been well attended, and the winter soirées completely successful. These facts seem to prove the truth of the assertion at the commencement of the report, "of a daily-extending interest in the city and its neighbourhood, with respect to pursuits and studies such as the Field Naturalists' Society was mainly instituted to promote." One work which this Society has accomplished will commend itself to botanists all over the country. It is the registration and publication of a list of all the mosses found in the neighbourhood of Manchester, which list is appended to the Report. Mr. G. E. Hunt, who was the presiding genius of this work, has conferred a boon on Bryologists, and set an example which other local societies would do well to imitate.

MORLEY NATURALISTS' SOCIETY.—A society of naturalists has been formed, with every prospect of success, at the Star and Birch Inn, Morley. The meetings are held fortnightly. Mr. Daniel Slack has been elected president, and the Society numbers twelve members.

DR. HUNTER'S EARLY WORK.—On his arrival in London, Mr. Thomas, in company with Mr. Nicol, called on Dr. Hunter; they found him dressing. "Well, young gentleman," said Hunter, when the first ceremonies of introduction were over, "so you are come to town to be a surgeon; and how long do you intend to stay?" "One year," was the reply "Then," said he, "I'll tell you what, that won't do I've been here a great many years, have worked hard, too, and yet I don't know the principles of the art!" After some further conversation, Mr. T. was directed to call again in an hour, which he did, and accompanied Hunter to the hospital, where he said to him, after the business was over, "Come to me to-morrow morning, young gentleman, and I will put you further in the way of things; come early in the morning, as soon after four as you can." It was summer: Mr. Thomas kept the appointment, and found Hunter, at that early hour, busily engaged in dissecting beetles.—*Hunter's Memoirs.*

NOTES AND QUERIES.

A Young Microscopist desires to know if he can procure any of the diatomaceous earths, such as Tripoli and other foreign deposits, and where?

Does the Spider Eat its own Web?—Blomfield affirms that it does. Is this merely a fiction of the poet, or a fact vouched for by naturalists? Satisfactory information based on personal observation is desirable.

Do Flowers that are normally blue become white or pink when propagated from buds or cuttings, in all cases? And do blue flowers, such as those of *Campanula rotundifolia* become white in seedlings. If so, under what conditions do these changes occur?

In poisoning plants for the herbarium some use a solution of corrosive sublimate, and with it wash over the entire specimen with a camel-hair pencil. On the other hand, some only mount their specimens with thin glue in which some corrosive sublimate has been mixed. The latter is by far the simplest plan—has experience proved it sufficient?

Veins of Leaves.—Professor De Candolle has recently observed that in some genera of plants (as *Fagus*) the lateral veins terminate in some species in the marginal teeth, in other species they terminate in the sinuses between the teeth, and in others they terminate partly in the teeth and partly in the sinuses. Have any of our correspondents noticed similar instances, or if they should observe such will they communicate the result of their observations?

Modern Military Botany.—A military gentleman recommended to the *Cotton Supply Reporter*, in a letter recently published, "in order to produce new and beautiful species of the cotton plant, as well as to insure good annual crops, *to cross the several kinds of seeds by burying them together in a large hole about nine inches deep*." He adds, "I beg to observe that I firmly believe that the *Gnaphalium*, cud-weed, or dwarf cotton, is the parent stock of all cotton."—Does not such a Solomon as this deserve a Marshal's baton?

Polyxenia Alderi.—During a marine excursion in search of animals for the aquarium, Mr. Hughes gives a humorous account of a colloquy which took place between himself and the boatman who was with him when the above-named was captured:—"Looking, as I dare say he did, with considerable disgust at my sport, and wondering why I did not follow his example in the more utilitarian object of mackerel-fishing, he asked, with some degree of superciliousness, 'And what might be the name of that jelly-fish, sir, that you've just took?' 'It would not interest you very much, my friend,' said I; 'but, as you seem to take an interest in the specimen, I will tell you: it is Polyxenia Alderi.' 'Well, to be sure,' replied he, 'it do look summat like a X.' He alluded to the cruciform appearance of the peduncle seen from below!—*The Zoologist*.

Death of Professor Silliman.—It is with much regret that we have learnt of the death of this veteran in science. The journal he edited, and which was known by his name all over Europe, as well as in America, expired just before him. For nearly half a century he held a high position amongst scientific men on the other side the Atlantic.

Prickly Pears Four a Penny!—This cry has been heard from street-vendors of fruit in the metropolis during the last two or three weeks. The fruit itself is not commonly imported. It is about the size and shape of a goose's egg, with a large concave depression at the apex, in which one may thrust the end of a thumb. Externally it is yellow, with a reddish tint on one side; small brown warts are scattered over the surface at regular distances of about three-fourths of an inch; from each of these in its early stage sharp spines are developed, but they fall away as the fruit ripens. Internally the fruit consists of a granular pulp of a deep rose colour, in which numerous seeds, about the size of hemp-seed, are imbedded. The taste is rather insipid, and the profusion of hard seeds scattered everywhere through the pulp is a great disadvantage. It does not suit the English taste, we imagine, and will scarce become a regular article of commerce. The Prickly Pear is the produce of a species of Cactus (*Opuntia vulgaris*), a native of North America, and closely allied to the plant on which the cochineal insect feeds. This Cactus has been introduced into the South of Europe, whence, probably, our recent importations have been derived.

Forty Years Ago!—In the first volume of "Loudon's Magazine of Natural History" it is stated, "The common rosewood of cabinet-makers is the root of *Convolvulus scoparius*, common in the Canary Islands, in Rhodes, and Cyprus." No comment is necessary.

NOTICES TO CORRESPONDENTS.

All communications for the Editor should be addressed to No. 192, Piccadilly, W.

F. M.—Being a collector of galls, of every kind, for the purpose of ascertaining what are the insects which produce them, would be glad to receive fresh specimens of any except the commonest kinds, from correspondents who would forward them to our publisher for that purpose.

Mosses.—Correspondents wishing for specimens of British mosses, especially those found in the Scottish Highlands, are advised to communicate a list of their desiderata to the editor.

H. C.—We regret that your MS. arrived too late for insertion in the current number, but it shall have a place in the next. To avoid any disappointment, contributions should be received on or before the 15th of each month.

R. H.—We have returned our correspondent's MS., but, for the information of all our contributors, take this opportunity of intimating that it is amongst our firmest resolves not to admit either *lists* or *tables*, whether of plants or insects, into our pages; because, however useful or interesting they may be to a favoured few, their interest would be very small with the majority of readers. We therefore prefer exclusion in all cases to making invidious exceptions.

Secretaries of Field Clubs and Natural History Societies are solicited to forward accounts of their ordinary meetings, excursions, and proceedings, throughout the year. A portion of the Science Gossip being devoted to the service of such associations, it is the wish of the promoters that it should be rendered as truly serviceable as possible.

"CUI BONO?"

"Surely, my friends, plenty of bacon is good and indispensable: but, I doubt, you will never get even bacon by aiming only at that. You are men, not animals of prey."—*Thomas Carlyle.*

WE English people have the credit of being one of the most utilitarian nations under the sun; yet, amongst ourselves, as though we believed it not, we call the present a *utilitarian* age, and flatter ourselves that during this nineteenth century we have become more practical. Now-a-days we are too utilitarian to erect handsome structures or do handsome things without first inquiring, What good will come of it? If, after a long sum in compound addition and subtraction, there appears a good balance in favour of the project, "Cui bono" kicks the beam, and the thing is done. Can we be surprised, then, after having worshipped this idol all the day, at having it flung at our heads at night? Shall we bend before it in our counting-houses, make the Ledger our prayer-book, and Contracts our homilies, and go home without expecting to see the shadow of the idol there? No! by the manes of "Porter's Progress," let's be true and faithful worshippers, even though we cast ourselves beneath the wheels, so that the car of Juggernath may pass over us!

Try the experiment with our youthful population. Pick up a little weed from the wayside in their presence; gaze at it earnestly, blow back the petals of the flower, take out a pocket lens, examine yet more closely, turn over the leaves, thoughtfully, but carefully, inspect it thoroughly, minutely; place it erect within the lining of your hat; return that undignified cylinder to its place of honour on the top of your head, and move on. Think you that this operation can be brought to a conclusion before you are assailed with the inquiry, "What are you going to do with it, what good is it?" Vain hope, for should you perchance escape it there, it will be at home waiting your return, and no sooner will you take the innocent little weed from its resting-place, than you will have to give an account of all the pleasures and profits, uses and benefits that you are ever likely to derive from preserving such rubbish between clean sheets of paper. How vain is it, under such circumstances, to attempt to convey to the mind of the inquirer any conviction unassociated with money-value or domestic economy! If it can be proved that your little plant of knotgrass, or pimpernel, or harebell is a certain cure for croup, or will flavour a stew like parsley or tarragon, then it would be admitted that it really *is* of use; or that a handful would realize a shilling in Covent Garden Market, in that case they would even turn botanists themselves; but, not to be worth a farthing in hard cash, or furnish food for a canary, is sufficient to prove them worthy of wholesale condemnation as rubbish, and the collector little better than a fool.

Mrs. Partington, with the encroaching sea at the end of her mop, could not have trundled more fruitlessly than those kind friends who by their efforts would stay the progress of inquiry and investigation in the young student of nature, by throwing a *Cui Bono* at his head, provided he has acquired just sufficient knowledge to direct his investigations into a right channel. If man could live by bread alone; if his sole mission were to eat, sleep, and die; if he were content to measure his happiness by twopences, and his ecstacies by biscuits, then it would be legitimate to inquire of every pursuit that did not end in twopences or biscuits, "What good is it?" But inasmuch as there is a higher aim in life, a better source of pleasure than the gratification of animal propensities, it indicates but a sorry intellectual capacity in those who inquire concerning every pursuit that is unconnected with the necessities of life—*Cui Bono*, "What good is it?"

"I have never known a man," says an old author, "become a worse husband, a worse father, or a worse friend, because he shared his love with a bird, a beetle, or a butterfly; and such an one is no less entitled to respect because he does not scorn to learn a lesson from the meanest thing that God has made."

A TIT IN MOUSTACHES!

IN these modern days of hirsute appendages, when bipeds in moustaches are by no means rare, it may be a novelty to some to learn that the infection of fashion extends to "bipeds with feathers," and that a little bird, a Tit, is indigenous to our own country, which bears a most unmistakeable pair of sleek, black, pointed moustaches, but with which the males only are furnished. The Tits are a daring, impudent family from the Great Tit down to Tomtit, and carry a saucy appearance in their very physiognomy. Everyone who has an orchard knows the Blue Tit, and his lively fantastic evolutions about the branches of apple trees, sometimes on one side of a bough and then on the other; as often head downwards as with his head uppermost; with his rough hair-like coat of feathers blowing about like that of a Skye terrier, or the shaggy tuft which surmounts the head of a little city Arab. Our Tit is a far sleeker, smarter bird, he is in fact the "exquisite" of the family of Tits, and so far has severed connection with the plebeian Tits, that he has taken to himself a new family name, and is regarded by naturalists as the type and scion of a new house, allied by family ties and old associations with the Tits, but no longer destined to bear their classical name (*Parus*). The Bearded Tit, for so it is most commonly called, has been dignified with a more aristocratic title (*Calamophilus**) long enough to satisfy the most emulous of birds, and it no doubt glories, if bird can glory, in its trim, sleek, aristocratic appearance, an aristocratic pair of long black moustaches, and an aristocratic name. Little boys in Norfolk make "game" of it and call it reed pheasant, but it bears the *sobriquet* without complaint. Neither does it resent being called "Pinnock" as in some localities, though perfectly innocent of "Catechisms." Specimens of this bird mounted on little wooden perches, and placed on the shelves of glazed cases in public museums, are gross libels upon the bird in its state of nature. We have never seen a stuffed specimen quite to our mind, and scores that we strongly object to. Amongst his native reeds he is the liveliest little "acrobat" one ever saw, running up and down, sometimes with head uppermost, but as often with the long tail thrust out towards the zenith, and his head where ordinary and less vivacious birds seem by their conduct to consider that the tail ought to be. One of the best descriptions yet given of this bird in its native habitat, is that of an observer, in the eighth number of *Loudon's Magazine*, nearly forty years ago, but the facts are true still. "I went," he wrote, "accompanied by one person and a dog to a piece of reeds below Barking Creek, on a cold, windy, dull morning, weather by no means favourable for my purpose. Arrived on our ground, we traversed it for some time without success; and were about to leave it, when our attention was roused by the alarm cry of this species, and looking up, we saw eight or ten of these beautiful little creatures on the wing, just topping the reeds over our heads, uttering in full chorus their sweetly musical note, which resembles (if it may be likened to a word) the monosyllable *ping, ping;* pronounced at first slow and single, then two or three times in a more hurried manner: it may be compared to the music of very small cymbals; is clear and ringing, though soft, and corresponds well with the delicacy and beauty of the form and colour of the bird. We saw several flocks during the morning,

* Perhaps the most recently adopted or revived scientific name for this bird is that given by Mr. G. R. Gray in his catalogue—*Panurus biarmicus.*

or, what is more probable, the same flock several times. Their flights are short and low, only sufficient to clear the reeds; on the seedy tops of which they alight to feed. If disturbed, they immediately descend by running, or rather by dropping. The movement is rapid along the stalk to the bottom, where they creep and flit, perfectly concealed from view by the closeness of the covert and the resembling tints of their plumage.

"We could hear, but not see, our dog hunting; and we thought he was of service in pointing out to us whereabouts the birds were. His being near them, however, did not make them easily take wing; they seemed to follow him, hovering and crying about him. I question if we should have seen, or even heard, a single bird without his assistance. We were fortunate enough to shoot one (a male) in fine plumage. I held it in my hand when scarcely dead. Nothing could exceed the beauty of the eye; the bright orange of the iris, nearly surrounded as it is by the deep glossy black of the moustaches and streak above, receives additional brilliancy from the contrast, and struck me as a masterpiece of arrangement in colour and neatness. The bill also was of a fine clear delicate orange; but this, too, soon became dull and opaque."

Their food is said to consist of the seeds of the reed, as well as insects and small snails, but we are disposed to conclude from the contents of their crops that they are more insectivorous than otherwise, at least, during the summer months.

The Bearded Tit is found amongst reeds in various parts of Great Britain. We have seen it commonly in Norfolk, and know that it is found also in Cambridgeshire, and along the banks of the Thames. It is also recorded to occur in Suffolk and Lincolnshire, and a very few other localities. In Scotland it appears to be unknown, and in Ireland to have been seen but once.

During the month of April, this Tit builds its nest amongst the dry stems of grass, reeds, and sedges; these it binds together around its nest by interlacing them with the outer layer of reed leaves, of which the structure is composed. The nest is sometimes in such a position amongst reeds, that it is scarcely possible to reach it from the shore, unless by wading in three feet of water and mud, into the depths of reed-clumps. The marshmen know more of the homes, haunts, and habits of this bird than any one else, or at least might do if they not only *saw* but *observed*, and the nests are seldom taken by any except themselves. We have seen a great many nests in our time, and not one taken from the ground, but from within a few inches to a foot of the surface, or suspended amongst dry grass, reeds, or, rarely, in a clump of fragrant "gale," or "guile," as it is locally termed (*Myrica gale*). The eggs are commonly but four or five, of a pinkish-white, irregularly spotted and streaked with reddish-brown, and larger than those of any other British Tit, except the Great Tit. In process of time the eggs are hatched, and a young progeny grow up, to gambol and sommersault amongst the reeds, —and wear moustaches.

M. C. C.

DIATOMS.

WHAT THEY ARE, AND WHERE TO FIND THEM.

SOME months since, availing myself of a fine afternoon and a few hours' leisure, I made an excursion into the country in search of objects for my microscope. I had scarcely commenced operations, when I fell in with a gentleman, who, as I soon discovered, was on the same pursuit as myself: the similarity of our object superseded the necessity of a formal introduction; by a kind of instinct we became mutually attracted to each other, and in a few minutes were as free and familiar as old friends.

I found my friend, for so I shall now call him, was the possessor of one of the best microscopes, with objectives ranging from 2 in. to $\frac{1}{8}$, and all the *et ceteras*, that placed within his reach every facility for microscopic research. On the present occasion he was hunting for Entomostraca, Rotifera, and any other kind of Infusoria that might come to hand. In the course of conversation, I said, "Are you well up in Diatoms?" To my astonishment, he replied by asking, "What is a Diatom?" For the moment I thought I had unconsciously met with some learned professor, and that his interrogatory was intended to probe the depth of my knowledge on this interesting question, but I soon found that he did not know what I meant by a Diatom, and that he was really unconscious of ever having seen one.

I do not suppose that amongst our readers there is one so thoroughly ignorant on a subject familiar to almost every microscopist; there may, perhaps, be some to whom the following hints on *Diatomaceæ* would not be uninteresting.

The *Diatomaceæ* are a large family of tiny plants, almost invisible to the naked eye, requiring the art of the optician to reveal their beautiful diversity of forms, and their extreme delicacy of structure. They are inhabitants of the water, and so widely distributed, that there is scarcely a pool, a ditch, or a water-course where they are not to be found, attached to submerged weeds, or mixed with floating debris, or deposited on old piles subject to tidal influences, or forming a covering on the surface of the mud, arranged in patches, and varying in colour from a yellowish brown to a dark chocolate. Some species are indigenous to fresh, some to salt, and some to brackish water, but those common to the one are never found in a lively and healthy state in the other.

In the early history of *Diatomaceæ*, they were placed by naturalists in the animal kingdom, in consequence of their curious movements; a more intimate acquaintance with their nature and habits, acquired by the aid of improved microscopes, and confirmed by chemical experiments, has resulted in their being transferred to the vegetable kingdom by the unanimous consent of all competent judges. It is now ascertained that the power of locomotion is not peculiar to the *Diatomaceæ*, but that many of the simple plants, such as *Oscillatoria*, the *Desmidiaceæ*, *Protococcus*, and others, possess this power in common with the Diatoms, and some of them, in certain stages of their existence, are much more active in their movements than any of the *Diatomaceæ*.

The characteristic feature of the Diatom is its silicious envelope covered with a net-work of fine markings, diversified in pattern, and in some of the species so exquisitely delicate as to require the best objectives and the highest powers to resolve them. Being composed of silica, these frustules are indestructible by the usual agents of decomposition; when, therefore, they are cleansed by being boiled for a few minutes in hydrochloric or nitric acid, they become objects of permanent interest, and may be preserved by mounting, either dry or in Canada balsam.

In order to secure clean and good specimens for mounting, it is absolutely necessary to separate the Diatoms from all foreign matter, which unavoidably becomes mixed with them in collecting. The following is a plan I have tried with great success. On returning home allow your bottles to stand for an hour, by which time the Diatoms and debris will have settled at the bottom, pour off the greater portion of the water, then shaking the bottle briskly, empty its contents into a soup-plate, place the plate in a window for an hour or two, when it will be found that the Diatoms, attracted by the light, will have arranged themselves on the surface of the mud; by gently rotating the plate they become loosened and may be poured off in a pure state, and are ready for being examined alive, or for boiling in acid.

In collecting Diatoms, half a dozen wide-mouthed bottles, a large-bowled spoon as thin as possible, and a stick with a hook at one end, are all the apparatus required. The spoon for carefully skimming the mud, the stick for pulling in any submerged plants or floating rubbish, and the bottles to hold your gatherings, taking care to place the different kinds in separate bottles, being furnished with a Coddington lens to examine your specimens on the spot.

The marine forms of *Diatomaceæ* may frequently be found attached to seaweed; but some of the rarer kinds must be sought for from the stomach of lobsters, oysters, whelks, and other mollusks.

The favourite habitats of those common to brackish water are marsh-ditches exposed to tidal influences, where they may generally be obtained in great quantities and many varieties.

The best localities near London are the marshes at Erith on the opposite side of the road from the entrance to the Railway station, and Swanscombe Salt Marsh, lying towards the river, about half a mile from Northfleet Railway Station. At both of these places I have always been able to get many interesting forms, together with fine specimens of living *Gromia*, and a variety of beautiful animal *Infusoria*. Others may be procured from the marsh ditches at North Woolwich, immediately beyond the Gardens by the Railway Station.

Fresh water Diatoms, in one form or other, are almost ubiquitous. They may be found deposited in brown tufts on the sides and bottom of nearly every clean ditch and every running stream. They line the sides of the locks up the river, fringe the leaves of the larger water-plants, and float in every collection of scum. *Pinnularia cuspidata*, *Stauroneis*, &c., may be obtained from a rill running across Keston Common, near Bromley, Kent, and all these forms, together with the beautiful *Surirella biseriata* and *Surirella splendida*, abound in the boggy pools on Winter Down, lying to the right of the main road one and a-half or two miles through Esher, opposite to Claremont Park.

I must reserve a few remarks upon the subject of illumination, and the best mode of resolving the difficult markings on some of the finer forms of *Diatomaceæ*, to a future opportunity. J. S.

A CHAPTER ON HAIRS.

AMONGST the numerous subjects which animal products supply for the worker with the microscope, there are few which are more interesting, or which offer a greater variety of structure, than those delicate filamentous processes which constitute the substance we know as *hair*. To pluck out a hair from the head of a playmate, and look at it with a simple microscope, is one of the first experiments of schoolboy days, although the result of the investigation is not always satisfactory, for reasons which will be presently apparent. Although this epidermal substance is not confined to hair only, but under various circumstances takes the form of horn, hoof, and nail, yet, as an external appendage, hairs are found not only on the superior orders of animals, but are likewise developed on the lower orders, on various insects, and to a limited extent on crustaceous animals; hence it naturally follows that the variety of hair is very great, its limits not being confined to the quills of the porcupine on the one hand, or the delicate hairs of the butterfly on the other; examination having proved that the horn of the rhinoceros is but a mass of hairs firmly united together, while the revelations of the microscope render it difficult to say how small those hairs may be which the insect world possesses.

It will be sufficient for our present purpose to refer more particularly to hair as commonly understood, and we may accept as a type of it, that with which we are most familiar, viz., human hair. This substance originates in a

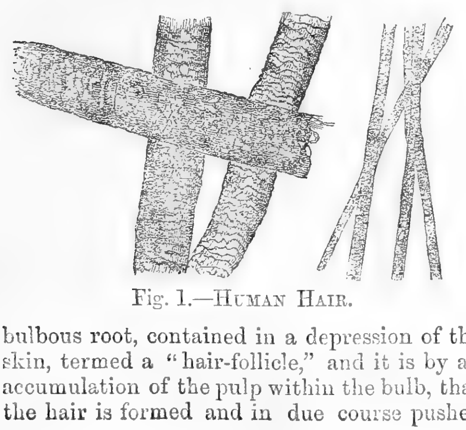


Fig. 1.—Human Hair.

bulbous root, contained in a depression of the skin, termed a "hair-follicle," and it is by an accumulation of the pulp within the bulb, that the hair is formed and in due course pushed upwards. When viewed through a microscope with reflected light, the external covering only is seen, which is called the cuticle, and consists of a thin membranous substance, freely marked with irregular lines, which result from the imbricated edges of scales or compressed cells with which the shaft is enveloped (fig. 1).

When viewed with transmitted light, a dark line is seen to run up the centre, which for a long time sustained the notion that human hair was tubular. A more careful investigation, however, has shown that the dark line is due to air, contained in cells, forming a pith or medullary substance. Surrounding this central column, and forming the bulk of the hair, is a fibrous substance termed the cortex, which, like the medulla, consists of cells, and to this horny portion of the hair is due its peculiar properties of strength and elasticity. There are likewise a number of pigment granules, exceedingly small, but which give to hair its various shades of colour, according as they are more or less numerous.

The microscopist will find a never ending variety in the structure of hair, both with regard to the internal and external arrangements of the scales, cells, and pigment. Thus, while human hair is comparatively smooth, the hairs of many animals are rough, and the scales on their surface looser. This is a principal reason why wools are so useful for weaving and felting, processes for which human hair is not applicable. A reference

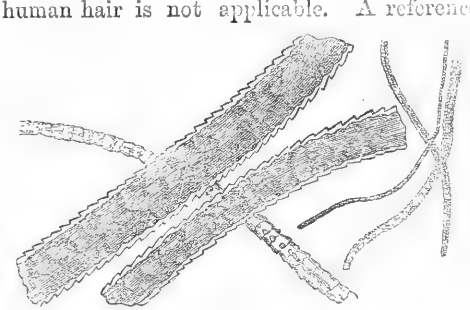


Fig. 2.—East India Wool.

to figs. 1, 2, and 3 will illustrate the difference between human hair and wool, which is but a modification of hair, and will explain why Merino wool is so esteemed by the manufacturers.

The wool of some kinds of goats, termed *mohair* (fig. 4), is of a similar character, but much finer in substance. The hair of the bat tribe affords most interesting objects, from the peculiar arrangement of the cortical scales, which project very much from the surface, and in the case of one of the Indian bats, the scales are arranged in curious whorls at regular intervals, not unlike the stem of the well-known plant "Equisetum." The

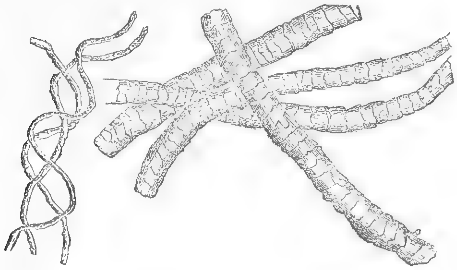


Fig. 3.—Spanish Merino.

hairs of the mouse (fig. 5), and rabbit (fig. 6), as well as all the rodents, are admirable objects, from their distinctly serrated surfaces.

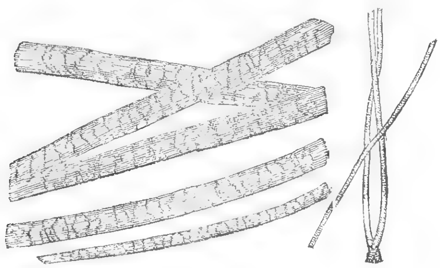


Fig. 4.—Mohair.

Without attempting to enumerate the animals whence these interesting objects can be obtained, it may be briefly stated that every hair has its own peculiar characters, and is worth all the patience and time which can be

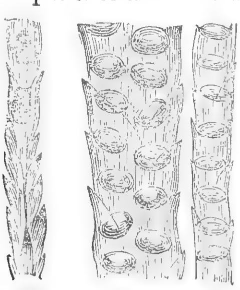


Fig. 5.—Mouse.

devoted to it. For examination under the polariscope hairs of all kinds, when properly mounted, are popular objects of admiration, exhibiting with extreme brilliancy characters and definitions otherwise unattainable. For the critical examination of hairs, recourse must be had to the use of acids and alkalies, aided by pressure and gentle heat; but for mounting hairs or sections of hairs on glass slides a different method must be adopted. Macerate in ether to cleanse them from fatty matters, and if opaque they must be soaked in turpentine, then mount them in balsam. Sections may be obtained by gluing several

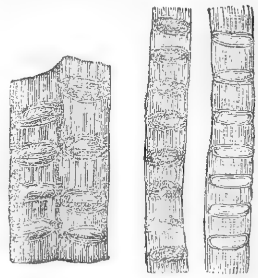


Fig. 6.—Rabbit Fur.

hairs together and then slicing them with a sharp knife or razor.

In concluding this brief notice of hairs, the young microscopist is reminded that the field is a wide one, and that it is not at all necessary to go beyond the boundaries of his native haunts to obtain materials for an extensive cabinet of interesting specimens.

W. M. B.

THE CABBAGE BUTTERFLY AND ITS METAMORPHOSES.

BY PROFESSOR A. DE QUATREFAGES.

(EXTERNAL PHASES.)

ALL our readers must have seen the cabbage-butterflies (*Pieris Brassicæ*) in their gardens, or in the country; they have black bodies, white ringed antennæ, and wings which are white on the upper side, but yellowish below, and covered with black spots, whose number and position mark the sexes. They are frequently seen in the months of August and September flying in pairs, sometimes in pursuit of each other, and occasionally rushing round and round, as though engaged in some severe contest. It seems as if a real struggle was going on, but it is absolutely nothing of the sort. The male urges his suit, and the female rejects it in true coquettish spirit. Finally, she settles down, but her wings are closely applied to each other, in this way covering the entire body. The male moves round and round her for a few moments, and then, as if he had taken his final departure, flies almost out of sight; but this is evidently a ruse. As soon as the female unfolds her wings and exhibits her entire form, he returns quickly enough, but to no purpose;

for she folds her wings together on his approach, and then the flirtations, pursuits, refusals, and pretended departures commence again.

These performances sometimes last for more than half an hour, no inconsiderable portion of a butterfly's lifetime. When they have ended, the female deposits its eggs, several hundred in number, upon some portion of a cabbage-leaf. The eggs are like little pyramids, three or four times as high as wide, and grooved by deep channels, which separate the rounded, undulating sides from each other. The *Pieris* arranges its eggs in a most artistic manner, side by side, and, having glued them firmly to the leaf, leaves them entirely to their fate. By far the greater number of them perish, but still some are hatched, and thus insure the perpetuation of the species.

Every one knows that there springs from each of these eggs a worm-like animal called a *caterpillar*, which must pass into the intermediate condition of *chrysalis* before it will become a perfect butterfly.

The egg which our *Pieris* lays is much smaller than a millet-seed, and the caterpillar which emerges from it is proportionally diminutive. When fully formed, however, it measures one inch and a half in length, and about 1-5th of an inch in width, and 1-6th in depth. We see what a great difference there is in size between the animal when it emerges from the egg, and when it is fully formed, and how rapidly the increase takes place. Moreover, this growth is not gradual, as in most other animals. We may describe it as occurring suddenly, and by a series of formative leaps taken at each of those periods ordinarily called *moultings*. In fact, as soon as it leaves the egg the young caterpillar eats with a voracity too familiar to our gardeners, but, nevertheless, does not increase in size.

After some days this enormous appetite is lost; the caterpillar becomes quite languid, and its skin loses its colour and appears to wither. It then crawls away to some sheltered locality. If we follow it to its retreat, we shall see it attach itself firmly to the ground, alternately contracting and inflating its body and twisting it about in every way; then resting for a while, as if completely exhausted, and finally commencing anew. Sometimes whole hours are spent before we can see the object of all these tiresome operations. Eventually the skin bursts at the third or fourth ring, and splits in a straight line from one end of the body to the other. The caterpillar now pushes out first its head and afterwards its entire body, and appears in a new skin as flexible and as brilliantly-coloured as ever. It has also increased in size, so that it would be quite impossible to enclose it in the case which before enveloped it. Its organs have increased in volume, but having been pent up and compressed by the old skin, when suddenly liberated they attained their proper size, as it were, through their natural elasticity.

There are several moultings gone through before the caterpillar arrives at its adult size and acquires its final characters. At this period we can distinguish but two anatomical regions in our insect—the head and the trunk. The head is small, of a blue colour picked with black, covered with a hard skin, and provided with six simple eyes, which are quite separate from each other. The mouth, as in other caterpillars, is formed for dividing and chewing the tough leaves of cabbage and other cruciferous plants. It is provided laterally with a pair of solid horny mandibles, and a pair of less powerful jaws, which are partly concealed by an upper lip and a wide lower one. In the middle of the latter may be seen a small tubular elongated organ, pierced by a microscopic aperture; this is the spinning apparatus, by which is made the soft wool-like material which the animal will soon require.

The body of the caterpillar is of cylindrical form, and is composed of twelve almost similar rings. It is of a greenish or yellowish grey colour, marked by three yellow bands which pass from end to end, and is covered with black spots. These spots are little tubercles, each of which carries a white hair, easily seen with a pocket lens. There are eight pairs of feet for the purpose of locomotion, and, as in all caterpillars, these are of two kinds. The three first of each side are conical, jointed, and terminated by hooklets or little claws; these are the *horny* or *true feet*. The others are termed membranous or *false feet*. The latter are like large tubercles, whose ends are truncated and furnished with a circle of hooklets. The most remarkable feature in connection with these is, that the caterpillar can move them in every direction, can push them out, or draw them into the body so completely that there is hardly a trace left of the positions they occupied. There is on each side of its body and extending over ten segments, a series of little orifices, each of which is surrounded by a brown circle; these are the *stigmata*, or apertures through which the air is admitted to the respiratory organs.

The caterpillar of the cabbage butterfly completes its growth about the month of October or November. It now prepares for its first metamorphosis by ceasing to eat, and thus completely emptying its digestive tube; then it seeks the hollow of some tree, or hole in some neighbouring wall, and having found a suitable spot, it begins its preparations.

Unlike the silkworm, this caterpillar spins no cocoon for its concealment and protection, but undergoes its metamorphosis in the open air. It now commences covering the spot it has chosen with filaments which cross each other in every direction; and this silken couch, delicate in texture, but withal of considerable strength, serves as a solid and firm support for the hinder limbs. Then bending its trunk and head posteriorly almost to the middle of the back—like an acrobat who makes a hoop of his body—it fixes a thread first on one side and then upon the other, and continues the operation till it has formed a kind of girth, composed of about fifty filaments. This done, it straightens its body, and undergoes its last moulting; the animal however which emerges from the cast-off skin is no longer a caterpillar, but a chrysalis, which is sustained horizontally by the hooklets of its tail and the girth we have described.

The *Pieris* in the new condition which it will maintain during the winter, bears hardly any resemblance to the caterpillar. The skin, which is dense and horny, is covered with a sort of varnish, thrown out at the moment of the metamorphosis, and rapidly dried. It has now assumed an ashy hue, picked out with black and yellow. The body has become thicker, but, as it were to compensate for this increase, has been shortened by about one-third. Instead of being made up of rings from end to end, it now exhibits two principal segments. The hinder one alone, which is short and conical, presents the annulose condition, although there is a keel-like elevation upon the dorsal portion of the anterior segment, and a kind of crest upon its undersurface. The head and feet seem at first sight to have disappeared altogether. On closer examination, however, we can detect a series of rounded elevations and projections, arranged symmetrically. Knowing what this inert mass will eventually become, we can almost fancy that we see the various organs beneath the skin, or rather beneath the cement which invests it; the proboscis, antennæ, and wings being indicated in the same manner as the form and proportions of a mummy are rudely mapped out by the bandages which enshroud it. To all intents and purposes the chrysalis is a mummy.

About the middle of spring, or beginning of summer, the *Pieris* undergoes its second metamorphosis. Its envelope splits along the dorsal portion, and the organs which had been inclosed by the crests and elevations come out, as if from a case; then the entire animal disengages itself, and from the chrysalis coffin there emerges a perfect butterfly. At first its feet are of too pliant a character to support the body; the wings are heavy, thrown into microscopic zigzag folds, and unfit for flight; and the proboscis with its component halves often separate, is extended in a right line. But after a while the surrounding liquids are evaporated, the limbs are strengthened, the proboscis is adjusted and coiled up, the wings are unfolded, and the insect, which in its early days was "a creeping thing," and afterwards a motionless one, flies to the nearest flower and makes its first repast.

VARIATIONS IN BRITISH PLANTS.

I HAVE here set down a few examples of variation which have come under my notice during the last two or three years. I have observed that the species contained in the order *Ranunculaceæ* have a peculiar tendency to depart from their ordinary forms; and many instances of such variations occur in the earlier numbers of the *Naturalist.* In addition to those therein recorded, I may mention that I have observed in Brompton cemetery a curious variety of the Bulbous Crowfoot (*Ranunculus bulbosus*), which bears flowers of a pale yellow or cream colour; though it differs in no other respect from the typical form: this variety is apparently constant, about a dozen examples having been observed in the same spot for the last four or five years. A friend has observed a single plant of the same species, at High Wycombe, Bucks, having blossoms "as double as those of the Dahlia," the whole of the stamens being transformed into petals. Another species, the Creeping Crowfoot (*R. repens*) is peculiarly variable in the relative number of stamens and petals; and semi-double varieties are in some places equally common with the ordinary form. The Lesser Spearwort (*R. Flammula*) also occasionally exhibits a similar peculiarity. The singularly deformed petals of the Wood Crowfoot (*R. auricomus*) must be familiar to all who know the plant; regularly shaped blossoms being quite the exception. The Pilewort (*R. Ficaria*) varies greatly in the number of its petals, instances being on record in which the flowers have been entirely double. Babington, in his *Manual*, assigns April and May as the time of the blossoming of this species; I have always observed it in flower by the end of February or the beginning of March; and have twice or thrice noticed it on Christmas day. In some neighbourhoods the blossoms of the Wood Anemone (*Anemone nemorosa*) occasionally assume a deep pink tinge; and this is especially the case when they are somewhat past their prime. Yet it is a curious fact that all, or even the majority of, specimens do not partake of this peculiarity, as I have observed it in a wood near High Wycombe, in which the fading specimens retained their original white, with the exception of one single patch, of which all the blossoms were deep pink. I met with a curious form of the Field Larkspur (*Delphinium Consolida*) on some waste ground in Chelsea last year, in which the petals were entirely wanting.

I have recently observed, in Wycombe Park, a variety of the common Bittercress (*Cardamine pratensis*) presenting features similar to that mentioned in Part 16 of the "Liverpool Naturalist's Scrap-Book," having young shoots growing from the base of the terminal leaflet, which was much enlarged. The blossoms of the Bitter Candytuft (*Iberis amara*) are sometimes of a purple colour, differing widely from the chalky-white which is their usual hue.

I last year received from a botanical correspondent residing at Durham the very beautiful variety of the Wood Sorrel (*Oxalis Acetosella*) which was recorded by Dr. Richardson, in Ray's *Synopsis*, under the name of *O flore purpureo*, as having occurred "in a hollow lane betwixt North Ouram and Halifax in plenty." My specimens came from a wood near Byer's Green, Durham, where I am informed that it occurred in abundance: and the same friend found it subsequently in Rokeby Wood, Yorkshire; he remarks that it blossoms later than the ordinary form. It appears to be rather unfrequent, and so conspicuous a plant could hardly be overlooked; it is reported from Chiselhurst, Kent; Shropshire; and Wales.

The proliferous variety of the White Clover (*Trifolium repens*) occurred last year in great abundance on the Balham end of Wandsworth Common; I had previously observed it in the grounds of Chelsea College. The blossoms of this species occasionally vary to a pinkish hue, somewhat similar to those of the variety known as the Scilly Trefoil, but of a much lighter shade; while those of the Purple Clover (*T. pratense*) are sometimes, though rarely, of a pure white. In the latter plant the calyx is occasionally much enlarged, and the flowers are almost hidden from view; this I imagine must be the variety called little-flowered (*parviflorum*) by some authors; it may usually be found on the Balham end of Wandsworth Common. The white variety above referred to I found last year in a field near Downley, Bucks, with a variety of the Hop Trefoil (*T. procumbens*), distinguished by Schreber as a species under the name of *T. campestre*. I am not aware that this last has been previously recorded as having occurred in Britain; it is much larger in all its parts than the Hop Trefoil (*T. procumbens*), and more robust in its growth; the leaves and flowers are also of a darker hue, and the former clasp the stem very closely, giving a shrubby character to the plant. The field in which I gathered it was sown with *T. hybridum*, and the former had evidently been introduced with it; but though it occurred in some plenty it did not appear to be part of the crop.

A curious variety of the Wild Carrot (*Daucus carota*) was noticed in the same neighbourhood, having umbellets, or small umbels, springing from the main head of blossom. This peculiarity was observed in but one plant. The lilac or blue hue, which is, with one exception, characteristic of our British Teazle Worts (*Dipsacaceæ*), is, as far as my experience goes, extremely variable—the shade of colour differing greatly in different plants. In the neighbourhood of High Wycombe, I last year found specimens of the Field Scabious (*Knautia arvensis*) and the Small Scabious (*Scabiosa columbaria*), having perfectly white blossoms, the latter occurring in one or two places; and at Whittington Park, in the same vicinity, a very pretty variety of the devil's bit (*S. succisa*) was observed, the flowers of which were of a pale pink, or flesh colour. The ordinary form of this plant is one of the last to yield to the approach of winter. I gathered a pretty bunch of its blossoms at the end of November last.

The order *Compositæ*, though large, does not furnish so many varieties as might be expected. The most interesting which I have noticed is one of the Nipple Wort (*Lapsana communis*), the flower-heads of which were proliferous, having smaller ones growing from their centre: this also occurred in the field near Downley, Bucks, above-mentioned: I am not aware that it has been previously observed. The pink hue occasionally assumed by the blossoms of the Milfoil (*Achillea millefolium*) is, I believe, caused by a peculiarity in the soil in which it grows; I have noticed a similar occurrence in the flowers of the Whitethorn (*Cratægus Oxyacantha*), though only on one or two occasions. The only other variety in this order worthy of note is one of the Great Knapweed (*Centaurea scabiosa*), having white flowers, which I have once or twice met with near Wycombe.

I may here mention a peculiar form of the Common Calamint (*Calamintha officinalis*) which occurs near Wycombe, and which has already been noticed in the *Botanist's Chronicle*. I first observed it in 1861, when I labelled it without hesitation *C. officinalis*, having found it to agree pretty well with the description of that plant, and not being acquainted with the ordinary form of it. Last year I received specimens of the same plant from the same locality, ticketed *C. nepeta*: I of course made inquiries, and was informed that they really belonged to that species. Later in the season, I found the ordinary form of *C. officinalis*, which certainly appeared very different from the plant which I had previously named as such, though it agreed at least equally well with the description given of that species. Thus in doubt, I sent specimens of each to a botanical friend, who kindly informed me that he believed both plants to be the Common Calamint (*C. officinalis*), and the discovery of a specimen, combining the characteristics of both forms satisfied me that the above conclusion was correct. The forms certainly differed widely in appearance; that which I had been induced to consider the Lesser Calamint (*C. nepeta*) being a larger plant, with hoary leaves and stems, and having pale lilac blossoms, spotted with purple; while the true *officinalis* had leaves of a brighter green, and deep pink flowers, mottled with white and red, and was altogether a more slender and graceful plant. It has been suggested to me that the former of these is but the second year's growth of *C. officinalis*; but I do not think that such is the case, though another year will settle the question,—it is certainly a persistent form, and grows in three or four places about High Wycombe, while the latter is apparently less common in the neighbourhood.

A pretty variety of the common bugle (*Ajuga reptans*), having white blossoms, occurs near Buttsbury, Essex, where it has appeared in some plenty for several years. The Forget-me-not (*Myosotis palustris*) occasionally retains the pink colour, which its buds frequently assume throughout the entire period of blossoming. At Medmenham, by the Thames, last year, I observed a form of Loosestrife (*Lysimachia vulgaris*), which had a red spot at the base of each division of the corolla; the whole plant was slenderer than is usual in the species; and a form of the great plantain (*Plantago major*), having a leafy flower-spike, was recently gathered at Chelsea. I have noticed that the entire habit of the English Blue-bell (*Agraphis nutans*) is changed by cultivation: the flower-stalk becomes shorter, and the blossoms fail to retain their drooping position, becoming erect, and changing in colour from dark to pale blue. A variety, having white flowers may be found in most neighbourhoods; and near Bristol this is said to be as common as the ordinary form: one with pink flowers is cultivated in cottage gardens, but I have never seen it in a wild state: and another with *yellow* blossoms is recorded as having occurred; if this was really the case, it affords a curious exception to one of the laws of colour.

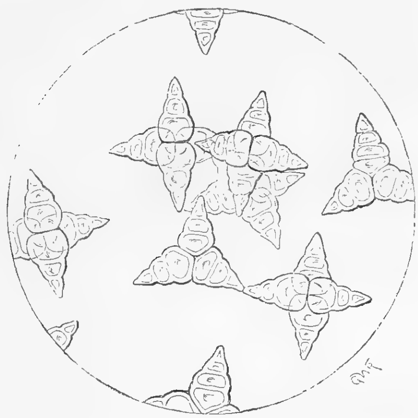
B.

Rustic Work for Fern Cases, &c.—The cultivation of Ferns and In-door Plants has led to a curious article of importation. The outer bark of the Cork-tree, hitherto looked upon as waste, has recently been brought to this country in large quantities. From its lightness and durability, it makes an excellent article for rustic work where wood and other heavy materials are inadmissible.

Our Lady of Toulouse.—Clemence Isaure, a lady of Toulouse, who lived in the fifteenth century, and who had often presided at the celebrated Floral Games of that ancient city, presented the citizens with magnificent markets, erected at her own cost, on condition that the games should be held in future within the hall which formed part of her donation, and that roses should be strewed upon her tomb. Her statue now adorns the hall of the Academy of Floral Games in Toulouse, and is annually crowned with brilliant flowers.—*Edwin Lees' Botanical Looker-Out.*

Superstition relating to Bees.—The superstitious practice of informing the bees of a death that takes place in a family, is very well known, and still prevails among the lower orders in some counties. The disastrous consequence to be apprehended from noncompliance with this strange custom is said to be that the bees will dwindle and die. The manner of communicating the intelligence to the little community, with due form and ceremony, is this: to take the key of the house, and knock with it three times against the hive, telling the inmates, at the same time, that their master or mistress, &c. (as the case may be) is dead!

SIMPLE OBJECTS.—No. I.



STAR-SPORED FUNGUS (*Asterosporium Hoffmanni*).

THE subject of our illustration is a small fungus which is very common on dead twigs of beech, lime, &c. It occurs in the form of black pustules which break through the bark, forming small orifices with a ragged, irregular mouth, within which the black mass of spores, about the size of a cabbage seed, is contained. The spores appear to be agglutinated together into a hard friable heap soon after the bursting of the cuticle, but at first they ooze out in a pasty mass. These spores are of a star-like form with three or four limbs, each of which is divided transversely by septa. When viewed by transmitted light they are almost of an amber colour. During the summer the pustules may be found on nearly every dead twig of beech or lime which still remains attached to the parent tree.

Mounting.—A little fragment of the black mass, taken out from one of the pustules, on the point of a penknife, may be laid on a glass slide, and a drop of spirit added, which assists in breaking it up into its constituent spores, whilst at the same time it expels the air. A portion of this muddy-looking fluid may be transferred to a clean slide, and as the spirit evaporates a drop of balsam may be let fall upon it, and covered with thin glass; or it may be mounted in the ordinary way with glycerine in a shallow cell. A piece of twig may be preserved for years with this fungus upon it, and will be as good as ever.* Our figure is magnified 420 diameters.

M. C. C.

* A limited number of fragments can be supplied to our subscribers on receipt of stamped envelopes.

NOTES ON LOCAL NAMES.

I HAVE often thought that a complete collection of the names by which our British plants and animals are known in country places would be interesting, and would be, besides, not without its utility.

Many of these names are exceedingly pretty,—far prettier than those by which they are generally known,—at any rate in works on Natural History. Some conjure up poetical associations, or remind us of traditions or stories connected with the plants themselves, or point out uses which have, perhaps, now become obsolete. Many local names, too, are no doubt very ancient; some being of Saxon, some of Norse, and others of Celtic origin; and these ancient names would be a very sure means of determining whether the plants which bear them were true natives, or were introduced amongst us, and by whom, in later times.

One fact would be very observable in such a collection, namely, that many different plants are known in different places by the same name; and, no doubt, the same would be true to a certain extent with regard to animals. Thus "Robin run by the hedge" is a name which, I believe, is generally applied to ground ivy (*Glechoma hederacea*); but I have heard the same name given to red campion (*Lychnis dioica*). Harebells, or hairbells, or airbells (*Campanula rotundifolia*, but which may be the correct *English* name I have not yet been able to make out) are often called "bluebells," and the same name is frequently applied to the wild hyacinth (*Hyacinthus nonscriptus*). I am told that in Sussex the greater bindweed (*Convolvulus sepium*) is called "woodbine," the name which in most places serves to distinguish the honeysuckle (*Lonicera*), which in Cumberland is called "bindwood"—a name not quite so euphonious as woodbine, but evidently meaning the same, and merely differing in the transposition of its parts. In Cheshire "bindweed" means the twining knotgrass (*Polygonum convolvulus*); but all these plants are characterised by their twining around others for support, and it is only likely that they should have received the same, or very similar names. As a rule, labouring men do not recognise minute differences in plants, and classify much more by similarity of leaves or habit than by resemblance in the flowers; thus many plants that have large coarse leaves are called "docks"—as "burdock;" while, in Cheshire, waterlilies are "flatter-docks" or floating docks. In that county, too, *Polygonum amphibium* is called ground willow because its leaves are just the shape of willow leaves, and the different kinds of *Lamium* are everywhere called "dead nettles" only because their leaves are like the leaves of the true or stinging nettle.

A source of error probably exists in this fact of the same name being given to different plants in different places, for it is not at all unlikely that localities have been erroneously recorded for both plants and animals from a confusion of English names. I can quite well remember that for years I mistook the eggs of the black-headed bunting (*Emberiza schœniclus*) for those of the blackcap warbler (*Curruca atricapilla*), because some of my schoolfellows who found them were accustomed to hear the black-headed bunting, otherwise red sparrow, called blackcap, whereas I understood by that name a very different bird.

Such mistakes would be very much obviated by some good-natured naturalist taking the trouble (and it would cost a good deal of trouble) to compile a volume containing the scientific names of every British plant and animal, with all the local synonyms printed under each.

Some local names are exceedingly curious, and it is somewhat puzzling to find out their derivations. In Cumberland the bistort (*Polygonum bistorta*) is called by the strange name of Easter man-giants. The only derivation that I can suggest for this appellation,—and I think it is the right one,—is that being sometimes in that country eaten in the spring about Easter-time, the leaves being boiled as a vegetable, the word "mangiant" must be derived from the French *manger*, "to eat." In Cheshire, the edible qualities of the plant are well known, but it is there called "patient dock," which is rather remarkable, as that name is given in botanical books to a different plant, "*Rumex patientia*,"—this latter plant being unknown in Cheshire.

In Gloucestershire, the purple orchis has a very ominous name; it is called "bloody man's fingers" —why, I do not know; but the country people have as much horror of it as if there were some terrible foundation for the name. If children gather wild flowers and bring them home, the orchises are carefully sorted out by their mothers and thrown away, lest bloody man's fingers should enter the house.

The local names of birds are quite as varied as those of plants. In Cheshire, the magpie is "piánnet," a rather pretty name; titmice are "tomtits," or "tittimaws," hedge-sparrows are "dunnocks." The starling is called "shepster," the long-tailed titmouse is "churn," the spotted flycatcher is "old man," the peewit is a "happinch," the chaffinch is "piedfinch," the missel thrush is a "sedcock," the yellow-hammer is in Yorkshire called "yellow-yowley," but in Cheshire it is generally known as a "goldfinch," a name which it certainly merits more than the real goldfinch, while the latter bird is frequently called "red linnet," and very often also "knicker-knocker."

If any naturalist should think it worth while to act upon the suggestions thrown out in these notes, and should wish to collect all the local names, I should be very glad to help him as regards Cheshire. R. H.

(N.B.—We are prepared to act as custodian for all local names of Birds and Plants, which will be acknowledged and retained until in sufficient number to construct a summary.—*Ed. Sc. G.*)

SPIDER EATING ITS WEB.

In the first number of "Science Gossip," under the head of "Notes and Queries," I observe that one of your correspondents asks the question, "Does the Spider eat its own Web?" Rennie, in his work on "Insect Architecture," states that the poet Bloomfield affirms that it does. But this Rennie seems inclined to regard rather as a fiction of the poet's brain than a well-authenticated fact. Perhaps the strangeness of the fact startled the accomplished naturalist, and led him to doubt the statement of one who from the very nature of his profession is privileged to take a "poet's licence" with the materials he works with. Still Rennie ought to have known that "truth is stranger than fiction." Any one who reads the "Farmer's Boy" cannot help being struck with the poet's admirable powers for observing and describing what he saw. Bloomfield was without doubt a *born* naturalist, whose poetic temperament led him to adopt song rather than prose as the vehicle of his thoughts and observations. Being well acquainted with the poet's productions, I have always entertained a lively faith in the accuracy of his statements, and was led to make the experiment I now record more for the vindication of the poet's character than for the satisfaction of my own mind.

The means for doing so were simple enough, and they were at hand. In a small garden, some 12 feet by 10, situated at the back of the house, a colony of garden spiders (*Epeira diadema*) had established themselves, and spread a perfect network of webs amongst my choicest chrysanthemums. I took great interest in watching the habits of these sagacious little creatures, and would not allow them to be disturbed although they did restrict my peregrinations by weaving their nets across the gravel path, and retarded the development of my flowers by encasing their buds in silken network. The instruction they afforded me more than counterbalanced the inconvenience they caused, so they were allowed to remain without molestation to increase and multiply in accordance with their natural instincts.

My first step in the experiment was to provide myself with a pair of sharp scissors, and my next to select one of the largest and most perfect specimens of a geometric web my garden contained. At that moment the little architect, contrary to custom, happened to be in the centre of his domains, looking much like an Alexander Selkirk—

> "Monarch of all he surveyed,
> Whose right there was none to dispute."

After a leisure survey, taken with the object of discovering the principal lines on which the web was supported, I rapidly cut them asunder with my scissors. The web instantly collapsed, and would have fallen to the ground but for one point of support which I had intentionally left untouched. From this point, hung dangling, like tangled threads, all that remained of this once beautiful structure. Stunned by the suddenness of the catastrophe, the spider for a moment remained motionless, but quickly collecting his scattered senses, he nimbly disengaged himself from the wreck, and plying his busy feet with the manipulative skill of as many hands rapidly rolled up the fragments of his web into a round ball the size of a small pea. This he held firmly between his mandibles, and courting retirement attached himself by his spinnarets to the underside of a leaf. I now seated myself in a convenient position from whence I could observe every movement of the little creature without being observed in turn, and I had moreover provided myself with an excellent Coddington lens of low magnifying power. My first peep at my small friend convinced me (notwithstanding what Rennie had said) that he evidently contemplated the feat of eating his own web. If this were not his intention, why should he be so busily engaged, under the shadow of his retreat, with feet and jaws endeavouring to bring the ravelled threads of his net into a more compact and commodious form? And why, when the dry loose materials resisted all his attempts at compression, did he saturate them with a glutinous fluid which I observed repeatedly exude from his mouth, causing them to adhere more closely to one another? And why should he take the trouble to knead them together and fashion them into a shape suitable for the gape of his royal mouth? All this with eye and lens I carefully noted, also the gradual diminution of the mass and its total disappearance down the gullet of the animal. All was engulphed, not a particle or vestige remained. From first to last the performance occupied just twenty minutes, and I would that every twenty minutes in a man's existence were as pleasantly and as profitably spent. During this time I never once removed my eyes from my little friend. Had he been disposed to play me a scurvy trick by tossing the pellet overboard, or otherwise attempting to conceal it, he could not have done so. Such an act would not have escaped my vigilant eye. The various processes through which the pellet passed, and its gradual consumption, all tending to one end, preclude the possibility of my arriving at any other conclusion that that which the poet affirmed when he said that *spiders eat their own webs*. After the conclusion of the experiment, I took the animal into my hand and overhauled every part of his body most carefully with my Coddington lens, but failed to discover any trace of the missing web. I might have killed and dissected the object of my study and should probably have exhumed some portion of the web from his stomach, but had I done so, it would not have strengthened my faith in the poet's statement which from henceforth I think should be received by a prosy public not as a fiction of the poet's brain, but as a well-authenticated fact. T. K.

THE PRESERVATIVE POWER OF FERNS.

DOUBTLESS many of the readers of this journal when passing the shops of large fruiterers in London and elsewhere have observed apples, pears, and other fruit packed in hampers containing fern-leaves, and had they but inquired why these leaves in particular were used, the more intelligent of the vendors would probably have told them they assisted in preserving the fruit from mildew and decay. Some years ago, when residing in the Isle of Man, I noticed that the bracken (*Pteris aquilina*) was in large demand for packing the fresh-caught herring forwarded daily by steamboats to the Liverpool markets; and more recently, during a brief sojourn at Frodsham, in Cheshire, brackens were collected on the Overton hill to line the hampers of new potatoes transmitted to the Manchester markets. Upon my return to the north of England, in a year when the potatoe disease was threatening the destruction of that valuable esculent, the rector of a parish in my neighbourhood at my suggestion induced one of his farmers to "hog" his winter potatoes on the ground where they grew, and to cover them with bracken instead of the customary straw. The farmer, sceptical about the result, only covered half the "hog" with ferns, leaving the other half protected by straw; earthing and sodding up the mound to exclude rain and frost. Winter arrived, and the "hog" was opened for a fresh supply of tubers, when it was discovered that those potatoes which had been stored in brackens were sound and good, whilst those protected by straw were so much decayed as to be scarcely worth the labour of removing. To me this experiment was very satisfactory and suggestive.

That ferns contain some peculiar preservative property there can be little doubt. Both the bracken and male fern abound in alkaline matter, which was once used by the manufacturers of soap and glass, and their astringent properties are well known to country people, and the dressers of leather. I believe the aroma from this family of plants to be repugnant to most insects and inimical to the growth of that species of fungi known as mould. I cannot now recall to my recollection ever having seen the larvæ of any lepidopterous insect feeding upon the fronds of our common ferns, nor do I remember having noticed insects of any orders resting upon them unless it were for shelter during a shower of rain. The peculiar odour thrown off by ferns must be familiar to all who have wandered near their place of growth. Is it due to an essential oil? The Russian leather so much prized in this country for its enduring properties and grateful smell is said to be prepared with oil distilled from the birch tree, and it has been stated that bales of this valuable leather frequently lie for months in damp warehouses at the London Docks without spotting or being otherwise injured by mildew. That essential oils of all kinds will prevent to a great extent the growth of fungi, we have but to mix a few drops in our flour-paste and see how long a time we may keep it unattacked by their sporules. Ferns boiled up with our paste would probably answer the same purpose. Hops, also, possess antiseptic properties, and dead game has been preserved in them for a lengthened period without showing any signs of decomposition. The root of the male shield-fern (*Lastrea filix mas*), when administered in the form of powder or decoction, is a powerful anthelmintic, and is frequently made use of for the expulsion of that pest of our race—the tape-worm. The young unexpanded fronds of this fern when cooked are said to be equal to asparagus. Dried ferns make a most enduring thatch for outbuildings on the farm, and should be largely used for the bedding of all animals affected with entozoaic diseases—the pig in particular. If in some parts of Germany and Denmark beech leaves are used to stuff mattresses in which fleas and bugs cannot exist, I think the poor of our own land might profitably collect the dead fronds of our ferns for the same purpose and ensure the same immunity from these midnight tormentors.

Reading. H. M.

SNAKE STONES.

ALLOW me to call attention to the following statement, copied from No. 139 of *All the Year Round*—"Description of a Snake-stone on the Island of Corfu, Ionian Isles.—Description of the Blue Stone.—This stone is of an oval shape, $1\frac{1}{5}$ long, $\frac{7}{10}$ broad, $\frac{3}{10}$ thick, and having been broken formerly, is now set in gold.

"When a person is bitten by a poisonous snake, the bite must be opened by a cut of a lancet or razor longways, and the stone applied within twenty-four hours. The stone then attaches itself firmly on the wound, and when it has done its office falls off; the cure is then complete. The stone must then be thrown into milk, whereupon it vomits the poison it has absorbed, which remains green upon the top of the milk, and the stone is then again fit for use.

"This stone has been from time immemorial in the family of Ventura, of Corfu, a house of Italian origin, and is notorious, so that peasants immediately apply for its aid. Its virtue has not been impaired by the fracture; its nature or composition is unknown.

"In a case where two were stung at the same time by serpents, the stone was applied to one who recovered, but the other for whom it could not be used died.

"It never failed but once, and then it was applied *after* the twenty-four hours.

"Its colour is so dark as not to be distinguished from black. "P. M. COLQUHOUN.

"Corfu, 7th Nov. 1860."

Upon the above I wish to make a few remarks. While in Corfu, where I resided some years, I became slightly acquainted with the gentleman in question, Signor Ventura, of the Strada Reale, Corfu. His family is, as stated, of great antiquity in the island; he does not know exactly when the stone first came in their possession, but conjectures it was brought from India by one of his ancestors. I have myself never seen this remarkable stone, but I am fully satisfied as to its efficacy, as I have constantly heard of people being cured by it; in fact the first thing the Greeks do when bitten by a venomous snake, of which there are several species in Greece, is to apply at once to Signor Ventura. The stone is then applied in exactly the manner described above, and the patient in due time is cured.

The instance alluded to where one died while it was being used for another, is of a countryman who was bitten by the olia or viper (whose bite is I think more deadly there than in England, owing, no doubt, to the greater heat of the climate) while cutting myrtle or bay for church decoration. He, as soon as bitten, ran to the town, distant some miles, and arrived when the stone was in use. When it was procured for him it would not adhere, for it seems this singular stone requires to rest in milk for some time, to vomit as it were the poison absorbed. Before it was fit for use again the man died.

The stone was broken by a very clever but unscrupulous native physician, who procured it to look at, as he said, but who broke it in halves, and subjected one half to the most severe tests, totally failing, however, to discover its component parts. Contrary to the opinion expressed in the preceding extract, the fracture of the stone *has* slightly impaired its curative power, and in consequence I have heard the physician, "Dottore ——," railed at in no very measured language by the Greeks.

There is a current rumour in Corfu that the Jews possess another and larger stone; but I will not vouch for the accuracy of this, nor do I profess to give an opinion as to the nature of these mysterious stones, but we have all heard of the so-called "Bezoar Stone," taken as is said from the inside of goats, monkeys, snakes, and toads, and its power in rendering the bites of snakes innocuous. I have read of such things in the works of Dumas and other authors, and have always regarded such as fables, but I had my faith greatly shaken in Corfu, and at last became a convert, per force, to public opinion and the wonders of this, which be it a bezoar-stone or what, does, it is certain, cure snake bites in every instance when properly applied. The wonder is that no one seems to know its composition, whether it is in reality the secretion of some animal or a stone of an earthly absorbent nature. Once, on mentioning it to an Indian acquaintance, he did not seem surprised, as he told me that he had seen a stone in India, known to possess the like powers, and which was taken from the body of a deer.

I have mentioned these facts and my own crude remarks in the hope that some more scientific person than myself can give a satisfactory explanation of the nature of such stones, or adduce fresh evidence in their support. A. M. B.

NOTE.—*Zuhr Mohra*, a blackish stone, is used in India for external application in cases of snake bites. Sir W. B. O'Shaughnessy states that the *Zeher Morah* is a kind of Bezoar, of which some are celebrated in Eastern works as remedies for snake-bites, hydrophobia, &c. Ainslie says that the Hindoos suppose it to possess sovereign virtues, as an external application in cases of snake-bites or stings of scorpions; and its various oriental names imply that it destroys poisons. Dr. Davy, on examining what are called snake-stones in India, found them to be *bezoar*. They are simply absorbents. The goat bezoar has a smooth, glossy surface, and a dark green or olive colour.—*Ed. S. G.*

ZOOLOGY.

THE GORILLA.—Three skulls of the gorilla, from M. Du Chaillu, were exhibited at the Royal Society, at the meeting on the 16th of January.

BUONAPARTE'S GULL (*Larus Buonapartii*)—Occurred in Falmouth Harbour on the 4th January. This is its first recorded visit to England. Twice it has visited Ireland, and once Scotland. Its first occurrence was in 1848.

A FEW days ago, whilst on a visit in Shropshire, a lady who heard me putting in a plea for the birds, gave me this fact. She was watching the trussing of a pheasant for dinner, and as the crop was much distended she had it opened, and the contents were wire-worms; of these real pests to the farmer there were, she said, as many as would fill a teacup. This occurred at a farmhouse in Salop, where game of all kinds is in bad repute.—*J. W. Bedford.*

NOTICE OF A MULE BREEDING.—Mr. A. Fonblanque, of the British Consulate at Alexandria, has communicated to Mr. Darwin a notice of a "curious birth," which has lately taken place at Cairo—that of a foal produced by a mule. He says, so great was the excitement at this unheard-of event amongst the native population, that it produced an official inquiry. The mule is twenty-two years of age, has no milk, and the jennet has to be fed.—*Natural History Review.*

IN WHAT NEST DOES THE CUCKOO LAY HER EGGS?—Mr. Brockholes says, "I have always found the titlark's nest the favourite with the cuckoo for the deposition of its eggs. The skylark's appears to be the next most favoured nest. I have also had the egg from the nests of the sedge warbler, yellow wagtail, yellow bunting, common bunting, and sparrow; but I do not remember an instance of two eggs in the same nest."

A STARLING WHO HAD SEEN THE WORLD.—I remember one poor bird (a starling) that had escaped from domestication, in which it had entirely lost, or probably never knew, the language or manners of its race, and acquired only the name of its mistress; disliked and avoided by its congeners, it would sit, by the hour together, sunning on some tall elm, calling in a most plaintive strain, "Nanny, Nanny," but no Nanny came; and our poor solitary either pined itself to death, or was killed, as its note ceased.—*Knapp's Journal of a Naturalist.*

A LIVE PORPOISE.—At length a real live porpoise has reached the Zoological Gardens, Regent's Park, in safety. At present it is said to be in rather delicate health, but it is hoped soon to be "at home" to visitors.

SONG OF THE SKYLARK (*Alauda vulgaris*).—White, in his "Natural History of Selborne" (Letter 27), says that the skylark sings in "February, and on to October." This year, on the morning of the 12th of December, I saw a lark rise out of a pasture by the road, and ascend about the usual height, singing as heartily as if his mate sat in the daisied sod beneath. The welcome strain at such an unusual time, and so unexpected, was doubly sweet, and I could not help exclaiming, with honest Izaak, "Lord, what music hast thou provided for the saints in heaven, when thou affordest bad men such music on earth!"—*Jno. Ranson, York.*

COLOUR OF BIRDS' EGGS.—The popular idea as to the colouring of eggs I think is quite at variance with fact. I don't say that old birds have not finer coloured eggs than young birds have, but from many experiments, made some years ago, when the question was mooted by a number of young ornithologists, we found the first eggs laid were the best coloured. By removing the eggs of the sparrow-hawk daily, the eighth or tenth egg will be quite white. By the same rule, if its nest is taken, and it builds again, the second batch will be light varieties, and one or more of them without any blotch. So with other birds, and the reason is obvious. The colouring matter is contained in what I may be excused calling "colour cells," and the egg is coloured as it leaves the ovary, the colour being exhausted the eggs are light.—*C. S. Gregson, in Naturalist's Scrap Book.*

DOUBLE YOLKED EGGS.—A correspondent observes in the "Naturalist's Scrap Book" that he found an uncommonly large nest of the green linnet (*Fringilla chtoris*) containing four eggs, two of which presented nothing worthy of remark, the third was much longer and curiously pointed, whilst the fourth was the size of an average skylark's. *Each* of the latter contained *two birds* and, unfortunately, incubation had proceeded so far, there was no chance of preserving the shells which were tender and thin to an extreme. He adds that he had not the slightest doubt, had another week elapsed without disturbance, that three live birds, if not four, would have been hatched from the two eggs.

THE SPIDER AND THE WASP.—I once saw in a hothouse in Shropshire a large female wasp caught in the irregular web of a quite small spider; and this spider, instead of cutting the web, most perseveringly continued to entangle the body, and especially the wings of its prey. The wasp at first aimed in vain repeated thrusts with its sting at its little antagonist. Pitying the wasp, after allowing it to struggle for more than an hour, I killed it and put it back into the web. The spider soon returned, and an hour afterwards I was much surprised to find it with its jaws buried in the orifice through which the sting is protruded in the living wasp. I drove the spider away two or three times, but for the next twenty-four hours I always found it again sucking at the same place. The spider became much distended by the juices of its prey, which was many times larger than itself.—*Darwin's Journal of Researches.*

THE GOLDEN EAGLE.—A few days ago, while one of the Earl of Breadalbane's gamekeepers was out shooting rabbits, he observed a golden eagle, and, taking aim, succeeded in bringing it to the ground. The bird is a beautiful specimen, and measures six feet nine inches from tip to tip of the wings. Within the last few weeks four eagles have been shot and trapped on the Breadalbane estate; and the noble birds are now getting very scarce.—*Daily Telegraph.*

SPIDERS AT HOME.—A friend of mine, who was in Australia some years, informed me he used to destroy all the large spiders he found in his house, until he discovered the nest of one of them surrounded by the remains of dead bugs with which the house was sadly pestered. Since this I have told many people to allow the spider a location in their dwellings, in places where the eye is not offended by the sight of their webs. I follow this plan myself, and my house is free from other insects; only two bugs were found in my house the past twelve months on bedclothes, none in crevices of furniture; these two I suppose to have been brought from the places of amusement which had been previously visited.—*Thos. W. Brown.*

BLUE TITS.—Mr. Artroyd, of Chester, relates the following anecdote in the "Naturalist's Scrap Book." In the winter season his garden was frequented by some tomtits (*Parus cœruleus*), and wishing to amuse himself with the active little creatures he attached a piece of fat mutton to a string and hung it on the bough of a pear tree growing near one of the windows. The birds tried various means to get at the meat and failed for some time; at last a male bird flew at it, fixed his claws, and succeeded in hanging on until he had made a hearty meal. The female, after trying several times, alighted on the branch from which the string was suspended, and by means of her beak and claws hauled up the meat. After eating as much as she required she flew away, letting the meat drop to the length of the string again. The same pair of birds continued to feed in the same way for a considerable time, *i.e.*, the cock flying boldly at the meat and hanging on by its claws, while the female waited on the branch ready to draw up. If the cock bird remained longer than her ladyship thought proper she would begin pulling up the string, and letting it go suddenly, whereby she never failed to shake off her tardy mate. No other birds were permitted to interfere; these alone had discovered the secret, and took care to keep possession of the well-earned prize.

NEWTS IN CONFINEMENT.—In March, 1861, while fishing for water insects on Barnes Common, a female smooth newt made its appearance close to my net. I immediately made a dab at it, and fished it out, accompanied by a male of the same species, and putting them in a glass bottle brought them up to London, and placed them in a fern-case about 3 ft. by 1 ft. 6 in. in area. The male did not thrive so well as the female; he gradually got thinner, and as I have not seen him since the autumn of 1863, I conclude he is dead, though I have not searched particularly for him. The female is still alive, and is now out and about, looking nearly in as good condition as usual. In the fern-case I formed a small pond of water, thinking that as efts are mostly found in ponds during the day, in summer they would enjoy the luxury of a bath. Not so, however. I never saw them voluntarily go into the water, and when thrown in they always scrambled out as soon as possible. The same thing occurs in keeping them in the aquarium; they always crawl out if they have the opportunity, seeming to eschew the very element they are generally found in when caught. These efts readily took food from the hand, particularly if it was rubbed against their noses; they seemed almost too sluggish to take much trouble in the matter else. I gave them small worms, gentles, and ants' eggs; they seized them with a bite, and got them down with a series of gulps. But I hardly ever fed them, perhaps not more than a dozen times altogether, as my object was to combine business with pleasure; the fern-case, in common with most others, I expect, being at times much blighted with green fly. I first put in lizards, to try and keep them down, but could not keep the lizards alive for any length of time, owing, I think, to the dampness of the case not being suitable to their constitutions, and their active habits making them require more food than they could obtain. I then tried small toads, and had the same luck with them as with the lizards. My third venture, the newts, were a great success; they soon cleared off all the green fly within reach, crawling to nearly the top of the ponds for that purpose. I have never had any trouble with the green fly since their introduction to the case, which has recently been removed into the country, and advise all fern-growers to try this simple remedy. —*H. F., Jun.*

Voracity of Sea Anemones.—Having kept a marine aquarium for a considerable period, on one occasion I noticed that a specimen of the common smooth anemone (*Actinia mesembryanthemum*) which for some time previous had been adhering to the side of the tank, had become detached, and was then floating, base upwards, on the surface of the water, and directly over a jutting piece of rock, about two inches below, on which was adhering a fine specimen of the daisy anemone (*Sagartia bellis*). Having occasion to look into the tank a few hours afterwards, my attention was arrested by the peculiar appearance of the daisy, the top of which then appeared of a bright red colour. A closer inspection, however, showed this red to be a portion of the red mesembryanthemum, which had been seized by the tentacles of the daisy, and was being drawn slowly and surely into its stomach. A few minutes afterwards it disappeared, while the daisy beautifully expanded, as if enjoying the meal. Here, then, was an illustration of a fact in natural history of which I had been ignorant, and which I have not seen noticed in any work on the subject, namely, that sea anemones will feed on their own species. And here also is a possible solution of the mystery attending the occasional disappearance of a specimen on which some store has been set.—*W. H. C.*

A Squirrel fond of Toadstools.—Walking in the pleasure grounds of my home in Warwickshire one morning in September, some years ago, I noticed a tall, well-grown toadstool springing up from the grass in a grove of trees. Being perfectly ignorant of "fungi" I can only say that this one was quite white throughout, and in shape like a well-expanded mushroom on a taller stem. A little squirrel descended from one of the trees, and made straight for the toadstool without noticing me, felled it in the neatest and most workman-like manner, by biting through its stem close to the ground; then, taking it in its mouth by the stem, he ran up the tree from which he had descended, and, having found a convenient seat, proceeded to eat the toadstool with much apparent satisfaction. A friend of mine has since told me that he had witnessed a similar incident in his own garden in Staffordshire, but I do not know whether the toadstool chosen by *his* squirrel was of a similar kind. Perhaps some of your readers may be able to inform me whether fungi are known to constitute a portion of the staple diet of squirrels, or are only reverted to in the dearth of other food; also whether they will eat all kinds indiscriminately.—*I.*

A Martin in Difficulty.—A young martin (at Rochester, in Kent) had the misfortune to become entangled in what appeared to me, at a short distance, to be a piece of thread. Having no means of extricating it, I was obliged to content myself with watching the efforts it made to effect its liberty, and the manœuvres of its parents for that same object Occasionally it struggled violently until exhausted, and then would remain quiet until it had recovered a little strength, when it renewed its struggles. In the meantime, the old birds showed their distress in loud twitterings, and by circling round their hapless offspring, frequently flying full tilt against it, probably trusting that the impetus they thus gave would be sufficient to release the captive. At last one of the parents managed to alight upon its young one, but the additional weight was insufficient to break the thread; the other parent then clung on also, but still without success, and after trying this several times, they seemed to become disheartened, and relinquished their efforts, leaving the young bird to its fate; but this was more propitious than might have been expected, and I had the pleasure of at last seeing the persevering efforts crowned with success, its repeated endeavours (like water which by constant dropping wears away stone) in time wore away the thread, and its release was attained.—*A. B. F.*

Flesh-worm Disease.—Trichinosis is a malady of the human frame which has probably raged with unremitting virulence for six thousand years, but of which man has unfortunately lived in profound ignorance; it has been working insidiously, concealed, underground I was about to say, but I only mean under-skin. How great has been our loss I need scarcely say; let us at once seek to repair it: six thousand years have been lost to us for ever. Ignorant of the existence of the disease, we have sought no cure; like the inhabitants of the Happy Valley, we have not known of our misery; at last Dr. Althaus, to whose name be every honour, has not only detected the evil, but has provided a cure. A worm, a little insignificant worm, a microscopic worm, inhabits the bodies of swine, pussy-cats, jackdaws and badgers, frogs and moles, crows, hedgehogs and hawks, and when man consumes the flesh of them he takes the living worms into his stomach, and thus offers his own body to them as a domicile. Microscopists have been for years acquainted with the existence of a minute vermiform entozoon inhabiting the human body, and until lately it was regarded as a harmless animal, and rather a microscopic curiosity than a source of danger. Its origin, as well as its life-history, long remained a problem, for which neither medical practitioners nor zoologists could offer a satisfactory solution; and the untenable hypothesis of spontaneous generation—that ever-present refuge of the ignorant—was freely resorted to by way of explanation. From experiments made by Virchow, Leuckart and Claus, it has, however, been clearly established that if animals, as dogs and cats, be fed with flesh containing Trichinæ, that other Trichinæ are produced in the intestines, and that these produce eggs and living progeny, which latter penetrate the coats of the intestines and "migrate into the body, more especially into the striated muscles, where, unless the animal in which they are contained should previously die, they are, after a time, encysted, and wait for the moment when they may be eaten by another man or animal to undergo the same changes as before.—*The Zoologist.*

Why was the Cat sacred to Hecate?—That the cat was domesticated among the Egyptians, we have pregnant evidence, not only in their custom of shaving their brows when their cats died a natural death, but also in the mummies found in their catacombs, and in the figures of these animals on the monuments of that ancient country—perched on the top of the *sistrum*, for instance, and supposed to represent the moon—probably from the following mythological legends:—

Jove, tired of state affairs and Juno's tongue, sought, one day, a little relaxation in the company of his pretty Latona twins, Apollo and Hecate. To amuse them, he bade them try their hand at creation, and do something towards filling the empty globule, now called earth. Apollo set his wits to work and produced man. No one likes to be outdone; so, as Diana saw at a glance that there was no going beyond her brother's handiwork, she tried to turn the laugh against him, and concocted a sort of H. B. of her brother's production in the form of an ape. No one likes to be laughed at, so Pol cut his sister's fun rather short, by turning up a ramping *lion*. Di, however, was not to be frightened, and played another card of ridicule in the shape of a *cat*. Apollo, upon this, got into good humour, and, determined to beat his lively antagonist at her own weapons, made a mouse, which Hecate's cat immediately ate up. The lovely sex always have it hollow in matters of finesse.

Her success at this game seems to have pleased the Goddess of Hunting; for when Typhon and his giant host pressed the gods so hard that they were compelled to flee into Egypt, and save themselves from his fury by shooting their souls into the bodies of quadrupeds and birds, she chose the form of a cat for her metamorphosis; whilst her brother was glad to escape into the person of a crow, and her papa into the woolly carcase of a ram.

No, say others, *that* is a fable; but the reason why the cat was sacred to Hecate is this: The triple night consequent on Jupiter's visit to Alcmena set all Olympus a wondering; and it was not long before Juno, whose acuteness was not suffered to become dull for want of exercise, soon discovered the *liaison*. The months rolled on. The Queen of Heaven sent for the Parcæ, and gave them her imperial orders, which they sternly obeyed, and poor Alcmena had a weary time of it. Her gossip, Galinthias, after scolding, beseeching, and saying and doing all that a kind woman, almost at her wits ends, from witnessing the agonies of her bosom friend, could, to make an impression on their stony hearts, had recourse to a little deception. She persuaded the Fates and Lucina, that it was the will of Jove that Hercules should be born. They believed her, and dissolved the spell. The good Galinthias, however, paid dearly for her friendly *ruse:* she had provoked the fiercest of all vengeance—that of a deceived Queen, and was turned into a cat. Hecate, though a bit of a prude, was so struck with commiseration, that she chose the metamorphosed dame as her consecrated attendant. Accordingly it was said that the number of the cat's offspring was a gradual progression—one, two, three, four, and so on, always augmenting, till a litter of seven was produced, and the total amounted to twenty-eight, the days of a lunation, and that the pupil of the cat's luminous eye dilated and diminished as the moon waxed or waned.—*Recreations in Natural History.*

ENTOMOLOGY.

Strength of Dorr-Beetle.—Having repeatedly placed one of these creatures (Dorr-beetles), weighing 15 grains, under a weight equal to 4,796 grains, sufficient, it would be considered, to crush its body, 319 times its own weight! it heaved it up and withdrew, and the same pressure being placed on its leg, was immediately disengaged by the powers of the other. Man effects his objects by the reasonings of his mind, mechanical agencies, or the strength of others; had he depended upon mere animal power to accomplish his wishes, in order to equal the means of a common beetle, he must have raised his body from an incumbent pressure of perhaps 20 tons.—*Knapp's Journal of a Naturalist.*

Death's-Head Moth at Sea.—Mr. Thomas Moore, of Liverpool, had a fine specimen of the Death's-Head Moth brought to him alive on the 26th Sept., 1863, by two fishermen who had captured it in their boat when about 30 miles south of the Isle of Man, between 6 and 7 p.m. on the previous day. Fishermen are not remarkable for delicacy of fingers, nor does a fishing-boat afford very promising material for entomological purposes. Jack and his mate, however, were equal to the occasion and brought their prize safely into port, and in excellent condition, enclosed in a *Pecten* shell.

Knoppern Galls. — The curious galls called "Knoppern," are produced in the North of Europe, on the acorn cups of the Turkey oak (*Quercus cerris*), altering and deforming them very much, as may be seen in our figure. The insect which causes this malformation is a species of *Cynips*, said to be *Cynips quercus-calycis*. The galls are very astringent, and are employed in dyeing silk.

Ligurian Queens and English Bees.—I placed a Ligurian Queen in a box having a perforated zinc communication, for some hours on the top of a stock from which the queen had been removed two days. I then admitted to the box one bee at a time, and they behaved very well until half a dozen had joined the queen, when they seized and attacked her, and I could not separate them from her without taking her up in my fingers, and actually pulling the bees from her. This took place four times, when, seeing that the bees would not accept her, I put her over another stock, and when I admitted the bees in this instance they received her joyfully. I then offered the stock that had rejected the queen in question another of the imported Ligurian Queens, and in this case the bees received her in a friendly way and conducted her in triumph into the hive.—*W. Carr, in Gardener's Chronicle.*

Wasps in Captivity.—Last year I procured a wasps' nest by placing equal parts of gunpowder and sulphur into the hole, covering the top with a sod, applying a match, and thus rendering the inmates harmless for a time. I then dug out the nest whole and placed it with its insensible inmates on a board, covering the nest over with a bell-glass sufficiently raised by four thin wedges of wood to admit air, and to enable me with a wire to clean away any refuse dead wasps, &c., but not high enough to allow any of the wasps to escape. I then fed them every morning with sugar, and thus kept them till the first week in November, when, I regret to say, I cleared them away. During the last few days only nine of them appeared, and these only in the middle of the day; in the morning and night they either disappeared into the nest, or clung to the outside and appeared quite dormant. It would be very interesting to watch them through the winter and on the return of spring. I shall endeavour to do so this year. Perhaps some of your readers will do the same. By the way, can you tell me how it is that there are no wasps in London?—*J. E.*

Crickets and Cockroaches.—My present residence, an old country house, was neither infested with cockroaches nor crickets until very lately. The cockroaches made their appearance about four years ago, and increased so rapidly and to such an extent that every night the kitchen-floor was black with them when the candle had been out about an hour. They made their way into every place, and although we tried every means to kill them they seemed to increase the faster, as if in mockery of our efforts. During last winter the chirp of the cricket was heard by the fire-side, and they increased from the solitary one to a full and noisy chorus, and as they increased the cockroaches decreased, and now (August) there is not a cockroach to be found. It has long been one of the articles of "folk-lore" that the two will not live together, and here is a proof. A neighbour of mine, a large farmer, has lost the crickets and is pestered with the cockroaches, which live and increase in spite of shoe-heel, traps, poppy-leaves, elder-leaves, or beetle-poison.—*J. Ranson, York.*

FISH TATTLE.

The New Fish.—Fourteen young specimens of a new edible fish (*Silurus glanis*) have been recently imported from Wallachia, for the purpose of introducing them into the waters of this country.

Salmon Breeding in the Tay.—The report recently published states that the late spawning season is the best that has been known in the Stormontfield ponds since their establishment ten years ago. Up to the 22nd of December last, upwards of 300,000 salmon eggs had been deposited in the breeding-boxes, and the ponds were swarming with young salmon hatched in March and April last. The average length of time required at Stormontfield for salmon eggs to ripen into fish is 120 days. It has also been ascertained beyond doubt that a smolt of a year old going down to the sea may return in a few months as a grilse of four pounds' weight, while its brother and sister fish which have not visited the sea remain tiny pairs of about half-an-ounce weight. The various stages of development at Stormontfield appear to take place at the following dates. An egg deposited in the ponds about Christmas comes to life in April, remains a parr until about April the following year, when, being seized with its migratory instinct, it departs for the sea. If recaptured in July it has become a grilse, weighing about four pounds, and if again set free and recaptured at a later period it will be a salmon weighing ten or twelve pounds. Upwards of a million of pond-bred fish have now been set at liberty in the Tay, and the result has been a satisfactory rise in the salmon rental of that fine river. The most curious speciality in connexion with the piscicultural operations at Stormontfield is the circumstance that only one-half of a brood of young salmon go down to the sea at the expiration of about a year from their birth, the others remain in the ponds a year longer, and do not become smolts until they are turned two years old. The operations at Stormontfield have been so successful that it is intended to increase the number of breeding-boxes.—*Athenæum.*

Salmon in Australia.—At the third annual meeting of the Acclimatisation Society of Victoria, held at Melbourne on the 11th Nov. last, Dr. F. Black reported that the salmon at Badger's Creek were going on as prosperously as could be wished. Dr. Officer, a visitor from Tasmania, gave a long account of the salmon and trout in Tasmania, hatched from ova sent there by the Acclimatisation Society, which were going on exceedingly well. There were about 4,000 salmon and 300 trout; and the former were expected to be on their return trip from the ocean in a twelvemonth. So far the experiment has been perfectly successful. Arrangements have been made to obtain a fresh supply of salmon ova from England. —*W. J. S.*

Gobies in an Aquarium.—I kept some gobies for a length of time in a salt-water aquarium, and used to feed them with bread-crumbs, which I dropped into the water a few at a time. In a short time the gobies quite recognized us when we came near the aquarium, and would all swim at once to the side, and they were so tame that they would take the bread from my fingers, and even jump out of the water to get it. After I had had them some little time they began to breed, and attached their eggs to the side of the aquarium in the same kind of way in which a caterpillar affixes its egg to a leaf. Then the male goby at once set-to to guard, and it was very amusing to watch how fiercely he would attack any creature coming near, puffing his cheeks out in a curious manner. He constantly attached himself by his pectoral fins close to the eggs, or kept swimming near them. Unfortunately none were hatched, as the crabs and periwinkles were too much for them, and devoured them, though there were several batches of eggs laid. I am sorry to say, that having to leave home, the aquarium was neglected and spoilt, since which time I have not renewed it. I see *some* gobies are said to build nests; but they must be of a different species.—*E. J. S.*

"I have seen
A curious child, who dwelt upon a tract
Of inland ground, applying to his ear
The convolutions of a smooth-lipped shell;
To which, in silence hushed, his very soul
Listened intensely, and his countenance soon
Brightened with joy; for from within were heard
Murmurings, whereby the monitor expressed
Mysterious union with its native sea."

Wordsworth.

BOTANY.

The town of Almora, in Kumaon, India, is said to have been so named from the abundance of *Ulmoreh*, or wild sorrel (*Rumex hastatus*), which grows in its vicinity.

Plants Rooting in the Soil.—In the notice about plants rooting in the soil (p. 18) they are said to go down about five or six feet. I know of a case where the roots of wheat were traced fourteen feet deep.—*E. J. S.*

Black Hollyhocks.—These flowers are being extensively cultivated, near Nuremberg, for the sake of the colouring matter they contain, and which is said to be chiefly exported to England for printing and dyeing fabrics.—*La Belgique Horticole.*

Collecting Roses. — M. Crepin recommends that roses should be collected between the hours of eight and eleven in the morning; after that time the pollen is removed and scattered by bees, &c., and if such be the case the petals will detach during drying, whatever pains may be taken to prevent it.

How to Mount Mosses. — To disentangle the stems of *Weissia verticillata* and other fragile mosses, Mr. Wilson recommends that they should be immersed for a time in diluted nitric acid, which dissolves the earthy matter. By this means, he adds, the brittle species of *Chara* may also be preserved.

Cybele Hibernica, on the plan of the "Cybele Britannica," is in course of preparation. At first, on account of the deficiency of information regarding the midland provinces, it will appear as "Contributions towards a Cybele Hibernica," under the editorship of Dr. Moore, of Glasnevin, and Mr. A. G. More.

Eriophorum Augustifolium.—In April, 1863, I noticed the following forms:—1, the sexes in different plants; 2, the sexes in different spikes on the same plant; 3, the sexes in different flowers of the same spike. These forms were in Sunninghill Bog, Berkshire. I could not find any hermaphrodite flowers there. — *G. H. Sawyer, in Gardener's Chronicle.*

Which is Right?—Professor Parlatore is engaged on a monograph of the species of cotton (*Gossypium*) of which he considers there are but five. Professor Todaro is performing a similar task, and enumerates thirty-four. Dr. Hooker, it is stated, has faith only in three, whilst Dr. Seemann recognizes upwards of thirty. Dr. Royle thought that there were but four, and some other authors believe in forty. Who shall decide when doctors disagree?

Seed Lying Dormant.—A friend of mine had a small plot of ground (about half an acre) planted with turnips for seed. At the proper time the seed was pulled, dried, and thrashed. Immediately after the crop was carried away the ground was trenched "a spit deep;" and in the autumn planted with filbert trees. It continued as a filbert orchard for twenty-one years, when the trees were grubbed up, and the ground trenched as before, after which it was soon covered with a luxuriant crop of turnips, doubtlessly from the shaken seed when it grew the crop of turnip-seed twenty-one years before.—*J. Ranson, York.*

At a recent meeting of the Natural History Society of Dublin, Mr. F. J. Foot read a very useful paper, entitled "Botanical Notes in the Midland Counties."

The Yew-in-the-Oak.—The yew occasionally presents itself in very curious positions, from its berries having been carried off and dropped or hidden by birds. I have more than once seen it as an epiphyte upon the willow, and one of considerable bulk is now growing *within* an *oak*, near Ribbesford, Worcestershire; and from its size and the wrenching power it has exerted upon the broken trunk of its sustainer, has evidently grown there for a period exceeding a century. The intertwining of the contrasting foliage of the two trees has a most remarkable effect. The ordnance surveyors have even recorded the circumstance, and "the yew-in-the-oak" appears marked in their map.—*Edwin Lees' Botanical Looker-out.*

A Fly-Catching Plant. — We have one plant in our gardens, a native of North America, than which none can be more cruelly destructive of insect life, the dogsbane (*Apocynum androsæmifolium*) which is generally conducive to the death of every fly that settles upon it. Allured by the honey on the nectary of the expanded blossom, the instant the trunk is protruded to feed on it, the filaments close, and, catching the fly by the extremity of its proboscis, detain the poor prisoner writhing in protracted struggles till released by death, a death apparently occasioned by exhaustion alone; the filaments then relax, and the body falls to the ground. The plant will at times be dusky from the numbers of imprisoned wretches.—*Knapp's Journal of a Naturalist.*

The Uses of Horse-Chestnuts.—For a great number of years M. Klose of Berlin has operated on a large scale on the horse-chestnut, and obtained the following products:—

1. From the burnt pericarp an alkaline ley.
2. From the skin or husk (episperm) a very fine charcoal, which forms the base of different printing inks.
3. From the amylaceous portion is extracted the fecula, which can be transformed into dextrine, glucose (sugar), alcohol, or vinegar, and which are all adapted to industrial use.
4. The fatty matter extracted serves to make a kind of soap, and to render certain mineral colours more fixed and solid.
5. A yellow colouring matter which serves for different purposes.

The use of the horse chestnut was commenced on a large scale in France in 1855, by M. de Callias, and is still continued. He operates on more than forty millions of pounds annually.—*The Technologist.*

Features of Plants.—To learn how to distinguish plants, and to identify those we have seen before, and to qualify ourselves to give the reasons how and why we know them again, and are sure about them, is the first thing, accordingly, that we have to do when we would become botanists. It is not enough to remember a plant by its general aspect, or to say of a lily, for instance, that it is white, and smells sweet. A hundred other flowers, which are not lilies, are white and fragrant, so that the description goes for nothing unless we can follow it up with an intelligible account of the shape and structure of the plant, which will not only be correct in regard to the lily, and apply to nothing else, but convey a fair notion of the lily to a person who has never seen one. This is no difficult matter, every plant in the world being stamped, as already said, with peculiarities which, if they do not render it unique, serve at least to give it character and physiognomy. All the parts of plants supply these signs and tokens, though some more immediately than others. The Flower and Fruit, as the loveliest and noblest, and the parts to which all the aims and energies of the plant are directed from the first moment, naturally stand foremost. Next in importance comes the Leaves, then the Stem and inferior members, the value of each part, as a witness to identity, gradually diminishing in the degree that it is coarser and less perishable. Everywhere in nature, that which most powerfully characterizes a thing is its most fragile part, and however frequently renewed is, like the sparkle of a diamond, the quickest to come and go.—*Grindon's British and Garden Botany.*

British Species of Burdock.—In the last number of the *Annals of Natural History,* Professor Babington has worked up the English species of *Arctium,* which he considers to be certainly four, with a doubtful fifth. These are *A. majus, intermedium, minus,* and the Llanberris plant, which is named *A. nemorosum,* Lej.; the doubtful one is *A. tomentosum,* Schkr. It should be observed that these are not all the plants described under the same names in his "Manual," of which *A. tomentosum* is the present *A. majus; A. pubens* is *A. intermedium;* and *A. intermedium* is *A. nemorosum.* Bentham includes all these forms under *Arctium Lappa.*

Tomb of Van Rhede.—Under an imposing monument, at Surat, lie the bones of Van Rhede, formerly chief of the Dutch possessions in Ceylon, and afterwards of the Dutch Factory at Surat. He was an enlightened Protestant, according to the ideas of enlightenment prevalent in the seventeenth century, and really a man of science and learning. His *business* at Ceylon was hunting Jesuits, and flogging their congregations; his *amusement* was composing that noble work, the "Hortus Malabaricus," with its magnificent plates, in twelve folio volumes. He died in 1691.

Fern Growing.—I have had *Hymenophyllum Tunbridgense* growing in an earthenware dish in company with a few common ferns, since the beginning of 1861, covered with a common bell glass. The taller ferns acted as a screen to their dwarfish brother, and to them I attribute my success. I have, however, seen it in great luxuriance at Tunbridge Wells, where it is the custom to place it in vessels by itself, and on a mound. I suppose this latter assists drainage? My roots were found by myself, growing on a huge piece of granite on the *Dewer Stone,* in Devonshire, the most beautiful spot, by the by, which my eyes have ever rested upon.—*William Gibson.*

Green Spleenwort (*Asplenium viride*).—Dr. Hooker has lately received a specimen of this fern from St. John's, New Brunswick, collected on sea-cliffs, Taylor's Island. This discovery is a most interesting one in connection with the glacial migration of Scandinavian plants over the North American continent; the plant being common in the sub-alpine regions of Europe, and also found in the Rocky Mountains, but not occurring in Greenland, or in any other part of North America.—*Natural History Review.*

GEOLOGY.

Bighorn at Belfast.—A few weeks ago, a very beautiful and perfect specimen of the Irish bighorn (*Megaceros Hibernica*) was found in the marl bed, underlying a stratum of peat. It is a great mistake to suppose that the bighorn is found in the bog or peat; it is always found in the marl below the peat, as in this case. The locality of the bed in question is the small peninsula to the north, as you go down our Lough, called "Island Magee."—*J. Hartley, Belfast.*

Drift of the East of England.—A very interesting paper on this subject was read by Mr. S. V. Wood, jun., at the meeting of the Geological Society, on Dec. 21st.

Glacier Phenomena.—A very interesting and instructive chapter on this subject appeared in the *Reader* of the 21st January, tracing the history of opinion thereon, and indicating the changes wrought during a quarter of a century.

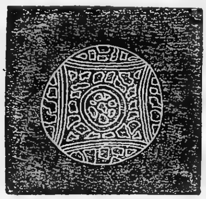
Gigantic Fossil Beaver.—At a recent meeting of the Norwich Geological Society, Mr. J. O. Harper read a paper on the comparative anatomy of Rodents, illustrated by numerous specimens, among others several of *Trogontherium Cuvieri* (a gigantic fossil beaver, found in the forest bed at Bacton, Norfolk), from the Norwich Museum and the Rev. J. Gunn's collection.

Phosphor Stone.—Towards the close of the eighteenth century, in a narrow winding street of the old town of Bologna, a cobbler—Vincenzo Cascariolo by name—might have been found more intent on the pursuit of alchemy than in making or repairing boots. While enjoying a walk one Sunday evening, near the Monte Paterno, not far from the city, he picked up a stone, which, from its great weight, struck him as peculiar, and from which he fancied he could extract gold. This stone was sulphate of Baryta, which Cascariolo, heating in his crucible with charcoal, converted into a sulphuret of Barium, and produced a body well known for its strange property of giving out light after it has been exposed for some time to the sun's rays. Since then, other substances have been discovered endowed with this strange property, and from the most remarkable of them, phosphorus, the name of phosphorescence is derived.

Geological Changes in Scotland.—At a meeting of the Geological Society (Jan. 11th), Mr. T. F. Jameson read a paper on the "History of the last Geological Changes in Scotland," which he divided into three periods,—Pre-glacial, Glacial, and Post-glacial. The absence of later tertiary strata leaves the first somewhat obscure. The author considered it in some degree represented by some thick masses of sand and gravel on the coast of Aberdeenshire, and he stated there were indications of the mammoth inhabiting Scotland at this period. The Glacial period was sub-divided into the period of Land-ice, the period of Depression, and the period of Emergence of the land. To the Post-glacial period Mr. Jameson referred the formation of submarine forest beds, which he considered was succeeded by a second period of Depression, and this again by the elevation of the land to its present position. It is in the old estuary beds and beaches formed during the second period of Depression that the author finds the first traces of man in Scotland, while the shell mounds with chipped flints he referred to the same epoch as the blown sand and beds of peat, *i.e.*, to the most recent period during which the land was raised to its present level.

MICROSCOPY.

Pollen Grains.—These are very interesting objects for the microscope, and offer a great variety of form and markings—some are smooth, others tuberculated, spiny, or with convolute ridges. The figures given are those of two climbing plants, a species of Passion-flower (*Passiflora incarnata*) and a *Thunbergia* (*T. alata*). These objects may be examined with great facility, and mounted, either dry or in fluid, with very little trouble.



1. PASSIFLORA INCARNATA.

2. THUNBERGIA ALATA

A Microscopic Object.—I have lately mounted as a microscopic object a portion of the scale attached to the seed of the fir-tree (*Pinus sylvestris*). The spiral vessels are shown very clearly. As I have never heard of this as a microscopic object before, I thought some of your readers would like to make it an addition to their cabinets.—*W. Gibson.*

The Amœba.—Here is one of the most degraded of animal forms—the little Amœba—a creature to be found in pools of fresh water in the summer time, but not so easily discovered as some of our naturalists would lead us to imagine. Watch him closely! He is but an irregularly-shaped mass of jelly, and very minute; moreover, he is quite transparent, and is not (as our quack advertisements have it) "troubled with a liver," nor indeed with any organ at all. He is really, as a lady once remarked to me of a snail—"all squash;" and yet, as I said before, watch him! Lo! a minute animalcule has just brushed past him. Ah, luckless animalcule, not *past!* for the Amœba has thrown out a long whip-like string of jelly, in which thou art entangled. Struggles are unavailing. The relentless monster has seized his quarry; and see! already he is throwing out other arms, hydra-fashion—now two, now four. In a moment a dozen hungry arms have closed around thee. Stay! "What will he do with it?" Art thou to be kept "in durance vile," hapless infusorian? 'Tis true thy cruel tyrant hath got no Bastile in which to entomb thee; a far worse fate is being prepared. The Amœba is gradually pushing his prey into the substance of his body. This has subsequently closed over it; and what do we behold? A transparent sphere enclosing the unfortunate animalcule, who is now subserving the comfort of the oppressor by undergoing rapid digestion. After some time, when all the nutritious materials have been abstracted, the remnants are quite *unconcernedly* forced out through some portion of the gelatinous film.—*Lawson's Popular Physiology.*

The Highest Power.—Messrs. Powell & Lealand have completed an object glass of 1-50th of an inch focus. It was exhibited at the October meeting of the Microscopical Society, at King's College. The object shown was a Podura scale, power 4,000 linear, perfectly free from chromatic and spherical aberration, the definition and penetration excellent. It was thought a wonder when this firm produced a 1-16th, still greater when their 1-25th made its appearance, but now they have reached a 1-50th, the greatest wonder of all.

Why Objects appear Larger through the Microscope.—T. K.'s Paper on the size of objects as seen nearer or farther off by the eye is not quite satisfactory, as he proves the fact, but does not show how it is. The reason is, that as an object approaches the eye it is seen under a larger angle. Thus, if at 10 inches from the eye an object is seen at an angle of 50 degrees, if it be brought to 5 inches from the eye the angle is then increased to 100 degrees, which being twice 50, the object is seen apparently twice as large linear. And this is all a lens does; it enables us to see clearly an object at a greater or less angle than it can be seen distinctly by the naked eye.—*E. J. S.*

The Fairy Shrimp (*Chirocephalus diaphanus*).—They swim upon their back, and in fine, warm weather, when the sun is not too strong, they may be seen balancing themselves, as it were, near the surface by means of their branchial feet, which are in constant motion. On the least disturbance, however, they strike the water rapidly with their tail from right to left, and dart away like a fish, and hasten to conceal themselves by diving into the soft mud, or amongst the weeds at the bottom of the pool. It is certainly the most beautiful and elegant of all Entomostraca.—*Dr. Baird's Entomostraca.*

Mounting in Balsam and Chloroform.—Take a quantity of the oldest balsam, place it in an open glass cup, pour on and mix with it as much chloroform as will make the whole quite fluid, so that a very small quantity will drop from the lip of the vessel. Having thoroughly mixed, pour the prepared balsam into long thin half-ounce phials, cork and set them aside for at least one month, now and then turning the corks to keep them loose. It sets quicker than if only mixed when wanted. I use no heat either to the balsam or the glass slide, nor, in fact, in any part of the process. Objects which have been immersed in turpentine need only be rinsed in clean turpentine, placed in position on the glass slide, a sufficient quantity of balsam dropped from the lip of the half-ounce bottle, and the cover laid on gently without delay. In a few days, or at most a week, the slides may be safely used with care; in a fortnight the balsam will be firmly set.—*W. H. Heys in Microscopical Journal.*

A Little Rhapsody.—The following choice sentence, containing the statement of a circumstance new to botanical science, is extracted from a little work entitled "Shrines of Bucks" (p. 57):—"The blush rose, climbing with loving arms around the hawthorns and other shrubs, that form the boundary line of the fields, and *the bindweed, azure-hued as the blue sky above us,* mingles its bright flowers with the fragrant honeysuckle, or the thorny sweet-brier, that fills the soft summer breeze with fragrance."—*B.*

REPORTS OF SOCIETIES.

MANCHESTER LITERARY AND PHILOSOPHICAL SOCIETY, *Dec. 13th.*—Some spores of plants found in the splint coal of Methill, Fifeshire, were exhibited; also some larger spores found in the Derbyshire coalfield. Mr. W. Brookbank read a paper on the "Discovery of the bones of the Mammoth in a fissure of the Carboniferous Limestone at Waterhouses, near Leek." The fissure in which these remains were found occurs in the upper beds, and has been exposed by the working of a quarry. All the bones from the dryer side of the fissure were recovered in good condition. A considerable part of the fissure remains to be explored, which is already in progress.

MICROSCOPICAL SECTION, *Nov. 21st.*—Mr. G. E. Hunt announced his discovery of *Potamogeton nitens* in Loch Ascog, Rothsay. This plant was first observed as British by Mr. David Moore, Dublin, in a lake near the sea at Castle Gregory, County of Kerry, in July last.

LINNÆAN, *Dec. 15th.*—Dr. St. Brady exhibited specimens of *Ammi glaucifolium, L.*, gathered by him on the banks of the Severn, near Gloucester, in September last. A paper was read on "*Potamogeton trichoides*, Cham., in England," by Dr. R. Caspary, and "Notice of two forms of *Eriophorum augustifolium*," by Dr. Dickie.

ETHNOLOGICAL, *Dec. 27th.*—Mr. John Evans, F.R.S., read a paper "On Flint Implements from Salisbury Hill, near Bath." These implements, consisting chiefly of small arrow-heads, and flint cores from which such articles had been flaked, were found on an oolitic hill, to the natural soil of which flint was a foreign material. The author did not attempt to assign these relics to any definite age, though he considered it would be justifiable to refer them to the pre-Roman period, and that for the first occupation of Salisbury Hill a date might be claimed far earlier than those Saxon times to which Collinson (History of Somerset) has ascribed the encampment.

ENTOMOLOGICAL, *Jan. 2nd.*—Mr. Bond exhibited *Depressaria olerella*, a new addition to the list of species of British moths, and some remarkable varieties of the ghost moth, *Hepialus humuli*, from the Shetlands. Mr. Dunning mentioned the capture, near Huddersfield, of a large number of *Dasypolia Templi*. Mr. F. Smith communicated a paper on "Wasps and their Parasites in 1864," by Mr. S. Stone.

AMATEUR BOTANISTS (London), *Jan. 4th.*—Paper by Mr. Harland Coultas on "Plant Palæontology."

MICROSCOPICAL, *Jan. 11th.*—Paper by Mr. Slack on the "Vinegar Plant." A committee was afterwards formed to work in association with Mr. Slack, in order that some important points, still open for elucidation on this subject, may be more thoroughly investigated.

SECRETARIES of Field Clubs and Natural History Societies are solicited to forward accounts of their ordinary meetings, excursions, and proceedings, throughout the year. A portion of the Science Gossip being devoted to the service of such associations, it is the wish of the promoters that it should be rendered as truly serviceable as possible.

NOTES AND QUERIES.

IN the woods, a man casts off his years, as the snake his slough, and, at what period soever of life, is always a child.—*Emerson.*

ZOOLOGICAL GARDENS IN INDIA.—It is reported that Zoological Gardens are about being established in Bombay.

MOUNTING PLANTS.—Corrosive sublimate mixed with glue will be of little service, as the glue decomposes it.—*E. J. S.*

DEATH OF DR. BAIKIE. — This enterprizing African explorer lately died on board ship on his return homewards from West Africa, after many years' residence on the Upper Niger.

WATERING VEGETABLES WITH IRON SOLUTION. —It is stated as a new discovery that wonderful effects may be obtained by watering fruit-trees and vegetables with a solution of sulphate of iron. Under this system beans will grow to nearly double the size, and will acquire a much more savoury taste. The pear seems to be particularly well adapted for this treatment. Old nails thrown into water and left to rust there will impart to it all the necessary qualities for forcing vegetation as described.—*Times*, Dec. 5, 1864.

MAN'S PLACE IN NATURE.—The fairy in Kingsley's "Water-Babies" tells her pupil, "Folks say, now, that I can make beasts into men, by circumstance, and selection, and competition, and so forth. Well, perhaps they are wrong, and perhaps again they are right. Whatever their ancestors were, men they *are*, and I advise them to behave as such, and act accordingly. Let them recollect this, that there are two sides to every question, and a downhill as well as an uphill road; and if I can turn beasts into men, I can, by the same laws of circumstance, and selection, and competition, turn men into beasts."

NO KNOWLEDGE WITHOUT WORK.—Many persons, in a scientific age, would become scientific without the labour of study, and imagine that knowledge may be acquired by some popular but ideal method, requiring no more mental fatigue or patient research than reading a novel or perusing a love ditty. Ladies would fain study chemistry as they sigh over the last new novel; while the "sworn horse-courser" wonders that the marvels of astronomy are not so much adapted to his capacity for knowledge as are the lucubrations of the *Racing Calendar*, or that the perigee is more intricate than the pedigree of an "Eclipse." — *Symonds' Old Bones.*

ORIGIN OF PROVERBS.—The memorable words of history, and the proverbs of nations, consist usually of a natural fact, selected as a picture, or parable, of a moral truth. Thus—a rolling stone gathers no moss; a bird in the hand is worth two in the bush; a cripple, in the right way, will beat a racer in the wrong; make hay whilst the sun shines; 'tis hard to carry a full cup even; vinegar is the son of wine; the last ounce broke the camel's back; long-lived trees make roots first—and the like. In their primary sense these are trivial facts, but we repeat them for the value of their analogical import. What is true of proverbs, is true of all fables, parables, and allegories.—*Emerson.*

SPHAGNUM RUBELLUM.—Can any one send us specimens in exchange for other mosses which the querist (Z.) may possess in duplicate?

COLOUR OF BIRD'S EGGS.—Will our ornithological correspondents please to observe, during the coming season, the colours and markings of birds' eggs, so as to determine whether the *earliest* or *latest* produced by the same bird are deepest in colour, or most definitely marked?

CLEANING SECTIONS.—A correspondent (K.) has succeeded in rubbing down some thin sections of the spine of an *Echinus*, for the microscope, but finds himself unable to cleanse them to his satisfaction from the debris of grinding. Can any of our subscribers assist him with practical advice?

FROM what plants are the leaves, in which *oranges* are sent to our markets, obtained; also the leaves lining tea-chests; and from what tree might the pegs which bind the leaves together be derived? There is also a kind of wicker-work encasing Florence oil-flasks, the name of which I should like to know.

"I am sure," said Gentleman Waife, "that there are not two house-flies on a window-pane, two minnows in that water, that would not present to us interesting points of contrast as to temper and dispositions. If house-flies and minnows could but coin money, or set up a manufacture, contrive something, in short, to buy or sell attractive to Anglo-Saxon enterprise and intelligence, of course we should soon have diplomatic relations with them; and our despatches and newspapers would instruct us to a T in the characters and propensities of their leading personages. But where man has no pecuniary nor ambitious interests at stake in his commerce with any class of his fellow-creatures, his information about them is extremely confused and superficial. The best naturalists are mere generalizers, and think they have done a vast deal when they classify a species. What should we know of mankind if we had only a naturalist's definition of man? We only know mankind by knocking classification on the head, and studying each man as a class in himself. Compare Buffon with Shakespeare! Alas, sir, can we never have a Shakespeare for house-flies and minnows?"—*Bulwer's What will he do with it?*

AGARDH'S VIEW OF NATURE.—"To me, nature appears neither a simple nor a reticulated series, but an infinite and innumerable multitude of series advancing from a lower to a higher grade, from any part of which lesser series may project like rays, some diverging more, some less, much as the trunk of a tree is divided into larger branches, these again into lesser and lesser ones, and at last into an almost infinite number of leaves. One branch of the tree becomes thick and strong, ramifies much, and reaches the top of the tree, while another remains weak, and a third may be scarcely developed at all. In determining natural affinities we must take nature as our guide in everything. It is not enough to take into consideration all the characters of the forms which we are investigating, and to develop the essence of the family from a knowledge of all the forms belonging to it. We must further seek to discover the direction of the evolution of each series, and inquire whether its forms are advancing this way or that. It is only after this has been done that we can decide to which series a plant should be referred, and whether apparent resemblances are to be considered affinities or analogies."

THE SMOOTH SNAKE (*Coronella lævis*, Boie).—*Is this a variety of the common snake?* Certainly not. It belongs, not only to a different *genus*, but also to a different *family* of Colubrines. *Is it a native of Britain?* Perhaps it is. The published evidence is very imperfect in dates and localities. This may do for "Gossip" but not for "Science."

ORIGIN OF SOWERBY'S ENGLISH BOTANY.—A letter from the son of James Sowerby, printed in 1828, gives some information which may interest those who now see that national work in its third edition. The work owed its origin to the circumstance of Mr. Sowerby having made a number of sketches of plants, to be introduced in the foregrounds of landscapes, which he was in the habit of painting from nature. These sketches were shown to various botanical friends, at whose suggestion the work was begun, with the valuable assistance of Sir J. E. Smith; and the only descriptions that were not written by that gentleman were supplied by the late Dr. Shaw. In addition to the praise due to Mr. Sowerby, for the excellence of the drawings and engravings in that work, some portion is due to him for the spirit of enterprise with which he carried it on; for, although he had to depend upon portrait-painting for the capital required, he still industriously and steadily pursued his expensive project, until it began to remunerate him (which was not for several years), and he finally brought up a numerous family to enjoy its profits, and lament the loss of one of the best of parents.

ORNITHOLOGICAL QUERIES.—1st. The passage of wild geese has been lately much commented on in the *Times*, and from the fact of their traversing England, from high northern latitudes, by routes somewhat divergent from those generally observed locally, the correspondents of that paper have deduced the *certainty* of an *unusually* hard winter here! Query, why should *such* a conclusion be enunciated, when we know that these, and many other winter *immigrant* birds, seek *yearly* the milder European latitudes?—2nd. If, as travellers tell us is the case, the *breeding* resort of *woodcocks* be in the marshy districts of Finland and Lapland (where their nests are found in thousands among the dwarf birch scrub of those parts), why should these birds *first* make their appearance on the Devon and Cornish, and south west coast of Ireland, for, by geographical consistency, their flight, from the head of the Gulf of Bothnia, in lat. 85° N., long. 22° W., to lat. N. 50°, and long. 4° and 9° W. respectively, *ought to be* primarily the Lincolnshire fen-district, as they fly *before* the N.E. wind, on moonlight nights mostly, and *must* pass over that *tempting* feeding ground *en route*, if their flight be the *direct track*, which I imagine it to be?—3rd. Can it be *proved* that wild geese, woodcocks, and other northern birds alight anywhere when thus *in transitu*, or do they accomplish their 1,800 miles of flight (from the North Cape, that is, the geese and duck species) in a single stretch?—4th. Can any of your correspondents inform me whether the west coasts of Ireland and Scotland receive these their winter visitants *from* the N.N.W. or E.N.E. points of the compass, for, if Ireland and South Greenland be their *habitat* in summer, their flight thence, per direct N.N.W. route, might follow *naturally;* and they need not traverse England intermediately, as they must do by the opposite route?—*W. E. A.*

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. *Noms-de-plume* are inadmissible, under any circumstances, but initials may be used. Records of facts and occurrences should bear the simple name and address of their authority. The good sense of our correspondents will dictate the omission of four or five "capital letters" after their names. Books intended for notice should be left with the Publisher. It is not our intention to *review* books; extracts will be given, from which our readers will draw their own conclusions, instead of formal review. It is hoped that copies will be kept by the writers of all communications, as we cannot undertake to return any which may not be suited to our columns. Notes on migration of birds, contents of crops, &c. cannot be published *in extenso*, but will be acknowledged, and retained until a summary of results can be given. It is exceedingly advisable that all names, whether of persons, places, animals, or plants, should be written as legibly as possible.

Preserving Birds and Animals.—"Tally Ho!" asks us for a receipt for preserving the skins of small animals. Arsenical soap is commonly employed. *Arseniated Soap.* Arsenic, 1 oz.; white soap, 1 oz.; carbonate of potash, 1 dram; distilled water, 6 drams; camphor, 2 drams. Mix under a gentle heat. It may be made into cakes, and dried for future use. When used form a lather with any spirituous liquor, and apply with a brush. *French Arsenical Soap.* Camphor, 5 oz.; powdered arsenic, 2 lbs.; white soap, 2 lbs.; salt of tartar, 12 oz.; powdered chalk, 4 oz. Cut the soap into thin slices, dissolve with a little water over a gentle fire, stirring with a wooden spoon; when dissolved add salt of tartar and chalk, when mixed take it off the fire, add the arsenic; pound the camphor in a mortar with spirits of wine, and add this to the mixture last. When mixed together it will be of the consistence of paste. When used it may be diluted with cold water. We have always used this, and never had a specimen touched by insects. Take care to label your vessel in which it is kept—Poison.

Skeleton Leaves.—J. F. G. may try the following method:—A table-spoonful of chloride of lime, in a liquid state, mixed with a quart of pure spring water. Leaves or seed vessels to be soaked in this mixture for four hours, then taken out and well washed in clean water, afterwards left to dry with free exposure to light and air. Rigid leaves may require more than four hours' soaking.

Skeletons of Fish.—We know no "royal" method. The process is difficult, and F. N. L. is advised to get his skeletons prepared for him by a regular practitioner.

Fresh-water Aquaria.—We hope soon to give "Robin" the opportunity of reading some "Hints" on this subject.

Vipers—We have received several communications, some affirming positively that the viper swallows its young, others, equal as positively, that it does not. Our private opinion is that of the latter. We cannot print all, therefore publish none.

W. H. N.—The following works are published on British Conchology:—Jeffreys's British Conchology; Woodward's Manual of Mollusca; Catlow's Popular Conchology; Reeve's Land and Fresh-water Mollusks of the British Isles; Sowerby's Illustrated Index of British Shells; Sowerby's Popular British Conchology; Turton's Manual of Land and Fresh-water Shells of Britain.

B. B. S.—Notes a Kestrel hovering over Chelsea Suspension Bridge.

J. B.—Notes a Grey Shrike at Everton, Yorkshire.

W. E. P.—Informs us of a Kingfisher plying his avocation in the Serpentine in August, 1844. We know of no record of Birds observed in Kensington Gardens.

W. S. B.—"Wet Streets" and "Metric Systems" are not subjects of Natural History.

A. M. B.—Desires to know if it is usual for the Common Sandpiper to *dive* when wounded?

Naturalist inquires, "Where could I obtain a chameleon, and at what price?"

W. W.—Your fungus is *Auricularia mesenterica.* Not uncommon.

William.—In narration of anecdote "Brevity is the soul of wit."

J. F. Cranswick.—We cannot devote space to other than Queries in Natural History.

O. O.—The microscope you name has an excellent reputation.

J. L.—We cannot open controversies, as our space is *not* unlimited.

Buckinghamshire Flora.—Mr. James Britten is collecting notes, and would be glad of any information. 18, Shawfield-street, Chelsea, S.W.

Mosses.—We cannot undertake to name two dozen specimens at a time, and the majority barren. Applications for specimens received from W. Gibson; J. F. Cranswick; Young Bryologist: Botanist—will be attended to in turn.

Migratory Birds.—Acknowledged from H. Wickham; C. Williams; J. Ranson.

Small-Bird Question.—Received from G. E. D.; J. W.

Thanks for Communications.—T. K.; I. (Warwick); J. S.; E. J. S.; H. F.; J. E.; W. Gibson; A. B. F.; H. M.; A. M. B.; T. Donaldson; T. W. Brown; Orniphilos; Prof. Buckman; W. H. C.; W. E. Williams, Jr.; E. D.; W. G.; V. A. S.; B.; W. S. B.; G. H. R.; W. F.; H. J. C. B.; J. Webster (we should see it first); G. C. Davies; W. J. S.

Received.—F. N. L.; D. R. R.; G. T. G.; Robin W. E. Page; H. A. A. (declined); S. A. S.; Zeta; R. A. C. (declined). T. F. F. is thanked for promised aid, as also J. Plummer. W. E. W. and J. H. (thanked for Infusorial and Diatomaceous Earths).

Books Received.—"British and Garden Botany," by Leo H. Grindon. London. Routledge. "Metamorphoses of Man and the Lower Animals," by Professor Quatrefages. Translated by Dr. Lawson. London. Hardwicke.

SHORT-COMMONS.

"Is there no nook of English ground secure
From rash assault?—if human hearts be dead,
Speak, passing winds; ye torrents, with your strong
And constant voice, protest against the wrong."—*Wordsworth.*

POLITICAL agitations do not originate from the laboratories or libraries of men of science, neither do these generally enter upon the political arena, or take an active part in discussing the merits of new measures, or the measures of new men. It is only when changes are proposed, or innovations are threatened, which are likely to influence their favourite pursuits, that they awake, as it were from a dream, and inquire, What do these things mean? And even then they do not speak or act as diplomatists, and their conception of the question is bounded only by the good or ill which is likely to accrue to them and their "hobby." We are not ambitious to be regarded as politicians of any school. Scarcely able to define the genus or species of any legislative phenomenon who figures in the pages of Hansard, or to unravel the mysteries of a twelve hours' debate, we nevertheless arouse now and then to a sound of "Enclosure of Waste Lands," which we translate into the more homely phrase of "Short-Commons." Whether or not there is any present fear of more absorption in this direction we are not prophets enough to tell, and we care little to inquire. It is sufficient for us to suffer the hallucination of Hampstead Heath laid out in squares, adorned with villas, cut up into terraces, and sacrificed to the demon of bricks and mortar. For us the vision of Wimbledon Common surrounded by miles of monotonous palisades, and laid out in trim parallelograms of level grass, intersected by the cleanest of gravel walks, is enough, be it only a vision, to arouse us from exploring the "Origin of Species" to protest against the "Origin of Parks," and the absorption of "the last of commons."

Not "the last of the commons," and not "closed to the public" are the pleas put in against us. Are not Wandsworth Common and the Black Sea left? Is there not a common at Barnes, or Esher, or Weybridge? And if Hainault is gone, and Epping is going, is not the New Forest left? We are not politicians, so perhaps all this is as it should be. It may be right enough to give to "Labour" its Saturday half-holiday, that it may go out of town and enjoy itself, and hold converse with Nature face to face, and at the same time drive Nature so far out of town, that a half-day is too short to reach her domains. Such changes may be in perfect accordance with the spirit of improvement, and our spirit may be stupid and stubborn to rebel. We might know better if we were politicians. Let our friend the mechanic, who has for five days and a half laboured in hope that during the latter half of the sixth day he shall run down to Wimbledon to collect a few plants or insects, hear the birds sing, scramble amongst the furze, and feel the cool fresh breeze blowing the smoke out of his hair, pause awhile, and picture to himself a future. In that day there shall be no more furze, or heather, or buttercups and daisies; the bluebell and the fern must give place to asters and chrysanthemums, and the furze be uprooted that the laurel and *Aucuba* may stand in its place. No daisy must dare to bloom in the shorn grass under peril of decapitation. The butterfly and dragon-fly, no longer denizens, but poachers or burglars, must seek the recesses of

Combe, where none may dare to follow. The lark, poor bird, may sing in the sky, for that is not farmed out, but his mate has no nest in the turf below, the grass not long enough to shelter it, and the gold-banded beadle will tell her to move on, or charge her a penny a-day for rent, should she dare to venture on the experiment. In that day the gravel walks will be trim and neat, now straight as an arrow, now winding in graceful curves, through lawns, and groves, and dells, adorned by shrubs, and trees, and flowers, too well trained to grow crooked, or stunted, or with undue luxuriance. Then may he rest on painted seats, and gaze on ponds of geometric form on which tame ducks may float, while visions of the past float too above the ducks, and the water, and the new park, and out of the reach of the lord of the manor. What, in such a paradise, could be the vision of the Saturday stroller? Perhaps, it might be the Old Common, where, amongst furze bushes, and mud puddles, and tall bracken, and swamp, he could find, year in and year out, always something new; when the time passed so swiftly away that he could chide the dusky evening for coming so speedily, and when enough had been found, or seen, to send him home with something to think about all the week; when the only feeling that could find a place in his breast was that of increased love for all created things; and when the only exclamation that could escape his lips was, "How manifold are Thy works, in wisdom hast Thou made them all!"

We by no means despise "parks, palaces, or public buildings," nor condemn the legislative wisdom that called them into existence. Against the parks of our metropolis, whether patrician or plebeian, we have nought to urge; but against the appropriation of all the waste places within range of a Cockney stroll we dare to protest, because it tends to deprive those of legitimate hunting grounds, who have no other "preserves," and whose "little game" are birds, beetles, butterflies, and flowers, or

"Rats and mice, and such small deer;"

because the rugged beauty, wild grandeur, and infinite variety of nature, have powers superior to the most elaborate art, in charming the healthy mind; and because the consummation of such appropriation will be—not only to deprive the operative classes of a patrimony in which they can stand erect, and feel themselves "at home" and at ease, but to check them in the enjoyment of rational amusement whilst in the pursuit of some branch of natural history for which no other and compensatory provision is made. Therefore, should we ever suffer metamorphosis into the body of a politician, one point in our charter would probably be, not favourable, but antagonistic to "Short-Commons."

GOSSIP ABOUT MAN-SUCKERS.

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

Reader, have you ever tried a cruise on the sea in an Indian canoe? I can vividly recall even now my early exploits in this most upsetable craft, spearing *Octopi* ("the Man-Suckers" of our fishermen) on the coast of Vancouver Island.

Canoes are generally supposed by the uninitiated "to glide over silvery streams," or "like an arrow shoot foaming rapids," and ride like sea-birds "over the ever-heaving ocean." I only wish those who entertain these poetic fancies could be indulged with one short excursion. First and foremost you have to get *in*. This is at all times, except to the natives or the most experienced voyageur, a service of extreme risk. If you are not extremely careful to place one foot in the exact centre of the canoe, then balancing yourself like an acrobat to bring the other foot alongside it, over goes the "fairy barque," and you take a sudden header into "Daddy Neptune's" diggings. This contingency avoided, and a successful *entrée* accomplished, the next performance is, to sit down flat in the bottom. This requires a careful and ingenious system of lowering—the slightest lurch to either side, and you bathe to a certainty; once down, you sit with your legs straight out, and as there are no thawts to lean the back against, the position is very nearly such as would be enjoyed in the parish stocks. Behind you, steering, sits a grim red-skin frescoed with war-paint; before you a similar unprepossessing specimen of humanity—the paddler. Your range of vision being limited to the amount of rotatory power your neck may possess, is not by any means extensive; one naturally grows restless, or perhaps gets a sharp twinge of cramp, and feels he *must* move. To accomplish this an arm is rested on the edge of the canoe, and you lift yourself just a little. A sudden heeling over, a splash, a frantic yell from the savages, with a lively consciousness that you are sitting up to your hips in water, recalls you at once to the indiscretion you have been guilty of. Add to all this a perpetual dread of being suddenly brained and scalped by the savage sitting behind, and you get a rough outline of canoeing.

Safely in, and safely seated, I started one bright summer morning from our barracks at Esquimalt (Van Island) to cross the harbour. The Indians were going after the *Octopus*, and I felt a strong curiosity to see how they caught him, at the same time to acquire a knowledge of his habits.

The anatomical structure of the *Octopus* is well known—his habits but little if at all.

The *Octopus* of our own seas is a mere dwarf as compared to the gigantic size he obtains in the land-locked harbours so common to the east side of Vancouver Island. These places are natural sea-nurseries, where the *Octopus* grows to an enormous size. Safe from heavy breakers, he enjoys life as in an aquarium.

His modes of locomotion are curious and varied; he is a good swimmer—using his eight arms as paddles, he rows himself along with ease and celerity; he can *ramble* at will through his pelagic parks, by converting his arms into legs marching on like a huge spider. He is a *gymnast* of the highest order: clinging to the wrack and sea-weed, goes about back downwards like a marine sloth. Of course he varies in size. I have measured the arm five feet long, and where it joins the central disc, as large as my wrist. Should he by chance wind his sucker-armed cable round a luckless bather, fatal would be the embrace. From watching him carefully, I do not think he often catches prey, on the ground on the rocks, but waits for them as a spider would, only that the *Octopus* converts *himself* into a net. Coiling one arm round the wrack, he stiffens out the other seven, and in this position you would hardly distinguish him from the brown sea-weed amongst which he is concealed. A shoal of fish come gaily on, threading their way through the sea-trees, two or three of them rub against the outstretched arms of the *Octopus*—fatal touch! As though a powerful galvanic shock passed through the fish and knocked him senseless, so does the arm of the *Octopus* paralyze its victim—then dragging the palsied fish to the centre of the disc, the beaked mouth seizes on it and sucks it in.

I feel sure that the *Octopus* possesses the power of numbing its prey; and the suckers along each ray are as much for the purpose of climbing and holding on with, as for detaining slippery captives. Tyrant and cannibal as he is, yet he has an enemy that hunts him with untiring pertinacity—that enemy is the Indian. He estimates the *Octopus* as we do turtle, and devours him with as much gusto and relish, only the red-skin roasts his glutinous carcase instead of boiling. And now to catch him.

The Indian well knows, from long experience, that were the *Octopus* to get his huge arms over the side of the canoe, and at the same time a hold-fast on the wrack, he could just as easily upset the canoe as a child could a basket, but he takes care not to give him a chance; paddling the canoe slowly and quietly amongst the wrack, he steadily looks through the crystal water until his practised eye detects the *Octopus*, his great arms stiffened out, patiently biding his prey. Armed with a formidable spear carefully barbed, and about twelve feet in length, the savage passes it carefully through the water until within an inch or so of his great pear-shaped centre, then sends it in as deep as he can plunge it. Twisting and writhing with pain and passion, the monster coils his terrible arms round and round the spear; then the savage, resting the spear on the side of the canoe, keeps him well away and raises him to the surface of the water. He must be dealt warily with now, for he is dangerous! If he could get a holdfast on either savage or canoe, nothing save chopping him off piecemeal would be of any service; but the wily spearsman knows all this, and has ready another spear, long, smooth, unbarbed, and very sharp, and with this he stabs the *Octopus* where the arms join the body. I imagine the spear must break down the nervous centres giving motive power, for the stabbed arm is at once deprived of its strength and tenacity; the countless suckers, that held on with a force no human power could have overcome, relax their grip, and the arm hangs, a dead, lifeless mass of gelatinous matter.

Thus the Indian stabs and stabs until the *Octopus*, devoid of life and motion, is dragged into the canoe—a great quivering brown-looking lump—destined to supply a roast and a revel by the log fire of his red-skinned captors.

CLEANING DIATOMACEÆ.

By A. J. Roberts.

It is often a source of difficulty to a microscopist who for the first time attempts the study of the various forms of *Diatomaceæ* contained in infusorial earths and guano to entirely free them from foreign matters. In order to do this some knowledge of chemistry is requisite, more, indeed, than is often possessed by microscopists; it is, therefore, the object of the writer in the following remarks to supply this to a certain extent by pointing out some of the constituents of these deposits and guanos, which are the principal sources of our foreign and some of our fossil *Diatomaceæ.*

The shells of the *Diatomaceæ*, it is well known, are composed of silex, or, in common parlance, flint, and are consequently not acted on by any of the ordinary mineral acids in common use, viz., the nitric, hydrochloric, or sulphuric; but, on the other hand, boiling in solution of the caustic alkalies, soda and potash, will dissolve them. It is also to be observed, that they are unalterable by the action of a red heat, but if heated with either soda or potash, the silex combines with the alkali, and fusion, and consequent loss, takes place.

These facts are well to be noted, that the operator may know what chemical agents are to be avoided in working on substances containing these minute organisms.

With regard to the constituents of the earths in which the shells are found, these consist principally of lime in various states of combination, usually either carbonate or sulphate, or perhaps both, frequently coloured with oxide of iron, and also silex in the form of sand, which latter can only be separated by careful fractional washing.

The carbonate of lime is soluble with effervescence in nitric or hydrochloric acid; either of these will form a soluble salt which may easily be removed by washing. Sulphuric acid should be avoided, for it forms with the lime a sparingly soluble sulphate. Sulphate of lime, if present as a constituent, will probably not be in very large quantity, and may be removed by frequent washing, as it is soluble to a certain extent in water. The oxide of iron, also small in quantity, may be dissolved by the nitric or hydrochloric acid, and should these fail when used separately (which will sometimes be the case from the peculiar state of combination in which the iron exists), they may be employed mixed together, forming *aqua regia.* The process of cleaning may be known to be completed when the deposit is quite white and acid have no further action on it; a small portion should then be examined (under water) by the microscope, and if quite clean should be well washed, first with common water, and finally with distilled water. The latter is indispensable to complete the operation, that all traces of acid and soluble salts may be removed.

If the earth under examination occurs in tolerable sized masses it should be broken into fragments about as large as a small pea, and then dropped gradually into a Florence flask or open evaporating basin, about half full of nitric or hydrochloric acid, diluted with one-third of its volume of distilled water. It is better to drop the substance under operation into the acid than to pour the acids on the material, as the action takes place more gradually and with less frothing than is generally the case when much carbonate is present, which sometimes causes the liquid to escape from the vessels, and consequent loss. When the acid ceases to act, heat may be applied by any suitable means, and when all action ceases the mixture should be allowed to rest, that the deposit may subside, and the liquid poured off as close as possible, and replaced by strong acid, and the acid again aided by gentle heat. Should the deposit not be quite white the mixed acids must be employed, and the process finished by washing with distilled water.

To proceed to guanos; these present more difficulty, their composition being much more complex, and containing, besides the lime salts and oxide of iron above mentioned, salts of soda, potash, and ammonia; also much animal matter, and some phosphate of lime. The salts of the alkalies are soluble in water, and the guano being usually in a more or less disintegrated state, it should be first well washed with boiling water, either on a paper filter or by repeated affusions, until the liquid comes off tasteless. Boiling water is preferable to cold, for the heat expels air-bubbles and causes the deposit to settle down into a smaller space; then the deposit must be subjected to the action of the acids as directed for the preparation of earths, to get rid of the lime salts. The partially cleaned deposit, which is now much smaller in bulk, must be separated as much as possible from the liquid, and strong sulphuric acid, in sufficient quantity to cover it, poured on to about the depth of half an inch, heat applied and continued for some time, but the liquid must not be made to boil; the result will be an almost immediate blackening of the liquid, which gradually becomes deeper, and a dirty, inky-looking compound is ultimately produced. When this has taken place, chlorate of potash in fine powder must be dropped into the hot mixture very gradually until the black colour disappears. This must be done cautiously, for the action is so violent that much spurting is occasioned, and the liquid being very corrosive a tolerably capacious vessel should be used in order to keep the splashes within reasonable bounds, or serious damage to the operator's clothes may ensue.

The nearly decolourized liquid must now be diluted with a considerable quantity of water, and the deposit allowed to subside, the supernatant liquid poured off, and the process of heating with sulphuric acid and addition of chlorate of potash repeated, until the sulphuric acid occasions no further blackening, then the cleaning may be finished in the usual way by washing.

The chemistry of this process is thus explained:—When strong sulphuric acid is brought in contact with organic matter it abstracts the greater part of the water, setting free the carbon in an imperfectly dissolved, or, at least, finely divided state. Other changes also take place of a somewhat complex nature. The chlorate of potash being now added to this mixture is immediately decomposed by the sulphuric acid, supplying oxygen to the carbon, with which it forms carbonic acid gas, which escapes with some free chlorine. Other oxidizing agents may be used; nitrate of potash may be added in the same way as the chlorate, or nitric acid itself may be used, but they are all inferior to the chlorate. This process was published some few years back, and has been found by experience to be the most efficacious method of operating on guano for *Diatomaceæ*. The operator requires no small share of patience in working on guanos, for it sometimes happens that some samples yield none, or so few as to be scarcely worth the trouble of cleaning. When, however, the yield is good, the experimenter is well repaid for his time and materials.

In consequence of guano being so largely composed of organic matter it is well to work on a tolerably large quantity, say a pound, or, at all events, not less than four ounces. The writer has found the Peruvian and Californian to yield a very rich variety of these minute objects. It may be as well to mention that the above processes may be well applied to the cleaning of the siliceous cases of our native species. The matters containing them should be allowed to dry before being subjected to the action of the acids.

It is scarcely necessary to add a caution as to the corrosive nature of the acids here employed; the operations should also take place under a chimney or in a well-ventilated apartment. In case of accident apply plenty of cold water, then any alkali at hand, chalk, or whitening.

LEAF TEACHINGS.

By W. Wallace Fyfe.

Oersted observes, in his "Soul of Nature," that organic beings constitute the elementary, and inorganic the higher geometry of nature; and, although we meet with many regular mathematical forms in the leaves of plants, whether triangular, polygonal, cylindrical, spherical, or elliptical (for in what may be *scientifically* termed leaves we have all these), nevertheless, in the shapes of leaves and the flow of their venation we have seldom figures that are severely exact; yet, for all that, every atom of the most waving lines and outlines is capable of being reduced to a regular curve. It was Goethe who defined all the appendages of the plant as leaves*—transformed leaves. We do not go so far as the German poet and philosopher, but deem it sufficient to recognise the truth that all are modelled after the leaf. The form of the leaf, therefore, becomes a generic principle in structural botany. The structure of a leaf is founded on what have been termed architectural principles; but in truth it is architectural principles that have been derived from it, since Sir Joseph Paxton has acknowledged that to the ribbing so peculiarly adapted for bearing up the broad floating leaf of the vast Victoria Regia and its massive inflorescence, he was mainly indebted for the idea of his palace of glass, which has so wonderfully resisted, in its fairy-like frailty of appearance, the storms of time. If we are entitled, with Goethe, to extend this principle of structure from the leaf to the tree, we shall find that to it also Smeaton was indebted for the design of the Eddystone Lighthouse—a structure calculated to sustain weight and resist pressure—since he derived it from the bole of a tree. The elements of plant structure are found, however, in the cell—the lower forms of plants being simply cells separate and independent; the higher forms,

* Linnæus had previously affirmed the leaf to be the type of all the floral organs. Goethe's *Versuch die Metamorphose der Pflanzen zu erklären* was published in 1790.

merely cells combined in several varieties of texture. Now, theorists assume the primary form of cells to be spherical—nature or vital defects in nature (*i.e.*, in growth or development) occasioning deviations, and also causing modifications of the cell where some particular end of plant life is to be accomplished. Thus it is that woody fibre comes to consist of elongated cells thickened by secondary deposits so as to attain great tenacity; and thus also that the ducts and spiral vessels of the vascular tissue, and the peculiar vessels of plants having a milky sap, are cells of special modification, in which the adjoining tubes have often free communication with or run into one another. Indeed, the ultimate results of vegetation, the fruits

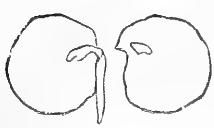


FIG. 1.

FIG. 2.

of the earth, may be separated into leaf-masses and resolved into cellular modifications. Thus the dicotyledons give, as everyone knows, two seed lobes, or actual seed leaves in germination, as in the case of the pea (fig. 1); whilst the monocotyledons, represented by the

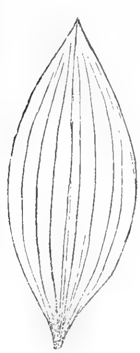


FIG. 3.

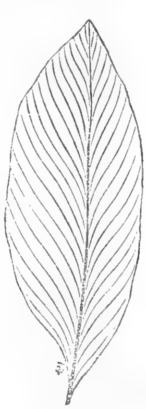


FIG. 4.

exaggerated section of oat (fig. 2), exhibit the rudimentary forms of future leaves. In the leaf itself, whether we take the curved or divergent venation of endogen (as in figs. 3 and 4), or the netted venation of exogen (as in fig. 5), we can see, through the outer cuticle or skin, the veins ramifying through the inner portion or parenchyma; and botanists all admit these to be modifications

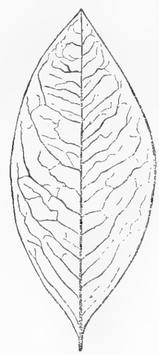


FIG. 5.

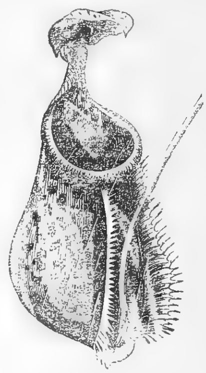


FIG. 6.

of the cell—the veins in the first instance (fig. 3) running parallel to one another from end to end of the leaf; in the second instance (fig. 4) they are given off from one principal vein or midrib; and in the last case (fig. 5) constitute a complicated net-work of numerous branches and branchlets. The parallel venation will be found in the leaves of lilies, palms, bananas; the netted, in those of oaks, beeches, &c.* The most remarkable modifications of the leaf-type are probably the Indian cups (*Sarracenia*) of North America, and the still more elegant shapes of the pitcher-plant (*Nepenthes*) (fig. 6). Sometimes, as in *Gloriosa superba*, the midrib, which, as shown above, is in fact the principal vein of the leaf, becomes lengthened out into a tendril. The tendrils in the vine proceed from the lateral leaf-buds; those of the passion-flower from the terminal; whilst the solitary thread-like attachment of the cucumber leaf is a sort of stipule, the stipules being leaf-like organs situated on either side of the point at which the leaf is attached to the stem. The pea and vetch having compound leaves, the tendril is formed of the end of the common footstalk, whilst in the vanilla-plant the whole leaf is sometimes elongated into a tendril.

If we notice the arrangement of leaves on the stems of plants, we will find that it proceeds invariably in a spiral—a favourite mode

* Amongst monocotyledons, *Arum, Calla, Lilium giganteum*, &c., are considered exceptions to the general rule, from having netted venation; and amongst dicotyledons, *Nereum*, &c., from having parallel.

of progression or development all throughout nature, and beautifully marked upon a branch of *Araucaria*, or the cone of a fir. The volute may be greater or it may be less, and the investigations of Braun and Henslow have reduced the spiral regulation of leaves to mathematical precision. It is well known that the leaf upon the stem or branch originates in a node, the leaves being "alternate" when each node produces a single leaf on different sides in succession; and "opposite" when two leaves originate in a node and stand out face to face. Two spirals are in the latter case to be considered as passing up the stem; and in the case of three or more leaves from the same node forming a whorl, the spiral is held to be reduced to a circle. The stems of twining-plants, like honeysuckle and convolvulus, evince the disposition of the entire structure to take the spiral twist. The leaves of banana exhibit the same tendency, in common with the leaves of many plants while in the bud, and in common also with tendrils and similar modifications of leaves which follow the same law, and even with the flower-stalk in *Cyclamen*, and the seed-vessel in *Streptocarpus*. In the ripe strawberry the numerous small pistils, erroneously termed seeds, dotted over its surface follow the spiral arrangement; for as the soft juicy part of the strawberry is only an enlarged foot-stalk, the numerous minute pistils or seed-vessels which it bears are arranged according to the law which regulates the position of leaves. The peas in the interior of a pod alternate with each other on the opposite sides on the true spiral arrangement, and even the seeds in the seed-vessel of the wallflower, though far more numerous; nay, those in the common foxglove (*Digitalis*), which are more abundant still.

The leaf of every tree possesses individuality. Its aggregate of leaves make up the character by which the tree is known. No doubt the tree possesses also what arboriculturists term its own "habit," and by that in some measure it is known and recognised. Nevertheless, the leaf is its characteristic element and emblem, and in all probability imparts the habit in question. In the following figures we have the cherry leaf and the leaves of the beech, the lime, and the poplar (figs. 7, 8, 9, 10):—And it has been ascertained from minute comparisons that the leaf is to a great extent a model of the tree. For instance, the beech leaf, it will be seen (fig. 7), has little or no leaf-stalk; now, the beech tree in its growth is naturally feathered, from its base, with branches. Accordingly the leaves of the beech, the oak, the elm, the box, the holly, the laurel, the bay, arbutus, laurustinus, privet, and snowberry, whose natural tendency is to cover the ground from the base, have

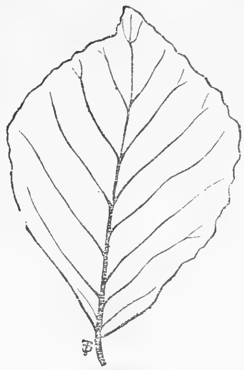


Fig. 7, Beech.

either a very short petiole or none at all. The beech leaf, too, like its branches, will be observed to throw out a venation nearly parallel—the angle being from 45° to 50°, whilst

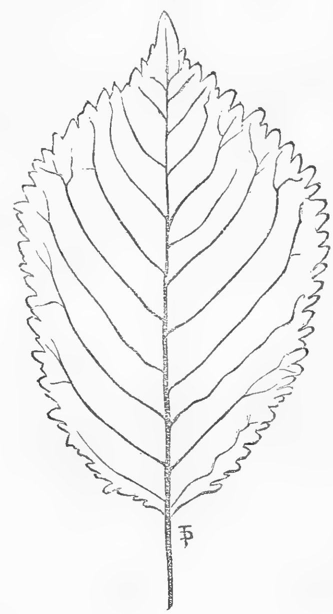


Fig. 8, Cherry.

the midrib is rather inclined to zigzag. The cherry leaf (fig. 8), and the leaves of the lime and poplar (figs. 9 and 10), are endowed with leaf-stalks, and represent trees with a bare trunk, as do the leaves of the apple, the pear, the birch, the chesnut, and sycamore. The lime leaf (fig. 9) affords an illustration of the correspondence between the distribution of the branches on the tree and the veins in the leaf. The veins are clustered or whorled with a nearly parallel venation at the point where

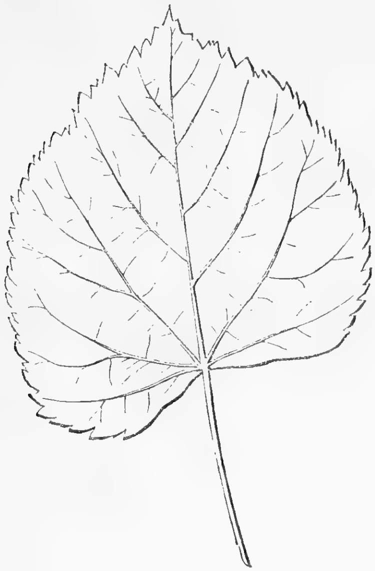


Fig. 9, Lime.

they begin to come off; the lateral veins making, with the midrib, an angle of 42°, and the veins proceeding from them an angle of

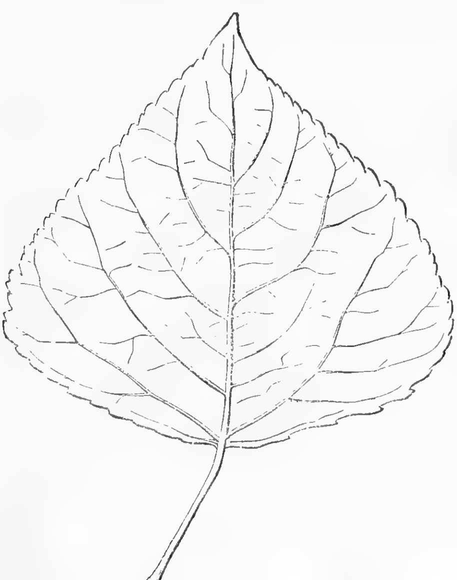


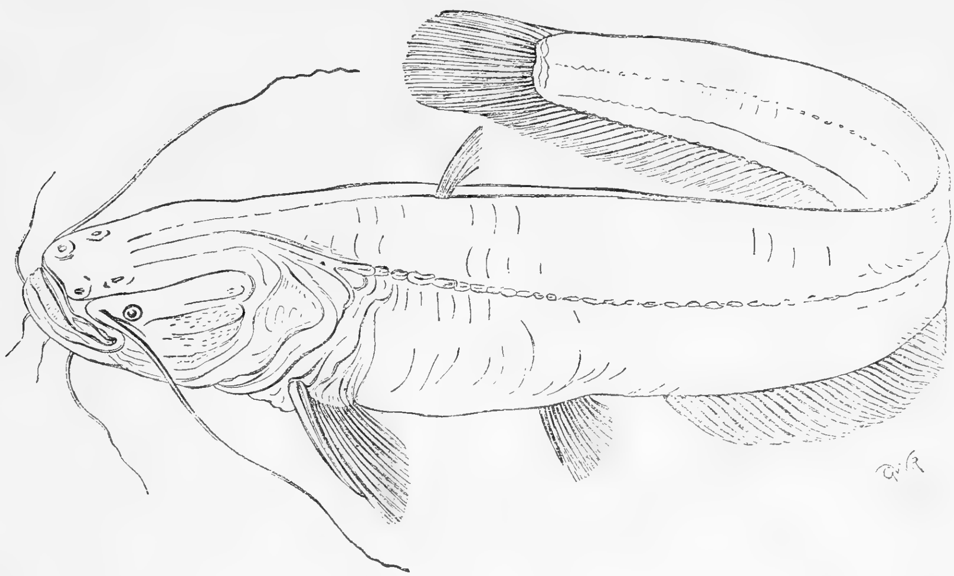
Fig. 10, Poplar.

50°—these last, corresponding with the angle of the peduncle, form the branch. A curious observer will in like manner discover that the horse-chesnut, which sends off at the top of its bare trunk seven branches, has its leaf commonly divided into seven leaflets; whilst the sycamore, sending off at eight or ten feet from the ground four or five large branches, has a long leaf-stalk dividing into five midribs. In like manner, laburnum and broom, with their triplet leaves, divide into three main branches; and rhododendrons, barberries, and azaleas, whose leaves issue from the stem in whorls, branch in a kindred manner. Not only these, but the triplet leaf and stalk of the marsh trefoil, the wood sorrel, the clover, adopt the law in question; as do likewise the lady's-mantle, geranium, mallow, and lupin, with their clustered leaves or midribs.

THE NEW FISH.

It was announced in our last that a new fish had been introduced into our waters from Wallachia. The Acclimatisation Society has received fourteen living specimens from Sir Stephen Lakeman's estate at Kapochein, or rather from the river Argich which flows past that nobleman's Wallachian domain. A brief notice of these visitors may prove acceptable as an adjunct to the portrait which stands above it. It should be premised that this species is noticed in Yarrell's British Fishes; not that this author believed it a native, but because it had the reputation of having been found here, on the faith of a paragraph in Sibbald's "*Scotia Illustrata.*" There is no doubt, that the conclusion arrived at was a wrong one, not admitted by Cuvier and Valenciennes in their great work on the "Natural History of Fishes," who state that its distribution in Europe does not extend to the British Isles.

The *Silurus* was originally classed by Cuvier between the pike and salmon families. To the former of these it may be supposed to claim kindred by its voracious habits, and to the latter, if all accounts be true, by the excellence of its flesh as an article of food. Notwithstanding these somewhat poetical affinities, it has another position assigned to it now. One evident characteristic in this fish is the absence of true scales, a feature which characterizes the group to which it belongs. Another important difference will be noticed in the great length of the anal fin, which extends to the tail; but, above all, the barbules will attract attention. Whether or not these are to be considered as substitutes for beard and moustaches, probably the



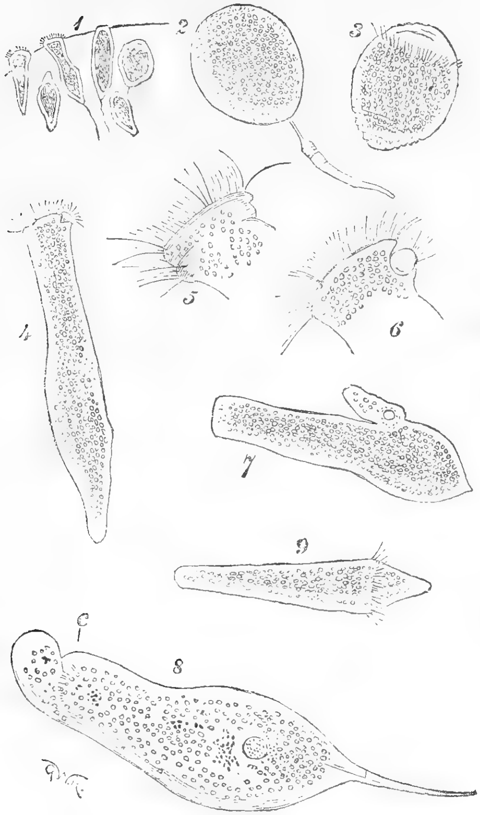
The European Silurus (*Silurus glanis, Boie*).

Silurus finds them equally useful, and regards them as highly ornamental. The two longest barbules have their origin, one on each side just above the angle of the mouth, the four others tend downwards from beneath the lower jaw. This will certainly be the largest of our fresh-water fishes, for Cuvier states that it is sometimes upwards of six feet in length, and is said to weigh three hundred French pounds. In the course of four years, if food is plentiful, it will attain the weight of fifty-six pounds. In appearance it is anything but prepossessing—the large flattened head, broad capacious mouth, and frog-like eyes, may perhaps earn for it the name of frog-fish, which its known partiality for frogs may serve to strengthen.

Mr. Yarrell says, "The *Silurus* is represented as sluggish in its habits, and a slow swimmer, taking its prey by lying in wait for it, in a manner somewhat similar to the angler (*Lophius*); hiding itself in holes or soft mud, and apparently depending upon the accidental approach of fishes or other animals, of which its long and numerous barbules may be at the same time the source of attraction to the victims, and the means of warning to the devourer. From its formidable size, it can have but few enemies in the fresh water, and from them its dark colour, in addition to its habit of secreting itself either in holes or soft mud, would be a sufficient security. In spring the male and female may be seen together, about the middle of the day, near the banks or edges of the water, but soon return to their usual retreats. The ova when deposited are green; and the young are excluded between the sixteenth and nineteenth days. The flesh is white, fat, and agreeable to many persons as food, particularly the part of the fish near the tail; but on account of its being luscious, soft, and difficult to digest, it is not recommended to those who have weak stomachs. In the northern countries of Europe the flesh is preserved by drying, and the fat is used as lard."

The *Silurus* finds its food in the frogs that pass into the rivers, and the small fish that abide there, but it is not very "dainty" in its tastes, if all accounts be true. The authors of the "Natural History of Fishes" state that it is so voracious that "it has been known in several instances to devour children; and in one instance the body of a woman was found in one of these fishes." To this account we can only add, that either the fish must have been "a mighty large one," or the woman uncommonly small. Old Izaak says, "The mighty luce, or pike, is taken to be the tyrant, as the salmon is the king, of fresh waters," but here is a tyrant before whom the pike would be obliged to succumb. Should the *Silurus* take kindly to his new home in the bosom of father Thames, and increase, multiply, and replenish the waters, we may well inquire, "What would old Izaak Walton say?" C.

SIMPLE OBJECTS, No. II.



Jelly Animalcule (*Ophrydium versatile*).

IN a bright clear stream you may sometimes notice masses of a green jelly-like substance, attached to the stones, and varying in size from a pea to an orange. If a portion of one of these is placed under the microscope, it will be found to consist of a multitude of very pretty animalcules, lying imbedded in a gelatinous substance, each moored at one extremity by a delicate filament.

These animalcules present at first the appearance of spherical or oval bodies, spotted over with green granules, like the chlorophyll of leaves. But in a little time they elongate themselves, and the free extremity opens, displaying a double set of cilia, one fringing the extremity; the other a little below, at the side (figs. 4, 5, 6) surrounding the mouth. By the rapid movements of these, currents are formed in the water, by which the substances which serve as food for the creature are brought to its mouth, and the rejected substances, by a contrary current, conveyed away. When any substance touches the mouth the cilia are immediately drawn in, and the animalcule contracts itself into the spherical form again; when the external covering of the animal may be seen gathered into a series of folds (fig. 3). This external covering is colourless, and contains in its substance very minute dark-coloured granules.

Each animalcule has the power of detaching itself from the rest, and of swimming freely, apparently that it may establish a new colony. The bottle in which the *Ophrydium* is kept will in a few days display along its sides several of these new colonies. In this free condition, a new ring of cilia appears towards the lower extremity of the animalcule (fig. 9), by which it swims rapidly through the water backwards way.

These new colonies are apparently increased by the process of gemmation (fig. 7). The young animalcule buds off from the side of its parent, having its own nucleus, surrounded with minute granulations, and a few scattered green granules. The animalcules are said "to undergo the encysting process, and assume the *Acineta* form." * In some individuals the green granules are less abundant, and are mixed with brown granules (fig. 8); the course of which may perhaps indicate the place of the œsophagus. A nucleus in this case is very apparent. The cilia also may be seen in motion within the body of the animalcule (as at *c*, fig. 8).

The *Ophrydium* may be kept in water for several months in an open vessel.

J. S. T.

Explanation of Figures.

1. A group of animalcules in the gelatinous envelope.
2, 3, 4. Separate individuals in different conditions, showing (2) the filamentous bond; (3) folds in the external covering; (4) the animal extended with the cilia in motion.
5, 6. The head more magnified.
7. Young animalcule forming by gemmation.
8. Animalcule showing the nucleus, and *brown* granules mixed with the *green*.
9. Swimming animalcule.

New Holland in Europe.—A lecture on this subject, delivered by Dr. F. Unger, Professor of Botany, Vienna University, has been translated into English, and the pages of *Seemann's Journal*. The professor directs attention to the occurrence of characteristic New Holland plants in the European Eocene formation; deduces therefrom that "Europe stood in some kind of connection with that distant continent;" and that "at the Eocene period Europe must have had a climate like that of New Holland at the present day."

* Micrographical Dictionary, p. 507.

A FRIENDLY NOTICE OF THE TOMTIT.

(PARUS CÆRULEUS.)

EVERYBODY is now acquainted with the new oak-gall, so much like the nut-gall from which ink is prepared, as it is now met with in nearly if not in every county in England and Wales, and for aught we know has penetrated into Scotland. We still call it *new*, because no longer ago than 1853 these galls were confined to Devonshire, and we have traced their gradual spread from this county over a large part of our island: at first, only as great rarities, difficult to discover; but in 1862 they were so abundant around Cirencester that we had no difficulty in procuring large bunches for the use of our pupils and lectures. Guess, then, our astonishment to find the same localities the following year, 1863, so scarce as to disappoint most of the members of our class who went in search of them.

Now, as we had heretofore observed these galls to increase from year to year, until, indeed, they have become a great pest, as threatening the very existence of young oaks, we were at first not a little puzzled; but on examining more closely into the matter, we saw quantities of freshly-broken galls beneath the trees, whilst those not so much broken were pierced to the centre—just sufficient to extract the grub by which the gall is caused—and the like was observed in the few examples then found on the trees.

Having observed so much, of course we concluded that some bird had pierced the galls for the sake of the fat maggot; and as we love birds, and quite agree with Coleridge—

> "He prayeth best who loveth best
> All things, both great and small;
> For the dear God who loveth us,
> He made and loveth all."
> —*Ancient Mariner.*

—Yes, with this sentiment we watched for our friend, and a little patience discovered to us that pretty little bird known as the *bluecap*, or tomtit (*Parus cæruleus*), busily engaged in pecking a triangular hole in the sides of the galls and extracting the grubs, looking all the time as cheerful and happy as though he had made a new discovery, and felt himself rewarded for his ingenuity. That this was a new discovery to good "little tommy titmouse" we have no doubt; because, though this bird abounds in the locality, we had scarcely observed their attack upon the galls on any previous season.

Mr. Hewitson says of this bird—"Although he has long been outlawed, and a price set upon his guiltless head, he is of a race still sufficiently numerous to rid us of countless insects, and to heap benefits upon us in return for all the persecution that he has met with."

In the county in which we now live—Dorset—these galls are so abundant that we this autumn gathered, for experiment, no less than six bushels from our own farm, where they are so thick that bunches of from 30 to 50 are not uncommon at the tops of two-year-old twigs; from one such bunch we had the pleasure of observing the plump little flies make their exit by dozens. Here some of the galls have been perforated for the maggots in the manner described; but, alas! our dexterous little tit is not common with us. We hope, however, after this, that the readers of SCIENCE-GOSSIP will join with us in wishing that there were more of them, and extend their protection not only to this but to the other species of a most beautiful, interesting, harmless, nay, eminently useful genus of birds.

We append a drawing of a small bunch of these galls. Fine bunches are to be got from the hedgerows of Woking Common and other places round London. If gathered as late as September or October, the larvæ will be found in their centres; but later, the perfect fly makes its exit by a round orifice, as seen in the left-hand gall of our cut—unless, indeed, they should be matured late, and then the fly is not hatched until the following spring.

JAMES BUCKMAN.

AQUARIUM EXPERIENCES.

THE SEA-WORM (*Nereis bilicæata*).—We were introduced to the pages of SCIENCE-GOSSIP by a friend, who sent us a copy of the first number, requesting us not only to take it in and read it, but to contribute occasionally some of our small experiences in the circles of natural history. We are most unlearned in technical phraseology; but still, as we wander through the world with our eyes open, and have an intense and appreciative love for the beauties which the Great Giver has so bountifully laid even at our very feet, we sometimes wish all the world could enjoy them with us; and here in your unpretending columns we have found a medium through which we can direct the attention of our readers to these pleasant subjects, assuring them that *ennui* could never visit the mind of one constantly employed in unfolding the secrets contained in nature's charming page, which lies ever open before them, and which gives to her perusers food for sweet thought and contemplation.

Just now our own sphere of observation is necessarily circumscribed, and an aquarium receives much of our attention. Pray do not lift your brow, gentle reader, and exclaim, "That hobby has been severely ridden;" for we wish to interest you in a little pet we have there. A worm it is; but such a worm! The *Nereis bilicœata* it is called. A few months since, a hermit-crab and the shell it inhabits found a place in our aquarium; but soon, alas! the days of poor *Pagurus* were numbered, and its body became food for Anthea and her floral sisters. We were on the point of casting forth the deserted shell, when our suspicions were aroused that it was not so tenantless as we first imagined, for there seemed to be a little domicile within composed of tiny pebbles. We waited many days in vain for sight of living thing. One evening, passing the vase, candle in hand, we caught sight of what appeared a beautiful caterpillar; but the shy beauty instantly vanished into the recesses of the shell. You may imagine with what patience—or impatience, if you like—we watched his re-appearance.

In vain we tempted him with juicy beef and other delicacies with which we regale our numerous pets. He was proof against all our bribes. At length, growing desperate, we thought to frighten him into displaying himself; so, taking up our tube, we tapped gently at his portals, and waited breathlessly the result; when, lo! to our astonishment, curiosity we suppose overcame his shyness, and he cautiously peeped to see whether friend or foe requested admittance. Being satisfied of our amicable intentions, he waxed bolder, and displayed to our delighted gaze, again and again, his graceful form and bright brown and golden stripes.

We never fail, in this way, to summon him to our presence, much to the amusement of our young friends. And we would advise those who are fortunate enough to number this pretty worm among their pets, and lament his shyness, to give a lady-like double knock at his door, and we trust Mr. Nereis will obligingly open to them in person.

That delightful marine biographer, Mr. Gosse, tells us, in his "Aquarium," that the *Nereis* is commonly found associated with the hermit-crab in old whelk shells; and it would appear that the worm has good reasons for entering into this partnership, as he expects Mr. Pagurus to cater for them both, frequently disputing even the possession of a tender morsel with his amiable companion; aye, even carrying his greed so far as to drag poor crabby's meal from his very jaws, and retiring into the recesses of the shell to discuss it at his leisure.

The sense of smell does not seem to be very acute in this little creature, for we have many times dropped pieces of meat into the shell, but have never seen them eaten; and if *Nereis* stumbled upon them, we believe it was more by luck than judgment. We fancy, indeed, that perhaps, after all, the *shelter* afforded by his friend's domicile is more essential to him than any provision made for his creature comfort, as our worm has flourished, and still continues to do so, after a six months' separation. The motives that lead to this companionship seem rather obscure, and we trust some of our young friends may be induced to pursue this interesting inquiry, and by personal observation endeavour to throw some light upon the subject.

M.

CAROLINA CRAKE IN ENGLAND.—At a meeting of the Zoological Society, Feb. 14th, Mr. A. Newton exhibited a specimen of the Carolina Crake (*Porzana Carolina*), stated to have been recently obtained on the Kennett, near Newbury, being the first recorded instance of its occurrence in this country.

THE DEATH-WATCH.

(ANOBIUM TESSELATUM.)

"The solemn death-watch clicks the hour of death."

TABLE-TURNING, spirit-rapping, and all other modern manifestations were in their infancy when I was a child, but a superstitious belief in the idea that the noise made by this small insect indicated an approaching death in the house was firmly credited.

You probably remember Dean Swift's lines:—

"Because like a watch, it always cries 'click,'
Then woe be to those in the house who are sick;
For, sure as a gun, they will give up the ghost,
If the *maggot* cries click when it scratches the post."

The habits of this *beetle* were evidently not so well known in the days of Queen Anne as they are in the present time, otherwise the great satirist would not have fallen into the error of making the "*maggot*" cry click, it being the perfect insect only, and not the larvæ, which makes this noise.

This pigmy beetle is constantly found in old houses. Its antennæ, or horns, are red, having their three last joints longer than the others, and clubbed; the body is brown, but the wing-cases and breast are spotted—"handsomely tesselated," as some writers term it—and covered with an ash-coloured down; the legs are brown, of the same hue as the body. It is very slow in its motions, will rarely fly, and on being touched counterfeits death for a long time. All the species possess this power, and hence their generic name, from "resuscitated." They will actually allow themselves to be pulled to pieces without showing a sign of life.

The larvæ look like little soft, white worms—the entire insect is only about a quarter of an inch in length—and they are especially destructive in their tastes. Woe betide the case of birds or prepared insects which they find their way to; old furniture, books, various sorts of grains, wafers, &c., are all in their line. They conceal themselves in grooves, and pass the nymph state in cells lined with a few silken threads. People formerly attributed the tickings of the death-watch to a species of wood-louse and of spider. I believe some of the wood-louse genus have the power of making a similar tick, but the death-watch best known to us belongs to the genus *Anobium*. According to naturalists, ten species found in Great Britain make the dreaded sound; our death-watch, however, on the present occasion is the *Anobium tesselatum*, and the way in which this insect chronometer goes to work is as follows:—It raises itself on its hind legs, and, with its body slightly inclined, beats its head against the wood with considerable force seven or eight times in rapid succession. The sound produced in some instances resembles that made by rapping gently with a finger-nail on the table, and is supposed to be the means whereby Mr. and Mrs. *Anobium Tesselatum* inform each other of their change of residence, and give notice of their being at home to their friends—notes of invitation, in fact, which are generally sent out in spring and summer.

I was staying many years ago at an old country-house, on a visit to a little schoolfellow friend, whose papa was taken exceedingly ill during my stay. The ancient nurse—a quaint, kind old creature, strongly infected with superstitious notions—came into the play-room one day, and Sara, my friend, being absent, proceeded to inform Nancy, the head of the nursery precincts, that "poor dear master could not live, because the death-watch was a-ticking like mad all night long in his room." I, in great sorrow, told my playfellow of her papa's doom; she repeated the tale to her mamma, a nervous, credulous woman, who became very desponding, and actually shook her head at the family doctor on the occasion of his next visit, when he was trying to inspire her with hope of his patient's recovery, repeating old nurse Jones's words.

I think I see the expression of his face now, as he quoted the following lines—

"A kettle of scalding hot water injected,
Infallibly cures the timber affected;
The omen is broken, the danger is over,
The insect will die, and the sick will recover"—

and proceeded to tell Sara and myself all about the tiny beetle that made the noise. H. WATNEY.

SNAKE STONES.

IT is well known that many lives have been lost by wounds received in anatomical research. The symptoms are those of hydrophobia, &c., and other modifications of blood poison. It is usual, therefore, in medical schools, to warn young students, and tell them the remedy. The advice is generally this: If the wound be slight, and no blood flows, it is the more dangerous; if deeper, so that there is a free flow of blood, less so. Always suck the poison out in the first case, and wash it well afterwards. This explains the lancet and porous stone absorption. As regards the milk, has anything else in which the virus is soluble been experimented on? Perhaps this latter custom may be well placed side by side with the custom of old doctors, of administering such simples as ammonia, albumen, &c., in the most nauseous forms, upon the principle—"℞ creduletatis quant. suff."

"Berthollet mentions eight kinds, chiefly phosphates, some resinous, biliary, and ligniform. Bezoars were deemed efficacious, not only when taken as medicine, but even when merely carried about the person; so that credulous people would hire them for particular occasions at a ducat per diem. . . A single oriental bezoar has been known to sell for 6,000 livres. . . They have now lost all reputation, and are never used. . . Factitious bezoars have been made of various materials, the nearest probably made from gypsum stained by some vegetable juice. It is said, however, that tobacco-pipe clay tinged with ox-gall is commonly employed, since it answers to the genuine tests (vegetable stains do not)—1st, a yellow tint to paper rubbed with chalk; 2nd, green colour to paper rubbed over with quicklime. *Bezoar orientale* concretion found in 4th stomach of *Capra agagrus* of Persia (said to be), oblong, size of kidney-bean, shining olive or dark green in colour. *Bezoar occidentale*, 4th stomach of chamois of Piedmont sometimes as large as a hen's egg; surface rough; colour green, greyish, or brown." The old terms *Bezoar Bovinum, B. Hystricis, B. Simiæ, B. Hominis* (?), will of course explain themselves to your zoological readers. A. P. H.

THE MONARCH OF THE FOREST.—The most magnificent oak ever known to have grown in England was probably that dug out of Hatfield bog; it was 120 feet in length, 12 in diameter at the base, 10 in the middle, and 6 at the smaller end where broken off; so that the butt for 60 feet squared 7 feet of timber, and 4 for its entire length. Twenty pounds were offered for this tree.—*Knapp's Journal.*

NOTES ON SOME BRITISH LAND AND FRESH-WATER SHELLS.

Helix obvoluta.—The principal locality for this shell is Ditcham Wood, Hampshire, where it may be found in abundance, but may be overlooked by one who is not familiar with the habits of this mollusk. The snail, like *Bulimus montanus,* is a great climber, and may be seen on the trunks of *Fagus sylvatica* as far up as the eye can distinguish them—a peculiarity that is not noted in our manuals. One, then, who would be repaid for his shell hunt must take pattern from that, that he would secure and ascend the trees; for among the moss and leaves at the base only dead specimens are met with. Living specimens of all ages show the epidermis clothed with hairs.

Clausilia Mortilleti.—In a list of the land and fresh-water shells of the neighbourhood of Hastings, inserted by me in the "Magazine of Natural History" and "Naturalist," 1858, p. 99, a variety of *C. Rolphi* is alluded to, but is not referred to any published form. My examples I subsequently submitted for determination to Mr. W. Benson, who at once recognised them as *C. Mortilleti.* This species had only been then discovered two years, and has been found in three localities—Charing, in Kent; and Birdlip and Charlton, near Cheltenham. I would now record a fourth, that of Hastings. I have not seen indicated the character of the situations in which the Kentish and Gloucestershire shells are found, but from the different conditions under which I find *C. Rolphi* and its ally in the Hastings district, I am convinced that the latter is but a variety of the former. The *C. Mortilleti* is a less ventricose shell, of a paler colour, and without the small plaits; but all these variations may be attributed to the differences that prevail in the habits of the respective forms. Thus var. *Mortilleti* I found only in the damp and shady recesses of Coghurst Wood, while *C. Rolphi* occurred very plentifully in the dry and open parts of the wood at Fairlight Glen. That *C. Mortilleti* is a mere synonym of *C. Rolphi* I do not agree with.

Achatina acicula.—This shell has occurred to me only in two districts—one, among the stones of the walls of Hastings Castle; the other, on the Cotswold plateau, over an extensive area—in the former locality at an elevation of 200 feet, and in the second of 500 to 1,000 feet, above the level of the sea. These situations are dry and bleak, and are not habitats assigned to this species—for it is said to be found at low altitudes, and only in a living state at a depth of some inches beneath the surface. Are these unobserved facts?

Planorbis corneus.—Mr. J. G. Jeffreys writes of the coil-shells, that "some of the smaller species of *Planorbis,* inhabiting marshes and very shallow water, which are dried up in summer, close the mouth of their shell with an epiphragm or filmy covering like that of some land-snails." I have recently observed this peculiarity in the largest of the British species of that genus, *P. corneus.* Some living specimens of this species, which I had taken from the pond on Hampstead Heath in September last, were placed in my botanical box, where they remained disregarded for several days; on examining them, I found that the mouths of both young and old shells were closed by a pellucid pellicle of dried mucus, and presenting a minute respiratory aperture towards the lower corner. RALPH TATE, F.G.S.

FURTHER EXPERIENCES WITH TOADS.

MY observations relate chiefly to the habits of the toad whilst feeding, and may be taken as a second chapter of E. D.'s very interesting paper (p. 12).

My toads, two in number, had lived for a year or two in a hothouse which was devoted to the growth of pineapples. They were, I think, first placed there purposely by the gardener, who found them very useful in destroying insects. I used frequently to visit the place and amuse myself with feeding the toads with worms, and with watching their habits. The heat of the place, which was considerable, did not seem to inconvenience them in the least, for they were remarkably active, and of a large size; but at the same time they seemed greatly to enjoy the artificial showers when the plants were syringed, and would come out from their hiding-places to be rained upon. They usually remained amongst the pineapple plants, which grew on a bed raised some four feet from the ground, where they sat under the long leaves; but when the place was watered they would not unfrequently jump down and lie upon the cool, wet tiles of the floor, spreading themselves out as flat as possible. How they climbed up to the pine-bed again I cannot say, for I never saw them do it.

They evinced very little shyness, taking worms readily when offered to them. When feeding, their actions were very curious. Upon placing a worm about three inches from a toad, it would instantly fix its attention upon it. Then its whole appearance was changed. Instead of the dull, lethargic-looking animal that the toad generally appears, it was all vivacity; the body was instantly thrown somewhat back, and the head bent a little downwards, its bright eye riveted upon its prey; and though the toad was perfectly still as long as the worm remained motionless or nearly so, yet its attitude and its eager gaze were full of life and animation. Directly the worm made any active movement, the toad would dart forward, open its mouth from ear to ear, and seize it, generally about the middle. A curious scene now took place; mouth and feet went to work in good earnest; the worm was gulped down by a series of spasmodic jerks, trying to make its escape every time the mouth was opened, the toad thrusting it back all the time, and forcing it down its throat by the aid of its fore feet. Altogether it was rather a disgusting sight, and gave one the idea that the toad is an uncommonly greedy animal.

Having got the worm down was by no means a reason that it would stay there, for I have sometimes seen a worm rather larger than usual make its way up again; however, the feet would immediately go to work a second time, and the toad would at length remain the undisputed possessor of its own dinner.

Frequently I used to cheat the toads by moving a small twig before them. They would seize it directly, imagining it to be a worm, and would regard it with stupid astonishment when they discovered their mistake.

I never had the good fortune to see my friends take beetles or other small prey; but these the gardener told me were never seized with the mouth, but were caught with unerring aim upon the point of the long tongue.

I observe that toads will sometimes establish themselves inside a cucumber-frame, where no doubt they are very useful in destroying ants, spiders, and other small insects that would otherwise be very troublesome. R. H.

SLUG OR SNAIL.

IN answer to "W. Q. C."—What is the difference between a snail and a slug?

The most obvious distinction between a slug and a snail is, that the body of the former is elongated and naked, while in the latter it is more or less spiral, and covered by a more or less spiral shell.

The gasteropods, animals such as the garden snail, whelk, and slug, have a distinct foot placed under the body for crawling, and have a distinct head with tentacles, or, as they are commonly called, horns. They are divided into two great divisions—1stly, those which breathe by means of gills, as the whelk, and chiefly inhabit the sea—some, however, occur in our ponds and rivers; 2ndly, those which breathe by means of a lung, as the garden snail and pond snail, which latter, though living in the water, are obliged to come to the surface for the purpose of inhaling the air.

Now, in both these divisions are animals provided with shells, and others without them; to the first we give the name of snails, and the second we call slugs. And thus we have marine snails, as the whelk; slugs of the sea, as the sea hare; land and fresh-water snails, as the garden snail and pond shells; and land slugs, which, however, are more generally known as slugs.

With regard to the land snails and slugs, which are very similarly organized, there occur many connecting links, from the perfectly naked and elongate slug to the spirally-coiled garden-snail, capable of retiring within its shell. The land gasteropods of our own island furnish us with ample illustrations of forms intermediate between these two extremes. In the first place, there is the common black slug or land sole (*Arion ater*), without any shelly covering; then there naturally follows the spotted slug (*Limax maximus*) of our cellars and gardens, with the same slug-like body, but is provided with a rudimentary shell—where? Mark that oblong, shield-like elevation, immediately behind the head, as the animal is crawling; beneath that you may find a thin, shelly plate—this is the rudimentary shell. In a very remarkable slug (*Testacellus haliotideus*), a small ear-shaped shell is placed externally at the hinder extremity of the animal. More markedly, there is the little green, glassy snail (*Vitrina pellucida*), so frequent in our woods amongst moss and decaying leaves, and rendered conspicuous by its green, glassy shell; it is intermediate in form between the slug and the snail, for it has the shield-like protuberance of the one and the spiral and external shell of the other; and further, some of the species of the genus (*Vitrina*) to which that snail belongs cannot withdraw themselves into their shells.

R. T.

THE BUTTERFLY AND THE NETTLE.—Watch the beauteous *Vanessa Atalanta* butterfly, lovely as the rose over which she flutters—see her sporting in the balmy air as if she had derived her origin from heaven, and was returning thither. But when she has to provide for her future progeny, does she deposit her eggs on the brilliant flowers where she spent her bridal? No! she retires to the nettles, and there safely leaves the infant embryo of a future race secure amidst the armature of the *Urticæ*. Thus a host of insects are sustained by an apparently useless weed, which is itself kept within due bounds by the caterpillars that feed upon it.—*Edwin Lees.*

ZOOLOGY.

CAPTURE OF BADGERS.—Six badgers, two old ones and four young ones, were captured together in April, 1863, at Stanner-rocks, near Kington. The young ones were supposed to be about five weeks old. The old ones and three of the young ones were preserved by Mr. J. B. Smith, of Kington.—*J. W. L.*

THE PORPOISE.—I regret to have to state that the porpoise, which I lately described as having been brought alive to the Zoological Gardens, is dead. We suppose that the cause of death was, either that the severe frost chilled him so much that even his thick greatcoat of blubber was not able to protect him, or else that he died from eating too many pounds of eels and sprats. The porpoise has been sent to the Royal College of Surgeons, where he will probably one day figure as a beautiful white skeleton. We do not yet despair of getting a tame porpoise, and possibly, some day or other, a whale.—*Frank Buckland*, in *The Field*.

EGGS OF THE LAND-TORTOISE.—Some years ago I became the possessor of a land-tortoise of about ten inches in length, which I placed in a walled fruit-garden. At first it was decidedly of a retiring disposition, subsiding into its shell on the gentlest approach or the slightest noise; but after a short acquaintance it became quite familiar, and would take from my hand lettuce-leaves, bread-and-milk, and such-like delicacies. In the summer it was found necessary to restrict its liberty, for after destroying the hearts of innumerable lettuces, it showed an inordinate affection for strawberries, and, as it always chose the ripest and best, would crush half-a-dozen in the attempt to reach one which particularly attracted its fancy. During the winter it resided generally among the manure of the hot-bed, crawling out on a sunny day, and tilting its shell against the wall, so as to catch all the sun's rays possible (resembling in this respect the more famous tortoise with which every reader of Gilbert White's "Selborne" must be acquainted), but quickly retiring when the sunshine passed away, or the least shower fell; indeed, it showed a wholesome dislike to water generally. When I had had it about a year, the gardener, in turning over an old cabbage-bed, dug up three eggs, which, undoubtedly, belonged to the tortoise. They were about the size of pigeons' eggs, but more rounded, with hard, unpolished, white shells; and one, which was accidentally broken, contained an abundant pale yellow yolk. The other two were placed in a bag of mould, in the greenhouse, for some time, but were eventually blown, and added to a collection of eggs. Like most pets, my poor tortoise came to an untimely end; a boy, at work in the garden, met it in its travels, and, attacking it with mistaken zeal, quickly deprived me of my tortoise, and the poor creature of its existence.—*G. H. R.*

A FABLE.—"I have something more to ask you," said a young eagle to a learned, melancholy owl; "men say there is a bird, named Merops, who, when he rises in the air, flies with his tail upwards, and his head towards the ground; is that true?" "Certainly not!" answered the owl, "it is only a foolish tradition of man; he is himself a Merops, for he would fly to heaven without for a moment losing sight of earth."—*Lessing*.

THE SKYLARK.—Last December I frequently saw and heard the skylark in this neighbourhood (about four miles west of Glasgow); and early last February I also saw and heard the same bird during a fall of sleet! It can therefore, in my humble opinion, be affirmed of the *Alauda vulgaris* that January is the only month in which the music is not heard.—*P. S.*

SWALLOWS UNDER THE EAVES.—One summer, we were much troubled with swallows building under the eaves of our house. We tried knocking the nests down continually, but to no purpose: they built again. A friend, seeing us thus employed, recommended our rubbing the place where they built with soft soap, which answered *perfectly*, as the clay would not adhere where the soft soap had been rubbed.—*E. W.*

DOUBLE-YOLKED EGGS.—Seeing this subject quoted in your last number, I mention the following fact, which I know to be true:—One of my family had a goose sitting on twelve eggs, one of which was double-sized. When the time of hatching came, a beak was seen at each end, and two perfect goslings came out. The twelve eggs produced thirteen goslings. The twins were as fine as the others, and lived a fortnight, when they were killed by an accident.—*E. W.*

SANDPIPER DIVING WHEN WOUNDED.—In answer to A. M. B.'s query as to the behaviour of the common sandpiper (*Totanus hypoleucos*) when wounded, allow me to say that, as far as my personal knowledge extends, this bird *does* dive when wounded. I shot one (April 29th, 1863) as it was flying up the river Tour. The bird fell on a little spit of land, jutting out from the opposite bank; and, just as I was going round to secure it, congratulating myself on its feathers being dry, as I wished to have it stuffed, it dived straight across to where I was standing, and then paddled up the bed of the river very quickly, using—wounded as it was—both legs and wings as propellers whilst under the water. The stream was clear, and only about three or four feet deep at the spot; so that I could clearly see its every movement. After a little wading and trouble, I caught it.—*A. J. N. M.*, Taunton.

PRESERVING BIRDS AND ANIMALS.—In No. 2 of SCIENCE-GOSSIP I see amongst the "Notices to Correspondents" a paragraph relating to this subject. Now, allow me to give you the recipe of a powder and solution that I have used for some time, and which I find to answer in every respect, as well as arsenical soap. Besides, it has the advantage of not being so dangerous as that compound from the use of which serious consequences often result, owing to its getting between the nails or into any cut that the operator may have on his fingers when using it.

POWDER FOR PRESERVING THE SKINS OF BIRDS, ETC.—Nutgalls, 1 ounce; corrosive sublimate, 2 drachms; white arsenic, 2 drachms; powdered camphor, 6 drachms; sal ammoniac, ½ ounce; powdered capsicum, ½ ounce. Mix all well together.

SOLUTION FOR PRESERVING BIRDS AND QUADRUPEDS.—Corrosive sublimate, 1 drachm; spirit of salts, 2 drachms; spirits of camphor, 6 ounces. Dissolve the corrosive sublimate in the spirit, and add the acid.

The above recipes are from Mr. Gardner's useful little work, "Taxidermy, or, Bird-stuffing made easy."—*J. Aspdin*, Richmond, Yorkshire.

RED-BACKED SHRIKE, *Lesser Butcher-Bird* (*Lanius collurio*).—Mudie, in his description of the above-named bird, observes that "the larger beetles appear to be the principal food of these birds, though they are also said to eat mice and to kill little birds, much after the fashion of the great shrike. There is, however, a want of precision in the description of their habits, as they seem to have been mixed up with those of the other; and they are given by British ornithologists more at second hand than from observation." Now, certainly, in Montagu's Ornithological Dictionary, edited by J. Rennie, there is a mixing up of the two species; for the great shrike (*Lanius excubitor*) is an extremely rare bird in England; and I much question if it has ever been known to breed here; and yet, he makes the following quotation from Knapp, the Gloucestershire naturalist, under the head of the larger butcher-bird:—"I could never observe that this bird destroyed others smaller than itself, or even fed upon flesh. I have hung up dead young birds, and even parts of them, near their nests, but never found that they were touched by the shrike." It was evidently the red-backed shrike which Mr. Knapp was here speaking of, which is not uncommon in the part of Gloucestershire where he resided; it could not be the species to which Montagu applies this passage from the naturalist. After alluding to these opinions by well-known writers on ornithology, it has occurred to me that a little incident, which fell under my own observation when on a visit to Lyme Regis, two summers ago, may be worth insertion in your entertaining periodical. While walking along a field pathway near the town, I noticed a red-backed shrike making a great fluttering and bustle near the top of a high hedge, at a short distance off; and after watching his movements for a few minutes, I crossed the grass to the spot, in order to ascertain what could be the cause of the disturbance, when I discovered a small branch with peculiarly long thorns, on one of which a young robin still warm had just been fixed; and on adjoining thorns were the wings of some other young bird, also the skeleton of a small mouse and portions of beetles. I had evidently lighted upon the larder of a pair of butcher-birds. Again, last summer, when crossing a field in the same neighbourhood, a bird flew across me with great difficulty apparently from being entangled with a piece of wood; it alighted in a pollard elm close by; and thither I followed it; on clapping my hands, out came a butcher-bird, carrying in its claws, as I think, a young thrush; at all events the bird it was carrying looked much larger than itself. It struggled on to another tree near; and the ground being very steep and much timbered, I was unable to follow it up with sufficient promptitude to compel it to drop its prey. However, these two incidents prove beyond a doubt that this little bird, scarcely larger than a house-sparrow, does destroy other birds, and does likewise transfix them upon thorns, in order, we may suppose, more conveniently to feed upon them.—*H. S. S.*

WATER-PIPIT (*Anthus spinoletta*).—At the meeting of the Zoological Society, January 24th, Mr. Sclater exhibited a specimen of this continental bird from the Collection of the Bishop of Oxford, stated to have been obtained near Brighton in the winter of 1859-1860.—*The Reader*. We hope to give further information of the occurrence of this bird in the British isles in our next.—*Ed. S. G.*

WEATHER FORETOLD BY THE ROBIN.—Few observers of nature can have passed unheeded the sweetness and peculiarity of the song of the robin, and its various indications of atmospheric changes; the mellow liquid notes of spring and summer, the melancholy sweet pipings of autumn, and the jerking chirps of winter. In spring, when about to change his winter song for the vernal, he, for a short time, warbles in so unusual a strain, as, at first, to startle and puzzle even those ears most experienced in the notes of birds. He may be considered as part of the naturalist's barometer. On a summer evening, though the weather be in an unsettled and rainy state, he sometimes takes his stand—

"On the topmost twig that looks up to the sky,"

or on the housetop, singing cheerfully and sweetly. When this is observed, it is an unerring promise of succeeding fine days. Sometimes, though the atmosphere be dry and warm, he may be seen melancholy, chirping and brooding in a bush, or low in a hedge; this promises the reverse of his merry lay and exalted station.—*G. T. Goodwin.*

ANOTHER SWIFT IN DIFFICULTIES.—One evening, shortly before dusk, my attention was drawn to a swift (*Cypselus apus*) endeavouring to cling on the plaistered side of a house. This it attempted several times, but from the evenness of the surface it could not manage to stay for any time, and invariably slipped down. After each futile effort, it would take a short circle in the air, and then return, to be again foiled. At last it seemed to give it up as useless, and flew off some distance, mingling with others who were sporting near; but they immediately pursued it, and drove it from them. Then it returned to the house, and renewed its efforts; at last, when darkness had set in, and all the other swifts had gone to their nests, this bird managed to cling to some slight projection; and as it evidently intended to remain there during the night, I was anxious to find out the cause of this occurrence; so about ten o'clock p.m. I mounted my insect-net upon a stout fishing-rod, and, with the further assistance of a ladder, managed to place the net over the bird (having previously ascertained its whereabouts with the aid of a lantern). Upon examining it, I found the legs had become entangled in a quantity of fine cotton, and this I imagine was the cause of the exclusion from the society of other birds; but how it became thus entangled I know not, unless some sparrow had taken the cotton, for domestic purposes, into the same hole in which the swift also had its nest, or while purloining materials from the nest of a sparrow (I have seen it mentioned that it does do such things), it had met with the misfortune alluded to.—*A. B. F.*

THE BRAMBLING. — During the recent severe weather large flocks of the brambling, or mountain finch (*Fringilla montifringilla*), have been observed in this neighbourhood. The bird is a native of the northern parts of Europe, and is only known to us as a winter visitant. It is of handsome appearance, and rather larger than the chaffinch, which, in habits, it closely resembles. Although few winters pass without our being visited by a few of these birds, the large number that have been observed this season is unusual, and is, in all probability, occasioned by the state of weather, as regulating the direction and extent of their migration southwards.—*Alnwick Mercury*, R. T.

CAPE SALMON.—Under this name the "Geelbeck" (*Otolithus æquidens*), one of the edible fishes of the Cape, has been eulogized. Dr. Pappe says, "the flesh is dry, but fit for salting. It forms food for the poor and lazy." Why call it Cape *Salmon?*

Spiders' Webs.—When we walk on a bright summer's morning alongside our garden walls, those who have a very quick eyesight, or a common eyeglass, may see the net-like webs of the common garden spider studded with minute drops glittering like dew; but as these do not evaporate when the sun advances, they must be something more substantial. Under the microscope, they will be seen arranged with beautiful regularity on the cross-bars of the web only. They are viscid to the touch; the web, in this way, being delicately lined, to take the smallest insects striking against it. When mounted as objects for the microscope, as they often are, the surprising fact at length grows upon us, that these minute beads of fluid, though kept in dry rooms and cabinets for months, and even years, never dry up, and apparently never change. What makes up these little persistent globules, and how are they arranged so evenly? If a newly-spun web is brought down upon a slip of glass, and made to adhere to it, the viscid drops spread upon the surface, and show a little nucleus or core of gum in the centre of each; it will be seen too, that the viscid fluid surrounds not only the cores but the whole line of the cross-bar, being collected only more copiously on the little cores dotted along it, and which have served as centres of attraction; but for these, the fluid, when poured upon the web, would have run into larger drops and fallen to the ground, or at least have been unequally distributed. The cores adhere but loosely to the web, and may be easily moved with a fine mounted hair; and, in doing so, it will be found that the cross bars, unlike the other lines of the web, are highly elastic. If the fresh viscid drops (still under the microscope) are made to touch blue litmus paper, they instantly sink into and redden it. The common solution of chloride of calcium also reddens the test paper; and it seems not unlikely that to the presence of this, or some other highly deliquescent salt, the undrying nature of the viscid fluid may be due. This spider's web is a complicated structure, and is composed of various materials: the side and radial lines of a fluid, which, like silk, hardens as it leaves the spinneret; the elastic cross bars which never harden, the little cores of transparent gum dotted along them, and the saline and viscid fluid poured over all; and yet, upon close examination of the spinneret, it is comprehensible that the web should be completed at one operation, that is, that no part of it should be gone over twice. A view of the insect at her work might clear up this point, and our fern-cases might, perhaps, be turned to further good account for this purpose. But the spiders have now gone into winter quarters, and we must wait another summer. Meantime these few facts and queries may show us that there is something yet to learn of this curious and beautiful structure.—*S. S., in Gardener's Chronicle.*

Lists of Acari.—Can you refer me to complete list of *Acari?—R. B.*

Koch's continuation of Hahn's Arachniden; and Koch's series of Apterous Insects in Henrich Schäffer's continuation of Panzer's German Insects, contain the most complete series of *Acari.* An excellent summary is given in Walckenaer's Hist. Nat. Ins. Apteres, in the Suites à Buffon, vols. 3 and 4.—*J. O. W.*

Embryonic Development.—All organs spring from a *blastema,* which is primarily composed of sarcode, and gradually assume their special features afterwards; but when first perceived they differ only in size from the adult forms. The embryo, in point of fact, is a miniature of the perfect being. In the course of development every animal exhibits very strange phenomena, both as to its entire economy, and in regard to special organs; and this is particularly the case with reference to mammalia. Daily, ay, even hourly, the scene is changed, and this unsettled condition applies not only to essential, but also to merely accessory organs. One might fancy that nature was feeling her way to a conclusion. Here may be seen cavities being gradually partitioned off, divided, as it were, into distinct chambers, or drawn out in the form of canals, which, in their turn, are often refilled with solid matter, and converted into ligaments; in another locality we observe previously solid masses transformed into cavities, membranous folds being rolled out into tubes, isolated portions of tissue drawn together to form a continuous organ, or even a mass hitherto entire, being cut up into several new structures. Not only the form and proportions, but the relations also of the various mechanisms are being momentarily altered. Parts which at first had been closely related separate from each other and become distinct, and organs which had heretofore been distant from each other form ties of close alliance. Those apparatus whose office is a temporary one rapidly increase in size, acquire an enormous volume, and eventually disappear altogether. Others are arrested in their growth at a certain period, and, though all the organs in their neighbourhood continue their development, yet they remain in their primitive condition, and may be detected in the adult, where they testify to a former state of things very different from the existing one. Thus we perceive that the history of embryonic development may be summed up as consisting in incessant transformations and constant activity.—*Quatrefages' Metamorphoses, translated by Dr. Lawson.*

The Irrationale of Speech.—To the minute philosopher, who holds that things are strange in proportion to their commonness; that the fit attitude for the human mind is that of habitual wonder; and that true science, so far from explaining phenomena, only shows that they are inexplicable, or likely to be so, not merely as to their final, but as to their proximate causes;—to him, I say, few things seem more miraculous than human speech. He has not time to ascend to the higher question of the metaphysics of language; not even to that first question, How did the human race ever make the surprising discovery that objects might be denoted by symbols, by names; and how did they communicate that discovery to each other? Puzzling as that question is, he is stopped short of it in wonder by a puzzle equally great—by the mere physical fact of articulation, which man has in common with the parrot and the daw.—*The Irrationale of Speech.*

Mounting Polyzoa.—A correspondent desires to be informed of any process by means of which he may be able to mount specimens of the *Polyzoa* in their expanded state. He has sought the information in various text-books, and tried several methods, alike without success.

ENTOMOLOGY.

Insects Feeding on Ferns.—H. M., in a paper on "The Preservative Power of Ferns," which appeared in the February number of Science-Gossip, says, "I cannot now recall to my recollection ever having seen the larvæ of any lepidopterous insect feeding upon the fronds of our common ferns, nor do I remember having noticed insects of any orders resting upon them, unless it were for shelter during rain." I beg to inform the said writer, and any who may feel an interest in the subject, that, having a small garden in the heart of Cheltenham, I have planted ferns along one sheltered and shady side of it, and for the last two summers the larvæ of the great tiger-moth (*Arctia caja*) has been a perfect pest. When I first observed my bunches of lady-fern (*Athyrium filix fœmina*) had been attacked by an insect, I examined each closely without detecting the intruder. I then gave the plants a shake, and two or three of the little hairy caterpillars fell to the ground. Having for many years reared the various species, lepidoptera, diurnal and nocturnal, I was pretty sure I knew this furry little gentleman; but accustomed to *prove* things for the satisfaction of others, as well as myself, I put two of them in a box, covering it with green gauze, and giving it a supply of food, not of my *Athyrium* though, but of the common plantain (*P. major*), where I regularly fed it till its change came, and when from its pupa sleep it evolved into the imago. Behold, I was right, *Arctia caja* displayed its gorgeous wings. But in the meantime, what of my ferns? A few days after having caught the first spoilers, I went to look at my ferns again, and to my consternation the Athyriums, which had been looking lovely only a week before, were completely eaten bare to the midrib, or rachis and secondary rachids, scarcely a bit of the soft part of the fronds remained, and on the little that was left, the "woolly bears" were sedulously at work. I then observed some fine specimens of *filix-mas* had been attacked and half demolished, also some of the other *Lastreas*, especially *L. æmula* and *dilatata*, the latter the last to be attacked. They also attacked my royal ferns (*Osmunda regalis*), and had entirely destroyed one or two fronds before I observed their depradations in that quarter. Morning by morning myself and a servant used to go out, and take from 25 to 30 sometimes off one plant, which, unwilling as I am to destroy life, I was obliged to suffer to be crushed, their numbers were so prodigious. What I have above related took place last summer, and the summer before the last, namely, in 1864 and in 1863. When the *Athyrium*, the *Lastreas*, and *Osmunda* fail, these animals are not too dainty to put up with *Polystichum lobatum*, but they prey upon that only when they can get nothing more tender.—*M. G. C.*

Artaxerxes Butterfly (*Polyommatus Artaxerxes*).—On the 17th August last, I obtained seven specimens of this butterfly, with other species, on the drift sandhills at New Brighton, near Liverpool, and have every reason to suppose that they will be as plentiful this coming season.—*John W. Love.*

The Hive-Bee and its Sting.—I have recently met with a statement to the effect that the use of the sting is always fatal to the hive-bee. How does this accord with the generally received fact that when there are two rival queens, the one is killed by the sting of the other, who becomes monarch of the hive? On the above hypothesis, the contest ought to be equally fatal to both.—*W. H. G.*

Crickets and Cockroaches.—In allusion to Mr. Ranson's observations (see p. 42), the editor of *The Entomologist*, in No. 11, states:—"Mr. Ranson is not the first to propose the patronizing of crickets on account of their presumed tendency to extirpate, or at least to drive away, the cockroaches; regarded as hypothetical the idea is excellent, but reduced to practice it is scarcely so satisfactory: my own experience is that the two creatures live together in exuberant abundance, and in the most sociable communion, in the kitchen of—*Edward Newman.*" With this extract our own experience harmonizes. A correspondent gives the following reason in favour of Mr. Ranson's hypothesis:—"Often have I caught a cockroach and placed it by the hole of a cricket, and have not had to wait long before a cricket (sometimes half the size of the cockroach) would make his appearance, and carry it away, and as I supposed to eat it; but to make sure of that, I caught both a cricket and a cockroach, and put them together under a glass, where I left them for a day. Upon paying them a visit there was only the cricket and a few bits of the cockroach. From that time I have not doubted whether the former eat the latter."—*Charles Stanley Barnes.* Another correspondent, H. D. C., recommends the importation of a hedgehog into the kitchen as the safest cure for the plague of cockroaches.

BOTANY.

Alpine Rose (*Rosa alpina, Des.*) at Perth.—Dr. White recently announced that he had gathered this rose in the depths of the woods on Kinnoul Hill, near Perth, where it seems to have fairly established itself. This plant is not uncommon on the Continent.

A New Bristle-mould.—A fourth species of the genus *Chætomium* has been found in this country. This is *C. murorum, Corda.* It is one of the small fungi occurring on decaying straw, damp paper, &c. The perithecium is generally clothed with rigid bristles, and each looks like a small tuft of nearly black mould on the surface of the substance upon which it vegetates.

The Cobbler Botanist.—Mr. Richard Buxton, who nearly twenty years ago wrote a "Botanical Guide to the Flowering Plants, Ferns, Mosses, and Algæ found indigenous within eighteen miles of Manchester," died on the 2nd January, in the 81st year of his age. "When about twelve years of age," he says of himself, "I went to learn the trade of a bat-maker—that is, a maker of children's small leathern shoes. There I continued about a year and a half, and then went and worked with one James Hyde for several years. At this time I was quite unable to read, and therefore got a spelling-book to teach myself. I soon became master of it; and then proceeded to the New Testament, &c. I am well aware," he adds, "that the narrative of the life of a poor man like myself, who has had the greatest difficulty in procuring the necessities of life in a worn-out trade like that of a child's leather-shoe maker, and in delivering a few newspapers on a Saturday, is anything but interesting." In this assertion he is mistaken; there is great interest in the history of a life devoted, under severe difficulties, to the pursuit of science, and honourably closed at last. Peace to thy manes, O Buxton! for what thou hast contributed to the *feet* of children and the *heads* of men.

BUCKINGHAMSHIRE FLORA.—Mr. James Britten is collecting notes for a Flora of Buckinghamshire. Any communications relative to the plants of this county may be addressed to 18, Shawfield-street, Chelsea, S.W.

MALE FERN AS AN ANTHELMINTIC.—(In reply to A. B.)—The dose of recently prepared powder is from one to three drachms—of oil, or ethereal extract, from half a drachm to a drachm, in the form of electuary, emulsion, or pills.—*Pereira's Materia Medica.* It is not our province to give prescriptions. We believe that the *green* fronds are used for packing.

FIJI ISLANDS FLORA.—The first part of Dr. B. Seemann's "Flora Vitiensis," or Flora of the Fiji Islands, has just appeared.

MOSSES ACCUMULATING SOIL.—In March, 1842, I took from the tiled roof of an outbuilding, at Malvern Wells, a tuft of *Bryum capillare*, a moss very common on walls and rocks. This tuft, with the black soil collected at its base, weighed six ounces, and on carefully extracting the mould by repeated washings, the actual vegetation that remained did not amount in weight to *one* ounce; the moss having thus, on a bare surface of tile, upon which it had been cast by wind or rain, not only subsisted itself, but amassed by its retentive qualities, a rich humus, above five times its own weight. —*Edwin Lees' Botanical Look-out.*

INTRODUCED PLANTS.—I quote the following from the current number of a Lincolnshire paper:— "Nearly all the favourite flowers in England are exotics: the honeysuckle and hawthorn are from America; the daffodil, from Italy; the foxglove, from the Canaries; asparagus, from Asia; the gooseberry, from Flanders; and the raspberry, from America; the hop-plant came from the Netherlands." Seeing that the hawthorn and honeysuckle are both mentioned by Chaucer, who died in 1400, and that the discovery of America by Columbus dates 1492, we must either suppose that the father of English poetry had a marvellous insight into the future, or that the editor of the newspaper has fallen into error. The other statements do not require comment.—*B.*

GEMMÆ OF MOSSES.—Will you inform me what is among botanists understood to be the function of the so-called gemmæ of *Tetraphis pellucida* and *Aulacomnion androgynum?* Few will have long followed the search for and examination of mosses without meeting with these interesting species. The beautiful golden baskets filled with bright green apples, that at this season ornament the one, and the bunches of pears that, grouped together on a slender stem, adorn the other, are, under a microscope with a low power, among the prettiest of vegetable things. Are these apples and pears of the nature of seeds, spores, off-sets, or really buds? for, surely, they are not, as some have suggested, only rudimentary leaves.—*C. F. W.* [They are generally regarded as reproductive buds, analogous to the bulbels of some flowering plants; their function being, within certain limits, the perpetuation of the species. In *Tetraphis pellucida* they arise from the centre of abortive female flowers. Of a similar character are the threads produced on the leaves of some species of *Orthotrichum* and the granules of *Pottia cavifolia.*—*Ed. S. G.*]

CLUSTER-CUPS.—If we take a stroll away from the busy haunts of men, though only for a short distance,—say, for example (if from London), down to New Cross,—and along the slopes of the railway-cutting, we shall be sure to find the plant called the goatsbeard (*Tragopogon pratensis*) in profusion. In May or June the leaves and unopened involucres of this plant will present a singular appearance, as if sprinkled with gold-dust, or rather, being deficient in lustre, seeming as though some fairy folk had scattered over them a shower of orange-coloured chrome or turmeric powder. Examine this singular phenomenon more closely, and the poetry about the pixies all vanishes; for the orange powder will be seen to have issued from the plant itself. A pocket-lens, or a Coddington, reveals the secret of the mysterious dust. Hundreds of small orifices, like little yellow cups, with a fringe of white teeth around their margins, will be seen thickly scattered over the under-surface of the leaves. These cups (called *peridia*) will appear to have burst through the epidermis of the leaf and elevated themselves above its surface, with the lower portion attached to the substratum beneath. In the interior of these cup-like excrescences, or *peridia*, a quantity of the orange-coloured, spherical dust remains, whilst much of it has been shed and dispersed over the unoccupied portions of the leaves, the stems, and probably on the leaves of the grass or other plants growing in its immediate vicinity. These little cups are fungi, the yellow dust the spores or ultimate representatives of seed.—*Rust, Smut, Mildew, and Mould.*

THE PINGUICULA (*P. grandiflora*). — What prompts me to write a brief description of this remarkable little plant is the feeling that it is, probably, not very well known to most of my readers. On account of its local habits, I was at first under the impression that it grew only in the bogs of the south of Ireland, where I have seen it flourish in great luxuriance. I noticed it later in the Gap of Dunloe, near the Lakes of Killarney. And I find by personal observation that it attains almost as fine a growth on some of the mountain-side morasses of Wales, especially in the district of the lead mines in Radnorshire and Cardiganshire. It always inhabits boggy or peaty soils that have a constant supply of moisture. When walking in any of its habitats, a flat circular tuft of glossy light yellow leaves is sure to meet the eye even of a very careless observer. It has a small fibrous root, which does not penetrate far into the soil. It flowers about the beginning of summer. At this season there spring from the centre of the tuft six or seven slender upright stalks, varying from two to three inches in height. These support flowers, in shape much like the common garden nasturtium, but about the size of a large violet, and of a rich purple colour. The leaves, which are very juicy, are said by the peasants to be poisonous to sheep. The Pinguicula derives its name, probably, from the Latin adjective *pinguis*, fat, *ula* being a diminutive termination, on account of its succulent leaves. It is called *grandiflora*, to distinguish it from another and smaller pinguicula, which bears pale pink flowers. I have tried several means of keeping the plant alive, by transporting with it a quantity of its native soil, and by giving it a continual supply of moisture; but this and every other plan of mine has failed, yet I have not given up all hopes of preserving it away from its native marshes.

GEOLOGY.

The Study of the Past History of Existing Species of Plants.—In a recent paper on the "Origin of the British Flora," it was suggested, in proof of its probable antiquity, that ligneous as well as herbaceous plants may have been preceded by numerous generations. If we confine our remarks to the existing species of oak, elm, maple, pine, yew, and cedar, some of which we know to have lived for hundreds of years, and, in the case of yew and cedar, from fifteen hundred to two thousand years—since inductive science is not able to make us understand extra-natural phenomena—we can only determine the probable number of generations which have preceded the birth of these monarchs of the forest, or their botanical dynasty, by an appeal to the testimony of the rocks. We know from the evidence of the rocks, that existing vegetation is only a continuation, through numerous geological changes, of an anterior vegetation. How long, then, have the existing species of oak, elm, maple, pine, yew, and cedar, been in existence? at what geological epoch were they introduced? and to what extinct species is their ancestry traceable? An attempt to answer these questions has yet to be made. Our most eminent living geologists—Lyell and Prestwich—will acknowledge as much. Very little has yet been done in quaternary geology by botanists, and what has been done seems to us to be most unsatisfactory. The question as to the successive epochs at which existing species have made their appearance can only be determined by a careful study of the botanical remains found in, comparatively speaking, recent geological formations; and as leaves appear to be the most common forms in which these remains are found, in many instances the nervation being most beautifully preserved, it follows that the careful study of the nervation of the leaves of existing species is a very suitable preparation for these researches. As a means of enabling us to study the ramifications of the nerves in the leaf, the process of nature-printing offers us most invaluable aid. When we consider how exceedingly polymorphous the leaves are on most plants; how leaves, in the neighbourhood of the flower, lose their lobes, teeth, and other incisions, and take an entire edge, or lose their petiole and become sessile, sliding imperceptibly into bracts, and then into the sepals of the calyx, it must be obvious that in the case of vegetable remains, where leaves only are found, in determining a fossil plant from its leaf, we must fall back on characters more constant, and therefore more reliable. These characters are furnished by the nervation of the leaves. Unhappily, we have not at present any work in the English language in which a classification of the various types of leaves has been effected, founded on characters taken from their nervation. The only work to which we can refer the reader is an exceedingly expensive one, published by the Austrian government. In this work the Austrian flora has been copied by the nature-printing process. A separate work has also been published on the nervation of leaves. There is nothing to prevent such English botanists, whose neighbourhoods afford the necessary facilities, from working in this novel and deeply interesting field. We want a list of our living plants, and the relative ages of the geological formations in which they are found. The most recent beds are the most important, as bearing directly upon this question, as to the antiquity of the existing species of ligneous plants. We most earnestly call the attention of botanists to this subject, reminding them that, wherever a plant is found, whether on the earth's surface or in its interior, it is legitimate botanizing territory. It is certain that nature is now preserving in modern lacustrine, fluviatile, and estuarine deposits, specimens of existing species; we know that she has done so at former epochs; it is, therefore, apparent that it is only in these modern formations that the lost links will be discovered which unite the present with the former plant creations. H. C.

The Order of Succession in the Drift-beds of the Island of Arran.—At a meeting of the Geological Society (Jan. 25), Dr. J. Bryce read a paper on this subject. "In a paper read last year before the Royal Society of Edinburgh, the Rev. R. B. Watson described all these beds as boulder-clay, and did not assign the shells which he had discovered in them to any particular part of the deposit. Dr. Bryce dissented from this view, and in this paper pointed out the various causes of error likely to mislead an observer in examining such accumulations. He then described the various sections of the deposits, and showed that the lowest bed is a hard, tough, unstratified clay, full of striated, smoothed, and polished stones of all sizes, but totally devoid of fossils, and that it is, in fact, the true old boulder-clay of the geologists of the west of Scotland. The shells are entirely confined to a bed of clay of open texture, containing a few small stones; it rests immediately on the boulder-clay as above defined, and is succeeded by various drift-beds, consisting of seams of clay and sand intermingled, containing stones that are rarely striated, and without shells. Dr. Bryce then discussed the probable origin of these drifts, and the amount of depression which the land had sustained before the shell-bed was deposited over the boulder-clay, which he considered to have been formed by land-ice emanating from central snow-fields, and covering the whole surface of the country."—*The Reader.*

The Occurrence of Beds in the West of Scotland in the Position of the English Crag.—Dr. Bryce also read a paper on this subject at the same time and place as the last. "In consequence of the results arrived at from the investigation of the drift-beds of Arran, Dr. Bryce determined to examine all the recorded cases of fossils occurring in the boulder-clay, the Chapel Hall case having, however, been already undertaken by the Rev. H. W. Crosskey. The most celebrated case is that of the occurrence of elephant-remains at Kilmaurs, near Kilmarnock, in Ayrshire; and the author showed, from a section of the quarry exposed for the purpose by Mr. Turner, of Dean Castle, which corresponded exactly with one already furnished to him by an aged quarryman, that the elephant-remains, the reindeer's horn, and the shells, all occurred in beds below the boulder-clay, and not *in* that deposit, as has always been stated. The same conclusion was arrived at respecting the occurrence of elephant-remains at Airdrie and Bishopbriggs, and of reindeer's horn with shells at Croftamie; and the author concluded by discussing the question whether the fossils belong to the Upper Crag period, or merely indicate a downward extension of the Arctic fauna which characterizes the beds directly above the boulder-clay, as described in the last paper."

MICROSCOPY.

Pollen Grains of Cedar.—I have a small quantity of the Pollen of the Cedar of Lebanon (*Cedrus Libani*), which forms an interesting object for the microscope. I shall be happy to dole out my little stock, as far as it will go, to any who like to send me a stamped envelope. W. H. G., 19, Claremont Square, N.

Balsam and Chloroform.—(In answer to W. G.)—This liquid is very convenient in some cases; as air-bubbles are much more easily got rid of than when undiluted Canada balsam is used. It also dries readily, as the chloroform evaporates very quickly, for which reason it must be preserved in a closely-stoppered bottle. It has been said that this mixture becomes *cloudy* with long keeping, but I have not found it so in any cases where I have used it. Should it, however, become so, a little heat will readily dispel the opacity.—*Davies on Mounting Microscopic Objects.*

Air-Bladders of Fish.—The following account of a microscopical observation may possibly be new to some of the readers of the Science Gossip.—In preparing some fish which had been angled the previous day, the air-bladders being unusually large were preserved, and as they promised to be of microscopical interest they were submitted to the instrument. In the blood-vessels interlacing them the corpuscles were observed to be still in active circulation after a period of some fifteen hours of their being caught—an instance of the extraordinary vitality of the life principle. Similar observations may facilitate the investigation of this wondrous and *novel* spectacle to the young microscopist. The fish, I have subsequently understood, were perch, a species unusually tenacious of life, and predatory in their habits.—*T. R.*

Ascertaining the Magnifying Power of Glasses.—(In reply to T. O.)—The apparatus requisite consists of a micrometer slide graduated into thousandths of an inch, each tenth division being marked by a longer line; or two separate slides, one graduated into thousandths, the other into hundredths of an inch; and an ivory scale graduated into inches, tenths, and hundredths. The simplest method is that by double-sight, as it is called. The micrometer slide is placed upon the stage, the lines brought into focus, and the image of one of the interspaces, as seen upon the stage with the open eye, not used in looking through the microscope, is measured with compasses. By then dividing the measure of the image of the space by the known measure of the unmagnified space, the quotient is the required magnifying power. Thus, if the space on the micrometer scale is equal to the 1-100th of an inch, and the image of the magnified space corresponds to 5-10ths of an inch, the space is magnified 50 times: $\frac{5}{10} \div \frac{1}{100} = 50$.—*Micrographical Dictionary.*

Foraminifera.—It is now well known that from common chalk it is an easy matter to obtain interesting specimens of Foraminifera. Scrape a small quantity of chalk from the mass and shake it in water; leave this a few minutes, pour the water away and add a fresh quantity, shake up as before, and repeat two or three times. Take a little of the residue, and spread it upon the slide, and when quite dry add a little turpentine. When viewed with a power of 250 diameters this will generally show the organisms very well. If it is desired to preserve the slides, they may be then mounted in Canada balsam. Mr. Guyon observes that the accumulation of the powder, by the action of the rain or exposure to the atmospheric action, at the foot or any projection of the chalk cliffs, will afford us better specimens than that which is "scraped," as the organisms are less broken in the former. When the Foraminifera are of a larger size, though transparent enough to be mounted in balsam, the air must be first expelled from the interior, otherwise the objects will be altogether unsatisfactory. To accomplish this they must be immersed in turpentine and submitted to the action of the air-pump. So difficult is it to get rid of this enemy that it is often necessary to employ three or four exhaustions, leaving them for some time under each. When all air has given place to the turpentine, they must be mounted in the ordinary way.—*Davies on Microscopic Objects.*

On Collecting Objects for the Microscope.—The following will be found, on an excursion, a useful addition to the collector's stock of wide-necked bottles. Take the smallest sized japanned sandwich-box, about four or five inches long, and a quantity of waste paper—old envelopes, and letters torn so that when folded across the pieces will go easily into the box. On arriving at a likely spot by the side of a pool or ditch, a sample of the produce, whether conferva, bit of rotten stick, or what not, is placed between the folds of one of the bits of waste paper and consigned to the box, the process being repeated as often as agreeable during the ramble. On returning home, the first thing to be done is to transfer the contents of the papers to glasses or jars of water, leaving them till next morning, when the observer's game will be found in excellent order, and ready for the live box or glass slide. The writer has no wish to disparage the *bottling system*; a well-corked wide-necked bottle is undoubtedly the best thing, but half-a-dozen such bottles are rather cumbrous, and are soon filled in a productive locality. When this happens, the hunter would be glad to be able to go on collecting and storing in a space no larger than a pocket-book from twelve to twenty good gatherings. Even the most fragile and delicate microscopic forms may be thus brought home uninjured—*Volvox, Vorticella, Rotifers, Entomostraca,* and, in fact, all the various classes of organisms sought for by those who practise this branch of fishery. Those who desire to command a more extensive range than is afforded by the invaluable hook-ended walking-stick are generally told to provide themselves with a cheap fishing-rod. A much better thing is the handle of an angler's landing-net. These instruments may be had at the fishing-tackle shops, with two or three lengths sliding one within the other like the draws of a telescope, and from their construction, the lengths cannot separate when dragging to land a heavy mass of weeds, as the joints of a fishing-rod are apt to do.—*Robert C. Douglas.*

British Salmon.—Dr. A. Günther is engaged in a revision of the British Salmonidæ, and, from the materials already at his command, is enabled to affirm that we have at least four non-migratory species which have not hitherto been recognized—one found in the mountain lochs of Wales, one in Ireland, one in the lakes of the Orkneys, and one in the Frith of Forth.

REPORTS OF SOCIETIES.

Botanical of Edinburgh, *Jan.* 12.—Amongst other communications, Professor Balfour read an "Account of Excursions to the Mountains at the Head of Loch Lomond, to Ben Lawers, and the Sow of Athole, in August and September, 1864."

Amateur Botanists (London), *Feb.* 1.—The president (Mr. M. C. Cooke) introduced the business of the evening by a brief explanation of the chief groups of Microscopic Fungi, selecting the section called *Pucciniæi* of Uredinaceous, and the *Sphæriacei* of Ascigerous Fungi for special illustration. Several microscopes having been provided, together with an excellent series of mounted specimens, the members proceeded, under direction of the president, to devote the evening to their examination, with the view to a better acquaintance with these interesting and little-known plants.

Dumfries and Galloway Natural History and Antiquarian Society, *Feb.* 7.—Sir William Jardine, Bart., of Applegarth, who presided, read a paper upon the occurrence of the Roller (*Coracias garrula*) in Dumfriesshire. He had heard of a strange bird being seen on the borders of Annandale, and its remains were afterwards found in a state of decomposition; but from the feathers he recognised it to be a Garrulous Roller. Dr. Gilchrist, medical superintendent of the Crichton Lunatic Asylum, read a paper on the proceedings of the geological department of the Society during the summer.

The Microscopical Society of London, *Feb.* 8.—The president, Mr. Brookes, delivered the annual address, in the course of which he congratulated Messrs. Powell and Lealand on their triumph in producing a $\frac{1}{50}$th object glass, the effects of which were marvellous. With regard to the examination of the microscopes sent in for competition, he had to state that some difficulties had arisen which had prevented the committee from delivering their report upon them on that occasion. Of the eighteen instruments sent in, five were at 10 guineas, seven at 7 guineas, five at 3 guineas, and one at a guinea; he regretted, however, to observe that not one of the leading London makers had responded to the invitation of the Council. After some business of a formal nature, Mr. Glaisher was unanimously elected president for the ensuing twelvemonths.

Liverpool Naturalists' Society.—The usual fortnightly meeting of this Society was held, at the residence of the secretary, on February 9th. Specimens presented by Mr. Hartley to the Society were exhibited, after which the following papers were read:—"Volcanic Islands," by Mr. J. Hartley; "The Cat," by Mr. J. W. Love.

Natural History Society of Northumberland, Durham, and Newcastle-upon-Tyne, and Tyneside Naturalists' Field Club, *Feb.* 9.—The following papers were read:—"Entomological Notes for 1864," by T. J. Bold; "On Naturalists' Field Clubs—their Objects and Organization," by G. S. Brady; "Reports on Deep Sea Dredging on the Coasts of Northumberland and Durham," edited by George S. Brady; "Descriptions of three new or imperfectly known Polyzoa found on the Coasts of Northumberland and Durham," by Joshua Alder. Mr. Bold's paper gave an interesting account of the severe attacks of insects on the various crops, and especially turnips, during the last season.

NOTES AND QUERIES.

Migratory Eels.—Does the common eel at a certain period of the year leave the stagnant ponds in which it is confined, and wriggle its way, through the dewy grass, to the nearest water-course?—*O. O.*

The Snake in Scotland.—A "Scotch Adder" will feel obliged by any of our correspondents mentioning authentic instances of the occurrence of the snake (*Natrix torquata*) in Scotland.

Blue-Bottles.—Can you account for the appearance of great numbers of the common blue-bottle fly at this inclement season? From the second week of January to the 10th of February, I have *destroyed* upon an average three per diem, and that in the hardest frosts, the thermometer registering as low as 12 degrees of frost. They appear only in the warmest rooms of the house, where the usual temperature is about 60°.—*T. H. F.*

Tussilago Hybrida.—We should be glad if any of our readers would favour us with a fresh, flowering specimen or two of this plant during the present season. Our correspondent desires to subject it to anatomical examination, for which purpose "dried specimens" will not suffice. The specimens should be sent to 192, Piccadilly, addressed to "Tussilago Hybrida."

Diseased Flies.—One day last summer I observed a common house-fly having a number of what appeared to be baggy protuberances of a reddish brown colour attached to some of its legs, and which I imagined to be some kind of disease. I should have examined it in the microscope, but failed to catch it. Have any of your readers seen the same thing?—*J. L. E.*

Leaves for Packing.—The Querist in our last should have sent specimens of the leaves he inquires about. Oranges are packed with the sheaths which enclose the ears of maize or Indian corn. We know of no leaves employed. The leaves of the same plant are also pegged together with small wooden pegs for packing; but it is so long since we saw them that we do not remember anything of the structure of the pegs; probably, if from China, they are little slips of bamboo.—*Ed. S. G.*

Use for Nettles.—Dr. Rutty, in his "Natural History of Dublin," after mentioning several curious applications of the nettle, makes the following observation:—"There is another use of nettles well-known and practised by our gardeners near Dublin, namely, to make the green hairy gooseberry red, or at least to improve the natural pale red, the red being in most request, which is done by putting them into a tub, and strewing it from the bottom to the top with alternate layers of fresh nettles and gooseberries, by which means they acquire a red colour, superior to what they have upon the trees." *Nat. Hist. of Co. Dublin,* vol. i. p. 132. 1772. I have tried this experiment on a small scale with pale-red gooseberries and the leaves of the common nettle, and found that the fruit was considerably darkened in colour after the lapse of some hours. The formic acid at the base of the stinging hairs in the nettle is probably the cause of the change. Could any of your correspondents inform me of such a practice being prevalent in any other locality?—*V. A. S.*

Parasites of Cabbage Butterfly.—I have always understood that the cabbage-worm eventually undergoes the transformations common to the insect tribe. Now, in the autumn of 1864 I observed some dark-green caterpillars, marbled on the sides with yellow spots and streaks, making great havoc of some winter greens in my garden. I squeezed one, by accident, and there exuded a number of small cocoons about the size of those belonging to the ants' nest. Not long after this, I found some of these larvæ climbing my window-panes. They deposited small heaps of these cocoons, protecting them with a covering of yellow silk, the caterpillars then, without changing to a chrysalis, died, being merely nothing but skin. Are these cocoons those of the Ichneumon fly?—*T. H.*——The fly in question is one of the *Braconidæ*, tribe *Ichneumonites;* it is the *Ichneumon glomeratus* of Linnæus, and the *Microgaster glomeratus* of modern authors.—*F. W.*

The Smooth Snake Again. — In reply to S. L. N. S.—The following is Dr. Günther's description of the smooth snake (*Coronella lævis*):—"Scales in twenty-one rows; anal bifid; upper labials, seven. Brown. Back with two, sometimes confluent, series of irregularly rounded dark spots. Hinder maxillary tooth smooth." It more resembles the viper than the snake in general appearance, but differs in the number of plates on the head, is commonly smaller in size, with a double row of spots down the back, and *not* a single zigzag line as in the viper."

On Behalf of a Salamander.—Will you oblige a particular friend of mine, a salamander, by informing me what would be most likely to please his eftship's dainty palate? I became acquainted with this gentleman some six months ago, and from that time to the present he appears to have lost his appetite, possibly because I dragged him from the society of his friends, and have immured him in an aquarium too small to please his high notions of his former estate; possibly because I have not tempted him with a sufficiently delicious morsel, though I should have thought a *recherché* blood-worm, dangling before his uselessly large mouth, would have satisfied any reptile. He ekes out a monotonous existence, enthroned in a small cash-bowl filled with moss, which floats on the top of my aquarium, looking down upon fish, leeches, his cousins the newts, a tortoise, &c., with the most supreme indifference, except that occasionally, when disposed for a spree, he mounts the back of the latter for a ride round his diminished domains. The tortoise, on these occasions, seems fully alive to his inferiority, and submits to be made a horse of for his highness the salamander, without so much as a murmur. I am the more puzzled to know what to make of his digestive organs, or the want of them, as he not only lives upon nothing, but actually gets fat upon it. His forty days and forty nights' fast has been repeated five times over, and I am beginning to get anxious about "the subject of our memoir." Perhaps you will kindly inquire of any of his family with whom you may meet, of what their favourite dish consists, as I should be sorry to be the cause of his untimely death resulting from my inattention, and thus bring upon my friend the fate of Timothy Daly.—*Dytiscus Marginalis.*

Aquaria and Fernery Combined.—I shall be obliged by information upon this—The aquarium to have a glass cover, the ferns placed under it on floating cork islands; what would be a good assortment, not only of ferns, but of any other suitable plants, if possible bearing flowers? It is said all the species of lycopodia will do well in this situation, but there may be many others. What description of growing moss or lichen would be suitable to form a ground, those plants requiring least soil to be preferred, also where the varieties recommended may be procured? Will the glass cover require apertures for ventilation? There is a film-like spider's web interlacing the plants in the aquarium—what is this? The same has been seen in rivers. Is there any cure for the fungus that grows on the fish in the aquarium?—*E. S.*

Wasps in London.—Your correspondent J. E. inquires how it is there are no wasps in London. I live within four and a quarter miles of the Bank, so there is no doubt as to whether I live in London. In front of my house there is a field in which I destroyed four wasps' nests last year; so tormented were we with them, that at any time during the hot months, from five to twenty together might be found in one room. After this I hope J. E. will not imagine there are no wasps in London.—*C. S. Barnes.*——[We saw plenty of wasps in London last year, some within three minutes' walk of Charing Cross.—*Ed. S. G.*]

Ornithological Query.—Will any of your readers, acquainted with Africa and South America, inform me whither the hirundines of those countries migrate, according as the rainy season affects each country respectively? I am induced to ask this question from reading, as follows, in Dr. Livingstone's South Africa:—"During the first week of *June*, 1855, in latitude 10° S., 19° W., saw many goat-suckers, swifts, and *different kinds* of swallows;" and again, during the last week of December, 1852, "large flocks of swifts were observed flying over the plains of Kuruman, S. lat. 28°, long. E. I estimated one stream alone of these birds (on their migratory route?) at 4,000 and over—can these be the swifts that beset Europe?" Mr. W. H. Bates, although seven years travelling in equatorial South America, only *once* names *swallows* as being seen by him, though so keen a naturalist, and this occurs at p. 239, where he says: "On the 3rd January, 1854, a kind of second summer set in at Villa Nova, 2°—3° S. lat., when a species of *swallow*, of a *brown* colour, with a short square tail (*Cotyle*), made its appearance in *great numbers, and* built their nests *in holes of the bank* on which the village is built." Now, Prince L. Bonaparte, in his beautiful work on Ornithology, enumerates among his 63 varieties of *Hirundines*, 10 distinct varieties for South America *alone*, and seven varieties as peculiar to South Africa. Where do all these hirundines migrate to, in each continent, considering that they *cannot* overpass that belt of intense rain (from 400 to 500 miles broad) that oscillates, according to the sun's declination, from north to south, from between lat. N. 15°, and lat. S. 5°? I cannot but think that these southern hirundines, take those of India, Australia, and the Eastern Hemisphere generally (as do the parakeets), all move north or south *within* their respective countries *only*. What say your travelled naturalist readers?—*H. E. A.*

Cutting Sections of Wood.—J. F. C., inquires what time of the year is the best for cutting sections of wood for the microscope? As green wood is not employed for this purpose, we see no reason why any one period of the year should be preferable to another.

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.

W. W. K.—The shells sent by our correspondent are a somewhat elongated variety of *Limnæus péreger*. The generic word *Limnæus* is derived from the Greek Λίμνη (*Limne*), a marsh or pool; the specific name is from the Latin *peregrinor*, "to travel through strange places." And thus we have the common name "the wandering mud-shell." It is the most frequent and widely dispersed of our fresh-water shells.—*R. T.*

Asterosporium Hoffmanni.—The specimens were distributed to the uttermost fragment; still, nearly fifty applicants were disappointed. The stamped envelopes are retained, in the hope that in a month or two we shall be able to supply all. This promise cannot be extended to fresh applicants.—*M. C. C.*

Ornithological Queries.—Page 47, five lines from the bottom, "Ireland" should have been "Iceland."—*H. E. A.*

P. Y. (*Wigan*).—Recommends "Benzole" for killing, and also for preserving, insects. Greasy specimens may be renovated by soaking them an hour or two, or all night, in "Benzole," and afterwards drying them.—*F. M.*

Chameleon.—G. H. R. states that during last summer these reptiles could be purchased at 5s. each, of Mr. King, 190, Great Portland Street. G. H. G. says that they will not live through the winter.

Tripoli.—A correspondent has a little of that substance (fossil remains of Infusoria), from Bohemia, which he will send to applicants on receipt of stamped envelope.—W. E. Williams, Jun., M.D., Corsham, Wilts.

J. H. (*Belfast*).—Could you supply a lady with a specimen of Diatomaceous earth?

J. F.—"Continued" articles are objectionable. We do not pretend to *teach* any science. If you name the order of insects which you desire to study, we can enumerate text-books. For a general introduction to the study of insects read *Westwood's*, or *Kirby & Spence's*. The latter can be had at your price.

L. L. L.—Read our answer to J. F.

W. Q. C.—Your query will find its answer in "Slug or Snail," p. 62.

J. R.—Our correspondent "B." is known to be too good a botanist, and too careful an observer, to confound *Plantago major* with *Plantago coronopus*. A novice could hardly do it.

A. J.—The book named is the only one within your limits.

Speedwell.—W. R. B.—A Subscriber.—We prefer *not* to recommend any maker of microscopes to the prejudice of others. Each instrument has its own merits and demerits.

S. A. and P. B.—Refer to our report of the Microscopical Society, at page 70.

C. E.—Should communicate with the Curator of the Society of Amateur Botanists relative to exchanges of plants. Address to 192, Piccadilly, W.

Caliban.—Lists can only be inserted as advertisements.

T. O.—Apply for price-list to Claudet & Houghton, High Holborn.

F. J. T.—What "sea-worm"? Second query out of our limits.

M. M. W.—Albino varieties in flowers, as in birds, are not uncommon. As a rule, we cannot undertake to return specimens sent to be named.

T. R.—Use a Kelner (c.) eyepiece on the substage, and reflect the light by means of the mirror.—*W. M. B.*

R. W.—We know of no complete work on the Bibliography of the Natural Sciences—we wish that we did. A good Bibliography of *recent* works will be found in the later volumes of the "Natural History Review." For Botanical works, consult Pritzel's "Thesaurus." For Zoological, Agassiz's "Bibliography" (Ray Society).

S. W.—(No. 1) Wilson's "Bryologia Britannica." Longmans. 1855. (Nos. 2 and 3) In our opinion "B." (No. 4) Probably "A." (No. 5) Not by experience; see Davies "On Preparing and Mounting," pp. 84 and 91.

W. S. K. (*Llangollen*).—The names of your mosses, sent for identification, are as follows:—1, Hypnum Schreberi; 2, H. uncinatum; 3, H. filicinum; 4, H. ruscifolium; 5, Zygodon Mougeotii; 7, Hypnum stellatum; 8, Aulacomnion palustre; 9, Bryum roseum; 11, Ptychomitrium polyphyllum; 12, Orthotrichum anomalum, *Wilson;* 13, O. Lyellii; 14, O. tenellum; 15, O. Bruchii.—*G. E. H.*

Thanks for Communications.—A. P. H.; T. R.; Pinguicula; G. H. R.; R. T; Dytiscus Marginalis; J. A.; A. J. N. M.; W. W. F.; J. W. L.; J. S. T.; A. B. F.; H. S. S; E. W. M.; R. C. D.; P. S. B.; E. M. H.; A. J. R.; M. G. C.; R. B.; J. B.; R. S. B.

Popular Names.—Received, M. H. L.; L. S.

Declined, with Thanks.—H. J. C. B.; E. L.; G. C. D.; E. D.; E. J. P.; A. F. C.; J. G. G.; Y. Y.; O. A. S.; R. R. P.

Received.—R. B. S. (Lists are forbidden. Shall be glad to hear of otters or badgers); R. B.; R. L. (Try benzole); M. H. L.; M. P. B.; J. R.; P. Y.; S. A. S.; L. S.; E. S.; E. B.; T. K. M. (We know it); G. T. G.; O. L.; S. L. N. S.; G. P. A.; J. H. C.; J. R. B. M. (Not sufficient particulars); J. C. C. (Try chloroform); J. F. R.; T. O.; H. D. C.; E. T. S.; P. S.; F. R. M.; E. L. B.; C. S. B.; J. L. E.; J. F.; T. H. F.; J. W. L.; W. L.; B.; G. F. S. (Durham); A. B.; J. A. (Richmond); D. R. R.; J. F. C.; A. I.; I. K. (Greenock); G. F. F.; H. A.; W. G. (*Not an answer*); P. B. St. J.; M. X.; E. B.; J. J. R.; R.; J. A.; J. G. B.; E. S.

Books Received.—"The Irrationale of Speech;" by a Minute Philosopher. London: Longmans. ——"Rust, Smut, Mildew, and Mould: an Introduction to the Study of Microscopic Fungi;" by M. C. Cooke. London: Hardwicke.

SPLITTERS AND LUMPERS.

"Strange that such difference should be
'Twixt *tweedle-dum* and *tweedle-dee*."

WHEN our good correspondents, in the simplicity of their hearts, inquire of us what these terms mean, and how they originated, they little think what a courageous face they call upon us to present, or how they challenge us to tread on some one's dearly beloved corns, in any venture to reply.

Looking at the words themselves, they are very good words in their proper places, very plain, and very significant; therefore, it is only to some novel application, forced or contorted, or it may be "cant" acceptation of the Queen's English, that such querists refer. If we are to credit the historian (satirist?) there was once a court and a country in which two factions raged. One party held that on entering a temple the right foot should be first placed over the threshold, the other that the left foot should be so employed. A new minister, or vizier, was appointed. Public curiosity was at its height when, on the day of installation into his high office, he should enter the temple. Will he place the right or the left foot first? was the universal inquiry. The hour and the man came, and the temple was entered, but neither the right nor the left foot party exulted. On arriving at the threshold the new minister placed his two heels firmly side by side, and thus leaped over the difficulty and the threshold together.

Wise or foolish in its origin or perpetuation, we will not stay to ask: certain naturalists are honoured with the title of Splitters, whilst others are denominated Lumpers, as if really there was a great fundamental difference between them. Popular creations in natural history are generally monsters; impossible beings such as sphinxes, centaurs, and unicorns. So "Lumpers" are regarded as a faction whose sole delight is in lumping together under one name all analogous forms, and constituting a *species* out of six or seven existing ones; whilst "Splitters," on the other hand, are an equally industrious faction whose occupation and amusement consist in hunting out the most trivial differences and distinctions, giving them a factitious value, and out of one species constituting twenty new ones. We need not add that such a character is unmerited by either. It may be true that amongst naturalists there is a difference of opinion as to what shall constitute or be the limits of a "species." If by any patent method "what is a species" could be definitely and satisfactorily settled, Lumpers and Splitters would be embalmed by the act with the mummies of ancient Egypt. All recognise, but with different values, the variations amongst individuals; a group of individuals agreeing amongst themselves, in some departure from a given type, with more or less of permanence, is to one man, or one section of men, worthy of regard as a variety, whilst others esteem the differences to be such as merit specific distinction, to be relatively permanent, and to be entitled to retain a distinct name, and take rank as a species. We think that were a young student to ask our advice, we should recommend him to imitate the most inveterate splitter that he could imagine, because such a course would, of necessity, compel him to a rigid scrutiny and comparison, which might thenceforth grow into a habit of close observation. On the other hand, we should feel disposed to caution the matured naturalist against new species, recommending him to cultivate a "conservative" spirit, and to regard all allied forms as the same species until he recognized unmistakeable evidences that they could not have diverged from each other, to that extent, under any ordinary conditions to which animal or plant life might be submitted.

The whole community is not agreed as to what is happiness, or what is honour, or what is taste; and it is somewhat invidious to apply terms intended to be anything but complimentary to those who differ in their interpretation of what is a species. We do not think that science suffers by including in her ranks men of extreme opinions on such an "open question." Certainly if one reviews the labours of the other carefully and candidly, or a third looks on and balances the evidence on both sides, there is more hope for the truth than if all were unanimous. To inquire of us, "What is the maximum speed of a cannon-ball?" is bad enough, but to ask us whether we belong to the high-heeled faction, or the low-heeled party is worse, and all the reply we can give is—Look at our boots and see!

THE CABBAGE BUTTERFLY AND ITS METAMORPHOSES.

BY PROFESSOR A. DE QUATREFAGES.

(INTERNAL PHASES.)

WE shall now describe in a few words the being produced from the little worm which sprung from the *Pieris'* egg (page 32).

The body, which is entirely clothed with hairs perceptible to the naked eye, consists of three segments, which are separated from each other by well-marked constrictions; these three are: the head, the chest or *thorax*, and the belly or *abdomen*. The head is small, and has attached to it in front two long, horny, jointed, club-shaped feelers, or *antennæ*, which had no existence in the caterpillar. The little *simple eyes* are still present; but in addition, a large round mass with a trellised surface may be seen on each side. These masses are the *compound eyes*, each facette of which is a true organ of vision; and since, according to the calculations of several naturalists, there are no less than thirty thousand of these facettes, it follows that the animal has this enormous number of distinct eyes. The mouth, which now, instead of being used for division and mastication, is only employed for suction, is admirably adapted to its new office. We can hardly find a trace of the upper and lower lips or the mandibles. The jaws have been immensely elongated; their horny tissue has disappeared, and flexor and extensor muscles have been developed in its place. Each jaw is penetrated by nerves and tracheæ, and is grooved deeply on its inner surface. These organs, when placed side by side and soldered to each other, constitute a sort of tube twice as long as the whole body, and continuous with the mouth. From having been organs of mastication, they are now converted by this process of fusion into a proboscis, which the insect rolls or unrolls at will, and which can penetrate the deepest calyx and allow it to suck up the juices of the flower as perfectly as if a syphon had been employed.

The chest or thorax bears the legs and wings. The first correspond to the horny feet of the caterpillar, but are very unlike them in appearance. The limbs of the caterpillar were short and massive, those of the butterfly are long and slender. Besides, their structure is entirely different. In the butterfly's limb there are five distinct parts, and the last or *tarsus* is itself composed of five joints and a pair of hooklets. The four wings are attached in pairs to each side of the back. Each one is united to the solid structures through the intervention of a chain of horny pieces, connected together by strong ligaments and supplied with powerful muscles, and to these are due the suppleness and force which are exhibited in the movements of flight. From this basal portion spring four main nervures, which diverge from each other, and by their ramifications support the wing-membranes, which are thus stretched upon a horny frame. Notwithstanding their solid appearance, these nervures are really hollow in their interior, and are pierced by *tracheæ*, or air-tubes, which extend almost to their extremities. Moreover they are covered by two exquisitely delicate, transparent membranes, which, firmly united together, clothe the upper and under surfaces. It is to these that the little scales are attached which give the peculiar colours to this and other butterflies, being implanted in the membrane somewhat in the same manner as a bird's feathers are implanted in its skin. The caterpillar did not present the slightest trace of these wings or their appendages.

The abdomen, which corresponds to the hinder portion of the caterpillar's body, has lost all its *false* feet; but with that exception has undergone very little alteration. The general form has been slightly modified, the colour is no longer the same; but the abdomen is invariably divided into seven rather distinct rings.

These moultings, metamorphoses, and alterations, although apparently occurring spasmodically, do not do so in reality. Beneath the veil of skin, which will be thrown off in course of time, even within those parts which will eventually disappear or be transformed into others, the new integument is being gradually formed; the general plan of the future animal is being drawn out, and the various organs which will afterwards be required are being organized. The old garment alone is cast off, both at the period of moulting and of metamorphosis. If we cautiously detach the old but still vital skin, a few days before the moulting takes place, we may see its successors lying beneath it. By doing the same with the caterpillar, a few days before it passes into the chrysalis condition, we shall discover the rudimentary wings and antennæ. If at this period we cut off the little scaly feet, we shall find that, when the butterfly emerges from the case, its legs will be imperfect.

Laying aside the internal changes which we have already alluded to, we shall confine ourselves to the study of the metamorphoses of some of the large apparatus, and more especially of the digestive tube and nervous centres.

The digestive apparatus which this caterpillar presents when it first springs from the egg, and even when it commences its transformation, is very simple in character. The alimentary canal begins as a very short and wide *œsophagus*, and ends in an intestine, somewhat of the same kind, but which can hardly be said to consist of two regions. Between these organs we find a stomach disproportionately large, which fills almost the entire cavity of the body. In addition to these, two salivary glands, composed of long tortuous tubes, are attached to them in front, and six well-formed biliary canals, which represent the liver, are connected with them behind. Opening into the mouth and the spinning apparatus which we alluded to before, may be seen two peculiar organs, which extend in a tortuous manner along the entire length of the stomach, and whose office is the secretion of the fluid from which the silk is formed. Every portion of this digestive apparatus is calculated to extract the nutritious materials from the crude masses of unsubstantial food which has been imperfectly prepared by the action of the jaws.

Even on the second day after the caterpillar has been converted into the chrysalis, very considerable alterations may be observed. The œsophagus is narrowed and elongated; the intestine, similarly modified, is now divided into two well-marked regions; the stomach has been diminished by about one-half of its breadth and a quarter of its length; the salivary and biliary glands have been shortened, and the organs which secrete the silk have become smaller. On the eighth day, the entire digestive tube is exactly like a spindle one-half of which is covered with thread, and which is loaded with lead in order to balance it. The œsophagus represents the upper portion of the spindle; the stomach corresponds to the middle, which is covered with thread; the small intestine to the thin portion, and the large intestine to the loaded part. At the same period the salivary glands and biliary cœca are reduced by about two-thirds, and the silk-secreting organs appear as two very slender threads.

During the entire winter—that is to say, for five or six months of the year—these operations are suspended; but they are recommenced in fine weather, and continued till the insect is fully formed. In a short time the silk-forming canals have entirely disappeared; hardly a trace of the salivary glands is to be found; and the stomach, though preserving its former shape, has decreased in size; but to compensate for this, it has developed a new cavity called the *crop*, which is destined to assist in sucking up the juices of the flowers, and retaining them till required by the insect. Moreover, the two intestinal regions have become more distinct, and the large intestine has developed an accessory pouch, not a trace of which existed hitherto.

We come now to the nervous system. In insects in every condition, this system is composed of two distinct portions. The *brain* is placed in the head just above the œsophagus. The other nervous masses, or *ganglia*, are situate below the digestive tube, where they constitute a ganglionic chain. The brain is united to the first ganglion, this to the second, and so on, by a series of nervous filaments, technically termed commissures. In each ring of the caterpillar's body there is a distinct ganglion; consequently there are in all twelve of these structures, equally distant from each other, with the exception of the two first, which are more closely approximated than the rest. The brain itself is very small, and is composed of two smooth lobes which are obliquely united, and give off a few slender nervous filaments.

Two days after the caterpillar has been converted into the chrysalis, the ganglionic chain has been shortened one-fourth, and various changes of alteration and concentration have begun. Some ganglia are approximated; others, on the contrary, are separated. At about the eighth day the chain has been shortened one-half. On the fourteenth the brain and first ganglion have come so close together that their commissures surround the œsophagus; the fourth and fifth ganglia have been fused together; and the sixth and seventh are hardly perceptible. Now there is a period of rest, brought about by the approach of winter. Then, after the latter season, the operations are recommenced, and when they are again arrested, after the last apparent transformation, there are only eight ganglia to be seen. The second, third, fourth, and fifth, have given rise, by their fusion, to two large masses, which are placed in the chest quite close to each other; the sixth and seventh have completely disappeared, and their former position is alone marked by the origin of a few nervous filaments; the five posterior ones have undergone little or no change. Finally, the brain itself had become twice as large, its lobes have assumed a transverse position, and each of them gives origin to a large optic nerve which travels to one of the compound eyes.

The changes which the organs of circulation and respiration undergo are not by any means as well known as those we have been describing, and this ignorance is due, most likely, to the great simplicity of the first, and the equally complex character of the second. In this caterpillar, as in every other one, the circulation is almost entirely lacunar. In it, as in the butterfly, there is a distinct heart, or rather its representation, in the form of a long many-chambered canal, stretching from end to end of the body. When the latter is shortened, this *dorsal vessel*, as it is called, is also diminished in length, and becomes more and more tortuous in proportion as the regions of the body are mapped out and separated from each other.

This degradation of the circulatory organ is compensated for by the formation and distribution of a series of respiratory organs, or tracheæ. These open externally at the stigmata to which we have alluded already. They consist, in *Pieris*, as in all other caterpillars, of two great lateral trunks, reaching from end to end of the body, and giving off hundreds of branches and ramifications, which travel over the whole frame, penetrate the smallest cavities, and supply the most delicate organs. In all insects with the power of flight, and consequently in the *Pieris*, this apparatus develops a pair of pouches destined to contain air, and thus, of course, diminishes the specific gravity of the body. According to Newport, it is only in the chrysalis that these organs are formed with rapidity. In *Pieris*, they first appear some time in autumn, and are half-formed before the winter; they remain at a standstill during the season, and assume their perfect form a short time after the last metamorphosis.

The function of all the organs we have already described is that of preserving or maintaining the life of the individual. They are all, moreover, in the full exercise of their duties from the moment that the creature emerges from the egg. Those organs connected with the perpetuation of the species are very differently situate. These are so slightly developed, and so imperceptible whilst the insect is in the caterpillar stage, that the penetrating researches of Herold could not demonstrate their existence. These organs are quite rudimentary, even at a period of five months after the conversion of the caterpillar into a chrysalis. It is only at the last moment, and just as the butterfly is about to make its escape, that they are to be seen in process of completion, whilst they undergo their entire development only in the perfect insect.

Here we must notice a very significant fact, and one which bears forcibly on the present subject. The female *Pieris* dies soon after depositing her eggs, and the male ceases to exist at a still earlier period. Matrimony is as fatal to them as it is to all insects, and their existence terminates when the preservation of the species has been insured. There is, however, an occasional circumstance which, by preventing the discharge of the functions essential to this final object, prolongs the usually short life of these insects to an extent beyond that which is intended. Some butterflies do not emerge from the chrysalis case till late in autumn, and then the cold temperature of the surrounding atmosphere retards their development, and winter comes on ere they have begun their amours.

In consequence of this, they retire to some sheltered spot, remain there during the whole season, and reappear in spring. Thanks to this condition of celibacy, the result rather of circumstances than of desire, their lives, instead of being limited to a few weeks, extend over several months.

THE WATER PIPIT.

(*Anthus spinoletta L.*)

THE first intimation of the occurrence of this Continental bird in the British Isles, or at least the first which was made public, was the exhibition at a meeting of the Zoological Society, on January 24th, 1865, of a specimen from the collection of the Bishop of Oxford, stated to have been obtained near Brighton, in the winter of 1859-60 (see p. 64). From information afterwards received, we were led to correspond with the Rev. H. B. Tristram on the subject, and as the name of this gentleman is well known to British zoologists, his communication will be accepted with confidence. He writes:—

"I have no hesitation in stating that I can distinguish no difference between a pair (male and female) shot by me in January, 1861, on the island of Rorkahill, on the east coast of Ireland, and specimens I have obtained in Greece, Tunis, and Cyprus. In this I am borne out by my friend, Mr. A. Newton. The common Northumbrian species is *A. obscurus*, and I never heard of *A. spinoletta* on our northern coast."

Upon such authority, therefore, we can no longer object to recognize the Water Pipit amongst our occasional visitors.

This Pipit, during the breeding season and summer, appears to be an inhabitant of the Swiss Alps, the Tyrol, the Pyrenees, and other mountainous districts; but in the autumn and winter it descends to the plains, and is found along the course of rivers. It is probably to be met with at this season on both shores of the Mediterranean, and in some of the Mediterranean Islands. In the north of Europe it is rarely found, being confined chiefly to the south and west. This is not the place to enter upon the question of its identity with at least a closely allied American species. Our species most resembling it is the Rock Pipit (*Anthus obscurus*). From this it differs chiefly in the following particulars: — In the Rock Pipit the beak is of a dusky colour, yellowish at the base, and the legs and feet reddish-brown. In the Water Pipit the beak, legs, and feet are black. In the Rock Pipit, the primaries, or longer and outer wing feathers, have the outer feather the longest, and the three next successively shorter. In the Water Pipit the first four primaries are of nearly equal length, but the third is slightly the longest, and the first the shortest. In the Rock Pipit those wing-feathers, which are termed the wing-coverts, are dusky, edged with pale olive, but not very distinctly, and in the Water Pipit they are bordered with yellowish, so as to form two bands across the wings. Any more minute description would only be interesting to the scientific ornithologist.

Having pointed out the most prominent features whereby an ordinary observer may discover to which of the two species any stray visitor may belong that may find its way into his hands, we wait with patience for further confirmation of its claims to be included in the British Fauna.

"UNDER A PALM TREE!"

Gomuti Palm (*Arenga saccharifera*).

All who have read the Laureate's poem, "Enoch Arden," will recognize the phrase which heads this paper, and to them it will suggest many a reflection. It will not be entirely barren of thought to those who, not having read the episode, have nevertheless acquainted themselves with other writers, ancient or modern, whose heroes may have rested beneath the shadow of one of these time-honoured trees. The allusions to Palms in sacred and profane writers of all nations and ages, wherever these plants flourish, are numerous; and he can have but little poetic feeling in whom the mention of the name excites no emotion. It is not, however, in their artistic relations, or poetical associations, that Palms claim our attention. Bound, as chroniclers of science, to the rigid zone of fact, it may not be permitted us to dilate on the romance of Palm history, or relate "the loves of Palms," but rather to confine ourselves to a matter-of-fact sketch of the "Princes of the Vegetable World." Those who may never have gazed upon a Palm, even under the artificial conditions in which they are placed in this country, can scarcely realize a true mental picture of their grandeur. Rising erect, with a simple unbranched trunk, to a height of from ten to nearly two hundred feet, according to the species, and with the summit crowned with a magnificent tuft of feathery or fan-like leaves spreading on each side for forty or fifty feet, the appearance is one which finds no parallel in our temperate climes. Beneath a tropical sky, within an equatorial belt of some twenty degrees, is the great region of Palms, and here amid—

> The slender coco's drooping crown of plumes,
> The lightning flash of insect and of bird,
> The lustre of the long convolvuluses
> That coil around the stately stems, the glows
> And glories of the broad belt of the world—

subject to the reeking heat of a broiling sun, the wearied traveller rejoices to rest for a few melting moments "under a Palm Tree."

Only one species, the Dwarf Palm (*Chamærops humilis*), is found in Europe, and that is only to be met with on the most southern points. Our continent is *not* the land of Palms. Dr. Martius, author of the most magnificent book on this tribe yet published, thinks that there are not less than from one thousand to twelve hundred species; and more than half this number are known. Remote as we are from Palm groves, and little as we know of the trees themselves, their products are amongst our most familiar things. To intimate that the rattan-cane is the stem of a Palm may not suggest pleasant reflections to the school-boy; but, as fifty or sixty years bring him nearer to childhood again, he will not despise the rest afforded by a cane-bottomed chair. A large portion of our sugar is derived from an East Indian Palm (*Elate sylvestris*). From the Oil Palm of Western Africa, and the Cocoa Palm of Ceylon, commerce derives its best of "stearine candles," and the microscopist his glycerine. Coir and cocoa-nut matting are their own advertisement; but how many brushes, for a hundred different uses, are entirely innocent of the fibres of Palm-trees, the makers alone can tell. One of the sources of the substance known as "vegetable hair," illustrates our paper.

It is time we turn from such generalizations as we have hitherto indulged in, to a few particulars of the Ejoo or Gomuti Palm (*Arenga saccharifera*). It is of importance, second only to that of the cocoa-nut, writes Mr. Crawfurd, in the rural economy of the Asiatic archipelago, from one extremity of it to the other. Its chief and most valuable product is its sap, obtained by bruising and cutting the inflorescence. From this liquid, and not from the juice of the cane, is made nearly all the sugar consumed by the natives, while the sap itself, which runs rapidly to the vinous fermentation, is their chief intoxicating beverage. The sap, however, is not the only product which is put to use. Between the trunk and the fronds there are found three different useful materials:—a black horsehair-like substance, which makes the best cordage of the western islands of the archipelago; a fine cottony substance, which makes the best tinder, and is exported for this purpose; and strong stiff spines, from which are made the pens of all the nations that write on paper, with the arrows for the blow-pipe of the rude tribes that still use this weapon. The pith furnishes a sago. The seeds have been made into a confection, while their pulpy envelopes abound in a poisonous juice, a strong infusion of them being used in the barbarian wars of the natives. The young leaves are boiled and eaten, as a kind of Palm-cabbage; and the Palm-wine is used by the Chinese residents in fabricating the celebrated Batavian arrack. When any accident prevents the collected juice from being manufactured into "jaggery," or coarse sugar, as it speedily ferments, and becomes sour, the acidification is taken advantage of to produce a vinegar equal in strength to that obtained by vinous fermentation in Europe.

Although a native of the Asiatic archipelago, this Palm has been introduced into continental India, and some other countries possessing a suitable climate, where it flourishes as in its native home. To follow it in its migrations, digress in its praise, or become prolix in its history, is not our aim; therefore, to all who desire a better acquaintance with it, or its companions in the order of Palms, we commend Dr. Seemann's interesting little volume, entitled, "The Popular History of Palms;" and, in its perusal, we doubt not, many will, ever and anon, wish themselves seated, "Under a Palm Tree."

M. C. C.

PRIZES FOR HERBARIA.—The Horticultural Society prizes have been awarded. Twenty-six silver medals are to be distributed. Gold medals have been assigned to Dr. St. Brody, Mr. Joshua Clarke, and Miss L. E. Becker. The gold medal for any new species found wild has been awarded to Mr. Joshua Clarke, for *Erucastrum inodorum*, collected near Saffron Walden, from the mould of a railway-cutting.

ABOUT THE OTTER'S-SHELL.

(*Lutraria maxima.*)

BY J. K. LORD, F.Z.S.

THE Otter's-shell, or, as it is more frequently styled in the north-west, the *Clam*, has a somewhat wide geographical range. It is found in great abundance on the coast of Vancouver Island, as well as on the mainland fore-shore from the Bay of San Francisco to Sitka, 53° N. lat.

This mollusc attains an immense size, and to the coast Indians is most valuable as an article of diet, either fresh or dried for winter use in the smoke of the lodge-fires. There are several monster specimens in the British Museum shell-room—brought by myself from Vancouver Island—visible to all who may be curious in Clams after reading the following episode on their manners and customs.

This bivalve spends the greater part of its time buried in the mud, about two feet deep, the long syphon reaching the surface discloses his place of concealment by constantly squirting up small jets of water. The rise and fall of the tide on these coasts, often from thirty to forty feet, exposes at low water great muddy flat banks that run out sometimes over a mile from shore. Here he lives; there is nothing about him poetical or romantic—grovelling in the mud, and feeding on the veriest filth he can find, constitute the great pleasures of his life. It is almost superfluous to remark that the Otter's-shell belongs to the family *Mactridæ*, some of the larger ones measuring eight inches from hinge to valve; shell oblong and open at both ends, cartilage-plate prominent, two small teeth in each valve, foot large, syphons united.

As soon as the tide is off the flats, numbers of Indian women (squaws) may be seen hastening towards the mud-banks, guiltless of clothing, with the exception of a small bit of skin tied round the waist. They wade into the mud, a basket in one hand, and in the other a bent stick, about four feet long; and, thus equipped, commence digging up the mud-houses of the Clam, guided by the jets of water that disclose his residence. Pushing down the bent stick, and getting it well under him, they place a stone, as a fulcrum, behind the lever, against which the squaw fixes her foot firmly, then lifts away, and, as a skilful dentist whips out a tooth ere you know the instrument is near it, so the bivalve is hoisted from its mud-house, thence transformed into the Indian's basket ere he knows it. The basket filled, they trudge back again to the lodge.

And now to open him—

He is not a *native* that an oyster-knife is likely to astonish. The wily Red-skin, if he never heard the fable of the *wind*, the *sun*, and the *traveller*, practises the same principle on the luckless Clam as the sun found so effectual on the obstinate pedestrian. What force fails to do, a genial warmth accomplishes—more persuasive, perhaps, than pleasant—to induce the Clam to open his shell.

The Indians hollow out a circle in the ground, about eight inches deep, then fill it with heated stones, on which they place the *bivalve martyr*. The heat finds its way through his walls, and his mansion soon gets *too hot to hold him*· so he opens his door for a mouthful of fresh air; fully enjoying the luxury, he incautiously opens it wider and wider.

Slily watching his movements sits a squaw, grim and dirty, armed with a long sharp stick; hotter and more thirsty grows the poor Clam; gradually the shelly portals are stretched apart, then down upon him the savage pounces, and astonishes his heated senses by thrusting the spear, with all her force, through the quivering tissues. His chance is over. Jerked off the heated stones, pitilessly his stronghold is forced open; ropes, hinges, fastenings, crack like thread, and the Clam is ruthlessly dragged out, naked and lifeless.

I venture to give a story, told by an old hunter (as we were wandering by the beach), of having seen a duck trapped by an Otter's-shell. And thus he told it:—

"You see I was a cruising down these flats, jist dead low water as it is now, when I see a big flock of shoveller ducks busy as a dog-fish in herring-time. So down I creeps, and slap I fires in among 'em. Six on 'em turned over, and away went the rest, gallows skeert, quacking like mad, making pretty tall travelling to pick up the dead uns. I spied an old mallard a playin' up all manner o' antics, jumpin', hackin', flappin', but fast by the head tho', as if he had his nose in a steel trap.

"What do you think had fixed him? I'll be dog gone, if a big Clam hadn't nailed him fast by the beak. The mallard might a tried his darndest, but, may I never trap another martin, if the Clam wouldn't a held him agin all odds till the tide run in, and he'd a been a gone shoveller, you bet your boots?"

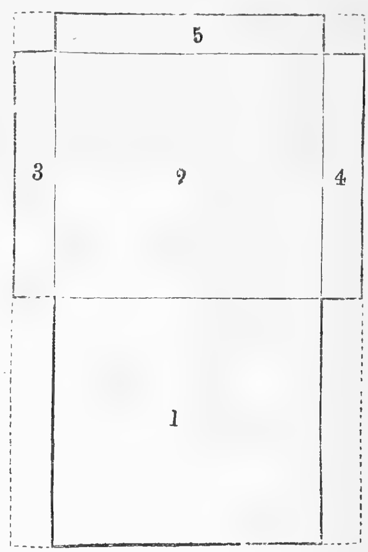
THE STUDY OF MOSSES.

THE study of mosses offers two great advantages to persons whose time is much occupied in business: 1st, that the year round every month will afford numbers of new specimens—some dying off as others come into fruit: and 2ndly, that the specimens gathered can be examined at any future time, four or five years after; for, by merely placing them into a little water, they will immediately resume their life-like appearance. Having worked this department of natural science for some time, I offer myself as a guide to give the benefit of my experience, and am induced to do this from having seen several papers on the mosses in various periodicals, evidently written by persons who had not studied what they wrote about; the advice given being rather calculated to mislead those who acted upon it. The first thing necessary (after making up the mind that, if anything is to be studied at all, it must be done in a proper, that is, in a *scientific manner*, and entails *real work*) is to provide a suitable text-book; and the only serviceable one in the English language on the British mosses is Wilson's "Bryologia Britannica." The next requirement is a microscope—we shall want two: a dissecting, and a good compound microscope; likewise a pocket-magnifier; we shall also require a *two-inch objective* to the microscope. Without good magnifying power no real good can be accomplished. The following are also requisite: a gross of glass sides, 3 inches by 1; a gross of india-rubber rings, $\frac{3}{4}$-inch diameter, *outside measurement;* an ounce of round, thin, glass covers, $\frac{5}{8}$-inch diameter; some *dead*-black paper, and a steel punch, $\frac{3}{4}$ inch diameter; a bottle of Canada balsam; a bottle of glycerine, to be mixed with equal parts of camphor-water; a bottle of asphalte; and a Shadbolt's turn-table, for making shallow cells; half-a-dozen glovers' triangular needles, for dissecting; a few camel-hair brushes; and a small vice, to fix on the table (this last makes a splendid section-machine, by placing the object between two pieces of cork, and with a sharp knife or razor, made flat on one side, taking a thin slice of the cork and object together); a few quires of blotting paper, and a memorandum-book, complete our requirements.

Before collecting, it will be advisable to get a general idea of the Families and Genera of the mosses; and this will be best accomplished by carefully studying the descriptions given by Wilson, at the same time constantly referring to his beautiful plates, until the *family-likenesses* are imprinted on our memory; and it is in addition a considerable help to enter into the memorandum-book all the most important parts of structure, and the principal distinguishing marks of the genera. We shall thus, from knowledge gradually and imperceptibly acquired, know when we get a *Sphagnum*, a *Weissia*, a *Tortula*, a *Bryum*, a *Hypnum*, &c.; and the genera more closely alike—as, *Trichostomum* and *Tortula*, *Racomitrium* and *Grimmia*, *Dicranum* and *Campylopus*—will also soon be easily distinguished.

Now for collecting; and all that is needful is a bag of good, strong material (such as lawyers use), a couple of newspapers torn into, say nine-inch squares, and a good, strong oyster-knife.

My advice is, eschew all *tin vasculums*. A moss having been found, take it carefully up (with the knife), wrap it in a piece of paper, and place it in the bag. The day's work finished, on arriving home we shall have clean, unbroken specimens, very different from the unsightly heap turned out from an ordinary vasculum. Having made out the names of several, we put the specimens into *cold* water, clean by means of a camel-hair brush, place on a white linen cloth, gently press them, and then lay on a sheet of blotting paper, with small slips bearing name, date, &c., cover with another sheet, and so on, put some large book on top to press—*avoiding too great a weight;* and when the specimens are dry, by means of gum fasten them on to the *inside* of the *second* leaf of a sheet of note-paper; write on *outside* of *first* sheet the family at top, the genus in the middle, and the species, habitat, &c., at the very bottom, commencing at extreme left hand. As, by the *slightest pressure*, mosses lose much of their character, it is requisite to have a quantity *unpressed*, but classified and arranged for reference. These specimens should be made up in paper bags formed of note-paper, thus—



Take half a sheet, turn up the lower edge to within half an inch of the top, fold the top over it, then turn the sides about half an inch over and inwards, open out the paper, and it will appear as represented in the above figure; cut away the dotted part, fold 1 on 2, then the sides 3 and 4 over that, and 5 over all. The bags thus formed will contain your unpressed specimens; write genus, species, habitat, &c., on the outside of No. 1, and arrange in cigar or other box.

We now come to the most fascinating part of our study, viz., the collection of microscopic dissections of leaves, capsules, peristomes, &c. These are invaluable even to the beginner. The first thing to be done is to take the $\frac{3}{4}$-inch punch, and cut a number of circles of dead-black paper; gum these upon the centre of the 3-inches-by-1 slides; when dry, take an india-rubber ring, dip a camel-hair brush in asphalte, and by it fasten the ring exactly over the circle of black paper; *reverse the slide*, so that the ring may dry and adhere evenly. Then take a few more glass slides, and by the aid of the "turn-table" make a circle of asphalte in the centre of each, apply another coat of asphalte when the first is dry, and we shall then have shallow cells for leaves, &c.

Let us now take a moss—say, the commonest species, such as *Funaria hygrometrica*, or common cord-moss,—select a few of the capsules (they are mature when of a fine golden-brown colour); take out a slide with an india-rubber ring on, the gum, our dissecting microscope, and two glovers' needles. We first gum all over the dead-black paper; place thereon, longitudinally, a capsule bearing calyptra, &c., and a small portion of the seta; another capsule with the calyptra off, showing the operculum side-view; another with the operculum off, presenting a side-view of the peristome. Then add upper half of capsule cut in two *transversely*, and placed upon end so as to show the peristome *in situ*. Now take one of the shallow cells made of asphalte, and fill it with glycerine and camphor-water; in this place leaves from the stem, branch, and perichætium; use another cell for the operculum, calyptra, and annulus, and another for the inflorescence. When the slides are finished, put a label on one end like this.

XXII.
58 · 1.
Funaria hygrometrica.
Peristome.

The upper figures refer to the family, 58 to the genus, 1 to the species. These slides should then be arranged for ready reference in boxes. I find the shilling boxes holding two dozen most convenient, as they will stand on end, and can be placed like books on a shelf or in a book-case.

I have said nothing about manipulation, as that can be obtained in any work on the microscope; but would point out that the best method of dissecting the peristome is to run the smallest entomological pin you can get through the centre of the capsule; fasten it down to a piece of cork, cut it in two transversely, just below the mouth—nearly all the spores will come out; transfer that portion which has the peristome only to a slide with a little water, and gently brush away the few spores that may adhere; and then place on another slide, arrange, and finish off. If we place the whole capsule on a slide with water at once, we shall never get rid of the clouds of spores, and after fruitless endeavours to obtain a clear view of the peristome, be obliged to give it up as a bad job.

In conclusion, I need only remark that if the mosses are studied in the way I have endeavoured to point out, the student will in time have a most valuable collection; and in its formation will derive an amount of pleasure never to be realized by the person who merely sticks a smashed clump to a sheet of paper, and calls it a specimen. By my method he will find that—

"Here to charm the curious eye
A host of hidden treasures lie!
A microscopic world that tells
That not alone in trees and flowers
The spirit bright of beauty dwells;
That not alone in lofty bowers
The mighty hand of God is seen,
But more triumphant still—in things man count as mean."

Roderick M'Leod.

[N.B.—Although sent as an *original* contribution, we are aware that this paper has appeared in the "Liverpool Naturalists' Note Book," but as very few of our readers will have had the opportunity of seeing it, no valid objection can be raised to its appearance here. We may add, by way of request, that our correspondents will not send communications "as original" which have already been published without a statement to that effect. If *we* should fail to make the discovery, some one of our readers would be sure to find it out.—*Ed. Sc. G.*]

THE HEDGEHOG.

(*Erinaceus Europæus.*)

As I have formerly found this animal to be a most entertaining pet, I am sorry to know that he is daily becoming less frequent amongst us, as persecution, the result of prejudice, and the trimming up and removal of old fences are tending to make this once common creature somewhat of a rarity.

I have been for years a keen observer of the habits of the hedgehog, and never yet saw a single case for suspicion of any mischief belonging to him. The notion of his sucking the cows, which once prevailed, is now scarcely believed by the "barn-door savage," a race still not uncommon, as testified by a savage desire for killing anything.

As regards the charge of egg-sucking brought against the hedgehog, I could never arrive at a tittle of real evidence in its support.

Seen in the fields, the hedgehog would seem to be a dull, inactive creature; but in domestication I have found them most "larking" individuals. I formerly kept a couple in my geological museum, and though they were comparatively quiet in the day-time, yet they were ever ready to come and eat bread and milk from my hands. At night, they became as "active as cats," and the rate at which they would run along the corridors of my college, and even get up and down-stairs, was surprising; and here they were not a bad police, for as equally active students would sometimes prowl from room to room on "bolstering dire intent," the chance of stepping upon a hedgehog, or having him run against one's naked shins, was enough to establish a decided "funk."

These and other hedgehogs which I have kept, at length got away, which, however well they are treated, they always endeavour to do; in one case (in as far as I could make out) falling over a ten-foot wall into a river; and as I have occasionally found them quite well at the bottoms of deep stone quarries, I presume that their peculiar dermal armature, or their ball-shape, when coiled up, renders a fall innoccuous.

I have penned these remarks in the hope that other observers might be enabled to say something in favour of my pet; for, as he has ever appeared to me not only harmless, but most useful as a destroyer of insects, I shall be glad, if possible, if Science Gossip, unlike usual gossip, may tend to save a reputation, and so preserve a race.

J. Buckman, F.L.S., &c.

THE COMMON HOUSE-FLY.

WHICH IS THE COMMON HOUSE-FLY?

MANY naturalists of considerable repute have not thought it beneath them to study and write the life and instincts of this insect. Notwithstanding having made the little creature my particular study since last summer twelve months, it still remains a problem with me which is the common house-fly.

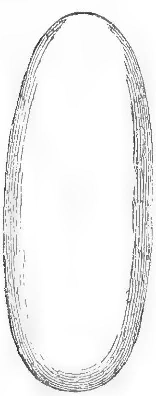


Fig. 1.

Out of the numerous flies which are frolicing about my parlour, I have caught three, which are now under the dissecting knife, two females and one male; the two females are to all appearance under the microscope exactly alike in size and markings, the same proboscis, brain, feet, spiracles, tracheæ, ovipositor and position of the ova in the abdomen; but the material difference is, that the so-called house-fly is oviparous, and its congener ovoviviparous. We will, for distinction, call the house-fly number one, its congener number two, and the male number three: the ova of number one is smooth and rather a long oval, requiring several days to hatch, brings forth a maggot common in appearance to that species (see figs. 1 and 2), while number two brings forth its ova with the grub alive, perfectly formed, and very lively; the egg is somewhat obtuse, and partakes of a peculiar form, similar to two lappets thrown back, which gives a thick appearance on the sides, while the centre, which is beautifully honeycombed, is quite transparent; the opening is at the top, very simple, something like a purse, through which the grub passed in less than two minutes after the egg had been deposited. I had previously covered the ova with a drop of water to keep it moist, but it did not impede the little creature's progress in its endeavour to escape. Figs. 3 and 4 will give the exact drawing of the ova and insect. I thought it worth while to call a witness to its faithful representation, as I had not at that moment an opportunity of mounting it as a microscopic object; the grub resembled more the caterpillar tribe, and certainly was a beautiful little creature, so perfect in its form though so minute. I will briefly give a description of the insect: the trunk or proboscis appears like two tubes attached together, at the bottom of which are two immature eyes; the tracheæ and spiracles were very distinct; it has ten legs on each side, fleshy and covered with hair; the body is covered with delicate spots and minute hairs, with ten fine horizontal lines of division form top to bottom; the tail horn-shaped and fleshy. I have been rather particular in my description, because it differs so widely from anything of the kind I have ever met with.

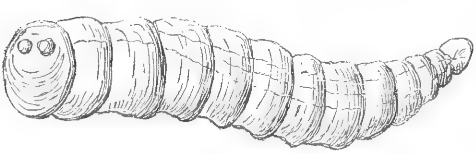


Fig. 2.

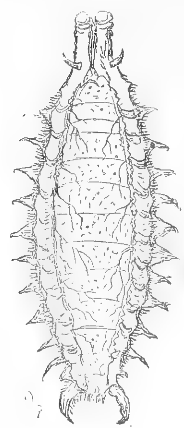


Fig. 3.

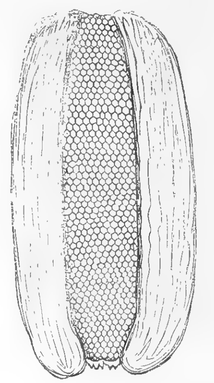


Fig. 4.

The male fly, number three, is not, I apprehend, the mate of either of the two females from the dissimilarity of the proboscis (see figs. 5 and 6); in all other respects the male appears the same species, only smaller, which is the case generally. But I am at a loss to find a mate for the male fly; in this I may perhaps succeed in time. The number of female flies in comparison with the males of the so-

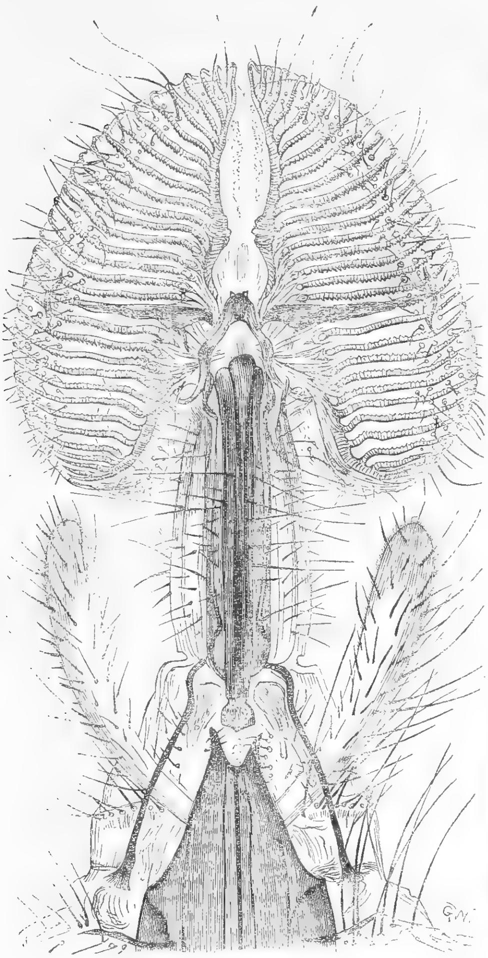


Fig. 5.

Fig. 6

called house-fly is upon the average of six to one in my little compartment.

Mr. Samuelson and Dr. Hicks published in 1858 a small but interesting book in a series of eight letters upon the "Common House-Fly," and as number one and two of mine represent theirs in every particular, with the exception of number two bringing forth a live grub, I would wish to ask to what class we are to place number two and three—are they also to represent the common house-fly? If so, we have three distinct varieties, and in all probability many others.

It occurred to me, and also to several of your subscribers, that a paper upon this subject might not be altogether uninteresting or out of place in your instructive Science Gossip, as it may lead some one more able than myself to solve the problem.

In the same series of letters to which I have made reference, the facets in the eyes of various insects are enumerated; among the number mentioned is that of the dragon-fly (*Libellula*). I believe it is not generally known, or perhaps only known to myself, as I have never heard it mentioned, that the eye of the dragon-fly consists of three distinct separate layers, which may with careful manipulation be separated, showing the facets more distinctly. I have one so obtained mounted for the microscope. I acknowledge it will require a very steady hand, a little skill, and plenty of patience. It is more than ten years since I made this discovery, and perceiving that no naturalist mentions the circumstance, I thought it might be interesting to those who are fond of insect anatomy.

I will also mention another object which will richly repay the trouble of mounting: the gizzard of the flea, *thoroughly* cleansed and skinned, is a most splendid object for an $\frac{1}{8}$ objective (mounted in Canada balsam). R. S. Boswell.

[*N.B.*—Our correspondent's drawing was too rough for engraving, and we have substituted the tongue of the drone-fly, which he states his own much resembled, except that it was smaller, and more opaque in the trunk.—*Ed. Sc. G.*]

CRICKET ON THE HEARTH.

On showing a very beautiful and perfect micro-photograph, by Dr. Abercrombie, of the so-called tongue (*ligula*) of the house-cricket (*Acheta domestica*), the question arose, "What do crickets eat?" Now, our little merry fireside-chirpers seem never to have confided this secret to mortal ears, not even in the celebrated duet on the hearth when "kettle began it." One reason for this may be that the ladies of the family, who might be expected to look after the larder, are dumb poor things. So Xenarchus, or some crusty old Greek, wrote:—

> "Happy are the crickets' lives,
> Since they all have silent wives."

The power of emitting the "crique! crique!" we hear is possessed only by the male insect, and is produced by a truly musical instrument, a sort of drum or tambourine formed of a part of the parchment, or partially horny substance, of the short upper wings, which in these *Orthoptera* take the place of the more elaborate wing-sheaths, called elytra, of the beetles; across or against this little drum, the cricket has the power of rubbing the toothed or corrugated inner edges of these upper partially sheathing wings—sometimes called *tegmina*—which fold a little over each other. In this way a pretty loud sound can be produced.

There is an elegant legend quoted by Dr. Shaw, in his volume VI., as from the Greek, of a cicada, which, as it might easily apply to our present friends, it may be allowable to repeat as gossip:—"A tale is related by ancient authors of two rival musicians, Eunomus, of Locris, and Aristo, of Rhegium, alternately playing for a prize; when one of the candidates was so unfortunate as to break a string of his lyre; by which accident he would certainly have failed; when a cicada, flying near, happened to settle on his lyre, and by its own note supplied the defective string, and thus enabled the favoured candidate to overcome his antagonist. So remarkable was this event that a statue was erected to perpetuate the memory of it, in which a man is represented playing on a lyre, on which sits a cicada."

Although the lady crickets are dumb, we must presume they are not deaf; Shakespeare does not consider them so when he says:—"I will whisper it gently, so that not even your crickets shall hear." The cricket then sounds his gong to summon the ladies from the tortuous passages and caves scooped out by their strong mandibles in the mortar of our walls, to join the festive board, when he finds some dainty crumbs scattered on the floor, particularly if they should be moist; for these chirpers are thirsty creatures, and have been known to devour holes in any *wet* woollen articles left by the kitchen-fire,—most likely for the sake of the moisture. They are said to have no objection to a savoury meal on a fat, juicy cockroach, and that the latter always abscond from places where crickets abound.

Sir W. Jardine states, on the authority of Koch, that the cricket has the characteristics of *omnivorous* animals, in possessing both incisive and molar teeth, of which he gives a figure on Plate VI. of his "Introduction to Entomology" in the "Naturalist's Library;" and they appear to have a strong propensity for nibbling and gnawing. A tender, young passion-flower was planted in a warm corner of my conservatory, adjoining the kitchen-chimney, where numbers of these crickets were continually chirping, as fast as the poor little plant sent forth promise of young leaves, they were eaten off, and the tender twigs regularly decorticated by some sort of little, nibbling teeth, just as rabbits often bark young trees in a plantation. Now, the crickets were never actually caught in the fact of feeding on the plant; so their friends may consider this charge against them as *not proven!* But as nothing else likely to have eaten them could ever be traced, and the crickets were constantly heard in suspicious vicinity, there is at least strong presumptive evidence which, perhaps, some keener observer may be inclined to follow up.

The Rev. Gilbert White records that "in the summer we have observed them to fly, when it became dusk, out of the windows and over the neighbouring roofs."

M. Bory de Saint-Vincent relates that the Spaniards have such an affection for these little creatures that they construct neat little cages for them, and hang them up like singing birds.

M. Latreille thinks they live chiefly on insects; in summer, the house-crickets make long excursions into the fields and gardens, where they sing away merrily in the open air, during the warm summer-evenings; but usually return by the end of August to their haunts, near ovens, or kitchen-hearths,—a habit which calls forth this little address from the bard of Olney to the "Cricket on the Hearth":—

> "Thou surpassest, happier far,
> Happiest grasshoppers that are:
> Their's is but a summer's song;
> Thine endures the winter long,
> Unimpaired and shrill and clear—
> Melody throughout the year."

P. S. B.

What we know, is a point to what we do not know. Open any recent journal of science, and weigh the problems suggested concerning light, heat, electricity, magnetism, physiology, geology, and judge whether the interest of natural science is likely to be soon exhausted.—*Emerson.*

A man is fed, not that he may be fed, but that he may work.—*Emerson.*

STRANGE REMEDIES.

In all country places there are very strange remedies recommended for various diseases. Generally, there is but little reason for the method of treatment. Often the doctrine that *similia similibus curantur*, or "like cures like," is its only foundation. Thus, the yellow bark of the berberry-tree is in some places administered as a cure for jaundice, only because it is yellow and the skin also is yellow in that disease. Our wise forefathers called the purple foxglove "throatwort," and prescribed it in cases of ulcerated sore throat, because the inside or throat of the flower is spotted like the human throat in a diseased state, and they thought that by these real or fancied resemblances nature pointed out the uses to which different plants ought to be applied. Whether the *Digitalis* was given internally, or used as an external application, I cannot tell; but if the former, I think it must have been a "kill or cure" kind of remedy.

I have heard of two remedies in Cheshire which have not even this shadow for their rationale. I observed a man intently hunting for something in the long wet grass. I went to see what he was looking for; in fact, he was trespassing in my own orchard, so I had a special interest in watching him. I found, however, that he was looking for some little frogs, which, if found, were to be placed (alive, I suppose) into the mouth of a child that had got the thrush!

The other remedy is a hedgehog, which is confidently recommended in cases of epilepsy! I have never been able to learn, however, whether it is to be cooked or raw, roasted or boiled, with spines or without, or whether it is to be tortured in some way, and made a charm of, as was sometimes done with other animals by our aforesaid wise forefathers, as in the following instance which I met with in an old farriery book. The remedy was to be used, "When a horse has been frightened or bitten by a mouse in its manger." The formula was:—"Take a mouse, and having cut a hole in the trunk of a tree (I think some particular tree was specified), there place the mouse, and fasten it up by nailing a piece of wood over the hole. Then, whenever the horse becomes unmanageable, or is frightened at any thing, take him to the tree (not a very easy matter, being unmanageable), and his fright will instantly cease, and he will become manageable."

Here, however, is a Cheshire remedy for warts, which is most wonderful, and which is by many implicitly believed in. *Steal* a piece of bacon. Rub the warts with it. Then cut a slit in the bark of an ash-tree; raise up a piece of the bark; put in the bacon, and close the bark down again. In a short time the warts will die away from the hand! but will make their appearance on the bark of the tree as rough excrescences!! This remedy has been quite successful in the case of my man, who told me!!! R. H.

ON COLLECTING DIATOMS.

The collector of Diatoms, Desmids, and other microscopic denizens of the waters, is often at a loss where to seek for the objects of his search. In the country every dirty ditch and stagnant pond or running stream is a natural aquarium for him, but the dweller in town has to go some distance before he can meet with a suitable hunting, or more properly, fishing-ground. It is to the latter, therefore, the writer now specially commends the following remarks. Of localities, the Londoner will find at the west-end the Serpentine in Hyde Park, the ornamental water in Regent's and St. James's Parks, very rich in diatoms, particularly *Diatoma*, *Surirella*, *Synedra*, *Plurosigma*, *Pinnularia*, and some others.

Northerly he will find the ponds on Hampstead-heath and Highgate. In the east the docks, and in the south the Surrey-canal, Clapham and Wandsworth Commons, which contain many prolific ponds and ditches; so that a ride by omnibus, or a few miles' walk from almost any part of London, will bring the collector into the vicinity of his prey.

Then, as to collecting apparatus. The writer has found the most simple to be the following:—Half-a-dozen wide-mouthed bottles, one-ounce size, with turned-back brim, fitted with good corks, and placed in a leather case for convenient carriage in the pocket, which case should also be provided with a pocket to contain a good stout india-rubber ring. A walking-stick or umbrella will complete his collecting implements. The use of the india-rubber ring will now be apparent. On reaching a likely spot for collecting, he is to remove from the case one of the bottles and the india-rubber ring. Having then placed his stick or umbrella under his arm, double the india-rubber ring over the ferrule end of the stick, and pass the neck of the bottle through the two loops thus formed.

This plan has been used by the writer for some years, and found to answer admirably; it has the advantage of taking up very little room in the pocket, and can be adjusted in an instant.

A. J. Roberts.

Art is nature passed through the alembic of man. —*Emerson.*

ZOOLOGY.

Natterjack in Ireland.—I met here again (Ross Bay) that curious amphibian the natterjack (*Bufo calamita*). It is a pretty, harmless creature, and its bell-like chorus at eventide could be heard at a great distance. I had previously observed it amongst the sand-flats of Southport an almost identical habitat.—*Dr. Carrington's Gleanings.*

Mole and Mouse.—Last winter, when the ground was frozen very hard, I saw a bewildered mole trying with all his might to bury himself in the ground. I soon captured the little beast, and pocketed him. In my walk I espied a poor field-mouse running about for shelter; him I easily captured, and put into the same pocket, which was large and capacious. Very shortly after the introduction, I found a considerable disturbance was going on between the two, and, supposing they were trying to escape, I closed the pocket to prevent their doing so. I reached home in about half-an-hour, when, what was my surprise, on feeling for my captives, to find the poor mouse gone, all but his head. The mole had disposed of him. I then placed the survivor on the table, laying the head before him, when, with all the coolness imaginable, he picked the bones of his unfortunate companion, taking no heed of several persons who stood round.—*W. H. B.*

Does the Spider Eat his Web?—Dig out the coal, let the hearth be bright, and let the forge glow, and then watch how the dark vapours creep and spread over the sky like some mighty spider's web. The spider still eats its own web. Even this last product of the furnace and the chimney is too precious to lose. Ten thousand green leaves attract and suck in the rich carbon which the atmosphere has distilled from the smoke. Through their innumerable mouths the unwearied old planet swallows her own workmanship again, as a tree extracts the substance of its own falling leaves, or as the spider eats his web. — *The Nonconformist*, No. 1,009. [What conscientious scruple could have haunted our contemporary to prevent the publication of the *name* of "the magazine for February," which supplied the title and subject of a "leader" of nearly three columns, whence the above is quoted? To this example *we* are "nonconformists."—*Ed. S. G.*]

Your correspondent T. K. has so ably answered the query respecting the garden spider eating its own web, that I can with pleasure bear testimony to the truth, having been a witness to the same nearly forty years back.—*R. S. B.*

The Cuckoo.—In the west of Scotland, the cuckoo selects, without any exception within my experience or knowledge, the nest of what is locally called the "mosscheeper" (mossbunting) for its egg, one egg only being found in any one nest. I have seen very many of the usurped nests with eggs, and ultimately with the solitary young cuckoo. The eggs of both birds are very similar in form and markings; but that of the cuckoo is slightly the largest. It is a fact familiar to most observers that a small bird flies some twenty or thirty yards in the rear and direct track of the cuckoo, and rests when the cuckoo rests. This I have observed during a long course of years; but I do not remember to have seen the fact on record. This devoted attendant is the foster-bird—the bunting—always under such circumstances called *the titling.* A schoolboy-rhyme, in the form of a puzzle, pointing to this connection, and likely common over the whole country, runs thus:—

"The linty, and the linty-wheet,
The laverick, and the lark,
The cuckoo, and the titling,—
How many birds *is* that?" *D. R. R.*

Reptiles in Confinement.—In a fern-case, about 3 feet by 1 in area, I kept two toads, a small frog, and a number of newts. The frog did not appear fond of the water; the newts would not go in, and if thrown in, immediately crawled out again. The toads, on the contrary, appeared to enjoy an occasional bath, remaining in the water, with the mouth and eyes above the surface, for several hours together. "H. F." does not appear to have been able to keep toads in his fern-case for long. Mine, on the contrary, lived, the one for about a year, the other for nearly two. The newts dropped off one by one, the last surviving for, I think, upwards of eighteen months. The frog lived for several months, and was a very interesting creature. When on the upper part of the fern-fronds, where he delighted to bask, he appeared of a distinctly greenish tint; but when on the soil, at the bottom, the hue changed to so decided a brown that it was difficult to find him. During the time that these creatures were among the ferns, I am not aware of having seen an *aphis*, whereas, since their decease, the young fronds (especially those of the Polypods) are, during the summer-months, infested with them.—*C. A.*

The Bittern.—A fine male specimen of the Bittern (*Ardea stellaris*) was caught by a dog amongst some rushes in a meadow near Northampton, in January, 1864. Another Bittern was shot by a gentleman, near Wellingborough, in February of the same year. I may also mention a male Bittern which was shot within a few miles of Wellingborough, in 1856. These, I believe, are the only recorded instances of this bird being met with in Northamptonshire of late years.—*W. L.*

A Sandpiper in Difficulties.—While walking by the side of a small mountain-stream in the north of Yorkshire, last summer, I was startled by a fluttering noise; and on looking round, saw a sandpiper

(*Totanus hypoleucus*) fly away from my feet. I began to look for its nest, thinking it might have built a second time; but to my astonishment, I saw a young sandpiper with one leg entangled in some wool, which had stuck to a small nut-tree. I went some distance off, for the purpose of seeing it try to liberate itself. As soon as I had gone away, the old bird came back again, and fed it. Having watched it for some time, I at last walked up, and set it free, but not without some difficulty; for the wool had got so tight round its legs that it had cut it in several places, and was covered with blood; so I was obliged to use my knife to get it off. When the bird was set free, it did not fly far; but hid itself under the river's bank. I never saw my little prisoner again.—*G. R. B.*

Habits of the Toad.—Neither "E. D." nor "R. H." notice the comical habit which the toad has of twitching his hind-toes with excitement when watching an insect he intends to eat. The frog does not do so, being much quicker in catching its prey at a distance. It leaps toward it, and throws out its tongue at the same time. I have at present four tame toads and a frog, which I should always be glad to show to any one calling. One of the toads croaks loudly whenever handled, but never dribbles now. I have also some natterjacks (*Bufo calamita*), from Wisley, Surrey. I shall be glad to catch and send specimens of this really handsome species to all who will write and ask.—*W. R. Tate, 4, Grove-place, Denmark-hill, Camberwell.*

Egg of the Stormy Petrel.—The stormy petrel (*Porcellaria pelagica, L.*) is the smallest of the web-footed birds, is very light, and but little larger than a wren; but the egg she lays is the largest, for the size of the bird, of any of the feathered race, being $1\frac{3}{20}$ of an inch long, $\frac{17}{20}$ of an inch in diameter. She lays two eggs, which are pure white, and full as large as a pigeon's egg, in the fissures of the rocks on the rocky isles, near the coast, in almost inaccessible places.—*W. W. K., St. Ives, Cornwall.*

Economic Entomology.—In a circular just issued, the Entomological Society of London announces its anxiety especially to devote attention to economic entomology, and requests the support of agriculturists and horticulturists, and of all who are interested in the habits and economy of insects, and the best modes of cultivating the useful and destroying the noxious species. The council has offered two prizes, of the value of five guineas each, to be awarded, at the end of the present year, to the authors of essays or memoirs of sufficient merit on subjects belonging to the economic department of the science.

The Badger.—On the 19th of March, last year, a man brought a live badger to Wycombe, which he had dug out the previous night. It was a very fine one; he sold it for ten shillings to a gentleman, who has it now. I have a fine badger's skull that was dug up three years ago in our cemetery with several other bones.—*Henry Ullyett.*

Cuckoo's Egg in a Linnet's Nest.—On the 9th of July last I found a linnet's nest with a cuckoo's egg in it. Is not this unusual, the linnet being a hard-billed bird? The spots on the egg were very light, corroborating the opinion of a friend of mine, who believes the cuckoo's eggs to be light or dark in shade, according to the nest in which they are laid. —*Henry Ullyett.*

Colour of Birds' Eggs.—I have had several eggs brought me, said to be those of yellow bunting, totally destitute of colour. These were always laid very late in the season, and this may serve to bear out the remark of Mr. Gregson, quoted in the February number. Two white eggs were once brought in the nest, which I believe to be those of wheatear. This was late in the year, too.—*Henry Ullyett.*

New Silk-producing Insect. — M. Guérin-Meneville presented a note to the Academy of Sciences, Paris, recently, on a new sub-genus of Bombycides producing silk — the *Saturnia Bauhiniæ*, Guér., an inhabitant of Senegal, for which M. Guérin proposes to found a new sub-genus under the name of Faidherbia, in honour of General Faidherbe, the commander of the French military expeditions in the district of the Senegal, through whose instrumentality the silk-producing qualities of the insect have been made known. Each cocoon contains 633 milligrammes of silk, those of the common silkworm containing only 290, and those of the silkworms of the ailanthus and ricinus only 255 and 175 respectively. It is proposed to introduce the cultivation of this new silkworm into Algeria.—*The Reader.*

The Man-sucker, or Octopus.—In the article about the man-sucker (*Octopus*), I find the author does not mention (which I have often seen) that the Indians, after catching the creature, will eat it raw with great gusto; and when I have been out all day shooting with them it has been brought with them raw as their luncheon. There is also another sea (I do not know whether to call it animal or fish—at any rate) creature, about as long and as thick as my arm, which has no power of volition, but sticks to the rocks by suckers; these I have seen the Indians spear, and eat raw, with the sea-water, with which they are filled, running down their beards.—*J. B.*

To the attentive eye, each moment of the year has its own beauty, and in the same field it beholds every hour, a picture which was never seen before, and which shall never be seen again.—*Emerson.*

BOTANY.

Common Things Unknown.—In the county of Devon the cowslip, nightingale, and mistletoe are unknown. The flower which in the county of Somerset is called the daffodil, is in Devonshire called the cowslip.—*J. A.*

Savanilla Rhatany.—All who are devoted to the study of materia medica will be glad to learn that Mr. Daniel Hanbury has determined the source of the Savanilla rhatany root of commerce to be that of *Krameria Ixina* Tr. and Pl.

Dr. F. C. Schubeler has recently been nominated Professor of Botany and Director of the Botanical Garden at Christiana.—*Gardener's Chronicle.*

New British Lichens.—The Rev. W. A. Leighton announces the discovery by him of two other new British lichens. One of these (*Lecidea tantilla* Nyl.) he found in October last on wood palings at Stableford, near Bridgenorth, Shropshire; the other (named by Dr. Nylander *Odontotrema longius*) in January, 1865, on railings near Shrewsbury.—*Annals and Mag. of Nat. Hist.*

New Source of Theine.—It has recently been announced that *theine*, the chemical principle of tea and coffee, has been found in the cola or guru-nut of Soudan (*Cola acuminata*). "It would probably prove a futile task to attempt the discovery throughout the vegetable kingdom of tropical West Africa of any analogous product that occupies such an exalted position in the social or dietetic economy of the negro tribes, or constitutes such an important article of traffic in Soudan, as the seeds of the cola-tree."—*Pharmaceutical Journal.*

Another use for Nettles.—There is a use of nettles well-known to the lower class in this neighbourhood, namely, that of feeding pigs. The poor people send out their children with thick gloves on their hands, and a knife and rope; the children then cut down as many nettles as they can carry, round which they tie the rope and trudge home, and boil the nettles, which destroys the power of the formic acid, leaving the nettles quite harmless, but forming a very nutritious food for their pigs.—*J. H., Belfast.*

British Roses.—M. Deseglise has recently completed a review of the roses of Britain and France in the pages of the "Naturalist." Mr. J. G. Baker (in Seemann's "Journal of Botany") says:—"At length the true *Rosa collina* Jacq. may take its place upon our British lists. Mr. T. R. A. Briggs has met with it in considerable quantity in hedges and thickets in the neighbourhood of Plymouth, and as the stations are upon both sides of the Tamar, they are consequently both in Devonshire and Cornwall."

Vegetable Origin of Diamonds.—Professor Gœppert, who recently obtained the prize offered by the Dutch Scientific Society for an essay on this subject, says:—"In my essay I have given ample proof that at one time diamonds were soft bodies. . . I have not yet attained any results with respect to graphite, but in diamonds I have found numerous foreign bodies enclosed, of which, if they cannot be said to be evidently and undoubtedly vegetable in their origin, it would, on the other hand, be difficult to deny their vegetable nature altogether.—*Seemann's Journal of Botany.*

St. Winefrid's Blood.—The blood-speckled stones, at the bottom of St. Winefrid's-well, at Holywell, in Flintshire, were long appealed to as miraculous relics of St. Winefrid's blood, till the prying botanist resolved them into an *algoid* production, known as *Palmella cruenta*, which has been frequently taken for blood spilt upon the ground. Thus Caxton quaintly says:—

"In the welmes ofter than ones,
Ben found reed spercled stones,
In token of the blood reed
That the mayd Wenefrede
Shadd at that pytte
Whan hyr throte was kytte."

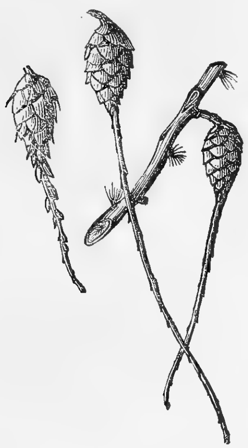
—*Lees' Botanical Looker-out.*

Servian Flora.—One peculiarity of Servia, Mr. Denton says, will not fail to be noticed by an English traveller. The flora is almost entirely English. The banks skirting the roads which wind through the forests are carpeted with the wild strawberry, and the open glades which run into the woods abound with the wild raspberry; the thin soil on the steep sides of many of the hills is covered with the whortleberry; the weeds and wild flowers of the fields also are those which are commonly met with in England; violets and daisies, pansies and spurge, primroses and oxlips, forget-me-nots and speedwells, orchises of all shades, and wild garlic, meadow saffron and the cuckoo flower, or ragged robin. The hedges are powdered with honeysuckle and the clematis, and fringed with yellow broom, with bramble bushes, dog roses, and the white and blackthorn. Trees, indeed, that are comparatively rare in England are met with in profusion in Servia. The wild pear and cherry, the plum, and the apple, may be seen in great numbers in the woods; the acacia and laburnum are met with by the sides of the roads, and lilacs abound on all the hill sides.—*Quarterly Review.*

Abnormal Larch Cones.—As a field-naturalist I have ever been fond of a ramble in the larch plantation. In winter the ground beneath is strewn with curious mosses and fungi, while in spring the delicious odour—

"As the larch hath hung all its tassels forth,"

exhaled, not only by the larch buds, but by occasional violets and primroses, gives the seclusion of the grove a perpetual charm.



But we would now direct attention to the subject of our engraving, which are some larch cones of a previous year, developed into branches, which may soon be seen budding into leaves, and growing like other branchlets on the tree. With regard to these curious productions, we may conclude that according to the theory of arrested development, the original cone was formed from the elements of a branch or twig, which after the cone was formed got a new impetus of growth, and developed the branch at the termination of the cone. In this cone, then, we may view the whole of the multiple flower of the larch as so many whorls of modified leaves, which, being no longer arrested, have resulted in the elongation of the whole into an abnormal branch, with all the elements of a fruit and branch united. This sometimes occurs with other coniferæ, more particularly the spruce, but in the latter it is seldom that the branch is so thoroughly perforated.—*J. B.*

Broom-rape in a Strange Place.—I have found the lesser broom-rape (*Orobanche minor*), a curious parasitical plant, with purple stem and light-brown flowers, on many of the walls of the castles of Wales and Monmouthshire, which seems a curious habitat for it, since it is supposed to grow only on the roots of other plants, as the clover, &c.; and as its seeds are not winged, it seems difficult to account for its location there. I gathered this plant on the top of Martin's Tower, Chepstowe Castle, in 1839. —*Edwin Lees.*

Truffles.—Truffles are found in several parts of the South Downs. The only ones I have eaten were grown at Lord Gage's, at Firle Place. His lordship informed me he had never found them except under the shade of beech-trees in his park. They are also found in Stanmer Park, and in the beech-woods of West Sussex. They are usually hunted by dogs, which so much affect this delicacy that they can only be bribed into giving it up to the hunter by a bit of raw meat. In Cartwright's "History of the Rape of Bramber," 1830, p. 73, is the following statement:—"The beech-woods in this parish (Patching) are very productive of the truffle. About forty years ago (*circa* 1790), Wm. Leach came from the West Indies with some dogs accustomed to hunt for truffles, and proceeding along the coast from the Land's End to the mouth of the Thames, determined to fix on the spot where he found them most abundant. He took four years to try the experiment, and at length settled in this parish, where he carried on the business of truffle-hunter till his death." Pigs are occasionally used for truffle-hunting.—*Mark Antony Lower,* in *Notes and Queries.*

The Walnut (*Juglans regia*).—In the south of England the walnut is a very common tree, not only in pleasure-grounds and gardens, but by the wayside in retired villages, as at Tickenham, Somersetshire, and ripens its dainty fruit every year freely and abundantly. In the north it is rather rare, and found chiefly near old halls, and other residences of note, and the fruit cannot be depended upon. Raised from seed, it begins to bear at ten years old, and every year, as it approaches maturity, it increases in productiveness. The tap-root is unusually strong, and gives the tree a powerful anchorage, so that it is less liable to be torn up by tempests than any other. There is good reason to believe that this tree has been in England since the time of the Romans, from whom it received the name of *Juglans,* or Jupiter's nut, in contradistinction to acorns and beechmast. — *Grindon's British and Garden Botany.*

Reproduction in Ferns.—In ferns and their allies the result of germination is the production of a cellular expansion of various forms, whether globose or scale-like or irregular, whether more or less differentiated and distinct from the spore itself, or confluent with it externally or internally or both, on which or within the substance of which, at least in the more normal cases, two organs are produced of different sexes, the one of which, called an "archegonium," consists of a pitcher-shaped cyst, within which there is a single free cell at the base, which is destined, after impregnation, to produce, first an embryo, and then, by continued development, a perfect plant like the parent; which either once only, or annually through a shorter or longer succession of years, gives rise to fruit, consisting of a sporangium filled with spores, destined after germination to go through the same circle of phenomena. In some cases two different kinds of spores are produced, one of which gives rise to the male, the other to the female organs. — *Berkeley's Handbook of British Mosses.*

MICROSCOPY.

An Economic Condenser.—The outline figures below are given at the request of an amateur-microscopist, and represent a cheap condenser, which he has constructed for his own use, and now publishes in the hope that it may be useful to others. Having seen his own instrument, with the condenser, in operation, we were so well satisfied with the results, as willingly to accord him space for his explanation. The woodcuts are executed from drawings sent to us with the accompanying particulars :—

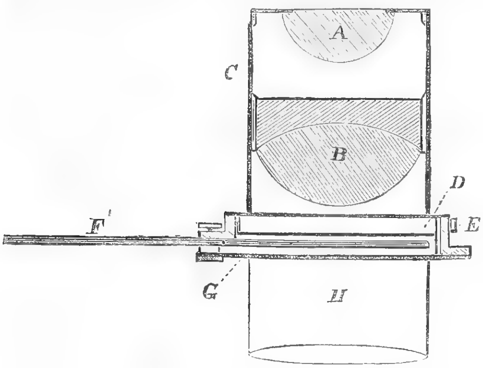


Fig. 1.—A, spot-lens, about $\frac{1}{2}$-inch focus. B, achromatic spot-lens, about $1\frac{1}{4}$ inch focus, placed at about the same distance as in a Kelner eyepiece, in a tube C, screwed in a flat ring of metal D, which is supported on a flat plate G, secured by a holdfast E, allowing room between for a diaphragm F, to revolve freely on its axis, which is done by a screw passing through a holdfast into the plate G. H is a tube $\frac{3}{4}$-inch long for carrying polariscope.

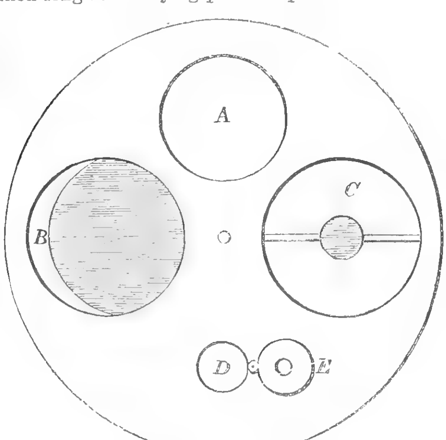


Fig. 2.—Diaphragm. A, for direct light. B, fro difficult test-objects. C, dark-ground illuminator. D, small aperture, with shutter E, having a small hole in it. The features presented by this condenser are,—that it is applicable for both high and low powers, can be used by merely sliding it into a tube under the stage, and never need be removed except for cleaning." He adds, "it would never make any pecuniary difference to me whether this condenser be used or not. All I have done is for the benefit of any amateur microscopist like myself who, wishing for a reasonably-priced condenser, can gratify that wish."—*J. Webster.*

What will $\frac{1}{50}$th Objective do?—Particles too small to be discerned by a sixteenth are well seen by a twenty-fifth or fiftieth, and particles too transparent to be observed by the twenty-fifth are distinctly demonstrated by the fiftieth, and Dr. Beale suggests that the further careful study, by the aid of these high powers of the development and increase of some of the lowest organisms, and the movements which have been seen to occur in connection with certain forms of living matter will lead to most valuable results bearing upon the much-debated question of *vital actions.* Another very great advantage resulting from the use of the highest powers occurs in minute investigations upon delicate structures which occupy different planes, as is the case in many nervous organs. In studying the distribution of the nerves in some of the peripheral organs of vertebrate animals, very fine fibres can be followed as they lie upon different planes. The most delicate constituent nerve-fibres of the plexus in the summit of the papilla of the frog's tongue can be readily traced by the aid of this power. The finest nerve-fibres thus rendered visible are so thin, that in a drawing they would be represented by fine single lines. Near the summit of the papilla there is a very intricate interlacement of nerve-fibres, which, although scarcely brought out by the twenty-fifth, is very clearly demonstrated by this power. In this object the definition of the fibres, as they ramify in various planes one behind another, is remarkable; and the flat appearance of the specimen as seen by the twenty-fifth gives place to that of considerable depth of tissue and perspective. The finest nerve-fibres in the cornea and in certain forms of connective tissue are beautifully brought out, and their relation to the delicate processes from the connective-tissue corpuscles more satisfactorily demonstrated than with the twenty-fifth.—*The Reader.*

Micro-Photographs.—At the meeting of the Microscopical Society, March 8th, an interesting collection of dissolving views was exhibited by the kindness of Mr. James How, of Foster-lane, by means of slides prepared by Dr. Maddox. The forms of some diatoms when thrown upon the screen measured over twelve feet in diameter; a section of echinus spine nine feet; a scale of a hawkmoth seven feet; and the blood discs of a newt from two to three feet long, every object being as sharp as a painting.

GEOLOGY.

A Coal's Account of Itself.—"I cannot exactly remember," he went on to say, "how I was formed, except from tradition; but as the members of our family (and it is a very large one, for I have relations in Staffordshire, Lancashire, South Wales, Newcastle, Scotland, and indeed in most parts of the country) are pretty well agreed upon the point, I may take it for granted that the account is tolerably correct. You will scarcely believe me when I tell you that the ancestors of myself, and all my kith and kin, were trees—nothing more nor less than stems and leaves, which the rays of the sun had ripened and made green; and it almost makes me believe in the doctrine of metempsychosis, to find myself giving out that heat which the rays of the sun stored up in the leaves of my forefathers—so much so, that a celebrated engineer, George Stephenson by name, actually called us 'bottled sunshine.' If you don't believe it, examine me closely through a microscope when I have finished giving out my heat and become a cinder, and you will find, by treating me with nitric acid in a particular way, not only the structure of the tree, but will also be able to tell from what particular class of tree I descended."—*Once a Week.*

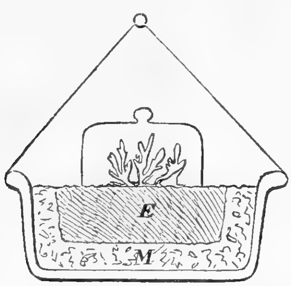
The Manufacture of Fossils.—At a meeting of the Manchester Geological Society Mr. J. Plant called the attention of the meeting to a serious fraud that had been going on for some time among excavators at the Macclesfield New Cemetery. The excavations had been made in gravels that belonged to the drift, and a number of fragments of shells belonging to a recent period, and occasionally a few nearly perfect, had been found by the workmen, and these had fallen into the hands of gentlemen interested in the geology of the locality. Encouraged by the pecuniary results of their discoveries some of the workmen had supplied spurious shells, obtained from their friends at Liverpool, Southport, or Ireland, and they had even robbed rookeries and garden plots that contained shellwork. The shells so obtained were subjected to the action of fire or acid, to deprive them of their epidermis, and to bring out a thin coating of white lime; to give them a true drift character they were afterwards shaken in a basket of gravel, and had imparted to them the necessary red tinge. Having no knowledge of species, some of the workmen had operated on West Indian and African shells, specimens of which Mr. Plant produced. But the most audacious fraud that they had attempted was the manufacture of a fossil. They had very cleverly set a *mactra* (*stultorum*) in a piece of Ketton oolite. The shell, which had the peculiar pink tinge of the species, was so cleverly cemented with the oolite that even an ordinary geologist might have been deceived. One of the workmen had said to a gentleman writing to Mr. Plant "that they had made a good thing of it. They had deceived the museums of London, Manchester, and Liverpool, and there had been a fine set of people asking them for the shells." Such a dispersion might lead to very erroneous deductions as to the origin of the diluvial drift of Macclesfield, and he (Mr. Plant) thought it right to mention the fraud to the society, so that it might be exposed.—*Manchester Guardian.*

Stanner Rocks.—I see a note in your last number respecting the capture of a female badger and her cubs at *Stanner Rocks*, near Kington, Herefordshire. Some of the students and lovers of nature who take Science Gossip may be glad to know that Stanner Rocks and the immediate neighbourhood possess peculiar interest for the naturalist. Stanner Rocks lie within a pleasant walk of the little country town of Kington, on the borders of Radnorshire, now easily reached by railway from Hereford or Leominster. They are very striking from the bold, rocky appearance they assume among the rounded hills of Hergest ridge and Bradnor-hill which flank them. They are, in fact, the north-eastern extremity of masses of volcanic rocks, which in Worsel Wood, Hunter Hill, and Old Radnor Hill, are emptied in this district though the lower Wenlock, or Woolhope limestone, which is altered and metamorphosed into a crystalline, amorphous mass, well worthy of observation. The volcanic rock of Stanner is a particularly hard, dark, hypersthenic rock; and Sir R. Murchison, who described this ancient lava in his "Silurian System," five-and-twenty years ago, remarked that it resembled the hypersthenic Trap of Cornish, in the Isle of Skye. Before the submergence of by far the greater part of England during the glacial period, the volcanic rocks of Stanner, Hanter-hill, Worsel-wood, and Old Radnor were, no doubt, connected. The valleys and hollows between were evidently eroded and scooped out during that period, as large masses of this peculiar rock are scattered over the different hills to the north-east and north of the district, and portions are found in the drift that lies along the slopes of old red sandstone near Lyonshall, and other localities. The botany of Stanner-rocks is almost as interesting as the geology. When I was last there, two summers ago in the month of June, the rocks were purple with that rare and local plant *Lychnis viscaria* and the *Geranium sanguineum*, which grows nowhere else in the Kington district. I also gathered that very rare plant, *Scleranthus perennis*, which I believe only grows in two or three localities in Great Britain. A friend, who accompanied me, took several good beetles; and what with scenery, rocks, geology, botany, and entomology, we passed two very happy days among the old volcanic rocks of Stanner.—*W. S. S.*

WINDOW GARDENS AND AQUARIA.

Plants in the Aquarium.—Mr. Shirley Hibberd says that in a large aquarium now in his possession he has never introduced an aquatic plant of any description, and has found, as the saying is, "their room better than their company." He used large blocks of coke for rockwork, which, in course of time, became covered with a microscopic green vegetation, which he has found quite a sufficient oxygen generator. His aquarium was placed in a well-lighted hall, but he found that an excess of light caused a too plentiful supply of the vegetation, therefore he drew down the blind, and it has since kept within bounds, the amount of light regulating the amount of vegetation.

Killarney Fern.—It may not be generally known that there is no fern so suitable to a room and so easily managed as the Killarney fern (*Trichomanes radicans*), formerly considered so difficult to propagate, and it may not be altogether uninteresting to some of your readers to hear of an easy way to have such an ornamental favourite growing even in their bedrooms. My plan has been to plant the fern in a suitable mixture of fibrous bog-mould and sand (E) on potsherds broken very small, with *thorough* drainage in an ornamental pottery vase. Instead, however, of filling the whole vase with soil, I leave a margin of two inches or so between the soil and the inside of the vase.



This margin should be filled up all round and to the full depth of the vase with moss, cocoa-nut fibre, and broken potsherds or porous stone (M). The glass used should cover only the fern and the soil immediately round its roots, and need seldom be moved, all necessary moisture being supplied through the moss, &c., which should be kept constantly wet. *Todea pellucida* flourishes under the same treatment, and is equally handsome. I subjoin a sketch of a vase such as I have used.—*H. A.*

Moss Culture.—The cultivation of mosses may be effected by lifting with a little care, towards the end of the season, a good tuft of the species it is desired to grow, and putting in a medium sized flower-pot. A greater proportion of the drainage should be given than for other plants, and the tuft should be placed in immediate connection with such material as most nearly resembles that on which the moss grows naturally. If a trial be made of such as grow on rocks, shores, or branches of trees, and some of these succeed very well, they should be for a time secured to these by a piece of string or some other contrivance. Those which like moisture, such as *Bartramia fontana*, *Hypnum cordifolium*, and *Dicranum squarrosum*, should have the pots placed in saucers filled constantly with water, by which means they are supplied regularly with moisture. A cold frame or shaded shelf of a cool greenhouse does very well for them to stand in while in a growing state, and at this season such should each day have a watering with a fine-rosed can, regulating the supply according to the degree of moisture in the surrounding atmosphere. During summer, which is a period of repose to most species, and when they are cast into the shade by the more brilliant tints of flowering plants, the pots may be placed under any shaded wall, taking the weather as it comes. The only precaution necessary at this time is to cover the assemblage of pots with some garden netting to prevent the birds picking up the tufts, which they are very ready to do in search of insects and worms.—*Robert M. Stark.*

An Economic Aquarium.—Any vessel that will hold water may be converted into an aquarium. Opaque vessels have many disadvantages, and something made of glass is preferred. The most ready and economic glass vessels are hand-glasses or propagating glasses, such as are employed by gardeners. These can be had of various sizes, and when inverted, with the mouth upwards, may be placed on a stand of turned wood, which forms a base or pedestal, and may now be purchased often at the same shop as the propagating glass. There is no difficulty in obtaining such glasses in almost any locality in London, and probably in the majority of our large towns. Having got your glass home, cover the bottom for an inch or two in depth, according to its size, with clean river sand. This is the soil required for your plants, that is, if your plants are such as require soil at all. Set your plants, cover the sand all over with a layer of small pebbles for another inch in depth, and then add the water, pipe water, cistern water, river water, rain water, or, if it must be, *pump* water. The latter is least to be recommended. Add the water gently. Let it trickle down the side of the vessel so as not to disturb the soil at the bottom, and at the same time become aerated. The glass being filled as high as you desire, let it rest until your plants are settled and promise growth, when you may commence stocking it with animal life. What plants? what animals? We will study to answer on a future occasion.

FISH TATTLE.

Eels and Fish Garbage.—Eels are particularly fond of the offal of either mackerel, herrings, or pilchards, and, by the aid of the oil as a clue, will follow up-stream for a considerable distance, even to the very hand of the person cleaning the fish. I recollect one instance in particular, where the offal was actually dragged from the hands of an individual cleaning mackerel one evening in a Devonshire brook; and on another occasion, in Looe harbour, in Cornwall, I was much amused in watching the actions of the eels, flounders, and crabs, contending for the possession of pilchard heads, &c., I had thrown overboard. The eels and flounders would dispute for the prize, but the crabs had it nearly all their own way, and it was evident that both eels and flounders held their pincers in great respect, and were quite aware that the crabs were fully clad in their suits of armour, without which they do not venture far from some secure hiding-place, for flounders and eels in tide-rivers prefer them to all other food when they have cast their shell. On the occasion above-mentioned, by placing some pilchard offal in a shrimp-net, I took an eel rather over a pound weight.—*J. C., in the "Field."*

Observations on the Common Eel.—In the river Avon, at Guy's Cliffe, near Warwick, there are two distinct sorts, so far as appearance goes: the black-skinned with white belly, and the olive-green with white belly. Both are about the same size, varying from $1\frac{1}{4}$ to $4\frac{1}{2}$ lbs. The best bait to catch them with, during the summer-months, is the large red worm, known by the name of the maiden dew-worm, which is plentiful on turf-land. They only come out of the turf after dark of a summer-night, when the dew is on it. Then, as to the question, "Do eels come out on to the turf-land to feed on the dew-worm?" I should say—and so would many other eel-fishers that I have spoken to on the subject—"Yes, I think so, though I have never seen one out." But I can say for a certainty that, if an eel is caught on a night-line and taken out of the water at day-break, when the dew is on the grass, and set at liberty, it is perfectly capable of getting about the grass, quite as fast as a duck can walk, and always makes towards the water. I have frequently noticed that the best place to set an eel-line at night, in summer-time, is in shallow water, and about a yard from the bank-side, which shows that the eel comes to the edge of the water to feed, if it does not go out of it. During the winter-months, the eel is supposed to bury itself in mud in deep water. To catch them in winter, the deepest and muddiest places are the best; the bait a small live roach.—*Stephen Long.*

NOTES AND QUERIES.

Why did the Bees go?—A lady, living near here, who kept bees, found one day this month that all the bees of one hive had flown away leaving the honey of their winter store, and only two dead bees could be found. Can any of your readers tell me the cause of this?—*E. W., Rugby.*

Mounting Polyzoa.—Your correspondent may insure success by adopting a very simple plan, viz., dipping the specimens, during life, into fresh water. Of course care must be taken that the tentacula are exposed at the moment of immersion (this can be easily ascertained under the microscope), and that the immersion be quite sudden. I have specimens mounted last July, in which the tentacula are in every stage of expansion. They are mounted in "Brunswick black" cells, in a medium of distilled water, in which a few drops of creosote have been placed, and then filtered. Nothing can exceed the beauty of the expanded tentacula, each separate thread retaining its original form and position. This is particularly interesting in the case of the Ctenostomatous polyzoa, in which the "invertile" nature of the crown, from which the tentacula spring, is well shown. The Avicularia are also fixed by the fresh water in the position in which the "beak" chances to be at the moment of death, whether entirely or partially raised. The vibracula, on the contrary, are, I think, always pressed close to the stem of the polyzoon. I have never succeeded well with the less highly developed polypi. Their tentacula appear to be of a more perishable nature, and soon fall into an undistinguishable mass.—*W. W. Spicer.*

Skylark's Song in January.—Several correspondents write to inform us of the skylark singing in January, so that it must be said of it that it sings "all the year round."

Woodlark Wanted.—An anatomist pursuing his researches on the structure of British birds, requires a specimen of the woodlark, dead, but fresh enough to dissect. Any correspondent able and willing to aid him should apply to us for the address. He will be repaid any incidental expenses.

Fly Parasites.—In answer to J. L. E., I should think it very probable that the baggy protuberances he refers to were the parasite, so common to the dung beetle, and also found on humble bees, as some time ago I caught a fly covered with them.—*E. B.*

Infusorial Earths (Tripoli).—I have tried several examples obtained at the chemists', but can make nothing of it. I should be glad of a little genuine, and also the *modus operandi* of preparing for the microscope.—*T. R.*

Death among Young Ferns.—I am interested and practically engaged in the propagation of ferns by spores, but have had the mortification of seeing hundreds of my young plants die before the first frond had budded out. The cause of death appears to have been a fungus growth, which makes its appearance first on the edges of the pots in small round spots, and gradually becomes deposited also on the ferns in *very minute* spots resembling the mealy matter formed on the under surface of the gold and silver ferns. Can you, or any of your correspondents, inform me the best mode of preventing the appearance of these, and of treating the plants which have been attacked?—*W. Ormerod.*

A Question for Ornithologists.—Is there any distinguishable feature in the male young of kites, ravens, or magpies at an early age, so that anyone wishing to rear a male bird might be able to select one without rearing the whole nestlings for the plumage to determine? If the males can be scientifically defined, it would save a deal of trouble to many.—*Ross.*

Snake-Stones.—We have received several communications, but do not think it prudent to occupy more space with this subject; especially as they contain no facts which have not already been published in "The Zoologist," p. 6,983, and Gosse's "Romance of Natural History."—*Ed. Sc. G.*

Cleaning Echinus Spines.—Our correspondent (T. K.) says that in rubbing down sections of the spines, by whatever mode it is done, the numerous cells accumulate foreign matters to a considerable extent, and that no one has yet suggested a method by which these sections can be made perfectly clean. Methods applicable to bone and other equally hard substances, are not necessarily successful in this instance.

Fossil Shell.—(In reply to Mrs. D.) The fossil forwarded for identification, obtained from the railway-cutting near Evesham, is *Rhynchonella tetrahedra,* Sowerby, one of the most characteristic fossils of the zone of *Ammonites margitatus,* or the marlstone of the middle lias.—*R. T.*

Toads in Town.—Can you or any of your readers inform me whether toads inhabit London houses? To-day, March 8th, my servant found a full-sized toad in an underground and somewhat damp apartment of my house; and he informs me that he found a smaller one in the same place some months ago. If the toad is an indigenous citizen, on what does he subsist? Is he in any way injurious? Where are the ova deposited?—*A. R.*

Garnets.—(In reply to W. M. F. P.)—Garnets occur abundantly in mica slate, hornblende, slate, and gneiss; somewhat less frequently in granite and granular limestone; sometimes in serpentine and lava.

A Fern Query.—Can you, or any of your readers, explain to me *why* it is that if a frond of fern is placed in mould for the purpose of rearing seedlings, the young plants produced are *not* invariably of the same description as the parent frond. Such is my experience, and that of other fern-fanciers who have spoken to me on the subject.—*H. J. D.*

Circulation in the Cosmarium.—In last October I examined some specimens of the *Cosmarium,* and was rather surprised to observe a brisk movement of particles going on between the two lobes of the plant, very similar to the circulation in the ends of *Closterium lunata,* only the movement seemed quicker, and the particles much more numerous and a little larger. I referred to "Carpenter," and other books on Microscopy, but have not yet found anything about any movement seen in the *Cosmarium.* I have often seen this since, and in all cases the endochrome has been contracted towards the centre of the lobes, leaving a transparent space between them, in which the circulation took place. I shall be glad to hear whether this has been seen before, or if I may claim the honour of this discovery.—*W. H. Holland.*—[Our correspondent should have referred to the "Micrographical Dictionary," p. 186, and read as follows:—"A peculiar swarming motion is observable at times in the cell contents of this genus, different from the circulation in *Closterium.*"—*Ed. Sc. G.*]

Black Cement for Rock-work.—I bought at Covent Garden market a short time since a piece of imitation rock-work made of cinders. I noticed each piece was joined together with a black *cement.* Can you, or any of your obliging correspondents, tell me how it is made, or where it can be purchased?—*Leicester.*

Curious Dietetic Phenomenon.—It is a common custom in the north of Ireland for farmers, whose holdings do not admit of their keeping two horses, to mutually assist by lending to each other alternately, one having the use of his own and his neighbour's horse on one day, while his neighbour has both on the next. If, before leaving home, one farmer gives his horse a feed of whins (*Ulex Europæus*), which when pounded or beaten is a common article of fodder, while the other feeds his horse on hay or oats, when the horses are put into the plough, the one that has been fed on the hay or corn becomes quite sick, and only recovers when his fellow is removed from him, or the effects of his meal pass off. Can any of your readers offer any explanation of this fact?—*R.*

Mounting Polyzoa.—In reply to a correspondent, as to the possibility of preparing specimens of the fresh-water polyzoa, or indeed any of the marine zoophytes, with the tentacula expanded, as permanent objects for the microscope, I have found the following method, though not uniformly satisfactory, being sometimes rather uncertain in its results; yet with patience, and by operating upon a number of slides at the same time, may give, in six cases out of twelve, all that can be desired. First, of the fresh-water species, say *Lophopus;* a portion should be placed in a cell—I prefer those formed by grinding out a basin in the slip of glass with a drop of water, and covered with thin glass; in a few minutes this magnificent creature will expand its glorious horseshoe-shaped head of tentacula, quivering with ciliary action; then, while it is under the microscope, allow a drop of pure alcohol to run under the cover into the cell; it instantly causes death, and generally with the tentacula extended; in many cases excessively so. The cell can then be cemented with Brunswick black. But the greater certainty of success is with the marine species, in consequence of the support given by the polypidom. *Coryne,* for instance, treated with alcohol while in a living state, as I have described, makes a beautiful permanent object, and illuminated with a parabaloid or spotted lens, scarcely inferior to when in its living state. Entromostraca, mounted with alcohol in a similar way, scarcely ever fail.—*E. D., Crouch End.*

A Dainty Salamander.—"*Dytiscus Marginalis*" should tempt his pet friend with a fine fat slug. I think it very likely that he finds food to his taste in the moss with which his prison-house is filled, and that he has not absolutely fasted for six months. Insects and slugs are possibly in the habit of visiting the moss-cup. Indeed, I should not be at all astonished to hear that he has been sleeping half the time, after the fashion of some of his order, the *Bufoidæ* family. Tritons have, I understand, a trick of swallowing their own skin; perchance Mr. Salamander has dined on his cast-off suit of clothes, and found them indigestible; or may be he took a fancy to a few young relatives in their tadpole state, and, repenting himself of such a cannibalish trick, is now fasting by way of penance. Aquatic insects and larvæ are his natural food, but I think he indulges in the freaks above described at times.—*H. W.*

The Sandpiper.—In answer to the question, Does the sandpiper dive when wounded? I can say it does. One evening, in January last, I was out wild-duck shooting on some flooded meadows at Guy's Cliffe, Warwick, and just at the edge of dusk I saw a green sandpiper come flying past where I was standing. I shot at it, and wounded it. It dropped on the water, and lay for, perhaps, half a minute—then recovered itself a little, and instantly dived out of sight. But it was so fatally wounded that it came to the top again and died on the water. I have had the bird stuffed, as it is a very pretty one, and quite rare in these parts. A few days before the sandpiper was shot, the keeper at Guy's Cliffe shot, in the same flooded meadow, a pair of dun-birds, or pochards, as they are sometimes called. They are something of the duck species, and very rare birds in this part of the country.—*S. Long, Guy's Cliffe, Warwick.*

Preservative Power of Ferns.—In this article the writer inquires, Is it due to an essential oil? Probably it is, at least as regards the male fern (*Lastrea filix mas*). When an ethereal tincture of male fern is submitted to distillation the distillate smells of the fern, and there is left behind in the retort an oleo-resinous extract, which also has a well-marked odour of the fern. From this it seems that the preservative power is due to the volatile oil and the resin, both which are inimical to insects.—*A. J. R.*

Eels (Migratory).—The eel is a fresh-water fish in reality, but it will migrate in the autumn towards the sea, if it can by any possibility get into rivers communicating with it, and as it can live for a time out of water, provided its gill apertures are *kept moist*, "O. O." may continually meet with specimens of the *Murænidæ* tribe "wriggling through the *dewy* grass to the nearest water-course." Eels bury themselves in the mud during the winter, and return in the spring up the rivers, together with their young fry. I believe some persons say that eels go out by night on a sort of poaching expedition in pursuit of frogs and slugs; but I always fancied that, when so met, they were on their travels from "stagnant pond" to purer quarters.—*H. Watney.*

Hedgehog among the Strawberries.—In your March number the tortoise was mentioned as being fond of strawberries. We had, in our garden at Worthing, a hedgehog who displayed the same taste. Not, indeed, for *eating* the strawberries, so far as we are aware, but for *gathering* them, both green and ripe, and piling them in little pyramidal heaps; thus causing more waste than the slugs, from the depredations of which we expected him to defend us. Are hedgehogs accustomed to feed upon fruit as well as upon animal food?—*H. J. D.*

Adjustments.—Will you give me a little information respecting what is termed "adjustments" to the object-glasses of the microscope, as, being about to purchase a 1-inch and ¼-inch object-glasses, I desire to know the advantage gained by the additional expense?—*T. L.*—(The adjustment is a contrivance by means of which the aberrations caused by the varying thickness of the glass covers are overcome, and is necessary for object-glasses of ¼-inch, or higher powers, only.)—*W. M. B.*

Can any of your readers inform me if they have ever met with the *Gonium pectorale* in water collected from streams, ponds, or ditches, for microscopic examination, and if so, under what conditions?—*J. J. R.*

Dragon-Flies.—"A young entomologist" asks what is the best method of preserving the colour of dragon-flies?—If taken as soon as they emerge, and before having eaten anything, their colours will remain bright. If this cannot be insured, the body must be slit longitudinally on the underside, and the contents removed, a small roll of blotting-paper inserted, and the skin closed over it. Finally, the insects must be dried as speedily as possible: a *little* artificial heat is desirable, but not too much, or they will become shrivelled.—*F. M.*

Food of Salamander (see page 71).—Salamanders do not live *in* water, nor *on* water, but in the neighbourhood of water. Keep the reptile in a good large fern-case, so arranged that he can get out of sight under the rocks; he will appear every now and then, during the summer, when he will take a good piece of raw beef with a wide-mouthed snap, handed to him on the point of a stick, and be thankful for it. In winter he will quietly sleep for months, awaking in the genial spring, and, reappearing for his food, relish it with an appetite.—*Charles Strange.*

Rosy Feather Star.—I spent some weeks, last summer (1864), at Dinard, a charming little watering-place near S. Malo. In the month of July I had the satisfaction of finding no less than five or six specimens of the young form of *Comatula rosacea* long known as *Pentacrinus Europæus.* They were all attached to *Corallina officinalis,* and were washed ashore, with the exception of one which was growing on a rock at about low-water mark. It was exceedingly interesting to watch them under the microscope, waving their long arms slowly to and fro, probably just as their gigantic relatives, the encrinites, did thousands of years ago! I saw two of them detach themselves from the stem. The animals made no effort to swim, but sank to the bottom of the glass, where they made feeble but vain efforts to move, as the smooth surface of the glass afforded no hold to the extremity of their arms, which exactly resembles a bird's-claw. Will any reader say where this form of comatula has been found on the English coast? Is it rare? It was first seen by Mr. J. Thompson in the Cave of Cork, in the year 1823.—*W. W. S.* [In Forbes's "British Star Fishes," it is said to be found on many parts of the British coast, Penzance, Milford Haven, west coast of Scotland, and near Dublin, at Cork, and on the shores of Antrim and Down.—*Ed. Sc. G.*

Wanted—A Diatom!—Could any of your correspondents supply me with a little material containing the diatom *Eupodiscus Argus?* In return I shall be glad to give either Richmond or Nova Scotia diatomaceous earth, Upper Peruvian guano, or soundings from China seas.—*W. J. B.*

What are the Fish about?—In a fresh-water aquarium I possess, I have very frequently noticed the fishes working with their mouths at the glass sides. Is this owing to attractive microscopic matter collected there, or because air-bells are generally so plentifully on the sides, or are they only in search of a way out? I have observed this so very often that I should much like an explanation of it.—*Z. Y. X.*

Bite of Viper.—Would you have the kindness to inform me whether any danger would arise from a wound by the fang of the viper (*Pelias berus*) twenty-four hours after its death?—*W. B. D.*

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.

Carbonile.—For information respecting this E. G. must apply to the inventors, Messrs. Glover and Sons, Ranelagh-road, Pimlico, S.W.

M. X.—We are not aware that any of the lectures you name have been published.

Asterosporium Hoffmanni. — Having obtained other specimens, and distributed them, we hope that now every one who was previously disappointed has been supplied.

T. O. B.—We fear that, practically, we could not carry out your suggestion in a periodical.

J. W. (Amlwch).—Procure the "Manual of Structural Botany," Hardwicke, 1s. 6d.; and Oliver and Henslow's "Botany," about 5s.

F. M. H.—It is a dung beetle (*Geotrupes puncticollis*, Steph.). This will suggest the reason for your being unsuccessful.

R. S. B.—It is quite a matter of taste. Look at the insects in the British Museum.

V. P.—Keep camphor, or some turpentine on a sponge, with your skins.

H. G.—Westwood's "Introduction to Entomology," 2 vols., about 14s., and Stephen's "Manual of Beetles," 7s.; second-hand, at Mr. Wheldon's, 58, Great Queen-street, London.

F. W.—Is referred to page 24, whence he will learn that *lists* and *tables* are inadmissible.

C. A. J.—The excrescences are produced by a dipterous insect; no one would venture to say what species without seeing it.

T. C.—(1.) Some emerge, others become victims, the majority hybernate. (2.) Look for the two crowns. (3.) Yes. (4.) Doubtless, the snails.

A. Z.—Queries which, with their replies, are only likely to interest the querist, can only be answered briefly here.

Curator.—Asphalte is the best cement for ordinary cells, and is easily manipulated with the aid of Shadbolt's whirling table. The thin glass cover is easily secured with the same cement.—*W. M. B.*

J. F. C.—Consult Dr. Hassall's "Food and its Adulterations."—The brown scale frequently seen on the rinds of oranges is the shield of a coccus or scale insect. An interesting paper, with illustrations, on this subject, by Mr. Richard Beck, will be found in the Transactions of the Microscopic Society of London, vol. ix., new series, page 47.—*W. M. B.*

A. S. (*Glasgow*).—Forward your address, and the names of your mosses shall be sent. We cannot afford space for so long a series.

W. S. K.—The cost of a camera lucida is from one to two guineas; a very good substitute may be had of some opticians for five shillings; of a Coddington lens from five shillings.

W. M. F. P.—Fossils and minerals may be purchased at any of the following shops in London; we can say nothing of the relative prices:—Tennant, 149, Strand; Calvert, 189, Strand; Wright, 36, Great Russell-street.

J. N.—A very common trick with some birds.

Declined.—J. E.—J. B. P.—F. T.—C. O. G. N.

Popular Names.—C. A.—C. W. W.—F. M. H.

Communications Received.—R. P. B.—E. S.—J. W.—G. R. B.—Ross.—W. W. S.—F. R. M.—I. B. (In the present No.)—C. S.—A. J. R.—A. I.—J. A.—E. M. H.—W. L.—H. D. C.—D. R. R.—H. W.—Sportsman (must be guaranteed by the name and address of the writer).—T. P. D.—W. J. B.—E. J. P. (certainly not).—E. D.—J. A.—W. O. (Bristol).—J. H. S. (yes, if suitable).—Z. Y. X.—C. A.—W. E. S. W.—H. M. G.—W. R. T.—A Wykehamist (no name).—F. S. T.—J. H.—W. W. K.—H. B.—E. W.—H. R.—F. R.—W. J.—and T. S. (we are not artists).—J. B.—H. U.—W. B. D.—A. H.—W. H. H.—F. L. N. S.—J. D. M.—J. M. L.—J. R. (Bognor).—F. W.—A. B.—V. P.—H. G.—A. R.—I. P.—W. H. B.—C. D. (rather common).—G. F. F. (we know of none).—D.—G. G.—E. W. (Rugby). E. M.—W. K. B.—F. B.—Old Stones.—E. B.—T. S.—G. B.—J. B.—F. E. W.—W. H. B.—F. W.—J. B.—F. B.—Leonora.—W. G.—A. R. S.—E. Jones.—J. J.—G. G. H.—Peter.—F. R. S.—W. S. K.—A. S.—M. P. B.—T. R.—R. S. B.—A. J. R.—J. G.—P. S. B.—R. H.—H. A.—R. Mc L.—W. M. B.—J. C.—J. G.—A. B. C.—J. T. C.—H. E. A.—J. A.—J. A. H.—F. P. P.—F. J. F.—W. G. S.—B.—F. M. H.—F. W.—P. B. St. J.—E. H. R.—J. W. C.—C. S. B.—R. S. B.—J. N.—J. C.—L. M. P.—J. W. (Amlwch).—A. B. F.—G. K.—T. O. B.—W. W. S.—M. P. W.—A Subscriber.—R. Bl.—P. G.—C. E.—H. W.—W. A.—W. E. D.—A. M.—E. B.—J. G.—W. H. G.

Books Received.—"On our Knowledge of the Causes of the Phenomena of Organic Nature, being six lectures by Professor Huxley." London: Hardwicke.—"Oswestry and Welshpool Naturalists' Field Club Report for 1857-1864." Oswestry: A. Roberts.—"Gleanings amongst the Irish Cryptogams," by B. Carrington, M.D., F.L.S.—"The Anatomy and Physiology of the Perforating Apparatus of Pholas Dactylus," by John Robertson. Brighton: W. Pearce.—"Observations on the Classification of the Genus Rosa," by M. A. Deseglise, reprinted from the *Naturalist*. Huddersfield: Wheatley & Co.—"The Stream of Life on our Globe," by J. L. Milton, M.R.C.S. London: Hardwicke.

HOW TO BEGIN.

"Nothing so difficult as a beginning,
Unless, perhaps, the end."—BYRON.

TO begin is always very puzzling, and the school-boy who essays to write his first letter home to his parents knows it full well. A well-informed and earnest supporter of our journal perhaps has a fact or two, interesting and new, which he is desirous of contributing to its pages, but he is lost in bewilderment at "How to begin." Another, equally earnest, is equally puzzled, because he is desirous of studying some branch of natural history, and, for the life of him, does not know "How to begin." It is for the especial benefit of the last-named individual that we have begun this chapter.

First of all, we are bound to assume that our neophyte is in *earnest*. This assumption being correct, all the rest is comparatively easy. If he is in earnest, a few disappointments will not discourage him, a few failures will not dishearten him, and a little work will not alarm him. If he *should* imagine that it is all as easy as "Gossip," he will soon become disappointed, disheartened, and alarmed. But to be earnest means a determination to succeed, and with such a determination none can fail. To begin well, he must have a clear conception of what he would wish to do. Never mind the ambition being a high one; the higher the aim, the more success he is likely to achieve. He should decide for himself to what his taste impels him, whether to the study of insects or plants, high life or low life, minute organisms, or only such as the unaided eye can take cognizance of. Then let him muse still further upon the subject, and select some well-defined group or section. If he has a leaning towards Insects, the field is a wide one; his time and means limited, and his subject must be limited likewise. There are butterflies and moths (*Lepidoptera*), beetles and ladybirds (*Coleoptera*), with sundry other *-opteras* and *-ipteras*, from which he may choose; but let him confine himself to one. We are continually being inquired of, "What is the best book for a beginner in the study of insects?" Our reply is, "Books are very good servants, but very bad masters." "Insects" is such an indefinite term in the way it is employed. To gain a general knowledge of the whole class is very useful, but that is evidently *not* what the querists intend. Therefore, for the future, let them make up their minds "where to begin," and begin at once. Suppose that the choice should fall upon beetles. Let the student immediately go out and find two or three of different kinds, and then come home and examine them for himself; see wherein they agree, and wherein they differ; spend the whole evening over them. We have spent many a pleasant evening over the examination of one minute portion of an insect, such as the tongue or foot of a fly; and felt at the close that we could spend another on the same object, and still leave something to learn. Books will necessarily have to be applied to for the technicalities of the science, for these must be mastered. There is no science without technicalities, as there is no trade or handicraft without them. We lately heard of a class of working-men who had devoted themselves during the evenings of a whole winter to the study of Botany without technicalities, and then found that they could not understand the Flora of their own county, or any other botanical work, and had to commence their elementary work over again. A good friend is a great help, if, having a knowledge of the subject, he is disposed to aid a beginner. There may be such a thing as *false* help, even though well meant. For example, to send a friend twenty or fifty specimens at a time, and persuade him to name them for you, is abusing the friend, and doing yourself an injury. The truest friendship on the part of such a friend would be to refuse. When the student trusts to himself, he will examine the object thoroughly; he will, of necessity, study the classification closely, review the characteristic features of allied genera and species, and through a train of logical and silent argument arrive, at length, at the wished-for goal. This may at first occupy much time, but gradually the time occupied in determining a species will be diminished, until ultimately it can be done with facility. If a friend names all but the most prominently marked and easily recognized species, he may do so a hundred times, and the student knows no better than before what are the features whereby one species may be truly known from its neighbour. An earnest student is no foe to work, and this kind of work will give him self-reliance. Whilst trusting to a friend or the Editor of Science Gossip to name his specimens "by the batch," he not only will fail in acquiring knowledge, but also reliance on his own work, whenever he attempts to name for himself.

"Take nothing for granted" is a good maxim for beginners. Take nothing for granted which you can verify for yourself. It may be so, or it may not. Investigate, examine, dissect, analyse, and do not rest until you have proved the point. It may consume time in the present, but will save time in the future. Study nature rather than books, and things rather than words. Observe trifles, for nothing is so trifling as to be without importance. Cultivate a habit of making notes of your observations. Keep up a good resolution, have faith in the future, and work earnestly in the present, and already you will have learnt "How to begin!"

LORD SCARABÆUS:

A STORY OF BEETLEDOM.

EGYPT is full of monuments of its grandeur and its weakness, and the astonished traveller who can spend days and weeks exploring its "chambers of imagery" still left amidst the stupendous ruins, is overwhelmed with the eloquence of the sermons

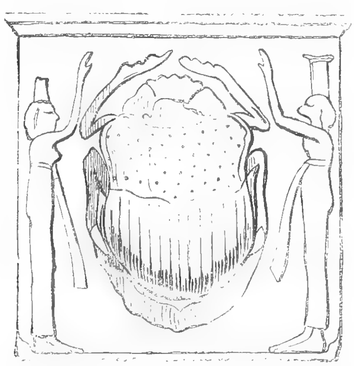


Fig. 62.—Sculptured Scarabæus, from Egypt.

in those mighty stones. The solitary column in the grand temple of Carnac, erect amidst a heap of ruins, is a touching emblem of the land "overshadowing with wings beyond the river of Ethiopia." In the beginning, probably a deeper and a holier meaning was attached to the mysteries of the worship of the Egyptians than in later times: the virtues and passions of the soul, and the actions and attributes of the Deity, were expressed by the figures of animals, plants, and other symbolical characters; but, ultimately, the meaning of these mysteries became obscure, and was lost. As an example of these symbols we may refer to that of the hawk, which, having the most piercing of eyes and the most rapid flight, served to express the divine intelligence and activity; and, placed on the highest branches of a pictured tree, signified that God was infinitely exalted above all matter. The winged globe, found by the modern traveller over nearly every temple door, encompassed with a serpent, signified the invisible unity of the Deity, without beginning or end; the serpent, the supreme wisdom; and the wings, that active spirit which animates and gives light to all; and these three qualities or attributes, united, still further indicated the Trinity, whom they worshipped as Osiris, Isis, and Orus. Amongst the symbols of the Deity which subsequently received divine honours, was the Scarabæus, or dung beetle, and a brief examination of a fine specimen recently brought over may not be uninteresting. It connects the present with the past history of these interesting people, and its portrait is precisely that which 3,000 years ago ornamented the walls of Egypt's palaces. It encloses its eggs

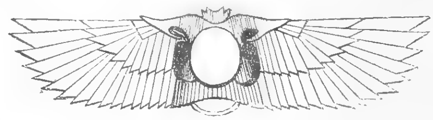


Fig. 63.—Winged Scarabæus, from an Egyptian ornament.

in a ball of excrement formed by a protracted rolling of the substance by means of its long hind legs; and although the insect measures 1½ to 2 inches in length, the dung pellet in most instances exceeds the size of the beetle. The head is flattened and truncated, and gave to the earlier Egyptians an idea of rays, as of the sun, whilst inability to distinguish between the sexes led to a conclusion that all were males; and this symbolised the exclusively masculine character of the Deity, whilst almost every part and action of the animal served to describe some property in nature or some attribute of the Creator. From a very old work upon natural history, written upwards of a hundred and fifty years ago, before the Entomological Society was born, or the modern microscope thought of, we make the following curious and fanciful extract respecting the object under consideration:—"The principal of all those animals, or that for which the *Egyptians* had most veneration, was the *beetle*, as well because of its wonderful birth or production, as from the analogy or resemblance this animal has with the sun, and the strange instinct in this creature to continue its own *species;* for when the male would produce, he seeks out the dung of an ox or bull, and having found it, he forms a round ball of the figure of the world, which, with his hind feet, he turns from *east* to *west*, and, turning himself towards the *east*, he imitates the motions of the world. Having thus rolled the ball, he puts it in the ground, and leaves it there twenty-eight days, which is the time that the *moon* passes through the signs of the zodiack, and during that time he hatches the little beetles in the ball; and the twenty-ninth day, which is the day of the conjunction of the moon with the sun, and the time productions are made in nature, this little animal rolls its ball into the water, where it opens, and the beetles get out. It is upon this account, some say, that it is made the emblem of *birth* and the *symbol* of fathers, because these insects have but one father, and no mother. They represent all the world, because of the ball which they form and turn round; and man, because there are none but male beetles. They are of several kinds, but those for which the *Egyptians* have the greatest veneration are such as have a head like a cat, accompanied with rays, which gives occasion to them to believe that these *animals* have some analogy to the sun; and the more because this insect has thirty little paws, made like fingers, which represent the thirty days that the sun makes each month in passing through the signs of the *zodiack*."

This description is so unique that little remains to be said. We need not remind our readers that it is rather a fanciful sketch, but the pictures and figures, of which we are promised photographs from the hitherto darkened tombs, by means of the new magnesium light, fully justify the poetical remarks we have quoted. In the burial-place of Ramesis VII. near Thebes was recently seen a gigantic scarabæus about three feet in height, standing erect on its huge hind legs, painted on the walls, while Ham, Noah's second son, the supposed founder of the kingdom, is drawing a red fluid, representing blood or life, from one of its *fore legs* (!), and is humbly prostrate during the operation. Here is the symbol of life-giving, which afterwards led to the animal's being worshipped as the source of existence. "I have frequently seen," says a friend, "huge figures of the beetle in the tombs of Egypt in the centre of an ark, having a god on either side as inferior attendants;" indeed, in later Egyptian times, so highly was this offensive insect admired that the honours of embalmment were bestowed upon it, and preserved specimens are to be seen at Thebes; whilst purely executed scarabæidæ upon rare stones are not unfrequently found in human mummy cases as having been buried with their owners. Like many of the other tribes of coleopterous insects, they possess extraordinary muscular power, and a large wine-glass recently placed over a living beetle soon found its way to the remote end of the table. The work of the insect is just that of an ordinary scavenger, subordinating its affection for its young to its work, and clearing away, in companies of several hundreds, camel or buffalo dung, and forming with the pellets a nidus for its eggs, as may be observed in this country with beetles of a less pretending character, but second cousins to our scarabæidean friend: standing on their fore-legs, their motto appears to be that which we earnestly recommend to our amateur friends in the study of natural history, "nil desperandum;" for the most untiring energy is displayed in rolling their dung-pellets, with their hind legs into a suitable locality for the preservation of their offspring. And another pretty lesson may indeed be learned from so humble a creature in another branch of "social science," namely, connubial harmony in a division of labour; for should a hill lie between the object of their search and their pellets, the male and female, like the burying-beetles, work together, forcing it up the incline every time it rolls to the bottom until the object is accomplished. The scarabæidæ form a very extensive group of the order *Coleoptera*, containing probably 3,000 species. The antennæ are more club-shaped than our cockchafer; the legs, like those of the mole crickets, are peculiarly suited to their work, representing ornamental trowels, the feet and tibia of the fore-legs more particularly. It is said that with this scanty supply of tools in the Egyptian desert the egg-ball is first made from a mixture of sand or clay and camel's dung, the rolling process occupying a whole day, with the object apparently of drying the material, the dung affording a banquet to the larvæ when hatched: this inference is based upon the fact of their leaving off work if the weather be cloudy, or at sunset, commencing with sunrise, which custom probably gave rise to the ancient idea of a symbol of the measure of time. A colossal scarabæus, sacred to the deity Tore, or Cheper, and at a later period, the emblem of the world, forming part of the Elgin collection from Constantinople, may be seen amongst the Egyptian antiquities at the British Museum.

J. C.

In a recent communication to the British Meteorological Society, Mr. Glaisher stated, as a result of an elaborate inquiry, that our climate during the last hundred years had altered—that, in fact, the temperature of the year is two degrees warmer now than it was then; the temperature of the month of January has increased still more, and the winter months are all much warmer.—*Overland Mail.*

What is it that constitutes and makes man what he is? What is it but his power of language—that language giving him the means of recording his experience — making every generation somewhat wiser than its predecessor, more in accordance with the established order of the universe?—*Huxley's Origin of Species.*

A POPULAR DESCRIPTION OF POLYCYSTINS.

BY MRS. P. S. BURY.

WHILST engaged in 1861 and 1862 in delineating the microscopic forms in some of the Barbadoes earths brought to England by Dr. Davy, and beautifully prepared for the microscope by Mr. Johnson, of Lancaster, the progress of my interesting occupation being partially watched by the late

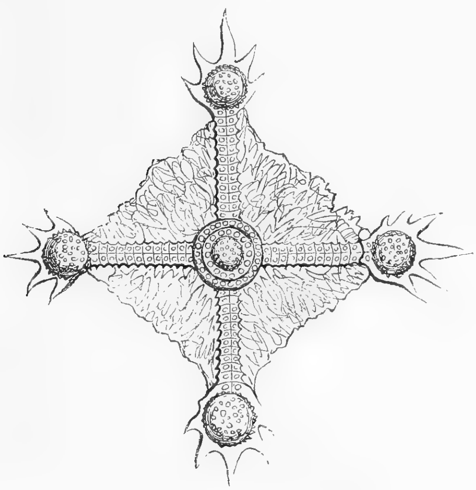


Fig. 64.—STEPHANASTRUM, *Ehr.*

accomplished Dr. Boott, he exclaimed, "You surely have found the excavated toilette-service of Titania, with all her essence-bottles and trinkets." Yes, in that dirty-looking, chalky earth are indeed found exquisitely jewelled vases, and diamond crosses and stars, to represent in fairy miniature the badges of every order of knighthood. But what, then, are these Polycystins? They are a family of the *Rhizopods;* the *type* of which group, and the object most attainable for examination, is the amœba, which may so frequently be found in the sediment of fresh-water streams or pools, or even in the moss of damp garden-walks, or similar situations, like drops of a translucent jelly, each drop having within it, though only discernible to practised microscopic eyes, a speck, an atom, which physiologists term the *nucleus,* and suppose it to be the first germ or commencement of animal life in its lowest form. The enveloping jelly is called *sarcode,* and differs but slightly from the cellulose of low vegetable forms of life. The little lump or globule of sarcode is self-coherent, though it is supposed to have no outer skin or integument to hold it together; and if watched under a lens, it will be seen to shoot out small portions like fingers, or as they are called *pseudopodia* (false feet), with which it has the power of creeping along in its native element; nay, more wonderful still, it can seize with them any small infusoria or alga, frequently some small diatom, which it can completely suck into, and bury in its own substance, melting out, as it were, all the nutritious part for its own sustenance, and then throwing the useless *débris* to the outside of the mass of sarcode. "Here, then, we have,"—as Dr. W. B. Carpenter so eloquently expresses it,—"living substances in which vital operations are carried on without any special instruments whatever; a little particle of apparently homogeneous jelly, changing itself into a greater variety of forms than the fabled Proteus, laying hold of its food without members, swallowing it without a mouth, digesting it without a stomach, appropriating its nutritious material without absorbent vessels or a circulating system, moving from place to place without muscles, feeling (if it has any power to do so) without nerves; and not only this, but in many instances forming shelly coverings of a symmetry and complexity not surpassed by those of any testaceous animals."

Now, the Polycystins are *lumps of sarcode;* and it is precisely this power of constructing shelly coverings which attracts our notice to them. They actually do spin or weave for themselves coverings resembling the most delicate and costly silver filagree-work, rivalling in pattern the choicest productions of the ancient Peruvians or modern Easterns. Yet, our little Polycystin artificers choose a far more beautiful material than silver, being a shining transparent preparation of silex, which these little lumps of apparently inert jelly possess,—a cunning laboratory capable of extracting the silex from the sea-water and fitting it for use. But it is not only outer-corselets that they construct, there are also solid internal pillars and rafters to support and strengthen the fabric, in the exterior walls of which suitable and convenient open spaces are carefully left for the extrusion of the pseudopodia, which we may suppose are sent out in all directions to collect and bring home whatever is needful, either for nourishment or for continuing their work. The internal supports so much resemble the nature of the spiculæ of sponges, as to bring the polycystins and sponges into very near relationship, although they belong to distinct groups of the family of Rhizopods. As yet so few naturalists have observed the Polycystins in a living state, that their history seems hardly determined. Dr. Wallich has in store a mass of valuable information, which he has not yet given to the public. Among the most diligent, careful, and successful observers of these organisms was the late Professor Johannes Müller, who fished them up in quantities from their native habitats on the sea-bed, under the clearest and purest sea-water of the Mediterranean, near St. Tropez and Cette. But even with his greatest care and contrivances he could seldom obtain them, without the mere pressure or friction in drawing them up through the water causing the pseudopodia to collapse and shrink, a change to take place in the oil-globules, as he calls them, of the sarcode, when death speedily ensued. He found, however, that in the globe, or bell-shaped species, such as the *Eucyrtidiums*, the sarcode substance was divided into four lobes or flaps (*lappen*); and Dr. Carpenter follows this idea in the very short notice he takes of Polycystina as a sub-order of Rhizopods. Müller says, in the inside of the shell the animal-substance consists of four folds arranged round a central axis, which reaches more or less deeply within the bell. The innermost part of these lobes contains one or more oil-like balls; and in the under-part, nearest to the open side of the shell, are some brown-yellow cells, and with them are also other cells or transparent spaces, or vacuoles, which have been conjectured to shadow forth the first incipient symptoms of circulation.

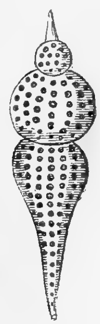


Fig. 65.

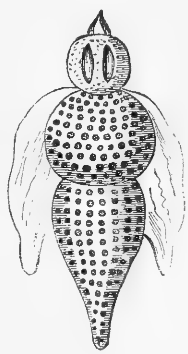


Fig. 66.

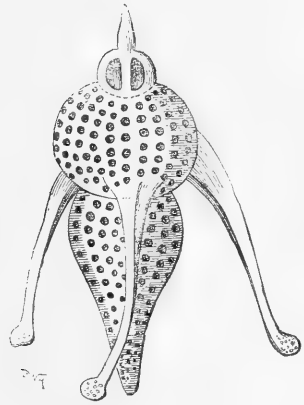


Fig. 67.—RHOPALOCANIUM ORNATUM.

It would be too long to name all the various external shapes of the shells; but among the most striking differences of form may be mentioned that some are like numerous little globes growing out of each other, beginning with a small one at the apex, and each increasing in size as they descend, sometimes so gradually as to look like storied beehives piled up one on the other. In others, the globes or bells dilate greatly and rapidly towards the base, till the lowermost exceed in width the most outrageous crinoline! Then there are single round balls pierced through and through with spikes sticking out in all directions, but ever pointing from the centre. Again, to compare small things with great, there are shapes of the Egyptian pyramids, and others stretched out and narrowed into obelisks.

Different from all these, are very numerous flattened disks, which appear to grow in concentric circles, some becoming bordered, others spiked round the edges, and many having very extraordinary radiating arms in endless variety.

A very remarkable feature in the Polycystins is their exuberant *out-growths*. Sometimes there are merely spines projecting in a tolerably regular, and always radiating manner; but sometimes these spines or projections branch out and subdivide in the most whimsical arborescent forms, so as to assume the shapes of stags' antlers, or even the more complicated delicate branchings of the once famed bedeguar of the rose (which we used to seek out in childhood's days, and call Robin-redbreast's pillow). Apparently these spines of the Polycystms, whether simple or compound, always are to a certain extent hollow, so as to have been permeated by the sarcode substance during their growth; sometimes instead of becoming finely attenuated, they become *bulbous* at their points; and these bulbils swell, become cellular or foraminated, and assume very much the appearance as if they were gemmæ from the parent, and intended to break forth and commence life as fresh individuals. Very remarkable instances of this simulation of "continued gemmation," as described by Dr. Carpenter as an attribute of the newly-discovered *Eozoon* of the Canadian rocks, occur in the Polycystinic forms called by Professor Ehrenberg *Astrommas* and *Stephanastrums:* in these a central spheroid body is enveloped by a sort of fine siliceous web or sponge, which gradually breaks away as the centre sends forth stalks (three to six, but normally four), celled and chambered as complicately as any foraminifer; and pushing their way through the sponge-like envelope and beyond it, their ends become club-shaped, often strongly spiked at the extremity, but the swollen part containing what looks like a reduplication of the central parent-form; and these seem as if they might possibly break away, and become in their turn centres of growth.

If comparatively but few of these organisms have been systematically examined in a *living* state, countless multitudes of their skeletons have been revealed to us from their tombs in a stratum of peculiar earth, extending through considerable tracks in the island of Barbados. Sir Robert Schomburgh, in his "History of Barbados," describes this track of deposit as having been thrown up from some old sea-bottom by volcanic action, through rents in the coral-reefs of which the island is formed.

Dr. Davy, writing on 14th March, 1865, says, speaking of these Polycystinic forms :—"I find, on referring to my note-books, that I first detected them on the 12th of January, 1846, in the chalk beneath the *coral-rock*, of which that remarkably-formed peak, the Peak of Teneriffe, consists." This was before Sir R. Schomburgh came to Barbados. During his visit I informed him of this fact, and of other localities in which this same chalk-like matter occurred, and showed him with my microscope the skeletons of the infusoria in question; that they were not known before, is not surprising, as there was no microscope in the island, except the one I had, capable of showing them. Sir R. S. states in his work (p. 560), how he had sent specimens of this mud and marl to Professor Ehrenberg for examination, and adds in a note that I had previously discovered them, and had made mention of them in a discourse I delivered to the Agricultural Society of Barbados, in July, 1846.

Among the specimens from this seemingly inexhaustible mine of Barbadian fossils (the same which has yielded also the subjects for many of Dr. Greville's most exquisite figures of diatoms) are found some symmetrical forms of Polycystins, the most perfect of which have doubtless been selected by Professor Ehrenberg, for his most beautiful and elaborate delineations given, among other objects, on a few of the plates of that rare and costly work, the "Mikrogeologie," and the drawings for which have been copied into Sir R. Schomburgh's book and other works. But though some of the Polycystins are nearly symmetrical in figure, they are by no means universally so; in fact, the greater number assert their near relationship with *amebæ* and sponges by displaying the most grotesque polymorphisms. For instance, you find a *Rhopalocanium* of Ehrenberg, with the flowing outline of some elegant Etruscan vase with a tapering base; the next specimen you see may have ugly nose-shaped handles, adhering to its sides in a clumsy way; in another example, the noselike protuberances enlarge, thicken, become wrinkled, and, however droll-looking, militate sadly against one's ideas of elegance. Yet look again and again, and in some favourably well-grown individual, lo! there are the clumsy excrescences, lengthened out, curved, refined, and developed into supports worthy of the famed Delphic tripod of the Pythian priestess; the gently-swelling ends of the feet meanwhile indicating appearances as of little reservoirs or deposits of material accumulating for future use, either as buds or for some further development.

Again, in some of the pyramid or obelisk shapes, the fenestræ, small at the apex, widen more and more towards the base, and a fine inner lattice-work is seen to line these too wide open windows. But the variations in form assumed by these cunning artificers are far too numerous to mention; and although they do not work by mathematical rules and compasses, as has been sometimes represented, they have within themselves a mysterious unerring rule, which guides every thread, every particle of internal sarcode, or external silex, into the position, shape, and size, best suited to the situation, surrounding circumstances, and requirements of each individual organism. We call these *low* forms of existence; yet they are influenced by the same unceasing All-pervading Power, that "teaches the rose to draw her crimson from the dark brown earth, and the lily her shining white," and has breathed into man the spirit and capacity for investigating even a small portion of these marvels, with feelings of wonder, love, and praise!

RIVER-WATER IN BRAZIL.

WHILST in the Brazils about four years since, I was rather astonished on awakening after my first night's sleep in the little town of Malta de Sao Joao, about 60 miles inland from the town of Bahia, to find my hands swollen to such an extent as to appear very much as though ensconced in boxing-gloves, entirely preventing my closing them, at which state of things I was naturally greatly alarmed, imagining some serpent had stung me in the night. I therefore summoned our two native servants to see if they could solve the mystery, which they quickly did, by saying that the swelling was due entirely to my drinking the water obtained from the little river Jacuinverim, which ran close by, to which I was not yet acclimatized; they likewise said that most Europeans on drinking its water for the first time were affected in the same manner. The water was perfectly pure, and as good as could possibly be wished for, very different to what since then I have been glad to drink from the swamps, almost putrid, but which drunk with a little brandy I have never found to cause any unpleasant effects whatever; and although I continually drank from rivers and swamps during the subsequent twelve months, my hands have thereby never since been disfigured, so as to warrant the inference which any one unacquainted with my antecedents would have formed that *sans doute* I was a member of a pugilistic society. A. I.

ON SOME IMPERFECTLY DEVELOPED FLOWERS.

By Robert Holland.

GIANTS and dwarfs, fat boys, Siamese twins, and such-like mis-shapen monsters, are exhibitions which are much sought after by the gaping multitude. And yet there is something exceedingly repulsive in such sights, and really very little, if anything, to be learned from them in a scientific point of view.

There are plenty of monstrosities, too, in the vegetable kingdom, like Siamese twins, giants, dwarfs, nondescripts, and other apparent mistakes in nature's handiwork; but here, strange to say, there is nothing unpleasant to contemplate, and they also differ from animal monstrosities in offering no attraction to any, save those who make natural history their study; but such imperfect specimens are always of great interest to the physiologist, as teaching him facts relative to the life and growth of plants, that a perfect flower would never have told him.

I have taken notes, and generally made drawings of a considerable number of these curious forms that have come within my observation, some of which may interest a few of the readers of Science-Gossip. I have taken them from my portfolio at random, without any regard to the sequence of time when they were found.

Twin Peas (fig. 68), gathered in 1861. These were two perfect and full-sized pods proceeding from one calyx; the stalk quite single, showing

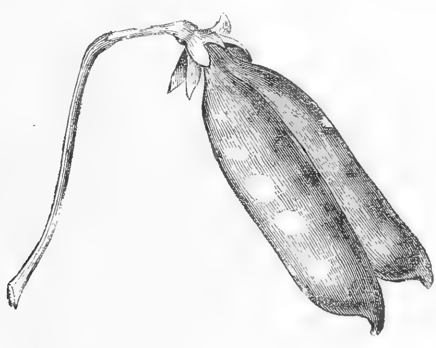


Fig. 68.—Twin Peas.

that it was not two flowers anastomosed together, as is not unfrequently seen, but that the pea blossom had contained two pistils.

Hedge Woundwort, *Stachys sylvatica* (fig. 69), gathered at Cirencester in 1849. In these specimens the calyx was in every case unchanged. Corolla in all cases monopetalous, but the segments somewhat enlarged, rounded, nearly equal in size, greenish in colour, and distinctly marked with branched veins like a leaf. Stamens absent. Pistils foliaceous, consisting of two leaflets united at their bases forming a tube, but spreading upwards into two distinct leaves. Ovules also foliaceous, consisting

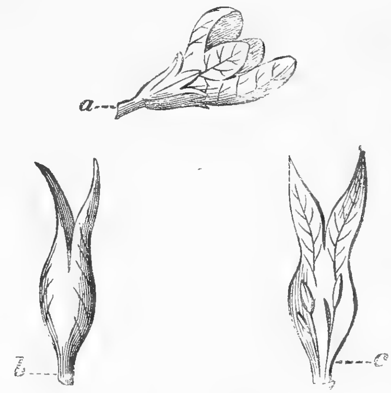


Fig. 69.—Hedge Woundwort.

a, Flower. *b*, Pistil. *c*, Pistil laid open.

of four minute green leaves attached to the inside of the ovary, with an indication of a petiole to each from the receptacle. I since found a complete plantation of similar flowers in Cheshire, but I do not remember the exact date, though I know the precise spot, which I have revisited several times, in the hope of finding more specimens, but always without any success.

Charlock, *Sinapis arvensis* (fig. 70), gathered at Cirencester in 1849. In this specimen almost every

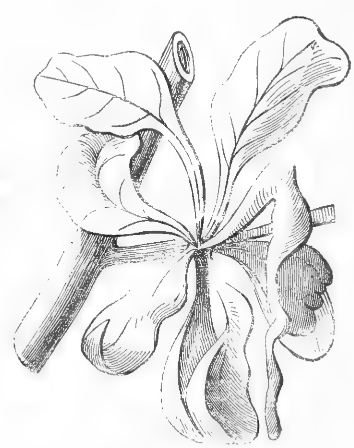


Fig. 70.—Charlock (twice the natural size).

flower was foliaceous, the sepals and petals being partially or altogether converted into leaves, of an obovate, almost lyrate form, tapering at the base, in colour either quite green, or yellow with a strong tinge of green. The stamens were in most cases absent or converted into leaves, though it was impossible to say which leaves were the altered stamens, for there was by no means a leaf for every organ in the flower, as the four sepals, four petals, six stamens, and one pistil—fifteen in all—were represented in most cases by from three or four to nine or ten leaves. The ovary was also foliaceous, but not so fully developed as the outer organs. There was this remarkable point connected with the specimen, that whereas in charlock there is generally only a bunch of flowers out at once at the top of the spike, the sepals and petals of the lower flowers falling off very quickly, in this case all the foliaceous flowers were persistent, forming a leafy spike nine inches long.

GARDEN ROSE, the old fashioned "union" with red and white streaks, in which the calyx was transformed into fine pinnated leaves, from the centre of which was produced a stalk some two inches long covered with irregular-shaped petals, some red, some greenish, the whole surmounted by a second bud with a green calyx. Such monstrosities are not at all uncommon in the garden rose, some kinds being very prone to form these irregular flowers.

Fig. 71.—TOADFLAX.

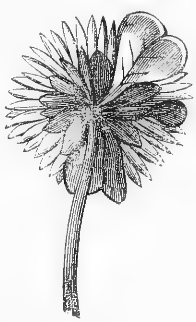


Fig. 72.—DAISY.

DAISY, *Bellis perennis* (fig. 72), Cirencester, 1848, in which several of the scales of the universal calyx had grown into leaves more than half an inch long, and similar in every respect to the radical leaves of the plant.

A PEAR, the fruit being apparently full grown, but producing from its eye a branch some three inches long, covered with large leaves. There is a figure of a precisely similar pear in Lindley's "Elements of Botany;" but this particular specimen was brought from Yeovil, in Somersetshire, by a student of the Royal Agricultural College, who showed it to me.

WHITE CLOVER, *Trifolium repens*.—The specimen of which I have a drawing was gathered in Cheshire in 1859; but the same thing is to be found every year in almost every locality, the flower head consisting of a few perfect flowers intermixed with others in which the various organs, especially ovary and ovules, have shot out into bunches of leaves.

SALLOW, *Salix Capræa* (fig. 73). Female blossoms of this plant gathered at Cirencester in 1848, in which the ovaries had become pedunculate, the stalks as long as the carpels, the greater number of

Fig. 73.—SALLOW.

ovaries being split open like the ripe follicles of columbine or marsh marigold, and disclosing a number of small leaves within, attached to the edges of the follicles, and which represented the ovules.

DOG'S-TAIL GRASS, *Cynosurus cristatus*.—Cirencester, 1848. In this the central floret of each spikelet had extended into a bunch of leaves. A common monstrosity in several species of grass. I have a fine specimen of cock's-foot grass (*Dactylis glomerata*), of which every floret produces a bunch of leaves.

COMMON HEATH, *Erica tetralix*, gathered on Lindow Common, Cheshire, a year or two ago, with polypetalous flowers, the urceolate corollas being split up into their component petals.

PRIMROSE, *Primula vulgaris* (fig. 74).—A most curious deformity, gathered at Mobberley, Cheshire, in 1863. I was attracted to this specimen, or rather specimens, for there were two or three on the same plant, by seeing a green, leafy sack protruding from the eye of the flower, and gathered them expecting to find that the ovary and ovules had become foliaceous. They had become so, and much more, for on dissecting the finest flower, I found two complete flowers one within the other. There was the ordinary five-pointed calyx, and the usual five-lobed corolla, both the normal size, but all the internal organs had become changed into a second perfect flower. The green sack which protruded from the eye of the primrose proved to be a second fine-pointed calyx, containing a second corolla, which, however, was only four-lobed and tubular like the flower of a cowslip; and within this were five perfect stamens, and a perfect pistil.

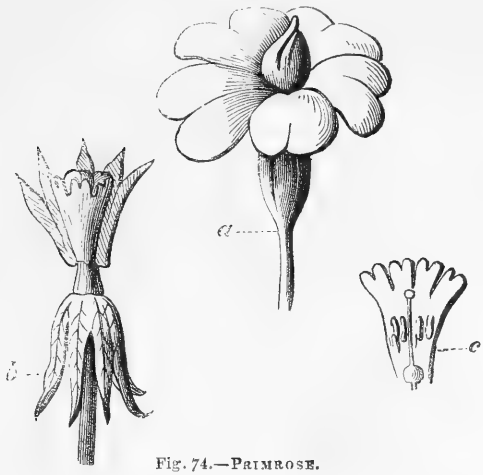


Fig. 74.—Primrose.
a, External appearance. c, Inner Corolla opened.
b, Calyx turned back, corolla removed, showing inner corolla.

Wood Anemone, *Anemone nemorosa* (fig. 75).—A very interesting specimen gathered near Cirencester in 1849 or 1850. The flower was perfect in every respect, but there was an extra fully-developed petal produced amongst the three leaves below the flower, looking exactly as if it had fallen from the flower, and been caught by the leaves. But there it grew, as firmly fixed as the leaves themselves, showing that the three cauline leaves in this plant are really part of the flower, and ought to be considered as calyx, the petals and other organs being elevated on a stalk, as is the case with the pistils only in *Geum rivale*. Similarly the involucre of *Erianthus* and some others may be considered as true calyces.

Fig. 75.—Wood Anemone.

Toadflax, *Linaria vulgaris* (fig. 71).—Mobberley, Cheshire, 1848. A remarkably beautiful instance of what is called the peloria form of the flower. The plant had been cultivated in a garden, and I gathered several spikes which produced flowers with two or three spurs; but one flower had become perfectly regular. The general form of the flower was that of a Florence oil flask, with a rather wide neck, the mouth divided into six teeth which were rolled backwards. There were six spurs curved upwards, and set equally round the base of the flower; and within the tube of the corolla were six equal stamens.

Calceolaria.—In 1857 I observed several flowers of a calceolaria in a green-house, which had taken on a perfectly regular form, being urceolate like the flowers of a heath. The change was in this case effected by the enlargement of the upper and smaller lip of the corolla, which was well shown in some intermediate specimens where the change was only half accomplished. Symmetry and regularity appear to be the rule in nature, and when we find a flower irregular in form, it is on account of the total suppression, the imperfect development, the abnormal increase, or the multiplication of certain parts, the change always taking place under ordinary circumstances; but the peloria form described in the two cases above appears to be an effort of nature, under the stimulus of extraordinary circumstances, to return to the regular type; and yet it is rather remarkable that when that effort is successful, and a regular symmetrical flower is produced from an irregular one, the result is not nearly so beautiful as the irregular but usual form.

A Cucumber grew a few years ago in my own garden, where one of the short prickles upon the fruit had grown out into a long curled tendril.

It would occupy too much space in this paper to point out the various teachings of all these strange forms. Such specimens exercise an important bearing upon the doctrine of morphology, that "Pons asinorum" of young botanists; but my intention is not now to write an essay upon that subject, but chiefly to direct the attention of beginners to a very interesting branch of botany, and to ask them to be on the look-out for imperfect as well as perfect specimens of plants, assuring them that careful notes of what they observe cannot fail to be of *some* use in the cause of botanical science, and *may* serve to elucidate hidden or imperfectly understood points of physiology.

PIGMENT-CELLS.

WHILE Ethnologists and others are debating the knotty question as to whether our first parents wandered about the garden of Eden in black or white skins, it may not be altogether uninteresting to consider wherein consists that striking difference of colour which is found in the skin, hair, and eyes, of the various human races, and which extends from the African negro to the fairest of Europeans. Even at the present day the peace and happiness of the negro is sadly interfered with by the prejudice which is entertained against him by reason of his sable colour, which seems to be warranted to "*stand fast*," notwithstanding the many efforts which have been made to wash a blackamoor white. But although a black skin has ever rendered the wearer of it liable to a miserable bondage, curiously enough matters are entirely reversed in Europe, where the hard task-master has been supplanted by a gentler nature, and the captive no longer is black, but white.

Much might be said of the all-powerful glance of a woman's eye, whether it proceed from that scrutinizing investigator of a Mrs. Caudle, or the not less potent eyes of the Miss just out of her "*teens*." Certain it is that the contemplation of sundry black, blue, or hazel eyes, of raven locks and auburn tresses, has given at all times such an amount of occupation to poets to describe as is perfectly alarming to dwell on. It is all very well for dull, prosaic, matter-of-fact people, like Mr. Weller, senior, to exclaim of these glowing descriptions, "Poetry's unnat'ral!" but when so many gentlemen, in and out of confinement, have devoted so much of their valuable time to the task of describing the effects of these colours, we are ready to exclaim, "There must be something in it." As we believe there is much in it which may be profitably investigated by the microscopist, the following notes may not be inappropriate.

On examining a vertical section of the human skin, one of the first things which attracts our attention is the general conformation of the various layers, composed of cells and fibrous tissue, interspersed with numerous delicate blood-vessels and other minute structures, which, in a healthy condition, serve to give to the skin that extreme softness and elasticity, which, mechanically considered, places it so far beyond the skill of man to imitate. The skin is composed chiefly of two parts, the lower part being termed the *cutis*, or true skin, and the upper or external portion, the *epidermis*. The latter is the part which now interests us; as it is in and below the epidermis we find those cells containing the colouring-matter, and which are called "Pigment-cells." The many tints and shades of colour which in a great measure serve to distinguish the human races as well as the lower animals are dependent on the presence of these cells, which are more or less distributed throughout the epidermis and its appendages, where the Pigment-cells are usually flat, and of a polygonal form. In dark-coloured races and negroes the skin is very thick, and is most liberally supplied with these cells; but they are also found in the fairest European, although in the latter they are fewer in number and lighter in colour, as extreme paleness of complexion is not an indication of their entire absence, but merely of their pale colour.

The most remarkable accumulation of Pigment-cells is found in the inner lining of that part of the eye known as the choroid membrane, where they exist in several layers, termed the *Pigmentum nigrum*, and are beautifully-arranged in six-sided cells, measuring from 1-2,000th to 1-5,000th in. in diameter, and abounding in Pigment (fig. 77). Dr. Carpenter* says,

Pigment Cells.

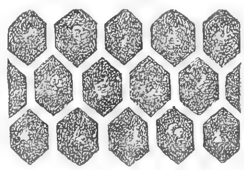


Fig. 77.—From Ox-eye.

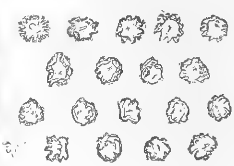


Fig. 76.—From Bat's-wing.

"The black colour is given by the accumulation of a number of flat, rounded, or oval granules of extreme minuteness, which exhibit an active movement when set free from the cell, and even whilst enclosed within it."

With regard to hair, the colour is given by the presence of these cells, which are thoroughly incorporated with it; hence the difficulty which the few followers of a recent absurd fashion experience, who, possessing blue eyes, deem it necessary to have a particular shade of light hair.

Occasionally it happens that not only animals, but individuals, are entirely devoid of Pigment-cells. We then call them Albinos; for, as it is the presence of these cells in the skin, hair, and eyes, which gives colour to those parts of the body, so the entire absence of them gives the unusual appearance to the Albinos. In their case the skin is leprously white, and the hair corresponding with it. The eye is likewise characteristic, for the *Pigmentum nigrum* being absent, the delicate blood-vessels reflect their bright red colour, which the Pigment would otherwise hide, and they are consequently so extremely sensitive to the light that they are generally only half opened, even in twilight. This peculiarity is, of course, well known with regard to many of the white animals.

A few years ago a paper was read to the Royal Society, giving an account of the desquamation and

* "The Microscope and its Revelations."

change of colour in a negro, who, from repeated attacks of ague, was completely converted to a white man, retaining the characteristic features and hair of an Ethiopian. This change was accompanied with a great sensibility in the skin to the heat of the sun and of fire. In the course of a few months the natural colour returned, first in patches which presented a singularly mottled appearance, and ultimately the former black hue was thoroughly restored to both skin and hair.

We have stated that the Pigment-cells are usually polygonal; but this is not always the case, as is illustrated in the frog, where the cells of the choroid coat vary very much, and in its skin are curiously stellate. The production or intensity of Pigment would seem to be greatly influenced by the sun's light and heat, a removal from such agencies speedily enabling the skin to regain its former colour, as is evidenced by the departure of freckles or browning after a few weeks' return from the exposure to them. Little appears to be known of the chemistry of animal Pigments, but their chief constituent is supposed to be carbon. In a beautiful German preparation of a section of the human chin now before us, not only are the hair-follicles and sudoriparous glands plainly discernible, but also the Pigment-cells in the stumps of hair, which have been cleverly sliced by the skilful operator. An experienced writer says that the skin must be macerated for some days, when the epidermis can be removed and examined with the under-surface uppermost. If it be that of a negro, or any other dark-skinned race, the Pigment-cells will be very distinctly seen by transmitted light. But as negroes are not within the reach of every microscopist, we must in this country be content to purchase a good specimen, readily mounted, from one of our well-known mounters. The eye of the ox yields an excellent object for examination, as the choroid membrane can be easily put up in glycerine, and mounted in a shallow cell. W. M. B.

THE HAIR-WORM (*Gordius aquaticus*).

By WM. HELLIER BAILY, F.L.S., &c.

WHILST taking a stroll with my family, in the month of July, during last summer, along the banks of the Dodder, at Milltown, near Dublin, at which time the water is very shallow in certain parts of that river; and as I am generally on the look-out for objects of natural history, as well to impart instruction to the young folks, as to add to my own imperfect stock; on looking into the water I observed, at its margin, an extraordinary hair-like creature swimming rapidly with graceful and sinuous motion like a miniature eel. It immediately struck me as being the *Gordius aquaticus*, or Hair-worm, although I had never seen one before. It was easily captured; and on removing it from the water evidently disliked the change, becoming more rigid, and when held between the fingers appearing as if in much distress, writhing about, and, displaying great elasticity, it made an attempt to tie itself up into a kind of true lover's knot, such as would perhaps, if it had not uncoiled itself again, have puzzled even the Davenport Brothers to unravel.

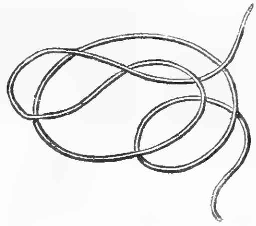


Fig. 78.
HAIR-WORM (*Gordius aquaticus*).

Being provided with an open-mouth jar of water, on returning home it was transferred to a glass globe, in which were some other fresh-water objects. Its restricted domains, or change of diet, did not, however, appear to agree with it; and after a few days it died before I could observe any change in its appearance. It is said in the early stage of its life to live parasitically in insects.

I obtained a second specimen from a moist place, where there was little or no running water, on the side of Carrick Mountain, near Rathdrum, in the county of Wicklow. I was searching for Cambrian fossils at the time, and on taking up a loose piece of slate to examine it, found, instead of the *Oldhamia*, one of these remarkable filiform worms. I kept this alive for some days, and on taking it to our Natural History Society, a young medical friend, who is doing good work in the investigation of entozoa and parasitic animals, took a fancy to it, and it was transferred to him.

There is a popular notion amongst boys, which probably arose from seeing this hair-like worm in motion, that if a horse-hair is put into water, and left there for a few days, it will turn into an eel.

These worms, although placed with the Nematoïdea, are distinguished from them by their structure, and especially by the absence of a posterior aperture in the intestinal canal; they are included in the genus *Gordius L.*, and are thus characterized:—head rotund, mouth none, or not distinct, tail of male bifid, and female rounded; its length is from 7 to 10 inches, and its thickness scarcely half a line. It is represented on the woodcut of the natural size, and shows the power it has of coiling itself up.

THE feeling of our dignity and our power grows strong when we say to ourselves, My being is not objectless and in vain; I am a necessary link in the great chain, which, from the full development of consciousness in the first man, reaches forward into eternity.—*Hyperion.*

THE HEDGEHOG.

The Hedgehogs kept by Professor Buckman in the Geological Museum are old friends of mine, for I was the curator of the said museum at the time, and I took as great an interest in the "pets" as my good friend and teacher did. I can well remember, however, what Mr. Buckman has not mentioned, that they were not the sweetest or cleanest of pets, and decidedly untidy in their habits, and that having once collected for them a quantity of black slugs, they devoured them in so foul a manner, leaving mutilated molluscous scraps in all sorts of corners, that we gave them no more of such juicy food, and, finally, voted them not quite desirable *indoor* pets; so, if I recollect rightly, they were popped in a bag, and sent as a present to a worthy clergyman in Cirencester, our former chaplain, from whose garden they very soon made their escape.

I wonder if my friend remembers the snake we had in the museum about the same time, and how, one day, it was missing from its box, and what a search was instituted from one end of the college to the other,—

"In the highest, the lowest, the loveliest spots,"

and all to no purpose; and how, at length, it came to the ears of our good matron, who never went to bed afterwards for months without expecting to find a snake coiled up between the sheets. Many a good laugh we had about it.

The Hedgehog is still very common in the north of England; at least there are plenty on my own farm in Cheshire. I quite agree with Mr. Buckman that it is one of our most useful animals, and I always save a Hedgehog from the "barn-door savages" when I have an opportunity, pointing out to them the absurdity of supposing that a cow would let such a prickly milker have anything to do with her; but I cannot quite acquit the Hedgehog of *all* mischievous propensities, for I know that he will take young chickens, having caught him in the very act.

The summer before last we had a hen with a brood of chickens placed in a coop near the back-door, in which they were left to roost. One night, as usual, I went out to look round just before going to bed, and found that the hen had forced her way out of the coop, and was covering her chickens outside; and as I passed the coop I heard a slight rustling and a sort of crouching noise within it, and upon looking in I found that a Hedgehog had pushed his way through the bars, and there he sat making a fine feast of one of the chickens, and so intent was he upon his meal, that, even when I threw the light of my lantern upon him, he was not a whit abashed, but, in the most impudent way possible, sat crunching the bones before my very eyes.

There is generally *some* foundation for most widely-spread popular opinions, and looking at the fact which I have just stated, I think there is every probability that the Hedgehog *will* eat both the eggs and the young of such birds as build their nests upon the ground; and small blame to him.

Robert Holland.

VIPER SWALLOWING ITS YOUNG.

The writer of the article at p. 4 clearly does not credit the assertion there alluded to, of the viper swallowing its young. Now, "seeing is believing," and I well remember having seen in my boyhood—some 30 years ago—an instance of the fact, the truth of which he doubts, because resting merely on the testimony of unscientific country people. Now, I have no pretensions to science, but I vouch for the truth—above referred to—of having, in my boyhood,—when out on a birds'-nesting expedition, in a southern county, with some three or four companions,—come suddenly upon a viper, sunning her young brood on an open grassy spot in a broad hedge-row: hedge-rows were common in those days. Immediately she saw us, she began to hiss, and away went the young, previously some feet from her, "helter-skelter" towards their mother; rushed into her mouth—expanded to an immense width for so small a creature—and down her throat, one over the other, while you could say "Jack Robinson." The space where she was recreating was some 20 feet square, so that before she could beat to cover, we, boylike, being armed with sticks, had beaten her to death. This done, one of the party with his knife opened the body, and out came again the little ones, all of which we killed. I do not remember the exact number, but my impression is that it was not more than 6 or 8. In confirmation of this statement I give you my real name and address below, and here subscribe myself,

A Norfolk Clergyman.

Nature is a great artist, when she is left to herself to suit her means to her end.—*Lamartine.*

The vast cathedral of nature is full of holy scriptures, and shapes of deep, mysterious meaning; but all is solitary and silent there; no bending knee, no uplifted eye, no lip adoring, praying. Into this vast cathedral comes the human soul, seeking its Creator; and the universal silence is changed to a sound, and the sound is harmonious, and has a meaning, and is comprehended and felt.—*Longfellow's Hyperion.*

CULTIVATION OF FERNS.

I NOTICE many questions in Science Gossip relative to Fern Culture, and think that a few words respecting the manner in which German gardeners propagate Ferns by seed may prove interesting.

They take a cube of turfy peat about one inch and a half square, and this they dip in boiling water in order to destroy all the animal life it contains; all life, in fact, animal or vegetable, that is in it must be destroyed; it is then laid in a flat saucer, and the spores are sprinkled upon the upper side. A small quantity of water must be poured into the saucer, and it should be covered over with a bell-glass. A little water should be added from time to time, as evaporation takes place, but great care must be taken to pour it in without washing the seeds off the turf, and in five or six weeks a green moss-like substance will cover the turf, and the young fronds will gradually develope themselves.

It is a singular fact that fern-seed, which has been gathered and dried three or four years, will, when sown, germinate more quickly than fresh spores.

One of your correspondents, "W. Ormerod," seems in trouble respecting his young Ferns, which are infested with a sort of fungus. I remember being so vexed a few years ago, when I first began to try and raise Ferns from seeds, by a black mould, which my more experienced friends told me proceeded from the moisture of the soddened peat rising to the surface through the sandstone. I gave up all kinds of stone at once, and have used well-burnt cinders ever since with decided success, having never been troubled with fungus afterwards. I should be inclined to attribute "H. J. D.'s" finding of strange Ferns in the pans where he had sown his spores, to the wild Fern-seed in the soil. The German method I have just described of preparing the soil, *i. e.*, dipping the turf in boiling water, effectually prevents this.

There are strange superstitions about Fern-seeds in various parts of England, and I know of some very curious ones in Wales. Ben Jonson, too, and Beaumont & Fletcher, allude to the "invisibility" of the person who carried Fern-*seed* in his pockets; whilst the ancients believed that Fern-seed was invisible from its very minuteness. Shakespeare, however, with his usual good sense, ridiculed the idea that it conferred the power of becoming invisible on the bearer.

Helen Watney.

We behold all round about us one vast union, in which no man can labour for himself, without labouring at the same time for all others.—*Hyperion.*

SIMPLE OBJECTS.—III.

Fringed scale-moss (*Ptilidium ciliare L.*).

THIS is one of the most elegant of British scale-mosses, and well worthy the attention of the microscopist. It occurs abundantly in heathy places, where it forms large purplish-brown patches, and, at first sight, looks almost like a kind of moss, but closer inspection dispels the fancied resemblance.

The stems are from one to three inches in length, and prostrate, bearing on each side a profusion of short branchlets, which are again and again sub-

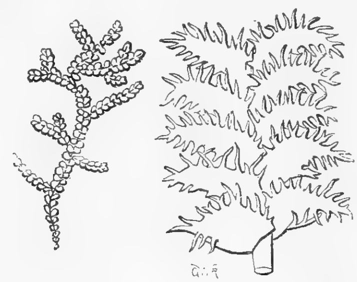


Fig. 79.—Fringed Scale-Moss (Natural size, and slightly magnified).

divided. The leaves overlap each other, and are placed in two rows on opposite sides of the stem. Each leaf is divided into two unequal lobes, and each lobe is again cleft into two pointed segments, all of which are fringed along their margins with

Fig. 80.—Pair of Leaves (further magnified).

long, pointed, cellular hairs. At the base of the leaves, on the under side of the stem, are smaller leaves or stipules, which are likewise cleft and fringed with hairs. All these parts, when viewed with a higher power (× 300) are found to consist of roundish cells, having a disposition to become hexagonal, except in the hairs, where the cells are cylindrical, and placed end to end.

Dr. Carrington recommends the following method for the preparation and examination of these plants:—"Take a leaf; place it between two slips of glass, with a few drops of equal parts of *Liquor potassæ* and water; warm over a spirit-lamp until ebullition, then wash the leaf in water, place on a fresh slip, and add a drop of iodide of zinc solution, and put on the cover. If the leaf is dry, steep it previously

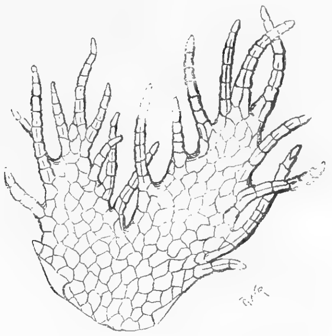


Fig. 81.—Showing Cell-arrangement.

in water. The preparations thus obtained are amongst the most beautiful of microscopic objects, and the physiologist cannot but be delighted with the precision with which the different layers of the cell are mapped out." M. C. C.

ASSYRIAN BOTANY.

A MOST curious fact in natural history has recently been brought to light by the decipherment of Assyrian inscriptions. The history of the artificial migration of plants—a very interesting and intricate subject—has been carried back to a period of great antiquity. Kūthāmī, a Mendaite writer in the fourth century, A.D., tells us that the kings of Assyria were accustomed to bring back with them from their campaigns in foreign countries any plant which they thought would be valuable and useful; that in this way, for instance, the cherry was transplanted from the banks of the Jordan to the gardens of Nineveh and Babylon. These statements are strikingly confirmed by an inscription of Tiglath-Pileser I., an Assyrian monarch, who was carried captive to Babylon, B.C. 1110. The king therein says:—"The pine-tree, the likkarina-tree, and the algum-tree, these trees, which none of the former kings, my fathers, had planted, I took from the countries which I subdued, and I planted them in the groves of my own country, and I called (the plantations) by the name of groves; whatever was not in my own country I took and placed in the groves of Assyria." The translation "algum-tree" is not quite certain; the word in the original is *alaka(ni)*, which certainly bears a greater resemblance to the native Sanskrit name *valgu(ka)* than does the Hebrew *almug*. If the identification can be maintained, it will be a proof of the occupation of the Malabar coast by the Aryans as early as the twelfth century B.C. This will not be the only case in which ethnology has received important aid from the botanical department of natural history. The northern home of our Aryan ancestors is borne evidence to by the fact that the "birch"—the denizen of a cold climate—is the only tree having the same name both in Eastern and Western Aryan, *i.e.*, both in Sanskrit and in the various languages of Europe. So, again, we learn from the fact that "flax" (Lat. *linum*, Greek λίνον, Goth. *lein*) is known by different names in Eastern and Western Aryan, that the separation of the forefathers of the Hindus and of the Greeks and Romans took place before either had exchanged an agricultural for a pastoral life.

We have reason to hope that the present researches into the early records of mankind may throw some light upon the primitive history and cultivation of the cereals. A. SAYCE.

THE SHRIKE, OR BUTCHER BIRD.

IN SCIENCE-GOSSIP (p. 64), before quoting from "Knapp's Journal of a Naturalist," you say there is some confusion between the accounts in "Montague's Ornithological Dictionary" and "Knapp's Journal" respecting the great and the red-backed shrike. As a daughter of the late Mr. Knapp, I am able to say the bird he mentions is *Lanius collurio*; that bird was common in Gloucestershire. I never saw the great shrike except in a private collection of stuffed birds; with us the red-backed shrike would often attack the nests of the small birds, and carry off the unfledged young.

In the neighbourhood I now live in, not far from Whitehaven, *Lanius collurio* is often seen. In the summer of 1857 or 1858, when strolling down a lane between the villages of Netherton and St. Bees with my little boy, we fell in with a brood of young butcher-birds with their parents; and while telling the child why called butcher-birds, the constant buzzing of the dorr beetle attracted my attention to a thorn bush, where we found (besides moths) three or four dorrs, not fixed as I have always before seen them with the body spitted, but with the thorn in each instance through one wing case, and these were spinning round and round. This was recalled to my recollection this summer, by finding a dorr beetle flying about with a large round hole in one elytra; in all probability this fortunate beetle, by long spinning, had worn the hole, and thus been enabled to fly off its spiked perch. L. M. P.

N.B.—The shrike in Cumberland is called skrike-pie or skrike bird.—L. M. P.

IN the beauty of form, or of moral character, or of the material creation, it is that which is most veiled which is most beautiful.—*Stonemason of Saint Point.*

HERBARIUM INSECT.

(*Atropos pulsatorius.*)

I HAVE long had in my possession a box of dried ferns mounted on sheets of paper, in which little insects, like paper-mites in size, live and breed, as may be seen from the portrait below. The creature has nothing to recommend him on the score of beauty, for he is incorrigibly ugly, and at first sight through the microscope quite startling to a novice in the science of microscopy. On further examination, however, this wears off, and many beauties may be discovered. The antennæ or feelers are very marvels of constructive beauty, being formed of a great number of joints, by means of which they can be turned in any direction with the greatest care and dexterity; the forceps are formed in the same way, all in joints; so are the legs — that portion of them begins at the termination of the thigh, and are in four or five sections; besides this, there are scattered all over the insect short bristles, some round the mouth, which give the little creature a very ferocious aspect;

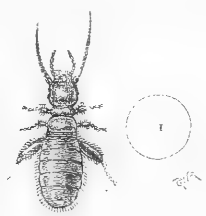


Fig. 82.

the back, as may be seen above, is striped across, and these stripes or rings are indented. I have not at present been able to discover any organs of vision, and rather think he has none; they certainly would not be of any use, because he always lives in the dark. One thing, however, is certain that, seeing or not, he continues to collect the spores of the ferns, and builds with them a very pretty dome-shaped nest, lined throughout with a white down, underneath which he first deposits the egg. I found in one of them a young one partly formed; the legs were just cropping out from the sides. There appears only to be one young bird in a nest, so that the insect is not a very prolific breeder. I have tried various means to rid the ferns of these little creatures, but at present without having succeeded; and as it gives me an opportunity of sending you his portrait, I feel rather glad that I had not succeeded, and also that I have discovered some hidden beauties of secret nature, which I must have remained ignorant of; and I am sure that no one can be otherwise than better for a knowledge of such things, seeing that their contemplation must raise our admiration and cause us to wonder more at the majesty and power of the Great Creator, who should have thought it well to bestow such infinite pains on these tiny objects of His creation. G. BAILEY.

ZOOLOGY.

THE NATTERJACK TOAD (*Bufo Calamita*).—As many readers of SCIENCE-GOSSIP have written to me for specimens of this reptile, perhaps the following short notice of my chase after them may not be unacceptable:—On Thursday, April 6th, I was looking about Wisley Heath all day for them, but did not find one. After dark, or, at least, after the rising of the moon, I was returning home across the heath, and when near a pond something ran quickly across the path. I took it up, and saw by its bright vertebral stripe, showing clearly in the moonlight, that it was a natterjack. I therefore commenced looking round the pond, and caught no less than fifty-seven of them. The noise they were making was very great; their croak being hoarse, and one continued note, instead of, as in the common toad and frog, a succession of short notes. The natterjacks showed more sense than the toads by leaving off croaking, and squatting close to the ground to escape observation whenever I approached one of their haunts, while the toads kept croaking and hopping. I found them always in shallow water (in which they can sit with their heads out), and, as their name implies, among reeds very often. On Friday night I caught a still larger number. I see now why their eyes are so much brighter by night than by day, as they are evidently nocturnal in their habits; but until this time I have always caught them on hot sunny days going about the heath in pairs.—*W. R. Tate, 4, Grove-place, Denmark-hill, Camberwell.*

LOCAL NAME FOR THE TOAD.—About Wisley, in Surrey, the common toad is called always the "ground toad," in contradistinction to the natterjack or "goldenback."—*W. R. T.*

CHILD POISONED BY A TOAD.—A young lad, ten years of age, named Louis P——, whose parents are small tradespeople in the Faubourg Saint-Antoine, was playing with some of his companions near Bercy, not far from a building in the course of demolition. This boy, who was of a delicate constitution, had a slight abrasion of the skin of the right hand. Having seen a lizard crawl into a hole in an old wall, he put in his hand, but instead of the lizard he drew out an enormous toad, which he immediately threw on the ground. The skin of the toad is covered with large tubercles formed by an aggregation of small pustules open at their summit. A milky liquid, of a yellowish white colour, very thick, and of a fetid odour, escapes from these tubercles when the animal is irritated. Whilst the lad had the animal in his hand, this liquid, which is a violent poison, was introduced through the wound in his hand into the blood. He was soon after seized with vertigo, vomitings, and faintings, and was carried to the house of his parents, who called in a doctor immediately; but already the malady had made such progress, that in spite of the most energetic means employed the patient soon died.—*Petit Journal, 29th March.*

Thrush and Frog.—R. H., in p. 85, says he can see no reason why, on the principle that *similia similibus curantur*, a frog should be sought as a remedy for the childish disorder which is commonly known as the *thrush*. In this part of the country the disorder is sometimes called "the frog."—*Humber.*

Rosy Feather-Star.—W. W. S., in his interesting account of the larva of the *Comatula*, as observed by him near St. Malo, asks "if this form of the feather-star has been found on the English coast?" I have no doubt that Dr. Carpenter has had the satisfaction of procuring specimens of this form of the *Comatula* since he discovered a habitat for the perfect animal in the Bay of Lamlash, off the Isle of Arran. Several years since, during a tour in the west of Scotland, I was busily engaged dredging in Lamlash Bay, and frequently I was delighted to find this beautiful star-fish among the numerous "treasures of the deep" which we hauled into the boat, and I fondly imagined, at the time, that I had been the fortunate discoverer of this very rare star-fish, little knowing that Dr. Carpenter was before me. One of my specimens was unusually large, being several inches in diameter, and of a fine dark red colour. Being very anxious to preserve him, it occurred to me that I would mount him as a sea-weed, on paper, well knowing that any attempt to dry the creature, out of his native element, would end in disappointment; so, having cautiously placed him in a deep dish of sea-water, I gently slipped a piece of drawing-paper under him, and raising my hand quickly out of the water, I had the satisfaction of seeing the extended arms of the comatula fixed to the paper, so securely, that notwithstanding the efforts of the creature to free itself, it was unable to detach any portion of the arms, except a few joints near their connection with the disc-like body of the animal, and this was accomplished only in consequence of those portions of the arms being elevated above the surface of the paper. The self-mutilating propensity of these irritable creatures is well known, and I therefore considered myself very fortunate in having secured so much of a genuine specimen of *Comatula rosacea.* The star-fish is now in the possession of my friend Mr. S. Highley, of Green-street, Leicester-square, who would, doubtless, be happy to show it to any one interested in this class of marine animals.—*W. H. Grattann.*

Otters.—Otters are very plentiful this year in the Teme (a tributary of the Severn), as many as five being seen together. A friend of mine started one which turned up an opening for a drain; he followed, and hit it on the head with a spade, and now has it stuffed; it is a fine specimen of a dog.—*M. J. B.*

Coral Reefs.—Captain Flinders, in the Gulf of Carpentaria, held his course by the sides of limestone reefs, five hundred miles in extent, with a depth irregular and uncertain; and more recently, Captain King seven hundred miles, almost a continent, of rock, increasing and visibly forming; all drawn from the waters of the ocean by a minute creature, that wonderful agent in the hands of Providence — the coral insect.—*Knapp's Journal of a Naturalist.*

Deer Poisoned by Yew-leaves.—A number of the deer in the park of the Duke of Beaufort, at Badminton, have been poisoned in a singular manner. There is a large yew-tree in the park, the branches of which are some feet from the ground. The late snow bore down the branches until they were within reach of the deer. The animals nibbled the leaves, and between thirty and forty have died, and a number are still suffering from the effects of the poisonous juice of the leaves. —*Herts and Essex Journal.*

Sparrows on the House-top.—At the house of Lady Soame, in Hereford-square, Brompton, is a Corinthian column reaching to the top, in the capital of which, as long ago as last spring, a pair of sparrows built their nest. About the time the young birds were hatched Lady Soame had a cage or covering of wire-work placed over the capital, one top of which came just under the nest; and it happened that shortly afterwards two of the young birds fell through. The meshes or openings of the cage were just large enough to admit them, as they then were, but not the old ones; and as they had not strength, probably, to force their way out as they came in, there they had to remain. The consequence was, that in their progress to maturity, they also became too large to pass through their prison-bars; and there they have remained, imprisoned but alive, from that time to this. The most extraordinary part of the story is, that the old birds not only continued to feed the young ones through the wires of the cage while they remained unfledged, but they have done so ever since. They have been seen, from day to day, to bring them food; indeed, had they not done so, it is plain the young ones could not have been, as they now are, alive, and, to all appearance, well. Could the old birds have managed by any means to give them water? or could the young ones have obtained a supply from the eavesdroppings, or in any other way? Or can birds really exist without water?—*Edward Morton, in the Field.*

ENTOMOLOGY.

Entomological Society of London.—The council are making strenuous efforts to augment the number of their members and subscribers, so as to enable them to publish more of the valuable scientific material in their hands. In this effort we wish them entire success.

The Driver-ant.—Fire will frighten almost any creature; but it has no terrors for the driver-ant, which will dash at a glowing coal, fix its jaws in the burning mass, and straightway shrivel up in the heat.—*Homes without Hands.*

Wasps scarce in London.—When we lived in Walworth, we scarcely ever saw a wasp in or about the house; but here on Denmark Hill they are tolerably plentiful. I think the fact of their extreme scarcity in central London may be accounted for by their seldom going more than two miles from their nests. Wasps may be abundant enough at Barnes, and yet quite unknown "in London."—*W. R. Tate.*

Hybernation of Flies.—On the 9th of October, 1863, I ascended a disused semaphore in Surrey for the purpose of enjoying the view from the top. On it was a flag-pole notched for climbing, like the bears' pole in Regent's Park, and covered with red baize. In order to climb this pole, I took hold of it, when out tumbled, through holes in the baize, and at the bottom of it, scores of bluebottles. I conceive that they must have got there to pass the winter in a state of torpidity, and probably T. H. F.'s were induced to leave their hybernacula prematurely by the heat of his rooms.—*W. R. Tate.*

Development of Butterfly-wings.—Mr. Sidebottom, in a paper read at the Literary and Philosophical Society, Manchester, January 16th, said that the great and rapid increase of size in the wings of the Lepidoptera, soon after the insect emerges from the chrysalis, is caused by air, taken in through the spiracles, being sent into the vessels of the wings; the membrane is expanded in consequence, and the scales, which were before packed under each other as closely as possible, are made to slide out until they remain in the fully-developed wing like the tiles of a roof. He exhibited preserved specimens of the currant moth and the tiger-moth with the wings, both in their small and in their expanded state; also a coloured sketch of one of them; and it was seen that in the unexpanded state the wings lie flat without any folding; and all their markings are a correct representation in miniature of what they ultimately become.—*The Reader.*

The Treasury has authorized the expenditure of £3,000 for printing the Royal Society's "Index to the Scientific Periodical Literature of the Nineteenth Century."

What do Crickets eat?—I am afraid that my own experience will not lead me to regard crickets with a favourable eye, if I look at the *useful* rather than the *ornamental.* I have by me at the present moment a pair of slippers, the soles of which are very much gnawed by the crickets. They must plead guilty, for they were caught in the act. A young friend of mine can tell you dolefully that they do not confine their ravages to *old boots.—R. B.*

A Wasp and its Victim.—I once witnessed a combat between a wasp and a yellow underwing moth. The wasp espied the moth in a small outhouse, andimmediately attacked it; the moth, with no offensive weapons, struggled bravely for nearly half-an-hour. At last, however, the wasp killed it; it immediately severed the head and body from the tail, and flew off with it; it returned after about ten minutes for the tail, with which it fled away too; it did not take the wings.—*J. A. M.*

Ants Storing Grain.—It is disputed by some whether ants do carry off grain and store it; but the following incident will show that they do so, and to a considerable extent. At the side of my house at Zante there was a threshing-floor, or rather the paved space was converted temporarily into one, a pole having been fixed in the centre, to which horses were attached, and driven round and round to trample out the corn. A pile of wheat was left here unthreshed for a few days. In the meantime the ants committed depredations upon it, and, on one of their nests being opened, two good-sized tin cansful of grain were found deposited in it.—*J. J. Lake, in Athenæum.*

Killing Insects for the Cabinet.—Years ago I advocated cyanide of potassium for killing all insects, or rather (if good and easy setting be an object) for stupifying them as immediately as by chloroform, after which they may be killed with oxalic acid if lepidopterous, &c., or by boiling if coleopterous. A small fragment wrapped in blotting-paper, and placed under a perforated-card false-bottom in a wide-mouthed bottle, soon renders the enclosed air more deadly than chloroform; whilst no expense or difficulty attends the use of this substance, which, for photographical purposes, may now be met with everywhere; also, when combined with old laurel-leaves, no stiffening will be found to ensue, even when insects are suffered to die, and remain all night in the bottle. My own plan with Lepidoptera is to pill-box them, and then, as shortly after as possible, to open the pill-box over the wide-mouthed bottle containing the cyanide, into which the moths almost immediately fall, when they may be taken out, stabbed with oxalic acid, and set or left as preferred. By this means females may be also left to deposit their eggs or not, without difficulty.—*W. D. Crotch, Weston-super-Mare.*

BOTANY.

PRIMROSES IN A ROOM.—There is a very easy, but I do not know whether it is a commonly known, way of keeping primroses in bloom in a room. The *whole* plant should be taken up, and the mould cleared from the roots. It should then be placed in a shallow vessel kept well supplied with water (an ordinary saucer will serve the turn admirably). With a little moss placed round the plant, it forms a very pleasing, although simple ornament to the drawing-room table. The plant will continue to bloom for weeks, and generally produces abundance of flowers. These, after the first few weeks, become of an unusually pale tint, and prove, I fancy, that artists are right in saying that primrose-colour is a delicate green. Some plants that have been tried this year had flower-stalks seven, and even more, inches in length.—*R. Bl.*

THE IVY (*Hedera helix*).—Is it a generally-known fact that the ivy occasionally produces blossoms in the early spring, as well as in the autumn? I find in my diary for last year an entry, under the date of March 7, to the effect that I then observed, near Parson's-green, Middlesex, a branch of ivy, almost leafless, bearing several heads of blossom of a *bright yellow* colour; and on the 25th of last month, I noticed, in a hedge near High Wycombe, a similar specimen, having two or three heads of well-developed flower-buds. In both cases the specimens had flowered in the previous autumn. Perhaps some correspondent may be able to adduce similar instances.—*B.*

TUNBRIDGE FERN (*Hymenophyllum Tunbridgense*).—This interesting species is included in the last number of "Beddome's Ferns of Southern India," where the author states that he has found it on the mountains close to Chokampatty (Tinnevelly), at an elevation of 5,000 feet. It had previously been found in Ceylon, and also to extend to the Australasian Colonies.

DEVONSHIRE MISLETOE (see p. 88).—Our correspondent was certainly wrong in affirming that the *misletoe* and *cowslip* are unknown in Devonshire. We have received several communications, which we regret that our space will not allow us to publish. Both plants have several localities in this county, and the misletoe does not appear to be at all rare.—*Ed. Sc. G.*

HORSE-CHESTNUTS.—In a village, about three miles from Puteaux, near Paris, was, four years ago, a large starch manufactory. The materials consisted wholly of horse-chestnuts, and the starch was excellent.—*P. B. S. J.*

NEW IRISH DIATOM.—The *Microscopical Journal* contains an account of the discovery of *Arachnoidiscus ornatus* in a pool of brackish water at Malahide, in the county of Dublin.

THE LANGUAGE OF FLOWERS.—Can you picture to yourself a man going wooing with a "Delphinum Donkelærii" in his button-hole? Don't you think Snapdragon hardly an august enough translation of "Antirrhinum caryophylloides?" No humble-bee would venture to show its nose in an "Indigofera-coccinea endecaphylla," and I should like you to tell me, off-hand, what a "Guiterezia gymnospermoides" smells like, or a "Cucumis aradac."—*Jones' Holiday Papers.*

BLOODY-MAN'S FINGERS.—Adverting to p. 36, the reason why some parents discard orchis-flowers from their children's nosegays, may have some superstitious connection with the legend which states that a species of *Orchis* grew plentifully on Mount Calvary, and was unspotted until the crucifixion, when some drops of blood fell, and spotted it. There are many such legends, one of which, equally authentic, states that the aspen has always been tremulous since that event, because "the cross" was made of its wood. It has also been affirmed, on the same authority, that the fig-tree poisons all other trees near it, having acquired this property only since the curse was pronounced on "the barren fig-tree."—*A. V.*

CRYPTOGAMIC VEGETATION IN SIKKIM HIMALAYA.—There were few mosses; but crustaceous lichens were numerous, and nearly all of them Scotch, Alpine, European, and Arctic kinds. The names of these, given by the classic Linnæus and Wahlenberg, tell in some cases of their birthplaces, in others of their hardihood, their livid colours and weather-beaten aspects; such as *tristis*, *gelida*, *glacialis*, *arctica*, *alpina*, *saxatilis*, *polaris*, *frigida*, and numerous others equally familiar to the Scotch botanist. The lichen called *geographicus* was most abundant, and is found to indicate a certain degree of cold in every latitude: descending to the level of the sea in lat. 52° N. and 59° S., whilst in lower latitudes it is only to be seen on mountains. It flourishes at 10,000 feet in the Himalaya, ascending thence to 18,000 feet. Its name, however, was not intended to indicate its wide range, but the curious map-like patterns which its yellow crust forms on the rocks.—*Hooker's Himalayan Journal.*

SELF-FERTILIZATION.—It is an astonishing fact that self-fertilization should not have been an habitual occurrence. It apparently demonstrates to us that there must be something injurious in the process. Nature thus tells us, in the most emphatic manner, that she abhors perpetual self-fertilization. —*Darwin's Fertilization of Orchids.*

MR. DARWIN has announced a new work, entitled "Domesticated Animals and Cultivated Plants, or the Principles of Variation, Inheritance, Reunion, Crossing, Interbreeding, and Selection under Domestication."

Furze-leaves Trifoliate.—The seedling furze (*Ulex*) has, at first, no spines. The young stem is clothed with leaves from twelve to twenty in number; these are shortly petiolate and trifoliate, consisting each of three small elliptical hairy articulated leaflets. When the stem becomes five or six inches in length (usually), the trifoliate leaves cease to be developed, and spines are then produced. We thus see that in *Ulex* the perfect leaves appear during the early period of the plant's development, while in the Australian *Leguminosæ*, their production is delayed till the maturity of the plant. *Ulex*, however, is truly a plant with compound trifoliate leaves, not simple-leaved, as stated in many works.—*Professor Lawson, in Trans. Bot. Soc. Edin.*

Botany at the Cape.—The Rev. Dr. Brown, Colonial Botanist at Cape Town, has recently addressed a circular to the missionaries in South Africa, beyond the Cape Colony, calling upon them to procure collections of plants, and forward them through him, or direct, to Europe, so that the vegetation of that portion of the world may become better known. A letter from the same gentleman, containing further particulars of that singular plant, the *Welwitschia mirabilis*, has also been printed and circulated.

Notes on Irish Plants.—1. *Barbarea intermedia.*—This species I inserted in my Flora of Belfast as *B. præcox*. Mr. G. More, F.L.S., a few days since, suggested to me the probability of its being *B. intermedia*, which he was the first to discover in Great Britain, in the county of Armagh. On comparing the Irish plant with *B. præcox* and with a French specimen of *B. intermedia*, its affinities with the latter were at once obvious. This species first occurred to me, in 1862-63, very sparingly about Belfast, but in several localities. During the spring of last year it occurred in profusion on the borders of fields and on railway-banks, on the light sandy soils of the valley of the river Lagan, from Derriaghy to Hillsborough, especially along the line of the new railway from Lisburn to Hillsborough. From Hillsborough it rapidly decreased in numbers; but a few stragglers I had now and then met with as far west as Bainbridge. Its diminution in this direction is to be accounted by the fact that a few yards west of Hillsborough the underlying rock is an argillaceous slate-rock, or a slaty shell.

2. *Rubus Kœhleri.*—A batch of Belfast *rubi*, sent to me, and collected by my late companion in the field, Mr. S. A. Stewart, were kindly named a few days since by Professor C. C. Babington; he makes the following note on one specimen:—"*Corylifolius* β=*Kœhlerii*, alone is new to the country." The locality yielding this new species is Carmoney, situated 3½ miles to the north-east of Belfast, or the slopes of the Belfast hill range.—*Ralph Tate, F.G.S.*

Preservative Power of Ferns.—In corroboration of your correspondent H. M.'s statement respecting the superior preserving quality of the bracken fern over straw, I may mention that the country people in this part of Somerset thatch over their potatoe "buries" with it, saying that they keep better under it than when straw is used. Ferns possess a volatile oil and resin, to which "the peculiar odour" noticed by H. M. is probably due, and which most likely makes them distasteful to insects, &c., though I well remember one afternoon last summer watching a hive-bee industriously using its proboscis on the young shoots of the bracken, and viewing it through a pocket magnifier, I found it sucked the moisture exuding from the young stems of the undeveloped fronds. The larvæ of *Hepialis velleda* (swift moth) feeds on the roots of this fern. Our Exmoor ponies crop its young fronds with avidity, and donkies also eat them and other common ferns. The young fronds of ferns are sometimes attacked by caterpillars when cultivated in a green-house, and I have found a white grub banqueting on the dried fronds of *Scolopendrium vulgare* in my herbarium. Ferns in tropical climates are said to contain a greater degree of nutriment, while the medicinal qualities are not so great as in those of temperate regions. In India, New Zealand, &c., several kinds are used as food, and it is possible that the ferns of these countries may be more tempting to the insect tribe than they are with us. Hugh Miller in his "Testimony of the Rocks" says, "The thickets of ferns which cover our hill sides scarce support the existence of a single creature," which, I believe, is a true statement; but perhaps it is hardly correct to infer from this, that the luxuriant ferns which formed the earliest terrestrial flora of these islands were *equally* unfavourable to the support of animal life: they doubtless resembled in their qualities the ferns of tropical climates; and it would be interesting to learn from the observations of naturalists in those climes, what insects and other animals feed upon them. In Frémont's "Journey to the Rocky Mountains" he relates that their horses and mules feed upon *Equisetum hyemale*, and in another part he speaks of their animals luxuriating on "prêle," that is, *Equisetum*, commonly called "horse-tails," allies of the fern genus. In the "Botanical Chart" of my lamented friend Miss Warren it is stated, "that in the north of Europe starch is made from the roots of *Osmunda*, and bread from those of the bracken, and that in the times of Henry the Sixth the people of England were reduced to the use of this bread."—*J. Gifford.*

Believe me, the talent of success is nothing more than doing what you can do well, and doing well whatever you do, without a thought of fame. —*Longfellow.*

MICROSCOPY.

Proposal to London Microscopists.—It appears to me that some association amongst the amateur microscopists of London is desirable, which shall afford greater facilities for the communication of ideas and the resolution of difficulties than the present Society affords, and which, whilst in no respect hostile to the latter, shall give amateurs the opportunity of assisting each other as members of an amateur-society, with less pretensions, holding monthly meetings in some central locality, at an annual charge sufficient to cover the incidental expenses—say five shillings a year—on the plan of the Society of Amateur Botanists. By the publication of this letter the general feeling of the parties interested will be ascertained, and by this future action determined.—*W. Gibson.*

N.B.—We insert our correspondent's communication, and would be glad to hear from any microscopists desirous of co-operating with him in carrying out his proposition.—*Ed. Sc. G.*

Mounting Opaque or Transparent Objects.—In reference to a mode of mounting for opaque objects I have found that, after trying cardboard, gutta percha, india-rubber, ivory, moulded shellac, &c., none answer my purpose so well, or look so neat, as those which are to be made from fishing-rod rings. My *modus operandi* is as follows: With a common gun-wad punch, punch out the paper, to form the back-ground, a little less than the ring, but slightly larger than its internal diameter. The paper need not be dead black, as, if so, its texture will be so coarse as to show its roughness with a 2-inch objective. A very dark bronzed highly-finished paper will be found the best. Have ready a number of the rings, blacked inside with Brunswick black, those measuring ½-inch external diameter being most useful. Next, centre a slip of glass on your turn-table, and with a little gum fix the paper in the centre of the slide, and by the time that you have thus papered, say six dozen, the first slip will be ready for the next stage, when you again centre on the turn-table, and just on the outside, but touching the paper, run a thin ring of gold-size, upon which drop the prepared cell; and so on with the remainder. When all are done, place them on wooden trays, and bake them on the top of the oven. In the course of a day or two again gold-size the cell, letting the size extend only a short distance on the glass beyond the circumference of the cell. When this second coat is dry, a third of Brunswick black may be laid over the whole exterior, filling up, as much as possible, the angle formed by the outer wall of the ring and the surface of the glass. In placing the object, a sufficiently small portion of gum may be generally taken up with a fine brush, just enough to make the object adhere firmly, and yet not to show beyond its margin. In fixing the glass cover again use gold-size, as being probably the most tenacious cement there is, and as being less liable to "run in" than the majority of such. After one or two applications, made at longish intervals, the whole may be finished off with Brunswick black. I say the applications are to be made at longish intervals, because I find that most of my friends are in far too great a hurry with their work, putting on coat after coat long before the last application can possibly be dry. Brunswick black and other brittle cements should never be used where adhesion is of the first consideration. As to the mounting of transparent objects, I am now using the glycerine jelly, recommended by Mr. Lawrence in the *Microscopical Journal*, and referred to in that, to the working microscopist, indispensable little brochure, "The Preparation and Mounting of Microscopic Objects," by Mr. Davies, and in which work the reader will find instructions for its employment. I can certainly recommend it most highly as being easily workable, clean, a most excellent preservative, and the object quickly put up and finished; the latter being a great desideratum with novices. If it had no other advantage there is one greatly in its favour, viz., that there is no fear of leakage. Whilst confervoid growths—to which, it is said, the jelly is somewhat liable, though I have not found it so—might probably be entirely avoided by always keeping the bottle closely corked, and carefully sealing the object mounted by a ring of cement.—*J. E. W.*

GEOLOGY.

Granite.—Granite, generally and theoretically, consists of crystals of quartz, of felspar, and of mica embedded in crystalline quartz. Practically, all porphyritic rocks are called granites. In many of these rocks the mica is replaced by hornblende, the result being the variety called Syenite. The mica and hornblende are sometimes absent or present in very small proportions. The quartz sometimes preponderates, and is sometimes almost absent. The felspar is sometimes in distinct crystals and sometimes only crystalline. The felspathic portion of the stone also is sometimes felspar proper, but occasionally *albite*, in which the alkaline element is chiefly soda instead of potash. The crystals vary in size and in the mode of their distribution, so that the granite may be coarse or fine grained. Some kinds of granite are brittle, and others singularly tough; some very easily break along lines of natural fracture, and are comparatively soft while yet fresh from the quarry, while other kinds resist any regular fracture, and are only reduced to a desired shape with extreme difficulty, even when first obtained. Chemically, true granite is a silicate of alumina and potash, with a little iron and lime, and with soda sometimes replacing the potash and magnesia the lime. This analysis, however, only indicates the ultimate elements, and not the mineral composition of the rock; and, to a certain extent, granites must be regarded as mixtures of crystalline minerals in various proportions. Thus it is also useful to observe that an average granite may be expected to contain from two to three-fifth parts of crystals of quartz or crystalline quartz, about the same, more or less, of felspar, also partly crystalline and chiefly in definite crystals, and the remainder (one-tenth part) of mica. But the mica may form two or three-tenths and the quartz three-fifths, or more, while the proportion of felspar, as well as the particular composition of the felspar, both vary extremely. Good ordinary granite weighs 166¼ lb. the cubic foot, and the cubic yard as nearly as possible two tons. Fourteen cubic feet to the ton is the usual estimate. Its toughness or resistance to crushing weights is very great, and is believed to vary a great deal in different samples. For practical purposes it is safe to assume that fresh unweathered granite will bear any direct crushing weight to which it can be exposed. Granite contains a certain amount of water capable of being driven off by continued exposure to a heat insufficient to produce any other change. This quantity differs much in different specimens, even of the same stone, but it may be said to be represented by the "loss" in the table of analysis. It averages, therefore, about 0·8 per cent. Taken in its ordinary state, and containing this quantity of water, it is still sometimes capable of absorbing about one-fourth more (or 0·2 per cent.), when placed in water for a few hours. This quantity is, however, rather larger than could be expected of a good sample. Expressed in another way, I may say that a cubic yard, or two tons weight of granite, contains, in its ordinary state, something more than 3½ gallons of water, and some specimens can absorb nearly a gallon more on being placed in pure water for a short period. It is important to notice this fact, as the influence of frost on stone is in proportion to the water it takes up, and determines its durability.—*Ansted's Lectures on Practical Geology.*

Festoons of Driver-ants.—First a single ant clung tightly to a branch, and then a second insect crawled cautiously down its suspended body, and hung to its long, outstretched limbs. Others followed in rapid succession, until they had formed a complete chain of ants, which swung about in the wind. One of the largest workers then took its stand immediately below the chain, held firmly to the branch with its hind-limbs, and dexterously caught with its forelegs the end of the living chain as it swung past. The ladder was thus completed, and fixed ready for the transit of insects; and in a similar way the whole tree was covered with festoons of ants, until it was blackened with their sable bodies. —*Homes without hands.*

WINDOW GARDENS AND AQUARIA.

Red-leaved Sea-weed (*Delesseria sanguinia*).—The eight leaves of this alga, sent herewith, are taken from a specimen which grew in the aquarium of the Zoological Gardens, Hamburg, in the winter and spring of 1865. Is any other instance known of the plant having thus grown from a very young state, or from seed, in a tank? It is the first time I have known it do so. I found it by accident in a deep and nearly dark hole in a large tank in which specimens were placed in the summer of 1864, but which specimens died. The present specimen is parasitic on the stem of some long alga (probably a *Fucus*); but it is also so much covered with conferva that not much of it can be seen. The conferva does not grow on the *Delesseria* leaves. Last night, on clearing out the tank in question, the alga was for some hours exposed to the air, and this morning some of the leaves were found of an orange colour—the colour of death, and these leaves are those now sent; but the orange (decayed) parts are not so apparent as when they were in water. But there are still plenty more of much smaller leaves on the same stem, and these will be watched carefully. —*W. Alford Lloyd, Keeper of the Aquarium.*

Aquarium and Fernery.—The salt-water aquarium before me is about 16 inches diameter and 8 inches deep, covered with a bell-glass about 2 feet high, but not fitting closely. The lower vessel is two-thirds filled with sea-water; in it, besides other living organisms, are various anemones, of all sizes and ages, gathered from different parts of our coast; fine shingle, bits of rock, coral, &c., are strewn on the bottom, many of the latter are covered with bright emerald green vegetation of spontaneous growth. In the centre stands a tripod supporting a wooden basin. The former consists of three strong zinc wire legs; both these and the basin are concealed by specimens of rocks, &c., collected from various places and firmly fixed with good Roman cement. In the basin filled with cocoa-nut fibre we have found almost any kind of common fern will grow (*Adiantum capillus-veneris, cuneatum, pubescens, pedatum. Asplenium viviparum, gracile,* and *Sandersonii,* with many others, grow well). Last year some sowed themselves in the crevices of the rocks, forming a pretty fringe just above the water The brushwood in this miniature forest is any kind of *Lycopodium,* except *cæsium,* which does not succeed well with us. I think succulent ferns do the best. The water is in a good state, and has not been changed since last October. I have grown ferns in pots in the room for several years in unmixed cocoa-nut fibre with charcoal for drainage, and the "mould" never appeared.—*Leonora.*

NOTES AND QUERIES.

CAPE PIGEONS.—(*W. B. D.*)—The birds thus named by sailors are a species of Petrel (*Daption capensis*), and the Cape hens are probably of the same character belonging to a different species, or perhaps a kind of gull. Something more than a merely common name is necessary to determine them with certainty.

JERUSALEM ARTICHOKE.—Why so strange a name is given to *Helianthus tuberosus*, I cannot guess. I know that its original name, "Topinambour," was given from the American people Topinamboun, from whom we had this alimentary root. That its first English name, "Jerusalem," is a corruption of the Italian *Girasole*, French *Tournesol*, Latin *Helianthus* (derived from the Greek), or the English "Sunflower," I have no doubt. But why is it styled "Artichoke?" The proper artichoke (*Cynara scolymus*) has an Arabic origin, *Kharchiof* (whence the Italian *Carcioffo*), and means a *dog*, or *spiny-cole;* but this has nothing to do with the commonly called "Jerusalem Artichoke." By the bye, does the latter ever flower in England?—*J. G.*

MANX CATS.—A. L. D. desires to be informed of the origin of Manx cats, and whether any other race of cats without tails exists?

REED PENS.—The Semitic nations are guiltless of such an innovation as steel pens. In the Indian archipelago pens are made of the petioles of the Gomuti palm (*Arenga saccharifera*), and in Continental India two or three species of reed are employed for the same purpose as the shur (*Saccharum Sara*) and khuree (*Saccharum fuscum* and *S. procerum*). Reed pens are still employed in Egypt, Arabia, Persia, &c. The *style* of pointed iron or steel is also used for writing upon the leaves of the talipot (*Corypha umbraculifera*), tara (*Corypha taliera*), and palmyra (*Borassus flabelliformis*) in India, Ceylon, Burmah, and elsewhere.

PALM TINDER.—A correspondent having taken exception to the remark at p. 78 on the tinder of the Gomuti-palm, we would be glad to know wherefore? It is well known that several species of palm yield a substance of a similar nature, such as the sago-palm (*Raphia Rumphii*), the date-palm (*Phœnix dactylifera*), and many others; that this palm-tinder is largely consumed by the Chinese, Malays, and inhabitants of the Indian archipelago, and is a regular article of trade in those countries. We must not conclude that, because we employ percussion-caps and lucifer-matches, all the Oriental nations follow our example.

REPRODUCTION OF THE EEL.—A friend who has much to do with fishes, tells me that he never found anything like a "roe" in the eel. How, then, is it reproduced?—*E.B.*—[Whether the eel be oviparous or viviparous has been much discussed. The general opinion is in favour of the former.]

WHAT IS IT?—Lately a very fine specimen of the badger tribe was captured by the gamekeeper on Lord Digby's estate at Mintern. The animal was of a pure white colour, a very rare species, and weighed over 27 lb.—*The Standard.* Query: What animal is this? Can anyone residing at or near Mintern tell something more about it?

NATTERJACK.—A. L. inquires the origin and meaning of this word as applied to a species of toad?

MACHINE FOR PRODUCING STREAMS IN AQUARIA.—Mr. Edwards, of Anglesey, announces in a circular that he has an apparatus which is much wanted, and which is cheap, single, and not liable to get out of order, and which being placed below a marine aquarium, and worked at for less than five minutes, will produce a stream (of water, I presume) in the tank above. Can anyone explain how it is done, or, more to the purpose, can evidence be given as to the contrivance having done its work as stated for a satisfactory period, without any repairs being needed, or any hitch having occurred? How much water does it deliver, and with what force during the six hours, and is there nothing corrosive about the thing?—*H.*

PARLOUR SCIENCE.—The boiling of lobsters is a process which, however speedy, one does not much like to associate with salad, or supper. The first thrill in the pot must be horrible, but it is soon over. Whereas, a slow death in an aquarium, with great eyes looking at you and offering quantities of unsuitable food, together with the puzzling resistance of the glass, like the mysterious detention of a dream, must altogether make the last hours of a "specimen" hideous. It must be as bad as dying of nightmare. "Oh! my lovely star-fish are all dead!" says charming Angelina, as she joins the breakfast-table, after nine hours of the soundest, rosiest sleep. "They are only just dead, I think," says she, with her mouth full of toast and butter. "I saw one of them move a little"—very likely. But what a night for the star-fish!—*Jones' Holiday Papers.*

MANSUCKER AND SEA-CUCUMBER.—"J.B." says, "The author does not mention that the Indians eat the octopus raw." I certainly did not, having but seldom seen them eat it in other than a semi-cooked condition, imagine that it is only from extreme hunger, or the inability from want of time to cook, or the absence of dry wood to build a fire, that induces the "noble savage" to eat his "ugly native" raw. The long sea-monster "J. B." speaks of is one of the Holothuriæ, common in the seas about Vancouver Island, where it grows to an enormous size, and, as he says, is much esteemed as a great dainty, not only by the Indians, but by the Hudson's Bay traders. There is a species closely allied (*Holothuriæ edulis*), caught in vast quantities by the Malays, dried for the Chinese market, and sold as *trepang.* Another species is very common on the coast of Cornwall, bitterly hated by the fishermen, who call it the "cotton-spinner,"—*cotton* being the slimy threads that stretch out from the creature if one touches it and then slowly draws away the finger; not a *crab* or *lobster*—so say the fishermen—will enter a "crab-pot" if a cotton-spinner finds its way in first. The "sea-cucumber"—for such it is often called—is very abundant on the Australian coasts. I have frequently tasted it as prepared for the China markets, and boiled like a lobster at Vancouver Island, and think it very good eating. "J. B.," I imagine, must be slightly mistaken, or must allude to other Indians than those native to Vancouver Islands, or the Oregon and British Columbia coasts, when he speaks "of seeing the sea-water running down their beards." With one or two solitary exceptions, I never remember seeing a savage with a *beard;* the hair is invariably *tweezered* out by the squaws as it grows.—*J. K. Lord, F.Z.S.*

FISH IN AQUARIA.—I have several times had fungus or parasites growing on gold fish, and have always succeeded in restoring them to a perfectly healthy state by placing them for two or three weeks in a tub of cold water, in the cellar, and allowing the water to drop from the tap, so as to prevent stagnation.—*H. B.*

BRITISH LAND SHELLS (*Achatina acicula*).—Mr. Ralph Tate asks if the presence of this mollusk in a living state on the surface of the soil be a previously unobserved fact? In Jeffrey's "British Conchology" it is stated that "its occurrence has been noticed by Mr. Bridgman at Norwich, on a sunny bank near the Thorpe tollbar, adhering to the roots of grass, in the loose earth between the stones." It was not, however, at the roots of the grass beneath the surface of the soil, but quite upon the top, and also in the fine loose earth among the large flint boulders, with which the bank is faced, and in the first instance adhering to the flint itself. Had it been *within* the soil, in all probability it would have remained undetected; in passing the spot a dead shell of *carocolla lapicida*, a species then unrecorded for this district, had just been discovered, and it was in searching amongst the grass and stones in the hope of finding the *carocolla* alive, which we ultimately did, that my sons came upon the *achatina*. It is now at least ten or twelve years ago, and several dozens were taken at various times during the year or two they were sought for, but it does not appear that any have been found lately.—*W. Kencely Bridgman.*

GREEN CONFERVA.—I wish very much to know the name of this plant? It is a very common inhabitant of "pools by the wayside," and forms masses of a green substance. It is a very beautiful object in the microscope, dark masses of green in the midst of tubes of hyaline.—*E. S.* [The specimen sent consists principally of a young spirogyra, mixed with it is also a diatom of the fragillaria, in broad bands with narrow divisions, the width varying much according to age. The species of the first, it is impossible at so early a stage to decypher. The writer will find it very interesting to watch it through the spring. It will keep well in some of its own water in a glass vessel.—*J. B. H.*]

SIX-SPOT BURNET?—In the Isle of Wight I have observed a black moth, about half-an-inch in size, the upper wings transparent, and spotted with red. The caterpillar is green, with black dots placed at regular intervals, and remains in the chrysalis state in a silky-looking cocoon, attached to a blade of grass. They were very numerous on a chalky spot above the Undercliff. "A. R." would be glad to learn its name. —[From the description, it would appear that your insect is a species of *Anthrocera*, probably *Filipendulæ*, called the "Six-spot Burnet." There are three closely allied species, *Trifolii* and *Loniceræ*, with 5 crimson spots, and *Filipendulæ*, with 6 spots, on each fore-wing. You should have sent a specimen. —*F. M.*]

SALMON MAUT.—It is the pleasure of many followers of good old Izaak Walton, in North Lancashire, to angle for a fish they call "salmon maut." The best sport is after heavy rain during the autumn months. The fish, *to look at*, are like young salmon, and vary in weight from $\frac{3}{4}$ lb. to 3 lb. Can any lover of the rod kindly tell me why the name "maut" is given, how it is spelt, and whether the fish belong to the salmon or the trout tribe?—*F. S. T.*

WHAT IS AN INCH OF RAIN?—The last weekly return of the Registrar-General gives the following interesting information in respect to rainfall:—"Rain fell in London to the amount of 0·43 inches, which is equivalent to 43 tons of rain per acre. The rainfall during last week varied from 30 tons per acre in Edinburgh to 215 tons per acre in Glasgow. An English acre consists of 6,272,640 square inches, and an inch deep of rain on an acre yields 6,272,640 cubic inches of water, which at 277·274 cubic inches to the gallon makes 22,622·5 gallons; and, as a gallon of distilled water weighs 10 lb., the rainfall on an acre is 226,225 lb. avoirdupois; but 2,240 lb. are a ton, and consequently an inch deep of rain weighs 100·993 tons, or nearly 101 tons per acre. For every 100th of an inch a ton of water falls per acre." If any agriculturist were to try the experiment of distributing artificially that which nature so bountifully supplies, he would soon feel inclined to "rest and be thankful."—*Times.*

GEOLOGICAL QUERIES.

"T. R." writes:—"In my search for fossils among flints I am frequently meeting with those which, upon being broken, exhibit flinty casts in their interior of a very perfect conical form; excepting some imperfect circular groovings I cannot detect any reticulations of the surface. They bear no resemblance to echini, and I can hardly imagine them to be ventriculites." They are casts of the alveolus, or conical cavity, in which is lodged the phragmacone of *Belemnitella mucronata.*—*R. T.*

"F. P. P."—We recommend the following works to enable you to name your Petherwin fossils:—M. M. Edwards and Haime's "Monograph of the Corals from the Devonian Formation" (1853). The Palæonthographical Society's Publication, vol. xvi., issued for 1864, contains the first part of the "Devonian Brachiopoda," by Mr. Davidson; this monograph will be completed in the forthcoming volume. In the same volume is commenced a "Monograph of British Trilobites," by Mr. Salter; a few Devonian species are described. For the remaining forms "Phillips" must suffice.—*R. T.*

"J. A."—Seven Oaks will well repay a visit. The principal geological formation is the lower greensand, with the wealden on the south, and the upper cretaceous on the north. The railway cutting and tunnel, now in course of construction, afford excellent opportunities for the examination of the lower greensand and wealden. A few quarries are opened in the lower greensand on the roadside from the station to the town. To the south-west of the town strike on to the railway cutting (it would be advisable to obtain a pass from the secretary of the South-Eastern Railway), and near the mouth of the tunnel the Atherfield beds are finely exhibited, and contain a few fossils; examine the *débris* of the shafts for weald-clay fossils in passing over the hill. At the south-end of the tunnel the Hastings sands appear. In a future number we propose giving a full account of the natural history of this delightful locality.—*R. T.*

"J. W. C." informs us that he has verified Mr. Tate's observations on "Planorbis Corneus" (see SCIENCE GOSSIP, No. 3, p 61).

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."

J. G.—Both specimens marked *Dicranella* are *Dicranum heteromallum*.—*G. E. H.*

J. W. L.—Your plant, resembling a coralline, is a species of seaweed, bleached by exposure, known as *Jania rubens*.—*W. H. H.*

W. W. K.—The objects from the Baltic, called "gold shells," are insects; the scientific name is *Margarodes formicarum*. See paper on them in "Linnæan Transactions," Vol. XVI., p. 115, and plate 12.—*J. E. G.*

E. B.—The galls on bramble are produced by *Cynips aptera*. —*F. M.*

S. A. J. (*Brampton*).—Will you favour us with name and address that we may comply with a request?

G. R., Jun. — Often observed and described in botanical works.

Hedgehogs.—We have, during the past month, received seventeen communications on this subject, some of considerable length, which collectively would occupy at least twelve pages. We may hereafter utilize one or two, but a "hedgehog number" is not a desideratum. Notwithstanding which, all those correspondents will please to accept our thanks.

W. W. S.—We have not seen any announcement of "Busk's Marine Polyzoa."

M. P. W.—An immature specimen of fresh-water conferva from whence its name cannot be correctly determined. It is in a bad condition.

A. T. L. (*Sunbury*).—"Rivers's Orchard House," published by Longmans, at half-a-crown, would, perhaps, answer your purpose.

W. E. R.—To all the queries within our province, the answer will be in the negative.

T. P. B. (*Newcastle*) would exchange *Diatomaceæ* slide for slide with any one possessing duplicates of other species. Lists can be exchanged through the Editor.

H. G. S.—Study "Westwood's Introduction to Entomology."

S. A.—We think our contributor wrong in his apparent belief that both are the same species. *Lemna gibba* has been placed in a separate genus, though not commonly recognized as generically distinct. It would be well if you could find it in flower.

British Butterflies.—Is it possible that R. S. has not seen Mr. E. Newman's admirable "Butterfly Number of Young England?" It is a marvel, and the sixpence expended in its purchase will *never* be regretted.

J. G.—Your supposed *Cetraria* is *Cornicularia aculeata*.

B. F.—Your query cannot be clearly answered in a word or two. As soon as possible it shall receive an extended explanation, which will, probably, prove acceptable to many of our readers.

Z. Y. X.—In answer to your query, p. 95, a correspondent writes:—"The phenomenon is owing to the desire of the finny tribe to escape from confinement. They open their mouths to catch the insects which constitute their food." See also "Owen's Comparative Anatomy," p. 105.—*L. N.*

J. R. (*Bognor*).—Your supposed discovery certainly requires confirmation.

H. A.—Gardner's "Taxidermy, or Bird-Stuffing made easy."

J. F. C.—The cats have never confided their secrets to us.

Acacia Flowers.—A correspondent has preserved a number of these with their pollen for distribution. A portion mounted as an opaque object is strongly recommended for the microscope. Stamped envelopes may be sent to J. M., Greenfield View, Egremont, Cheshire.

Tussilago Hybrida.—Forwarded to its destination.

Mosses.—We regret that we do not possess the leisure to *name* specimens. See also p. 97.

British Hepaticæ.—It is contemplated to issue a list, with figures and descriptions of every species, at a very cheap rate.

Webster's Economic Condenser.—Several correspondents having made inquiries of us concerning this condenser, we are permitted to refer them to Mr. John Webster, 9, Adelaide Cottages.

J. W. (Amlwch).—The correct title of the book named in our last is—"Lessons on Elementary Botany by Professor Henslow, edited by Professor Oliver," published by Macmillan & Co.

C. S. B.—See the same query, p. 71, and its answer, p. 119.

Nyssia Zonaria.—A correspondent writes us that during an excursion to the sand-hills at New Brighton, Cheshire, in search of this insect, he was successful in capturing both male and female specimens in good condition; and that he expects to secure the breed. Should any reader be wishful to exchange, he would be glad to communicate with him, several of the females having already deposited ova.—D. Baxendale, Akroydon, Halifax.

Florence Flask-Covers.—A subscriber informs us that he has discovered the material employed for the basket-like covers of Florence oil-flasks to be the sea-wrack (*Zostera marina*).

J. F. C.—The pegs are most likely bamboo; the leaves are *not* those of the maize, but possibly of a large-leaved species of bamboo.

H. (*Gisburne*).—Your query has been sent, and replied to elsewhere.

A Hint for Contributors.—If our contributors will oblige us by always using the common names of plants, animals, insects, &c., wherever there is a common name in use, to be followed by the scientific name in brackets, this will save us a large amount of trouble in sending their manuscript to press. As we do not pretend to address scientific readers alone, vernacular names are indispensable.

Communications Received.—J. B. (Humber).—P. B. St. J. —D. E. G.—E. H. B.—R. H.—P. S.—A. S.—W. W. K.—J. B.—E. B.—B. T.—T. P. B.—W. A. L.—F. W. (already recommended).—A. C. G.—R. K.—J. A.—A. F. L.—D. R. R. —J. M. S.—C. A. J.—C. S. B.—S. A. S.—H. Gisburne.—A. B. F.—Inquirer.—J. E. W.—W. R. T.—A. L. D.—J. R. J. —J. W.—B. T.—A. J. R.—R. H.—R. Bl.—W. H. B.—R. S. —G. S.—W. E. R.—H. G. S.—T. S. (not authenticated by the writer's name and address).—W. A. L.—W.—W. N.—W. Ross.—F. J.—J. F. C.—L. S.—A. L.—L. N.—E. B.—J. W. (*Amlwch*).—F. J. F.—J. M.—Vigilans.—G. L.—A. X. M.—T. T. C.—A. O.—M. W. B.—E. C. E. (we think so).—D. B.—A. M. B.—H. A.—J. S. W.

Popular Names.—M. H. L.—L.

BOOKS RECEIVED.

"Stammering and Stuttering; their Nature and Treatment." By James Hunt, Ph. D., &c. Sixth edition. (Longmans.)

"The Applications of Geology to the Arts and Manufactures." By Professor Ansted. (Hardwicke.)

"Old Bones; or, Notes for Young Naturalists." By Rev. W. S. Symonds. (Hardwicke.)

"Popular Science Review," No. 15, April, 1865. (Hardwicke.)

TOM TIDLER'S GROUND.

Think of your home on "Tom Tidler's ground,"
Among the gold and silver.—*Eliza Cook.*

"TOM TIDLER'S GROUND" was the romantic El Dorado of our childhood, and even now, when inexorable Time is planting his crow's-foot on our brow, we cannot forget the stories or shake off the influences of the days of our innocency. Old or young, rich or poor, we have all our fairy land, whether in dreams or realities, and Tom Tidler's Ground is a domain trodden more or less by all. Some will skip over the plain with a merry heart and a smiling face, kicking all obstacles out of the way, or o'erleaping them; whilst others will be continually stumbling, tripping, knocking their shins, and suffering manifold discomfitures; but it matters not, the great aim is still kept in view—the object is still pursued,—

Along with the crowd on Tom Tidler's ground,
Looking for gold and silver.

Wherever there is an earnest pursuit of some worldly business, a striving early and late to push their way in the world, to "make both ends meet," and ultimately to retire from the contest, and leave the battle-field of competition to younger and more active men, there is "Tom Tidler's ground." Wherever there is some "hobby" followed zealously, some occupation of leisure hours which absorbs the cares of life, and creates out of a barren waste a fairy land of order, harmony, and beauty, there is "Tom Tidler's ground." Wherever there is a family circle in which every member strives to advance the well-being of all, where petty jealousies are unknown, where love is the motive power, and happiness the aim of all, there is "Tom Tidler's ground." In fact, wherever as much of happiness can be attained as this world can furnish, that is "Tom Tidler's ground." And as for the "gold and silver" which children are apt to regard as the greatest good, as the highest reward, as the most superlative treasure in life, these are represented by different objects, according as the pursuer estimates the prize for which he constantly aims; and although some adhere tenaciously to the letter of the old legend, and seek veritable "gold and silver;" and though—

Youth may have vanish'd and manhood come round,
Yet how busy they are on Tom Tidler's ground,
Looking for gold and silver;—

there are others who rate at a higher value than mere gold and silver that which elevates the mind, enlarges the heart, and leads the possessor "through nature up to nature's God."

As the bright sun is inviting all that love beauty to come abroad and warm themselves, and thaw away the last icicle of selfishness from their hearts, that they may gaze on the face of nature with sympathy and affection, we cannot resist the impulse once again to plead for the study of natural objects as a worthy—

Tom Tidler's ground,
Where springeth the gold and silver.

Everywhere treasures are being laid open for the microscopist, and may be had for the trouble of stooping and picking up. In the woodland the early flowers are shedding their pollen, or their leaves are spotted with unmistakable evidences of the development of microscopic fungi. On the anemone, the pilewort, the sheep's sorrel, the nipplewort, the coltsfoot, the nettle, the sanicle, and the violet, cluster-cups are bursting through the cuticle, and expanding their fringed lips. On the leaves of the wild hyacinth, the dandelion, the common thistle, the mercury, the hog-weed, the wild strawberry, and many others, the golden or brown dust of Uredines appear in patches. Mosses display their fringed peristomes, and liverworts are green and glorious. Every drop of stagnant water quivers with life. Cyclops, volvox, and hydra, are well represented, with a host of kindred spirits which constitute the low-life of the animal world. Along the sea-shore, zoophytes and sea-weeds, in variety sufficient to employ the microscope for a month, may be gathered in a day. Moths and butterflies yield their curious antennæ and multiform scales; flies offer their eyes, tongues, and toes; spiders their legs and feet; bees and wasps their tongues and stings; and all the air, the earth, and the ocean are peopled with myriad forms, which only await the inquiring spirit and the earnest will to be converted into an inexhaustible source of amusement and instruction,—

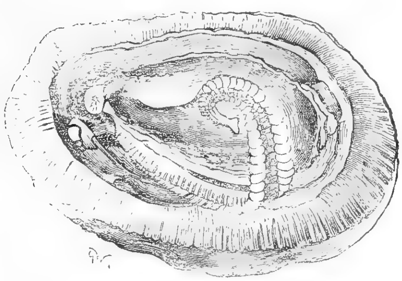
> Where you'd walk on eternal Tom Tidler's ground,
> Picking up gold and silver.

Over all, "the lark at heaven's gate sings," the cuckoo utters its well-known note, the little birds twitter in the boughs, the hawk suspends itself 'mid air, and man alone, of all created things, is apt, in getting or spending, to lay waste his powers, to permit the literal El Dorado to absorb the ideal. Where—

> He is gathering up a worldly store;
> Though holding enough, he is longing for more;
> And you'll meet him, despite his text profound,
> Along with the crowd on Tom Tidler's ground,
> Looking for gold and silver.

THE KEYHOLE LIMPET AND ITS PARASITE.

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



The Keyhole Limpet, I may briefly state for the benefit of the unlearned in shell-fish, is a gasteropodous mollusc, belonging to the family *Fissurellidæ*, its generic name, fissurella, being derived from the diminutive of fissura, a slit. In shape and colour the shell closely resembles the ordinary limpet (*Patella vulgata*), so common on our British coasts; possessing a like power of adhering to the rocks, with a tenacity requiring knife and hammer to overcome,—an obstinate adherence, giving rise to a popular saying, "they stick to you like a limpet to a rock"—its shape conical, the base being occupied by a powerful muscle, which is not confined entirely within the shell. It performs the office of legs by its expansion and contraction, a means by which the creature moves from place to place on the rocks; a system of progression you may see for yourselves if you watch a garden-snail taking a constitutional over a cabbage. This muscle also enables it to fix itself at pleasure, aided by atmospheric pressure 15 lbs. to the square inch. They browse on sea-weed, and are usually found between tide-marks.

At the apex of the shell is a hole, somewhat oval; hence the name of Keyhole. This orifice is for the escape of the outgoing branchial current. There are about 120 species inhabiting all parts of the world, India, China, Australia, and the Pacific at Vancouver Island. When shell-collecting near Esquimalt Harbour (Vancouver Island), I frequently picked up empty fissurellas on the beach, but diligent research at dead low water, in the rock pools, failed to discover the living fish, neither did the dredge ever bring one up, from deep or shallow water. The empty house, in this instance, was less desirable than even a bad tenant, as the mansion without its liege lord was a useless ruin.

The tide at Vancouver Island plays all sorts of eccentric freaks, setting all tidal laws at defiance. In May, June, and July, there is but one high and one low water in twenty-four hours; high water at the change and full of the moon happening about midnight. Springs range from 8 to 10 feet; neaps from 4 to 5. In winter there is a complete reversal of this process; but it will suffice for present purposes to state that in summer the water is low during the day, and in winter low during the night.

Macauley's Point, a long ridge of slaty rocks running far out to sea, but bare at low water, was a favourite hunting-ground of mine, the snug little rock basins generally affording some novelty, left prisoner by the receding water. An usually low tide disclosed a ridge of rocks I had never before seen—an opportunity for exploration not to be neglected. Clinging to the slippery wrack, and scrambling down a vertical ledge, I discovered a regular cave, its sides and floor literally covered with the strangest collection of marine wonders I had ever gazed on:—

> It was a garden still beyond all price;
> E'en yet it was a place of paradise.
> * * * *
> Here, too, were living flowers,
> Which, like a bud compacted,
> Their purple cups contracted,
> Now, in open blossom spread,
> Stretched, like green anthers, many a seeking head.
> Others, like the broad banana growing,
> Raised their long wrinkled leaves of purple hue,
> Like streamers wide outflowing.—*Kehama.*

Actinia spread their treacherous petal-like arms, gorgeous in every variety of exquisite colouring; huge Holuthuria, like brilliantly-painted cucumbers, clung to the dripping rock; star-fish of all sizes and tints—chitons in black spiny mail—shells of purpura and trochus, and hosts of kindred. Annelides too were peeping from out their cases of stone and horn, their exquisite feathery tufts, fishing-lines, and traps wondrously beautiful, but, like the embrace of a siren, fatal in its clasp;—all these, hungry and anxious, waited for the coming tide. Biding his time like the rest in this stronghold was Sir Keyhole Limpet.

I had found him at last, and at home, so pounced upon him as a lawful and legitimate prize. Knife and hammer soon severed his close attachment to the rocks; and turning him up to take a peep at his powerful ring of muscle and strangely-formed breathing apparatus, I spied a worm evidently very uneasy, about three inches long, brown, and in shape like an ancient dagger-blade. He appeared to me to be wriggling out from betwixt the folds of the foot or the mantle, and apparently most anxious to escape.

My first impression was, that he was a captive that by some mischance had got imprisoned under the shell of the fissurella; and thanking his lucky stars for such a fortunate deliverance, wished to make the best of his liberty, and rejoin his friends. But in displacing other shells, I found in nearly every one a similar tenant: the secret was discovered —the worm was a parasite, that lived in peace and good fellowship with Sir Keyhole,—recalling to my remembrance Ossian's lines on the Pinna and the parasitic crab—

> One room contained them, and the partners dwell
> Beneath the convex of one sloping shell,
> Deep in the watery wastes the comrades rove,
> And mutual interests bind their mutual love.

That the parasite does no harm is clearly proved by the healthy state of the mollusc in whose shell it takes up its abode. How far mutual interest may conduce to mutual friendship, I am unable to say.

The illustration heading this article will give the reader a good idea of the Fissurella and its parasite.

On more carefully examining the position of the worm, I found it was invariably coiled away in a semicircle under the foot, like a ribbon on its edge; never flat. This seems to me a wise provision; for the pressure of the muscles when the limpet grips the rock would crush a soft-bodied worm to death if flat; but edge on, the position chosen, all risk of harm is avoided, as it fits in a cleft between two layers of soft material.

Tying several of them tightly round to prevent the worm escaping, I brought them home *in situ*. At least four out of every six contained a parasite, and what is rather strange, the worms were nearly all of one size. A query or two naturally suggest themselves. How did this friend or intruder, whichever it may be, first get installed as a lodger? Did he get in as a baby, and thus become an adopted child; or did he slip in as a full-grown annelide, defying Sir Keyhole to turn him out? How does he procure food; and on what does he subsist? I confess utter inability to give a satisfactory reply: my impression, however, is, the parasite grows from a minute germ (if that is a right term) in the place and position in which I found it.

I put them in sea-water, after taking them out of their sanctuary; but in no single instance did one ever go back again. I tried to replace them, but could never accomplish it, or induce the worm to remain. Not that this proves anything, inasmuch as experience teaches me any interference with the regular habits of any of the lower forms of life is at once resented; and the power, or will it may be, to adapt itself to altered circumstances is but slowly acquired. I cannot conceive the possibility of a large worm, the feet armed with curved bristles, like bundles of minute fishhooks, being quietly permitted to creep under the shell, force its way by crawling round and round the foot, by a system of hook and drag; for in no other way could it edge in, without worrying and enraging the fissurella beyond all power of endurance, ordinary pressure being only needed to squeeze the intruder flat as a pancake. By gently tickling it with a bit of sea-weed under the shell, one would say that patience was a virtue but little cultivated by the fissurella; the slightest touch, and down goes the shell with a force that cuts the weed in two like scissors. What chance would a soft-bodied worm stand? Not the slightest. The parasite, like Topsy, was "raised" where it lives.

What part a worm, doomed, as far as we know, to pass its whole life captive in the shell of a mollusc, plays on nature's wide stage, is a problem beyond human ken. We know nothing was created in vain —that the tiny diatom has its use; and this insignificant annelide serves a purpose and fulfils a destiny in the endless maze of life, as important as the lordly lion, or even man himself.

For the benefit of our scientific readers, we annex the specific description of this new parasitic worm.

LEPIDONOTUS LORDI (*Baird*).—This species is about 3 inches long, and rather more than one-third of an inch in diameter at the broadest part of the body. It tapers gradually from the head to the tail, which is only about $\frac{1}{8}$ of an inch broad. The colour is of a light brown, a broad line of a much darker brown running along the whole length of the centre of the back. On the surface, a groove runs down the centre of the body throughout its entire length. The elytra are 35 pairs in number, thin, membranous, and of a light-brown colour. The two first overlap each other slightly in the middle; but for the rest of its length the centre of the back is uncovered. The antennæ are five in number; the central one short, of much the same length as the internal ones; the two external ones the longest, white, with a bright black ring round the upper part, but leaving the point white, which is acute at the apex. The feet are tolerably stout, and the two divisions are both furnished with sharp but curved pointed bristles. The superior cirrhi are white, and of a moderate length; the inferior ones being short.

ORCHIDS, AND HOW TO GROW THEM.

TO any one in search of "a hobby," I would recommend the study of orchids. There is no necessity to pore over big books, or swallow hard names, but grow and study the plants themselves. There is only one book known to me in which the growth of British orchids is treated; that is "Appleby's Orchid Manual," which is more general than particular. A good treatise on the subject, by David Cameron, appeared in the first part of the third volume of the "Journal of the Horticultural Society." This includes nearly all the indigenous species. But before one can indulge much in the theory of growing the plants, they must be found or purchased. The former plan is the *best*, and, except for those who live in cities provided with a Covent Garden, or similar market, the *only* method which can be adopted. I have generally found that not more than one in every six of the orchids bought in the market will grow, as their roots are nearly always broken or injured in the digging. One or two of the large nurserymen will supply them; but the best way is to go and dig them for yourself. The greatest care must be taken in removing the plants from their native spots not to touch the roots. Let the tool—be it spade or trowel—be inserted six inches from the stem of the plant, and dig it out, with its soil adhering to it, and in this state convey it home, and pot or plant it in the open ground. The best time, I think, for collecting orchids for cultivation is after they have done flowering, at the close of the summer, because the tubers for the next year are then fully formed, and have not begun to make roots.

Whichever mode is adopted in their cultivation, whether in pots or in the open ground, good drainage is essential. This may be accomplished by a sub-soil of broken lime rubbish. When watering them, as far as possible, the water should be prevented settling in the sheaths of the leaves, as the latter are apt to rot off. This remark is applicable to those grown in pots and under cover, since, when exposed to the wind and air, superfluous water is soon dispersed. What is essential to their well-being is plenty of light and air, and the purer the latter the better.

In potting orchids, the soil employed should be as nearly as possible like that in which they were found; hence the advantage of bringing away plenty of mould with the plants when collected. I have employed in other cases a mixture of friable loam, with peat and sand. In winter, if the plants are in pots, they should be stood at the base of a wall with a southern or western aspect, and not watered. It is advisable to cover the surface of the mould with ashes, and strew ashes also on the ground about the pots, to preserve the plants from the attacks of slugs, which are exceedingly partial to the roots and young leaves. It is a good plan to look the plants over once a week, and exterminate all such visitors. If the orchids are planted in the open ground, each spot should be covered with ashes.

Most of the species I am about to enumerate are those which I have cultivated in the manner already described.

EARLY PURPLE ORCHIS (*Orchis mascula*, L.) has a spike of pretty purplish flowers, and spotted leaves, but rather disagreeable odour. The stem is nearly a foot in height. This species requires a heavy soil and plenty of room.

GREEN-WINGED MEADOW ORCHIS (*Orchis Morio*, L.) is very similar in external appearance to the last, but the leaves are not spotted. Of course, there are botanical differences, but with them we have, on the present occasion, very little to do. The remark about soil and room also applies to this.

BROWN ORCHIS (*Orchis fusca*, Jacq.).—A tall and handsome species, with a rather dense spike of dark purple variegated flowers. Grows on the chalky hills of Kent. Requires a light soil.

SPOTTED ORCHIS (*Orchis maculata*, L.).—Very pretty and common species in damp pastures, heaths, and woods. It is very easy of cultivation and is sure to succeed with any one.

LIZARD ORCHIS (*Orchis hircina*, Scop.).—This is a very rare, but snowy species, with a long dense spike of large greenish-white flowers. It has been found on the chalk hills of Kent and Surrey, but is nowhere common, though widely diffused through central and southern Europe.

MARSH ORCHIS (*Orchis latifolia*, L.) is a species subject to considerable variation, is more luxuriant than the "spotted orchis," which it much resembles, has purplish-crimson flowers, the leaves sometimes spotted, and affects a moister locality and a richer soil. It should be grown with plenty of peat and be well supplied with water.

PYRAMIDAL ORCHIS (*Orchis pyramidalis*, L.).—Very handsome, with rosy-purple flowers in a dense spike. Found in chalky pastures.

FRAGRANT ORCHIS (*Gymnadenia conopsea*, Br.).—Has pretty rose-coloured flowers, and is possessed of an agreeable odour. Rather widely dispersed over Britain, in hilly pastures.

MAN ORCHIS (*Aceras anthropophora*, Br.).—A rare and curious species, confined to the Eastern counties of England. Flowers of a dull yellowish-green.

GREAT BUTTERFLY ORCHIS (*Habenaria clorantha*, Bab.).—This is a handsome species, with white flowers, and is found in moist woods and thickets.

BEE ORCHIS (*Ophrys apifera*, Huds.).—So called from the fancied resemblance of its flowers to a "bee." Found on chalky soil in the South and East of England. Is very handsome, and easy of cultivation.

Spider Orchis (*Ophrys aranifera*, Huds.).—Much more rare than the last, but equally handsome, and easily grown.

Fly Orchis (*Ophrys muscifera*, Huds.).—More common than either of the preceding, is also curious and handsome, but as difficult to cultivate as any species which it has been my fortune to obtain.

Musk Orchis (*Herminium monorchis*, Br.).—Small, delicate, yellowish-green flowers, very fragrant, but confined to a few spots in the South of England.

Creeping Orchis (*Goodyera repens*, Br.).—With a one-sided spike of greenish-white flowers. In Britain, it is confined to the Scotch Highlands.

Lady's Tresses (*Spiranthes autumnalis*, Rich.).—Flowers white, with an odour of almonds. Abundant on a dry chalky soil in most southern counties of England. Flowers in the autumn.

Tway-blade (*Listera ovata*, Br.).—Insignificant in appearance, but curious, common, and not difficult to manage.

Helleborine (*Epipactis latifolia*, All.).—The flowers are drooping, generally greenish, and not particularly attractive. Flowers rather late in the summer.

White Helleborine (*Cephalanthera grandiflora*, Bab.).—Flowers large and white or cream-coloured. Occurring in dense woods, on a calcareous soil. Flowers in early summer.

Lady's Slipper (*Cypripedium Calceolus*, L.).—Is the most splendid of British species, but nearly extinct in these islands, so that only cultivated specimens can be obtained, and these are difficult of cultivation to the amateur.

With the majority of the species I have noticed, no great failure can be anticipated, under moderate care, and I think that if the instructions I have ventured to give are carried out, success is certain. The study of these plants will, more than any others, repay the labour expended in their cultivation. Any "Flora" will furnish the strictly botanical characters; which I have not attempted to give.

Arthur B. Cole.

RAT AND HAWK.

Some years since, I became possessed of a very large and beautiful kestrel hen, which in a short time became very docile and even affectionate, readily coming when whistled to, and perching upon the hand, taking much delight in being fondled; and in return rubbing her head against the hand that caressed her.

During the day she had the run of a large and high-walled garden, being prevented from flying away by the close clipping of the secondary and tertiary feathers of one wing, the primary feathers being left untouched; so that, unless she spread her wings, her beauty was unimpaired. Being thus in a state of half-liberty, her health and courage were not affected, and she kept her plumage and feet most delicately clean.

At night she always roosted in a small building at the end of a hothouse, where the stove was placed, and which was used as a tool-house and for other gardening purposes. Here she was always shut in, till I let her out in the morning.

One day, after myself securing the door overnight as usual, I was surprised to find that she was missing; and a long time was spent in vain attempts to find her. Feeling perfectly sure that I had left her secure, as I thought, I continued my search; and after removing some bean-sticks which were piled up in a corner, where the outside wall formed an acute angle with the inner, discovered a solitary feather sticking up in the ground. Stooping down to pick it up, it proved to be the end of one of the long feathers of the tail; and upon pulling it, up came what remained of the half-eaten body of the poor hawk, the surrounding soil having been carefully replaced after burying it. My first impression was that a cat must have been the culprit; but there was no opening by which so large an animal could have got in or out, excepting the stove-pipe; and as many feet of that were upright, and surmounted by a tin top, it was out of the question.

After thinking the matter well over, I decided upon placing the dead hawk in, as near as possible, the same position as that in which I found it—removing a little of the loose soil, and substituting a small but strong pair of "clams" (an iron trap, made of two semicircular rows of teeth, which close with a spring when pressed upon), just *over* the body, and very lightly covering it up as before; and so I left it, anxiously waiting for what the following night might bring forth.

The first thing next morning I hurried to the tool-house, and before the door was reached heard the rattling of the chain by which the trap was secured, showing that the murderer was caught. Upon opening the door, what was my surprise at seeing an enormous *rat*, caught by the loins; and, although his back was broken, still full of fight. However, I soon disposed of him, and, I must own, with no small sense of satisfaction.

The rat measured 22 inches from nose to tip of tail, with enormous teeth to match. He must have stolen upon the hawk while she was asleep; or, in spite of his size, she would have beaten him off.

I have heard of hawks in a state of nature attacking rats, but never before of the rat being the aggressor.

R. K.

A BROOD OF CATERPILLARS.

THE summer of 1857 was one of the hottest I ever remember, and therefore one that ought to have seen great things accomplished in the search for truth among the lower ranks of animals. I am now going to give an account of some roadside inhabitants which fell in the way of my sister in that year—not that they were of any peculiar kind, but some of the things we observed in their habits were very interesting, and will show what a large share of that wonderful faculty, instinct—so profound in its depths even in the lowest beings—has been bestowed upon creatures holding this rank in the scale of life.

It was on the 5th of June that, when passing along the road on the moors close to the watering-place of Clevedon, in the Bristol Channel, my sister saw a white nest in the sloe bushes. On examining it, she found it was full of tiny little black larvæ, about as long as a finger-nail,* apparently not long out of the eggs, but which had safely housed themselves, even at this tender age, within the precincts of a snug home. Gently transferring the whole to her handkerchief, that universal receptacle for sundry sticks, stones, and creatures, when in the possession of a naturalist of any type, she conveyed it home in safety. There she prepared for her charge a large deal box about 21 inches square, fitted with a perforated zinc top to admit air and light. As the days passed by, the little creatures grew marvellously big creatures, and their appetites were even more marvellous. My sister being unable to go out to obtain food for them, I used to undertake that business every morning, bringing in arm-loads of sloe bush, as much as I could carry; but in a short space of time not a vestige of it remained but the bare dry wood of the branches, and often I had to go out again and again to obtain more. Those voracious little creatures never would be satisfied I thought, and sometimes I inwardly wished they had remained on the moors—a wish never, however, breathed to my sister. I think they would have eaten up ourselves in ten minutes' time if we had only been made of sloe bushes. The moment the box was opened, dozens of little black heads were over the sides, and clambering on the branches almost before they could be put in. They were like a lot of hungry schoolboys. In the clamour and confusion that prevailed when the box was opened, it was no wonder if two or three of the naughty little creatures made a clandestine escape. This occurred several times, and my sister was surprised soon afterwards, when seated in the drawing-room, to discover the long body of one of her friends complacently hanging to the fringe of her shawl, or by a tickling sensation to feel it quietly creeping up her wrist. Then the truant was speedily conveyed back to its home, from whence it had strayed, with sundry reprimands and reproofs.

They clung on to the edge of the leaf by their numerous legs, and commenced eating, from the top of the leaf, nibbling it straight downwards as far as they could reach, then raising their heads again to the top, they again nibbled downwards, thus forming a curve in the edge of the leaf. Their habits of taking their food and the times of their meals were as regular as those of the most perfect epicure. They filed out of the nest one at a time, crowding on the heels of one another at their meal-hour, and took up their station on the branches, each scrambling for a corner at the repast. As soon as all had finished, as if a signal-bell had been rung, with one consent they marched back into the nest for sleep and digestion. There were three or four holes in the silken web, just large enough to admit one Caterpillar at a time. These holes were beautifully finished at the edges, no raw work or roughness could be detected; it was the most beautiful selvidge I ever saw. When all went into the nest after eating, they left one lying outside each hole as a sentinel to keep guard; thus showing their perfect understanding of danger and its consequent troubles. We tried experiments with them, by tapping gently on the nest, or moving a bit of the branch on which it lay, and immediately the watchful sentinel made his signal, and out came numbers of the little people from the city,—the soldiers of the community, I suppose. When they found all was quiet, and that it was a false alarm, they soon retreated again to their slumbers. If we broke away a little bit of the nest, the masons were immediately set on to repair the breach, and the in-

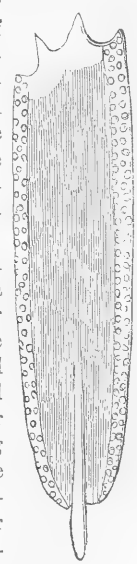
* The moth is the small Eggar (*Eriogaster lanestris*), one of the Bombycidæ, or silk-spinning moths. It is a sort of dingy brown, with some white spots on the wings, and a good deal of soft fur about the head.

dustrious little workmen never rested until their labour was completed. As they grew bigger and needed more accommodation, they enlarged the boundaries of their silken fabric, and sometimes this was almost a daily work. When the weather was very hot, they must have found the inside of the nest uncomfortably warm, for many of them would come out and lie on the outside to sleep, packed in a group together as tightly as they could lie. Then these would go in after they had enjoyed sleeping out for a time, and another party would come out in the same way. When the Caterpillars were fully grown, they were about two inches in length. There were a few of them, about half a dozen, who were much fatter and bigger than the rest, quite a kind of aldermen in their way. Down each side of the body were a row of small squares filled with a tuft of light-brown hair, the lines forming the squares being bright yellow. Down the middle of the back, between these rows on either side, was a rich purple stripe. Their legs were red. When they were fully grown, they showed signs of wishing to build their cocoons and pass into their "dead-alive" state. At this time they evidently wished to separate; for whenever the box was opened, they rushed out on all sides with tenfold more eagerness than they had ever done before. My sister kept them together, however, as the box was amply large enough for them to pass their changes in, and she wished to trace them through the whole. They made for themselves small oval smooth cocoons of rather a hard nature, brown in colour, some rather darker than others. Each had one, and some two, tiny little holes in the side, just like a minute needle-prick; I conclude they were to afford air to the mysterious being within. If this was their purpose, they would show that respiration *is* carried on by the chrysalis and set at rest one point respecting the life of the insect during this period of entombment. On the 17th July, they began to change. In the following spring (1858) the moths emerged from their living tombs into the glories of the sunlit-world. On March 20th, the first appeared, and the others, upwards of 400 in number, followed closely after. They had beautifully contrived a little door in one end of the cocoon with a hinge of the most perfect workmanship which opened outwards, and, therefore, on being pushed from within, made an outlet for the little prisoner. By about the end of April, the short lives of these little creatures were all ended, the one life of each was gone for ever, their "narrow span." What "blessed toil" filled up each hour of that tiny life we understand not fully, but they did their work and did it bravely, each in that little home, the builder and the soldier and the careful watcher, and many another that was hidden from our view. They worked out their little destiny, and that is the task which is allotted to each of us. Y. Y.

A PUZZLE WORTH THINKING ABOUT.

IN the course of a recent re-examination of some of the Barbados-deposit slides, I came upon an object not referable to any of the infusorial forms I had ever seen; and on sending it to a friend in Edinburgh of the highest microscopical authority, the answer received was, "It is undoubtedly the scale of some Lepidopterous insect, possibly off the wing of some antediluvian butterly." How did it get among the Polycystins? The first thing was to ascertain from the careful, experienced, and most skilful preparer of the slides, whether he had about him any other material at the time he was manipulating the Barbados earth, from which this scale could have been accidentally brought into the preparation. No; the replies to these inquiries quite confirmed the notion that the scale in question was an integral part of the Barbados deposit. On further examination it appeared to be partially *silicified*, which, in fact, it must have been, not to be destroyed by the repeated boilings and washings in strong acids and alkalis to which the material had been subjected.

Sir Henry de la Beche says ("Geological Observer," p. 631), in countries, and especially in tropical islands, such as the West Indies, where the off-shore or land winds are at times somewhat strong, multitudes of insects are often borne out to sea, where, though the greater proportion may become the food of marine creatures, some fall in situations to be entombed amid mud, silt, or sand. In deposits chiefly formed of organic remains, the probable chemical composition of objects introduced amid the accumulations in which they are found should not be neglected. Whole layers may be formed of the harder parts of infusoria; so that when these are siliceous, they, and the spiculæ of many sponges, may serve to diffuse no small amount of silica amid deposits of a different character. Has, then, our little scale been brushed from the wing of some ancient seaward-wafted butterfly, and thus preserved amid the siliceous organic silt of that former sea-bottom, now raised and forming a stratum of dry earth under the hard coral-rock of the Peak of Teneriffe? It is a beautiful object under a high magnifying power; its scolloped end is transparent for a little way down, and then the ear appears a roughened and slightly opaque surface, while down each side is a richly-ornamented border, or binding; and the stalk or peduncle by which it was attached to the



wings of the insect is inserted between the layers composing the scale, and forms a little raised ridge.

The accompanying figure is magnified about 600 diameters. We need not doubt the possibility of so frail a subject as the dust off a butterfly's wing being preserved through ages of time; for many delicate insect vestiges, even gnats and ants, have been found in the Miocene beds, and associated with the leaves and branches of fossil ferns in the coal measures; and Sir Charles Lyell, in his latest work on geology, published in 1865, gives, on the authority of Professor Oswald Heer, a very remarkable instance of a fossil Vanessa (a tolerably near relation of our English Camberwell beauty, or peacock butterflies), in the brown coal of Radaboj, near Angram, in Croatia, so perfect that the pattern on the butterfly's wing has escaped obliteration; "and when we reflect on the remoteness of the time from which it has been faithfully transmitted to us, this fact may inspire the reader with some confidence as to the reliable nature of the characters which other insects may afford."

The Vanessa figured (see Lyell, p. 243), retains, says Heer, some of its colours, and corresponds with *V. Hadena* of India. The accompanying plants in the Miocene marlstone of Radaboj are tropical, including several palms.

P. S. B.

WHAT DO CRICKETS EAT?

I WAS smoking, and my chimney, from some cause unexplained, and always most mysterious in the habits of chimneys generally, deemed it expedient to smoke also, and puffing out spasmodically vast volumes of pungent gas, drove me to seek refuge in the cook's sanctuary, the kitchen chimney being the only one free from bad habits, and sociably warm and comfortable, as a respectable and well-conducted chimney ought to be. Everything was still and quiet, and as I sat watching the curling wreaths of fragrant smoke (as all Englishmen do), that, making their way up from the cosy pipe, twist and turn themselves into all sorts of strange fantastic shapes, my reverie was disturbed by a slight rustling noise, that evidently came from under the grate. On looking down, I saw at first about a dozen "nasty black-beetles" (cockroaches) making most erratic and hurried gallops through the cinders. It was quite clear that something was wrong. A hawk suddenly wheeling over a hedge, and coming plump among a flight of small birds—a beadle appearing like a ghost amidst a crowd of mischievous urchins—would have hardly created a greater panic, or produced a more general state of disturbance. The cause was soon evident: slowly marching from their holes in the walls, came a sortie of crickets—big, powerful, handsome fellows they were. Just as greyhounds course a hare, or the hunting-spider pounces on his prey, so did the crickets set upon and wage deadly war on the cockroaches. Quick as thought a cricket pounced upon and seized a cockroach much larger than himself, and, fixing his powerful nippers on him, like a steel trap, dragged him off to the hole, and, backing in, tugged the luckless beetle to inevitable destruction. It was often a stiff trial of strength, a rough-and-tumble battle; but the "pale face" always had the best of it, and invariably vanquished and tugged away his dingy foe. Several crickets I watched backing up the smooth iron of the stove, each with a heavy beetle in its mouth; twice I saw a beetle slip from its captor, and fall to the ground, but no sooner had he reached the floor than another cricket had him, or the one who had lost his prisoner would rush down and again grab him savagely, and try the system of backing up again. I never saw one attempt to carry up the load; they knew, by some inherent and marvellous intelligence, that it was easier to drag it up than to carry it. There was one Brobdingnag beetle, that evidently depended for safety on size and strength; whether he scorned to seek safety by running away, or whether he was too fat and portly for rapid progression, I could not clearly make out; at any rate, I saw him set upon several times and seized; but "no go." He was manifestly too ponderous to be upset or towed away, so he remained during the battle looking on in sullen indifference. I watched this hunt among the black-beetles for some time, until the cricket-hunters, having each bagged his beetle, disappeared into their lodges, and I, growing sleepy, turned into bed, and turned over in my mind this to me novel proceeding on the part of this household pet. I have watched the "cricket on the hearth" on and off since I was a boy, and knew him to be of a prowling, dishonest, destructive disposition, given to nibbling holes in stockings left to dry, eating the black off boots, making predatory excursions over the kitchen dresser for stray bits of anything nice; but never did I know he was such a blood-thirsty cannibal as I then discovered him to be.

A lady and gentleman witnessed the conflict as well as myself, so I could not have been deceived, or, having smoked myself into a state of nightmare, have dreamt it. No, it was all true; the cherished little minstrel enshrined in poetic fancies, celebrated alike in song and story as gentle, innocent, companionable, the embodiment of every domestic virtue, was a sanguinary savage—a very Dahomey.

It may be said in his favour, that the black gentleman he destroyed was a most objectionable pest; but, nevertheless, it does not exempt him from the charge of being a murderer, and all his poetry, like "Othello's occupation," has gone from me for ever.

J. K. LORD, F.Z.S.

HINTS FOR MARINE AQUARIA.

In the early part of last year the rag-collecting brigade commenced its operations; and one of the most abundant articles of rubbish acquired by its members proved to be old aquaria. This fact faintly indicates two things; viz., that formerly aquaria were very common in London, and that from some cause or other, having ceased to be of interest to their owners, they have been consigned to the rubbish-heap. In many cases, probably, the loss of interest arose from want of success. With a view, therefore, of stimulating some to renew, and others to begin, the cultivation of an aquarium, we wish to give a few hints for keeping one, based upon the experience of several years. The word "we" is used by the writer because much of the experience is that of other persons; while the tanks and bowls mentioned towards the end of the paper belong to a lady friend of his.

In the first place, let the reader discard the notion that aquarium-keeping is easy, but let him be convinced that what is worth doing at all, is worth doing well, and that the more diligently the necessary conditions are considered, the greater is the probability of success. Any attempt to cultivate flowers without some knowledge of horticulture is not likely to lead to a satisfactory result; and to expect to have a healthily-stocked aquarium without some knowledge of the laws which govern the health of its tenants, is quite as futile.

The crabs, star-fishes, gobies, molluscs, annelides, &c., of our tanks so far resemble ourselves, that their health and existence depend upon the quality of the medium in which they are placed: we require good fresh air, while they require good fresh sea-water. In an aquarium the same water is usually retained as long as possible; hence it should contain within it the means of supplying the requisite gases. This is done by keeping up the growth of a little seaweed. Each little creature is constantly engaged in abstracting from the water the gaseous and solid materials conducive to its existence and increase, and restoring to it again those which are not adapted to its nourishment. The water consequently undergoes deterioration, and if the animals are too numerous, they either die off or struggle on in an unhealthy state. Overstocking is a serious fault; but, nevertheless, is very commonly met with among aquaria-keepers. In order to keep a large stock alive, many persons introduce a large supply of weed into the tank, and force its growth so as to obtain as many air-bubbles as possible, as it is thought that the more numerous these are, the larger is the stock of other animals they will be able to keep. This, we believe, is a false principle, since the water only absorbs a certain proportion of the gases generated (chiefly oxygen), while the rest rises to the surface and escapes into the air without benefiting the inhabitants of the aquarium. Moreover, plants that are stimulated by strong light in aquaria do not appear to be the healthiest. In some special cases, as when water is made to flow in a current through shallow vessels, plants may be dispensed with, as the necessary supplies of oxygen and nitrogen are absorbed by the water from the atmosphere. The vegetation that grows spontaneously in the aquarium is much more likely to thrive than such as has been introduced. Whether the water is stationary or flowing, shallow vessels are preferable to deep ones, as they will support a larger amount of life for the same area, and the creatures can be more easily seen and fed. The increased capability of maintaining life is owing to the more efficient aëration of the water, there being a smaller bulk of water to the same extent of aërially-exposed surface and of growing vegetation.

The regulation of the temperature is another important point. The seas off the British coast fluctuate between 38° and 60° F., but in tanks the water should not be allowed to range beyond a temperature limited by 44° and 65°. The best degree of heat is from 50° to 58°, to maintain which is one of the most difficult, at the same time that it is one of the most important things to do. Warm water absorbs less air than cold; so that a tank may healthily support, say, twenty creatures at 58° F., but it would not do so at 80°, partly in consequence of the diminished quantity of air in the water. If, however, means be taken to ensure the constant aëration of the water, the temperature may be allowed to rise considerably above 58°; but there is always a large amount of risk thus incurred. If the water sinks below 44°, the anemones, &c., do not expand as usual. Variation in temperature has considerable influence on the density of sea-water when in small quantities; so that this should be taken into account when fresh water is added; the density should be kept as constant as possible at 1026, an equal bulk of distilled water being equal to 1000. This can be regulated by an hydrometer, which ought to sink up to a line marked 1026 (or 26 as it is marked on some instruments).

By especial attention to temperature, which may be regulated by opening or shutting doors and windows, burning gas, partially covering the tanks with damp cloths, and adopting other means, so as to keep the thermometer within the limits we have mentioned, at the same time taking care that the temperature does not rise or fall rapidly, most of the denizens of the aquarium may be kept in a flourishing condition for prolonged periods.

The limited space at our disposal forbids our saying more at present, but we may briefly sum up thus. Do not overstock; keep the aquarium in a spot where the light does not exceed in intensity the diffused light of day; use shallow vessels; keep the temperature as even as possible, and between 50° and 58°, and the density at 1026.

As some illustration of the success which has followed attention to these hints, we may instance that in a tank and several bowls, we have now, among other creatures, a mullet and a rock blenny, which have lived in good condition for 3½ years in unchanged water, and in vessels whose contents have not been disturbed for four years; anemones of various species, for from one to four years; limpets, three years, and colonies of *Hydra tuba*, for from three to four years, which have this spring split up into swarms of minute jelly-fishes, or medusæ. We have not spoken of the choice of creatures, and other matters, such as feeding, which would require this paper to be materially lengthened.

A. Ramsay, Jun.

MICROSCOPIC ILLUMINATION.

EVERY one accustomed to the use of the microscope knows how much depends on proper illumination in order to ensure successful results. For purposes of microscopic investigation in general, daylight is unquestionably the best source of illumination; it is less trying to the eyes, and is purer and whiter than artificial light. But as, for obvious reasons, only few persons have the opportunity of using daylight, the question arises, which is the best kind of artificial illumination to be employed? Some microscopists give the preference to the Cambridge lamp, which, in its mechanical arrangements, is very convenient; others like the moderator lamp, and some use the small camphine lamp manufactured expressly for the microscope. Having tried these and almost every other description of artificial illumination, I decidedly give the preference to the common Belmontine lamp, which combines all the useful properties of the other kinds, and possesses the additional advantage of a flat wick, which is of paramount importance in the exhibition of fine-lined objects. The markings on many of the most difficult forms of the Diatomaceæ may be perfectly displayed by illuminating from the sharp edge of the flame, when by employing its flat surface, or a round flame, not a trace of them would be apparent. It is sometimes urged as an objection to the Belmontine lamp, that it emits a disagreeable smell, and burns with a smoky flame. These inconveniences may be entirely obviated by a little careful management. All that is required to make it act perfectly is to select a tightly-spun wick, that fits closely into the metal tube in which it runs, being careful to trim the wick before lighting it.

The character and quantity of light required in microscopic investigation depend very much on the nature of the object to be looked at, for much light will obliterate the finer structures of delicate and transparent objects; whilst for more opaque objects it is almost impossible to use too brilliant an illumination. For showing the superficial markings on many of the frustules of Diatomaceæ, pencils of rays of great obliquity will be required, especially for the severest test-objects. Without entering upon the question whether these markings be lines or dots, they are evidently produced by inequalities of surface, and are arranged in a linear direction; it follows, consequently, that the best mode of bringing them into view will be to let the light fall upon the object at right angles with its markings, so as to cause the ridges or depressions to cast a shadow in the opposite direction to the side illuminated. The striæ on many forms of Diatomaceæ, that were formerly considered severe tests for objectives of high power, may now be easily resolved with a good ¼ or ⅕ of modern manufacture, using the concave mirror placed at an angle, so as to reflect rays of considerable obliquity. If, however, it be desired to exhibit the extremely delicate striæ of the more difficult valves, object-glasses of one-eighth or one-twelfth, of large angular aperture, must be employed; and as most, if not all, of these beautiful and interesting forms have two sets of markings, one running longitudinally and the other crossing in a transverse direction, in order to show both sets simultaneously, the light must be managed so as to have two pencils of rays falling on the object at right angles. This effect may be produced with two lamps, one placed on the side and the other in front of the microscope, making use of the rays from the mirror for illumination in one direction, and interposing a prism, mounted on a separate stand, between the other lamp and the stage of the microscope. This, however, is a cumbersome and bungling performance. The simplest and most successful mode of showing all difficult tests is by employing an achromatic condenser, such as manufactured by our best opticians, which is fitted with a diaphragm-plate and stops, allowing of every modification in the form and arrangement of the light, and possessing optical appliances so perfect in quality and of such large angular aperture as to afford any amount of obliquity required.

There is another and much cheaper form of achromatic condenser, invented by Mr. Webster, of Hanwell, and recently manufactured, which I have seen perform excellently, in resolving difficult test-objects; and, in addition to a large and varied range of capabilities as a condenser, it can be used as a dark ground illuminator with admirable effect.

But microscopic illumination is just one of those subjects that must be mastered by experiment and patient attention. There are many little niceties which can only be learnt by practice; one evening's practical attention will teach more than a whole code of written instructions.

J. S.

BITTEN BY A VIPER!

IT is a common belief that the venom of the viper, and other serpents, is almost innocuous in winter, and that its virulence is proportionate to the heat of the weather, whether at home or abroad; hence that the snakes of tropical climes are more deadly venomous than those of temperate countries, on account of the greater heat. Recently Dr. Guyon has set himself to investigate this subject, especially whether the poison is innocuous in winter, with the following results:—

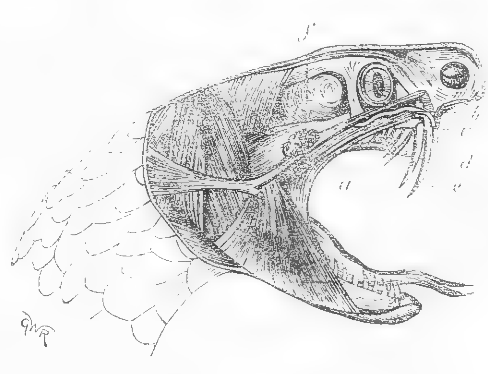
Regarding its violence, he says there is a general belief abroad that it is much more powerful in summer than in winter; but this he does not consider well authenticated, and quotes against it the case of one Drake, an exhibitor of snakes, who, having in the summer of 1827, at Rouen, handled a rattlesnake which he took to be dead, while it was only benumbed by the cold, was bitten by it and died in the course of nine hours. From a considerable number of observations, Dr. Guyon concludes that the intensity or power of the venom is less owing to difference of season than to the length of time it has been accumulating in the reservoir of the reptile; and the greatest accumulation necessarily occurs during winter, because the animal is in a torpid state and does not take any food during that season. So it was in the case of Drake, and so Dr. Guyon found it in that of a horned viper which had been given to him at the caravanserai of Sidi-Makhlouf, Algeria. This reptile had been put into a bottle, which had since remained hermetically closed. It had been in there for six weeks, without food and without air, and looked quite dead, since it could not stir in the bottle, which it filled entirely. And yet, on opening the bottle, the doctor found the reptile perfectly sound, and saw it kill a large fowl instantaneously with its sting. Our author quotes another case, that of a scorpion, that had been kept in a bottle for a long time, and on being released killed two sparrows in less than a minute, and a pigeon in three hours.

A circumstance has come to our knowledge which occurred in Warwickshire, of a boy that was bitten by a viper during the winter.

"The 19th of January, 1864, was an unusually warm and sunny day for the time of year. A boy, aged 11 years, started for a walk to Kenilworth, about two miles from the village where he lived. Under one part of the road flows a small brook. The boy had his dog with him, and he wished to see whether he would follow him across, as the stream was shallow, and there were some large stones to step upon. The opposite bank is rather steep, and there were several large pieces of wood and roots projecting from it. One of his leggings was caught in the roots and became unfastened, whereupon he sat down on one of the stumps to refasten it and watch his dog in the water, but not for more than two or three minutes. They then started off again, and had not gone more than a quarter of a mile before the boy felt a sharp pain in his wrist. On looking at his wrist he saw plainly, and to his great horror, three little punctures and places, as though a nettle had stung him. His first impression was that he had been bitten by an adder, and he immediately tried to bite out the piece of flesh. The first time he could not manage it, and after two unsuccessful attempts, the third time he bit out the flesh, sucked the wounded part, and at intervals spitting out the poisoned blood.

"Being fond of natural history, he remembered reading some of the particulars about the bite of an adder, and was frequently in the habit of expressing his fear of going where the grass was long, lest he should meet with one. He went on a little farther, but feeling faint and weak, and getting frightened about the bite, he returned home. On arriving there he could hardly speak, from excitement and the haste he had made; but his first words were: 'Mother, I think I have been bitten by an adder: though I did not see one, I feel and see on my wrist the hard white swelling which always comes after a bite.'

"His mother immediately put his arm into very hot water, and then applied a bread and oil poultice. When the doctor arrived, he said all was done right, and the boy had saved his own life by the courage and presence of mind he had shown in at once biting out the piece of flesh. The poison, however, had swelled up his arm through his veins as high as his shoulder; but by the next day this black streak of poison apparent in the veins of his arm had completely disappeared, and in the course of a few weeks the boy was perfectly restored to health."



The poison apparatus of the viper consists of the *gland* in which it is secreted, the *duct* or canal along which it travels, and the *fang* by means of which it is injected. The *gland* is placed at the side of the head (*a*), and consists of an assemblage of lobes.

The substance is soft and yellow, with a spongy appearance. The *duct* or canal through which the poison is conveyed to the fang is a narrow cylindrical tube swelling in the centre of its course into a kind of reservoir, and terminating in the base of the fang (*b*). This latter is a tooth in the form of a tube, much longer than the other teeth, and curved (*d*). It is placed in the upper jaw, one on each side of the mouth. On the outer surface of the fang, near the apex, is an elongated opening or slit (*e*), from which a canal passes through the hollow in the interior of the tooth, and is united to the duct which communicates with the poison-gland. These fangs fall backwards, and lie concealed in a groove in the gum when not in use.

The following elaborate description of the mode by which the viper wounds and envenoms its prey scarcely leaves anything to be desired:—"When a viper is struck, it first coils itself up, leaving its head in the centre, or at the summit of the coil, and drawn a little back, as if for the purpose of reconnoitering. Speedily the animal uncoils itself like a spring. Its body is then launched out with such rapidity, that for a moment the eye cannot follow it. In this movement the viper clears a space nearly equal to its own length; but it never leaves the ground, where it remains supported on its tail or posterior portion of the body, ready to coil itself up again and aim afresh a second blow, if the first should fail. To do this the viper distends its mouth, draws back its fangs, arranges them in the right direction, and then plunges them into its enemy by a blow of the head or upper jaw: this done, the fangs are withdrawn. The lower jaw, which is closed at the same moment, serves as a point of resistance, and favours the entrance of the poison-fangs; but this assistance is very slight, and the reptile acts by striking rather than biting. There are times, however, when the viper bites without coiling itself up and then darting forth. This occurs, for instance, when it meets with some small animal, which it destroys at leisure and without anger, or when it is seized by the tail or middle of the body, in which case it turns round and plunges in its fangs. As the teeth are buried in the tissues of the body struck, the poison is driven down the canals, which pass through them by the action of the muscles which close the mouth, and the injection takes place with a force proportionate to the vigour and rage of the reptile, and the supply of poison with which it is furnished."* In the bite there are two punctures corresponding to the poison-fangs.

It has been taken for granted that the bite of the viper proves fatal in this country, without, perhaps, a knowledge of any instance in which it so terminated. Professor Bell declares that he had never seen a case which terminated in death, nor had he been able to trace to an authentic source any of the numerous reports of such a termination, which have at various times been confidently promulgated.* Nevertheless, in France and other continental countries many instances are recorded. Bedard, in his lectures, relates a case of a young man in the neighbourhood of Angers, who, falling down in a meadow, was bitten by a viper in several places, and died in consequence in a few hours. Matthiole records an instance in which a countryman falling down in a meadow happened to divide one of these reptiles in the middle; he seized the portion of the trunk to which the head was attached, in an awkward manner, and was in consequence bitten in the finger and died from the effects of the wound. It should be remembered in connection with these instances, that the reptile which is regarded as the common viper in France is the *asp*, and not the same species as that which occurs in Britain, whilst our viper, not uncommon also, is called "the little viper." The former of these is doubtless more venomous than the latter.

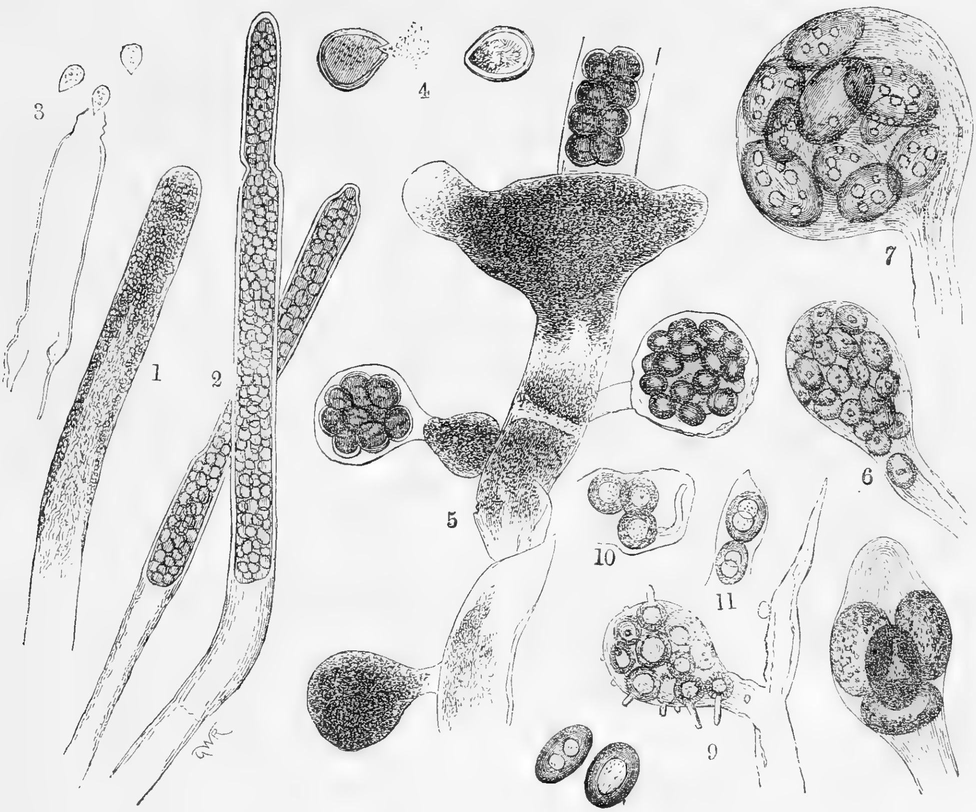
* M. Moquin-Tandon's "Zoologie Médicale."

* Bell's "British Reptiles," p. 59.

REPRODUCTION OF KOLPODS.—The French Academy has awarded a prize to M. Gerbe for his discovery of the reproduction of kolpods. In his researches on the embryology of marine crustacea, he observed that kolpods, after the manner of the conjugated confervæ, connected themselves by pairs. Following this conjunction, unique in the animal kingdom, as far as is known at present, he has shown that in the common *gangue*, or matrix, formed by the fusion of the two individuals of each couple, the reproductive organ of each is divided into two, and four reproductive ovules are thus formed in the matrix, which then dies. These oviform germs are soon disengaged, showing living and moving kolpods in precisely the same manner as does the newly-born conferva. It will be seen that M. Gerbe's observations supply us with an analogy between the generation of animals and that of plants.—*The Reader.*

PETRIFIED HUMAN REMAINS.—In a volume recently published, which, although a descriptive poem, contains many allusions to natural phenomena ("Beauties of Tropical Scenery, &c." London: Hardwicke), the petrified human skeletons found in the island of Guadaloupe are mentioned at page 47. Are these fossil remains of man to be considered of great antiquity, or of comparatively recent formation? One of these petrified skeletons is preserved in the British Museum.—*Inquirer.*

INSECT MOULDS.



(*Saprolegnia ferax.*)

ON A DEAD SPIDER IN WATER.—A descrip- of a fungus, which I observed last autumn upon a dead spider in water, may not be uninteresting to the readers of SCIENCE GOSSIP. It consisted of a mass of white filaments, from the eighth to a quarter of an inch in length. Upon examination under the microscope, these were resolved into two sets; one long and filamentous (figs. 1, 2), the other slightly branching, with spores either contained in spherical sacs, or arranged in lines in the interior of the filament (fig. 5). The former, which seem to be the male filaments,* are at first filled towards the extremity with finely granulated matter (fig. 1). This, after a time, appears to break up, and develope into androspores, which are gathered together in a separate cell at the end of the filament. When the spores are ripe, the end gives way, and they escape. If one of these be burst by pressure, the contents which escape seem to consist of finely granulated matter, similar to that in the filaments. The other set of filaments exhibit a somewhat similar mode of growth. The cell-wall bulges out on one side, until a pear-shaped sac is formed, which, when filled with the granular matter, is shut off by a cell-wall, and the contents are gradually developed into circular spores, somewht larger than the spores of the other filaments.

* These are *not* male filaments, but produce zoospores, and not androspores, as supposed.—ED. S. G.

ON A DEAD FLY IN WATER.—I observed a very similar, if not the very same species of fungus upon a dead fly in water. Figs. 6 to 9 show different stages in the development of the spores. When mature, they exhibit small radicles, which penetrate the wall of the sac. It seems probable that the spores increase within the sac by cell-divison, since some of them (figs. 11, 12) have double nuclei. J. S. T.

Fish Moulds and Fly Moulds.—Several times has attention been directed in these pages to the mould which attacks fish in aquaria. This has been either as a query or a brief reply. The opportunity now occurs for making more extended observations on the subject. At page 10 appeared a communication on "A Dead Fly on the Window,"—this is singularly associated with the present question. The little mould therein referred to, called *Empusina muscæ*, is the terrestrial state of what seems to be an amphibious species, which in its aquatic condition has been named *Saprolegnia ferax*, and generally regarded as an Alga, but sometimes as a Fungus. It is not our intention to enter upon a dissertation as to its affinities and proper place in the vegetable kingdom; but our own opinion, strengthened by the recent investigations of Dr. De Bary and others on Fungi producing zoospores, certainly is in favour of regarding this mould and its allies as Fungi. If such a diseased fly as those described by W. M. B., in the paper already alluded to, are cast into water and allowed to remain, it soon developes a misty, filmy mouldiness around it, in a similar manner to the mould on fish in aquaria, and on the ova of fish, as well as upon molluscs and some other bodies, and just such a mould as that described and illustrated in the preceding page.

There are four genera known, each containing a greater or less number of species, and all bearing a great family likeness to each other, growing in water on similar substances, and doubtfully referred both to Algæ and Fungi. The name of *Achyla prolifera* cannot but be familiar to all who have paid any attention to disputed botanical questions.

A brief description of the development of one of these somewhat obscure vegetable productions must serve as a type of the rest. The first appearance presented by it is that of delicate threads, which are either simple or but slightly branched. These whitish threads radiate in all directions from the body whence they spring. The extremities of these threads become filled with granular matter, as figured on the other side (fig. 1), they gradually swell, and a division is formed across the thread, beneath the granular contents, which become rounded into little pellets (fig. 2). Each of these pellets separates from the rest, becomes an ovate spore which escapes by an opening at the top of the threads (fig. 3). These spores in *Saprolegnia* have two thread-like appendages, by means of which they move about in the water for a period as zoospores, until ultimately the motion ceases and germination commences. In *Achyla prolifera* the spores on issuing from the threads are at first enclosed in a membrane, which soon ruptures and sets the zoospores free.

A second form of fruit is also produced on other threads, lateral branches ending in globular sacs are formed, which contain resting spores (fig. 5), larger than the zoospores. Similar branches contain granular matter, which would appear to be antheridia, the function of which is to fertilize the resting spores (figs. 6, 7, 8). These large spores are called Oogonia. The walls of the globular sacs in which they are developed are perforated, so that through these perforations the resting spores are fertilized by the antheridia.

A third kind of fruit, described by Cienkowski, appears to have been observed also by J. S. T., in which a spherical sac, resembling those which contain the resting spores, is produced on a side branch, and contains spherical spores with a long tubular neck (fig. 9), which bore through the walls of the sac enclosing them and discharge minute swarming bodies into the water; these have not hitherto been known to germinate. Further information on this subject may be found in the "Micrographical Dictionary" under the head of Achyla, and also under Sporendonema. M. C. C.

THE "STANDARD" WASPS' NEST.

Dr. Bingley, at a recent meeting of the Sheffield Field Naturalists' Society, gave a very interesting account of a wasp's nest which was exhibited. In April, 1864, he had tied some pieces of the *Standard* newspaper to a string, for the purpose of keeping the birds off some seeds he had sown in his garden at Whitley Hall. In May he observed a number of small holes in the paper, as if perforated by some insect. Watching it narrowly, he at length discovered a party of wasps at work upon it. By carefully following them, he traced them to an ivy bush, where he found them busily engaged building the nest exhibited, which he believed he was correct in stating to be constructed entirely out of the *Standard* newspaper. The animals appeared in the first instance to puncture a small hole in the paper, and then gather further supplies by gnawing round its edges, working it into pulp at the place, and after getting as much as they could carry, flying off with it to the nest. The comb was constructed simultaneously with the outer shell. The formation of the entire nest occupied until the middle of June, and the greater part of four whole newspapers were consumed in this manner before it was completed. To his surprise the nest was evacuated by them in the first week of August.

The solubility of granite in pure water and in hydrochloric acid are among the tests of its value. An indifferent granite was found to lose 0·25 per cent. of its weight in the former and 5 per cent. in the latter.—*Ansted's Lectures on Practical Geology.*

ZOOLOGY.

THE HOUSE SPARROW IN INDIA.—The house sparrow is more widely distributed than any species found in Hindostan; it is found all over India, and northward even on the steppes of Chinese Tartary. In every village and town of Hindostan it swarms in countless thousands, and is the same dirty, noisome bird as we find in the streets of London. During summer evenings, in Cashmere, they assemble in vast flocks on the chunar trees, accompanied by myriads of jackdaws and maina birds (*Acridotheres tristis*); their rough *calls*, mixed with the chirpings of the sparrows, are anything but pleasant. In the wild and barren Ladakh, the sparrow lives and dies under the roofs of the rude inhabitants of that desolate and dreary land. I recollect, when travelling in that country, we came to an assemblage of Tartar huts, after a long and fatiguing march of twenty miles. Not a symptom of animated nature was visible; long we waited at the doorway of a miserable little hut; but no natives made their appearance. At last a chirp was heard, and a sparrow flew out of the hovel; this little fact was convincing, for the sparrow loves man.—"The place is inhabited;" and so it was. A short time afterwards a flock of goats and sheep were seen winding down the glen, and we were soon surrounded by crowds of wondering Tartars.—*A. L. Adams, M.B.*

THE SONG OF THE WATER-DIPPER.—As I have been fishing during the afternoons of several days lately, I have had a very agreeable companion in a water-dipper (*Cinclus aquaticus*), which I find daily in the same locality, and very frequently on the same stone. The song of this bird struck me as being peculiarly sweet and harmonious, and as having a bubbling, pipe-like sound. It is low, but very distinct, and can easily be heard above the babble and roar of the shallows. I heard it singing in October last, and, for the first time this year, in the middle of March. Its spring song, in my estimation, is as yet inferior to its autumn, thus reversing the general rule. This may be merely owing to my hearing the bird *recording*, rather than in full song. There is a peculiar beauty in the posture of the bird, as he leans forward, singing and jerking his tail, and then stopping for an instant to plume himself, somewhat in the manner of water-birds in general.—*R. Bl.*

A BADGER and five young ones, about five weeks old (apparently), were presented, about the third week in February, to the Clifton Zoological Gardens. The young ones all died; the mother looked very ill.—*J. A. N.*

RING OUSEL.—The Welsh mountains appear to be the head-quarters in Britain of this bird. It is not uncommon to see three or four pairs during a morning's walk.—*M. C. C.*

BURIED ALIVE.—In the spring of 1863, I was in want of a few eggs of the martin (*Hirundo urbica*), and while examining a number of their nests I came upon one, the hole of which had apparently been plastered up with the same material as the nest was composed of. The well-known anecdote of the sparrow, who, taking possession of a martin's nest and refusing to evacuate, was plastered up by the martins and left to perish, at once occurred to me; and I expected to find the remains of some poor sparrow in the nest; but on taking it down I was much surprised to find the dried remains of a common wren (*Troglodytes Europæus*), and three or four martin's eggs. What can have been the motive of the wren in going there I cannot imagine; perhaps some of your readers can enlighten me on the subject.—*J. A. H.*

OCTOPUS.—In the Levant, among the Greek islands, this creature, called "Octopodia" (eight legs) by the fishermen, assumes large proportions, and is exceedingly troublesome to them when alive, but is much esteemed when dead as an article of consumption. Boiled, and afterwards pickled in vinegar, or stewed, it is really very palatable, as I can vouch; yet had mine been the task of preparing them, perhaps I should never have been enabled to give an opinion, as the *modus operandi* is to beat them severely for an hour or so against the nearest large stone until all their sliminess exudes and leaves them fit for market.—*A. M. B.*

VERY LIKE A SHRIMP.—Preserve me from the distilled prattle of the conscientious quack who grinds up facts out of a printed book, and then repeats them at haphazard, because he thinks educated society expects some acquaintance with the phraseology of science. Protect me from him, I should only put him out; let him enjoy himself in his own way, I in mine, out of shot. Perhaps, while I am peopling a flat valley with ancient monsters, smacking the slime with their great tails, gobbling, sleeping, snorting, fighting—while I hear the shriek and the rustle of strange birds in the air, but see the same blessed sun above our heads, the same harvest moon, though rising on the unreaped earth—while I am thus out of date, or may be picturing to myself the naked battle around the barrows on the windy downs, my friend with the book shouts to me that he thinks he has found a *Coleopterum ridiculosum* in the shingle. Will I come and see? And the inspected beast bounds off his open palm with an elastic "spang," very like a shrimp, as I tell him,—and is gone past verification; is probably at the moment hastily shoving himself, at great risk of bruises, deep down among his native stones. But my friend says, contemptuously, that it cannot be a shrimp—because shrimps are red.—*Jones's Holiday Papers.*

The Thrush at Rome.—The thrush has for centuries been a very popular bird in all those countries of which it is an inhabitant, and, as is well known to all those of our readers who may be skilled in classical lore, was highly prized by the Romans, not merely for its song, but also for the delicacy of its flesh. Thrushes were as common in the Roman markets during the reigns of the twelve Cæsars as larks are at the present day in our own Leadenhall, and on account of the estimation in which they were held, fetched on occasions very respectable prices, frequently being sold for as high a figure as would be reckoned by six shillings of our own money. The fattening of thrushes for these markets was a regular branch of trade with Roman bird-catchers, and the chief ingredients used in making the birds plump and juicy for the table of epicures were ripe fresh figs and wheat meal. Horace himself, a regular *bon vivant,* informs us that "nothing is better than a fat thrush," and he was certainly a good judge of such matters.—*Once a Week.*

Newts.—On February 27th I obtained three web-footed newts (*Lissotriton palmipes*). Two of them, a male and female, died the following week; the other, a male, in which the filament in the tail was just appearing, is living now. On March 15th he changed his skin, and not succeeding in quite getting the old skin off one of his fore feet, the limb inflamed very much, and after a few days came off just above the foot. As the poor creature did not appear to suffer much, but seemed to be enjoying himself, I have since kept it in a glass alone. On visiting the pond, in the end of April, from which I took it, I found many newts in full dress, with filament and web, but the one in solitary confinement has advanced no further, either in filament or web, than he was on March 1st. The injured limb has become apparently thoroughly healed now, and appears to be growing longer. The newt never uses it in swimming, but allows it to hang, or rather stand out, quite motionless. Are there any authentic instances of newts reproducing a limb that may be lost?—*R. Bl.*

Stutterers in the Frontiers. — In Great Britain, I think, there is an excess over the average amount of stutterers in the North, where our language meets the Gaelic. Where a mixed language is spoken, the majority are unable to speak the one or the other perfectly, and the result is, that they find difficulties in both; whence arises a certain hesitation, the forerunner of stuttering. If this be true, we might, *à priori,* expect a large number of stutterers and stammerers at the frontiers of countries in which the languages differ; and I believe this to be the case.—*Hunt on Stammering.*

The European Swallows (*Hirundines*). — Alluding to the absence of *Hirundo rufula* from his European list, Mr. Newman says:—"This pretty swallow is a native of Africa, and particularly abundant in the neighbourhood of the Cape of Good Hope, from which circumstance it is called in Gmelin's 'Systema Naturæ' *Hirundo capensis.* It occasionally comes more northward, and has been seen in Egypt in flocks, and accidental stragglers have been observed in Sicily; several have been killed at Palermo, and a few have killed themselves by flying against the lighthouse at Messina. Temminck has observed four or five females in the market of St. Gilles; and the Marquis of Durazzo possesses the skins of a male and female killed in the neighbourhood of Genoa. Giving full credit to all these statements, I still doubt whether I should mention this South African bird were I again to enter on the task of defining the purely European species of hirundines. I may perhaps express my regret that Temminck should have changed the name of this bird from *capensis* to *rufula;* the first name is truthful, and ought to have been retained. Another species, the *Hirundo Boissonneauti* of Temminck, has been twice found in the south of Spain; but I cannot regard this as establishing a claim for it as a European species. I am, therefore, content to abide by my list as already referred to."—*Edward Newman, in The Field.*

Drying Starfish.—Starfishes may be dried *so as to retain their natural colours* almost unimpaired by immersing them in alcohol of moderate strength for about a minute, or just long enough to destroy life and produce contraction of the tissues, and afterwards drying them rapidly by artificial heat. The drying is best effected by placing them upon an open cloth stretched tightly upon a frame and supported a few feet above a stove. Care should be taken not to raise the heat too high, as the green shades change to red at a temperature near that of boiling water. By this process I have succeeded in preserving the delicate shades of red, purple, and orange of the species found on the coast of New England, specimens of which are in the Museum of Yale College. The same process is equally applicable to Echini and Crustacea.—*A. E. Verrill, in Silliman's Journal.*

Fossil Teeth and Scales of Fish are abundant in the thin stratum of black shale which overlies the low main seam of coal at Dudley, Cramlington, and West Cramlington collieries, Northumberland; and jaws, with teeth, and spines in excellent preservation, are far from scarce in the same localities. The average depth of the collieries or pits is 100 fathoms. I shall be glad to exchange the teeth and scales for rare diatomaceæ.—*T. P. B.*

The more we contemplate the symmetrical structures presented before us, the more do we find to admire: the more we probe into their nature and purpose, the greater our wonder.—*Sir John Graham Dalyell.*

ENTOMOLOGY.

Wild Bees' Nest.—A few weeks ago, on felling some elm trees in the neighbourhood of Warwick, a wild bees' nest was discovered in a hollow part of one of the elm trees, in a fork of the tree at about twenty feet from the bottom. It appears that the bees' nest was built upon the *débris* of an old starling's nest, which might have been in existence for several years. The bees were alive when the woodmen discovered the nest, from which they extracted nearly a bucket-full of honey of very fine quality. Large portions of the comb, &c., remained in the hollow place in the tree after the workmen had destroyed the bees and collected the honey. There were three separate entrances to the nest; two were in a bough which branched out immediately above it, and the other one below, in the trunk of the tree. We wish to be informed whether or not this is an uncommon occurrence in apiology?—*W.*

Early Wasp.—I found this morning (March 17th) upon the window-sill (which has a due north aspect, with the house standing upon a northern slope, and quite in the country) a torpid wasp, plump and bright-coloured, which, upon being placed in warm water, immediately revived. What renders the circumstance more extraordinary is, that the weather for many days has been very cold, with east wind, and almost total absence of sun, with slight snow-fall on most days. In Markwick's "Naturalist's Calendar," April 2nd is the earliest date of appearance, and in Gilbert White's, May 23rd.—*R. K.*

Pendent Wasps' Nest.—Late in the autumn of 1864, a curious wasps' nest, of a round shape, and hanging from a branch of a spruce-fir, was sent to me by a friend who had cut it from a fir-tree in Wickwood Forest. It is of a round shape, measuring in circumference about twenty-two inches and in diameter seven inches, with the mouth hanging downwards. The branch from which it is hanging is three-eighths of an inch in thickness, and the nest is fastened to the small twigs at the end of the branch. Its shape, and the paper-like substance with which it is covered, give it, at a distance, the appearance of a huge cedar-ball. The cells which are built at the mouth appear to me to be larger than those of the nests which are built in the ground. Perhaps some of your readers may be able to say if this is a nest of the common wasp (*Vespa vulgaris*), or of some other species.—*George Scarsbrook, Chipping Norton, Oxon.*

The Male Gall-Fly (*Cynips quercûs-folii*).—Many distinguished students of the *Diptera* have, it is well known, examined thousands of gall-nuts of the oak, finding only a single female in each gall, without ever finding a single male. No male specimen of *Cynips*, it is believed, had ever been found, or been alleged to be found, until September last, when Mr. John Robertson (author of the "Anatomy and Physiology of Pholas Dactylus"), after examining many hundreds of galls, which he found in great abundance on the sessifloral oaks in the neighbourhood of Bognor, Sussex, discovered a male and a female both in one gall. The crypt of the male was only about a tenth of an inch from the outside of the gall. In size the male crypt is scarcely a third of the size of the female crypt. Of course, the male is much smaller than the female; the difference is less, however, between the size of the sexes than between the size of the crypts. There is no mistaking the male when seen, if the observer is well acquainted with the female. On being exposed to the knife, the male fly, unlike the sluggish female, was soon wide awake, alert, and nimble. He disappeared before the means of capture could be applied. This quickness, with the instinct of concealment, and the locality of his crypt in the gall, probably explain why he has never been found. Split the gall, and the male is not likely to be found; but pare it, and he will be found by observers with the patience and perseverance necessary to examine a few hundred galls. Mr. John Robertson shows the gall, with its male and female crypt, to anybody who wishes to see it. During the approaching autumn, this observation can be corrected or confirmed by the students of galls.

[N.B.—We publish the foregoing *verbatim*, as communicated to us by Mr. John Robertson, and entirely at his request and upon his responsibility. We do not think the facts proven. Confessedly, the male insect escaped, and a second insect was found in the gall; but if it did not remain to be examined, what evidence can be produced that it was a *male* gall-fly, or even a *Cynips?*—Ed. Sc. Goss.]

BOTANY.

Vegetable Monstrosities.—In reference to Mr. Holland's valuable paper in the last number of *Science Gossip*, I may state that while walking to-day (May 9th) through a wood near West Wycombe, Bucks, I found a single example of the wood anemone (*Anemone nemorosa*) similar to the one therein figured. The white petal or sepal was, however, quite perfect in shape, and rather larger than is usually the case. In a field near the same wood I noticed, among hundreds of examples of the ribwort plantain (*Plantago lanceolata*) a specimen bearing two flower-heads: at the base of each of these were clustered five or six smaller ones, which gave the plant a somewhat remarkable appearance. —*B.*

STRAY NOTES ON STRAY PLANTS.—In the summer of 1864, I had two instances, one, at least, a remarkable one, of the "distribution of species," and of the way in which the flora of a country or district may be enriched. 1. I found two plants of candytuft (*Iberis*) growing wild on the banks of the river Wyre, a few miles below Garstang. Both were in full bloom, and the flowers were quite equal, if not even superior, in richness of colour and in size, to those ordinarily seen in cottage gardens, where the plant is, I believe, a favourite one. One plant was far away up the stream from the other, which was a quarter of a mile below a garden, the refuse from which was generally thrown into the river. Unfortunately, I left the neighbourhood before I could ascertain whether the plants brought their seeds to perfection. 2. In the parish of Bredwardine, in which I am now living, I found a solitary colony of Lungwort (*Pulmonaria officinalis*), on the wooded bank of a little hill stream. I cannot see any apparent reason for its being found there, seeing that it is, as far as I can discover, after a careful examination, the only colony of Lungwort (*Pulmonaria*) for some distance round. There is a cottage at some little distance, but there is no pulmonaria in the garden at present. Possibly there may have been, for the plant is sometimes a favourite, on account of its variegated leaves.—*R. Bl.*

"STANNER ROCKS."—I am surprised to find that your correspondent "W. S. S." should not have met with the Welsh Speedwell (*Veronica spicata β hybrida*) in the Stanner Rocks. It is quite as scarce a plant as those he has mentioned. It grew there between thirty and forty years ago, on a steep grassy bank, near the foot of the rocks, at the point where the rocks come nearest to the Kington Road. The *Scleranthus* grew on the same bank. I gathered one plant there of the white-flowered Speedwell (*Veronica flore-albæ*), but all the rest were of the usual colour. There was a good sprinkling of the plant, and I can hardly believe it to be distinct. I examined only a very small portion of the rocks, from my time being limited. I would mention that the botany of the Stanner Rocks is almost identical with that of the Breiddin in Montgomeryshire, the *Geranium sanguineum*, the *Lychnis viscaria*, and *Veronica hybrida* being common in each group, and the geological formation is very similar.—*T. S.*

HERB PARIS.—This plant (*Paris quadrifolia*) grows in abundance in the copse at Chilcombe, a mile and a half from Winchester. I have found plants with three, four, five, and six leaves.—*B.B.S.*

QUINQUEBRACTEAL ANEMONE.—At the last meeting of the Society of Amateur Botanists the president exhibited a specimen of wood-anemone with five bracteal leaves instead of three.

CHESTNUT-TREE OF THE TUILERIES.—The celebrated chestnut-tree of the Tuileries that bursts into leaf before its neighbours, and generally enters an appearance by the 1st of March, is a laggard this year. Crowds stare up at its bald crown in disappointment. The tradition which has given the people faith in the precocity of this tree dates—neither from the birth of the King of Rome, nor from Napoleon's return from Elba. The date is the 20th of March, 1746. A celebrated painter was accused of having assassinated his rival at the Royal Academy on that day. The painter's name was Joseph Vien. He proved before the tribunal of the Châtelet that at the moment of the murder he was standing, gossiping with the Duchess de Roncevaux, under a chestnut-tree. He said he could identify the tree, for it was the only one in leaf. This "*alibi*," we are told, saved Vien's head; and from that time the people have watched the precocious tree. It has seldom failed; but the cold of the present year has been too much for it.

THE CULTURE OF VALLISNERIA SPIRALIS.—This most beautiful of our water-plants is much more easily cultivated than most people imagine. Friends on seeing the luxuriance of my plants, have frequently asked me how it was that they had not attained the like success. I now proceed to give to your readers the course pursued by myself during the last five years. The best shaped vessels are those used by confectioners, that is to say, if you wish to grow the plant by itself; these may be purchased for a few shillings at any of the shops where fern-glasses, &c., are sold. On the bottom of the glass lay some stiff mould, to the depth of about an inch; on this place the roots of the Vallisneria, and cover them with shingle, to keep them in their place. Water-beetles are as good as anything to give it an air of life, or a few minnows; but fish, I think, nip the tops of the plants, and unless they are well established, this does harm. I can fix no regular period for changing the water, but whenever the confervæ are getting ahead this must be done. The sides of the glass may be cleaned with a little rag and sand when necessary. —*W. G.*

A WONDERFUL TREE.—In the birch wood of Culloden there is a remarkable tree, well worthy of note. Somewhere about thirty years ago a little giant of the forest was blown down in a storm, and fell right across a deep gully or ravine, which it completely spanned; and the top branches took root on the other side. From the parent stem no less than fifteen trees grew up perpendicularly, all in a row; and there they still flourish in all their splendour, while the parent stem evinces no token of decay. Several of the trees are not less than thirty feet high. Is not this a forest curiosity worthy of a visit by naturalists? The tree is a larch fir.—*Invergordon Times.*

WHAT IS MILDEW?—"Mildew" is just one of those loose terms which represent no definite idea, or a very different one to different individuals. Talk of *mildew* to a farmer, and instantly he scampers mentally over his fields of standing corn in search of the brown lines or irregular spots which indicate the unwelcome presence of *Puccinia graminis*, known to him, and to generations of farmers before him, as "mildew." Try to convince a Norfolk farmer that anything else is "mildew," and he will consider you insane for your pains. Speak of *mildew* in your own domestic circle, and inquire of wives, or daughters, or servants, what it means, and without hesitation another, and even more minute species of fungus, which attacks damp linen, will be indicated as the true mildew, to the exclusion of all others; and with equal claims to antiquity. Go to Farnham, or any other hop-growing district, and repeat there your question,—What is *mildew?*—and there is every probability that you will be told that it is a kind of mould which attacks the hop plant, but which differs as much from both the mildew of the farmer and the laundry-maid as they differ from each other. The vine-grower has his mildew, the gardener his mildewed onions, the stationer his mildewed paper from damp cellars, the plasterer his mildewed walls, and in almost every calling or sphere in life, wherever a minute fungus commits its ravages upon stock, crop, or chattels, to that individual owner it becomes a bugbear under the name of "mildew." — *Rust, Smut, Mildew, and Mould.*

TRUFFLES.—Truffles are plentiful occasionally in Hampshire. In the village of Cheriton, about three miles south of Alresford, when I was a boy, there were two families whose principal means of support depended upon the success of their truffle-hunting; and their name was Leach. At present there are three brothers in the village who follow the occupation of their sire. These men do not bribe the dogs by giving them meat, to prevent their eating the luxury; but they give them a piece of bread now and then as a reward for their discoveries. Nor do the dogs, as might be inferred, get possession of the truffles. They find them, and their master digs them up with a pike he carries for the purpose. The dogs used by these men are white ones, very similar to the French poodle. The hunting is not limited to any particular places; but in all the hedgerows round and fir plantations are the truffles found.—*J. W. Batchelor.*

A NEW "RUST."—Mr. M. C. Cooke found during his recent visit to North Wales, a species of "rust" growing upon *Empetrum nigrum*, and known to mycologists as *Uredo Empetri*, DC. This is the first record of its occurrence in Britain.

INTRODUCTION OF RARE PLANTS, &c.—The programme for the season of the Manchester Field Naturalists' Association contains the following suggestion:—Members who join in the excursions might add to the beauty and interest of the country round Manchester by taking with them any surplus roots and seeds they may possess, especially of native plants brought from a distance, and also living fresh-water mollusca, and depositing them in places where they would be likely to become permanently established. No confusion would be caused, since the Flora and Fauna of the neighbourhood are now both well known, and the introduction of new species would be a set-off also against any possible lessening of the abundance of those produced spontaneously. Members are invited to collect seeds, &c., for this especial purpose, when at a distance from home, and also to enrich the neighbourhood by a judicious sowing of the seeds of exotic plants.

WELLINGTONIA GIGANTEA.—Prof. Brewer, of the Californian State Geological Survey, announces to Sir William Hooker the discovery "of the big trees in great abundance on the western flanks of the Sierra Nevada, in about latitude 36° or 37°;" and he describes them as "very abundant along a belt at 5,000—7,000 feet altitude, for a distance of more than twenty-five miles, sometimes in groves, at others scattered through the forests in great numbers." One of the largest trees seen by Prof. Brewer measured 106 feet in circumference at four feet above the ground, and was 276 feet in height. "You can have no idea," he adds, "of the grandeur they impart to the scenery, where at times a hundred trees are in sight at once, over fifteen feet in diameter, their rich foliage contrasting so finely with their cinnamon-coloured bark." It is satisfactory to learn that there is no danger now of speedy extinction of the species, for "immense numbers" of seedlings have been seen growing.—*Athenæum.*

LAUDANUM, A SPECIES OF DEW.—Laudanum is procured in a curious manner in some parts of the isle of Cyprus. It is a species of dew, which falls during the evening and night upon plants resembling sage, the flowers of which are like those of the eglantine. Before the sun rises, flocks of goats are driven into the field, and the laudanum fastens on their beards; whence it is taken. It is of a viscous nature, and, collected in this manner, is purer than that which adheres to the plants; because these plants are subject to being covered with dust during the day.—*Bucke's Beauties of Nature.*

[Doubtless gum ladanum is meant, and not the opiate with the above name. Ladanum is a resin which exudes from several species of *Cistus*, especially *Cistus creticus.* Such paragraphs as the above, containing as much romance as truth, are only calculated to mislead.]

MICROSCOPY.

Exotic Diatoms in British Localities.—The discovery of isolated valves of exotic diatoms does not prove that they ever lived in these isles. I have myself found (very sparingly) mixed with fresh-water forms species hitherto only detected in guano. In a gathering made from a small ditch, I found some fragments and one perfect valve of Aulacodiscus scaber, and also several valves of Triceratium alternans. No doubt these forms had been washed out of the adjacent fields, which had probably been manured with Peruvian guano. I had not cleaned any guano for many years. I have also occasionally observed marine and brackish-water species in washings from moss. In one gathering I detected a valve of Coscinodiscus radiatus and several valves of Pleurosigma Æstuarii. These must have been floating about in the air, and then brought down by the rain. We may fairly conclude that unless a species is found alive, and in tolerable plenty, it is not a native of the locality in which it is discovered, more particularly if the species are exotic. Thus, Arachnoidiscus has no claim to a British habitat. I believe only three valves have been found, one by M. de Brébisen, in a gathering from Ilfracombe, and described in the *Synopsis of British Diatomaceæ*, and two more twelve years after, by Mr. Archer. It is very desirable that all who make Diatoms their study should, before adding a new species to the large number already (and in many cases imperfectly) described, have found it plentiful and alive. To describe it correctly it must be examined living as well as dead. If the material is in sufficient quantity, a portion may be well washed with liquor ammoniæ, and afterwards with distilled water. By this means the stipes, or filaments, are preserved; and if the specimen is heated on the slide, it may then be mounted dry or in balsam (Achnanthes longipes and brevipes are beautiful objects prepared in this way); a further portion may be acidized in the usual manner, as it renders striation more distinct.—*Fred. Kitton, Norwich.*

Guano, &c., in Exchange.—I shall be glad to exchange Upper Peruvian guano, Richmond earth, Nova Scotia earth, or China sea-soundings, rich in foraminifera, for any good foreign material containing diatomaceæ, or British gatherings of one species only.—*W. J. B.*

Scales on White Cabbage Butterfly.—Will any of your correspondents kindly inform me on what part of the white cabbage butterfly the elongated and tufted scales are found which are used as test objects? I have never been able to find such as are described and figured by Quekett and others.—*W. H. Reynolds.*

Webster's Condenser (p. 90) is now being manufactured by a London optician. (See advertisement.)

GEOLOGY.

Serpentine is used as a kind of marble. It is a silicate of magnesia, coloured very richly by metallic oxides, especially those of iron, nickel, and chrome. One kind, obtained from Cornwall, where the Lizard rock contains veins of extreme beauty, is remarkable for its brilliant red and mottled colour contrasted by veins of the purest white, and taking a very high polish. It is well adapted for small ornaments; but when used for church work, such as fonts, internal columns, &c., its appearance is injured by its numerous veins and cracks. The polish, though brilliant, does not stand exposure to weather or damp air. The Italian serpentine (*ophite*) is a different mineral, and far less brilliant, the rich red tints being absent, and the colour generally mottled dark green. It is used, however, for similar purposes, and is of nearly the same value. It is comparatively soft, and very easily worked. Irish Connemara marble is a variety of serpentine, and is a very beautiful material for columns, tables, altars, and other decorative purposes. Its colour is much paler than the Tuscan, which it otherwise resembles. —*Ansted's "Practical Geology."*

Education in Geology.—There is no greater mistake in modern school tuition, and none so general, as the neglect of the natural sciences; and yet there are few departments of knowledge to which boys are more readily and earnestly attracted. The majority are naturally observers and collectors—as witness their little cabinets of birds' eggs, butterflies, and minerals; and it only requires encouragement and direction to make them reasoners and reflectors. If it be an important point in education to foster habits of observation and discrimination, then assuredly there is no theme so admirably adapted as the field of nature, and no section so accessible at all seasons as that of geology. It is true that the ordinary branches of tuition must ever occupy the main share of the schoolboy's attention; but there are intervals when natural history would be a recreation, and in that recreation the otherwise dormant mind might be first awakened to interest and energy. Get the mind by all means aroused to self-exertion; let it once taste the pleasurable excitement of knowing in one department, and the battle is won. The desire for further knowledge increases with the growth of that knowledge and strengthens with its strength. And even where such subjects as geology form no part of the regular curriculum, a day in the field or an afternoon in the museum might be given as a reward for diligence and proficiency in other departments, and in this way a certain amount of available information might be imparted without any attempt at formal instruction.—*Page's "Geology as a Branch of General Education."*

FISH TATTLE.

Fish Culture on the Lea.—It may prove interesting to many of your readers, especially Waltonians, to know that there is an establishment for the cultivation of fish at Ponder's-end, on the river Lea. It is certainly on a smaller scale than the one at Hampton, yet everything is in a perfect state, and some thousands of salmon and trout ova are to be seen in their different stages of development. The proprietor is at all times willing to permit inspection. I was much gratified myself, and have no doubt so will others who take an interest in pisciculture.—*Daily Telegraph.*

A Good Pike.—On the morning of May 9th, a pike was caught in Grasmere Lake, weighing 23½ lbs. Its length was forty-two, and extreme girth twenty-one inches.—*Edwin Green.*

Salmon in Australia.—At a recent meeting of the council of the Australasian Acclimatisation Society, a letter from Mr. Green, of Badger Creek, was read, stating that the salmon continue in the best of health. Mr. Green also forwarded a memorandum of the temperature of the creek, by which it appears that on the hottest day, when the temperature of the air at noon was at 98°, that of the creek was only 61°; thus proving that from this source no danger is likely to arise that will in any way imperil the undertaking.—*R. T.*

Reproduction of the Eel.—In reply to "E. B.," no competent ichthyologist has the slightest doubt that eels are produced from deposited ova, after the fashion of most fish. If "E. B.'s" friend will open any eel, at almost any time of the year, he will see two beautiful white fatty fringes running nearly the whole length of the body, one on each side; these are the sexual organs. If a portion of the fringe be submitted to microscopic examination, it will be seen that it consists of a multitude of round or oval grains, very minute, imbedded in a mass of fat or oil globules. The oval grains are the eggs of the female fish, the round ones are the milt of the male. These latter are extremely minute; the ova are readily discernible by the naked eye, and may be seen by shaking or breaking up a portion of the fringe upon a glass slide with a little water. The author to whom we are chiefly indebted for having clearly demonstrated the oviparous nature of the eel is M. Reinh. Fr. Maur. Hohnbaum-Hornschuch, in his treatise, written in Latin, "De Anguillarum Sexu ac Generatione." The treatise, which bears the date of 1842, is, I believe, rare. I possess a copy in my library. It has one plate, with accurate figures illustrating the sexual organs. If your correspondent is interested in eel-lore, he may perhaps care to read an article of mine on this subject in the "Quarterly Review," No. 229, January, 1864. W. Houghton.

WINDOW GARDENS AND AQUARIA.

Brücke's Lens.—I make frequent use of this valuable little arrangement, manufactured (and sold for fifteen shillings) by Messrs. Paetz & Flohr, opticians, of No. 14, Under the Lindens, Berlin. It consists of a one-slide achromatic telescope measuring when closed about three inches long, and an inch and a half in diameter, and its use is to magnify small objects in aquaria, when they cannot be closely approached or removed. Under these circumstances, and at distances varying from fifteen to eight inches, this instrument produces the same amount of amplification as is obtained by an ordinary pocket-lens at distances of from one inch to half an inch.—*W. Alford Lloyd.*

American Water-weed (*Anacharis alsinastrum*).—This plant, commonly known as the "American water-weed," was first noticed in England in 1842. Since then it has spread rapidly, and in many counties has become almost ruinous, choking up water-courses and canals, and threatening, in some parts, a universal stoppage. It is found, also, very commonly in ponds and ditches, where it soon obtains a similar mastery. The best eradicators (if introduced before the plant has become too powerful) are said to be swans. After flowering, however, it appears to decline of itself: it is also much affected by severe frost. One reason of its enormous increase in Britain is, probably, that the individuals are all of the feminine gender, since it is a matter of common observation that plants prevented by any casualty from ripening seed, and supplied at the same time with plenty of nutriment, are prone to extra vegetative development. It should not be overlooked, that although in one respect a hateful incumbrance, the Anacharis produces good sanitary results; many a ditch that was offensive before having become clear through its purifying influence. Like others of the family, it makes a becoming and cheerful aquarium plant, and, preserved in a parlour, often blooms freely.—*Grindon's British and Garden Botany.*

Plants.—What are the most suitable plants for an aquarium? Not the oar-weeds or tangles; for though young specimens have an attractive appearance, they will not live long in captivity; they presently begin to decay, and slough off in slimy membranous shreds, filthy to look at, and hurtful to the living creatures. The *Fuci* live pretty well, but their sliminess and ugliness are fatal to their pretensions. From the red and the green orders we must make our selection. The pieces of rock to which the plants are attached should be as clean as possible. All adhering sponges, in particular, should be carefully scraped off, unless they are wanted for immediate examination.—*Gosse's Aquarium.*

NOTES AND QUERIES.

MANX CATS.—In the Burmese empire this species of cat is well known, and a military friend, who was with the army in the conquest of that country, brought me a pair from Ava, from which I had quite a little family at Madras, and made a most acceptable present of them to an officer on leaving India. You are in error in stating that this species of cat *have not* tails, for there is a little *screw-like knot*, which forms a singular little *round tuft of hair*, being the only tail, if such it may be called. I know the Manx cat very well, having seen them often at Wighton, in Galloway, where I was in early life, and have since been upwards of thirty-six years in India, of which I spent fifteen in Calcutta.—*David Ross.*

INSECTS OF NOVA SCOTIA.—In 1863, being obliged to leave Bermuda on account of failing health, during the summer months I took my passage in the Cunard steamer *Alpha,* and in four days found myself in Halifax, Nova Scotia. The passage was an exceedingly pleasant one, and made very attractive to me by having to cross the Gulf Stream. That stream, as most of your readers may know, is almost as clearly defined in the ocean as any river can be inland. The temperature and colour of the water, the natural productions, and especially the gulf-weed, all proclaim that you are in it, and at certain seasons of the year you are unmistakably warned of its neighbourhood by the violent storms, generally accompanied with lightning and thunder, that agitate its surface. On arriving in Halifax, after a few days spent in town, I proceeded to the house of my friend, J. M. Jones, Esq. (author of "The Naturalist in Bermuda"), a most ardent naturalist, and with whom I had spent previously many happy and interesting hours in Bermuda. His house is situated in the woods, or rather, I should say, in the "forest primeval," for man has never disturbed the country in some directions for hundreds of miles. There, roaming in the woods, I regained in great measure the strength I sought for. Having been an enthusiastic entomologist in earlier days, I was soon attracted by the number and beauty of the insects, especially the butterflies, flitting around me; so, providing myself with a box, I set to work, and in a few weeks filled it. Forms exceedingly rare in England seemed quite common. The clouded yellow was more abundant than our cabbage butterflies. Two of the Fritillary tribe were very common (*Cybele* and *Aphrodite,* I believe), and later in September the scarce painted-lady and the only white butterfly in that part of the American continent, *Pieris oleracea.* I captured duplicate specimens of those I have mentioned, and shall be glad to send them to any of your readers who may care to possess them, as I do not desire to keep a collection of insects myself, but am much interested in shells. Where it is possible, I shall be very glad to receive any English or foreign land-shell or fresh-water duplicates in exchange (I may just mention that I could make up a series or two of those of Bermuda for any person who wished, and could exchange others). I ought to mention the "Camberwell beauty," which is a common sight in the streets of Halifax; but of such I was too late to capture many specimens. I enclose my card, and should any of your readers care to have the insects, my best plan will be to forward the specimens to you.—*T. B. F.*

THE HIVE-BEE AND ITS STING.—After using its sting, the bee will always carefully withdraw it, if possible. In this case, the bee does not die; but only when it loses its sting by being unable to withdraw it. When two queen-bees fight, each takes all possible care not to inflict the death-wound till she can do so without being stung in return. Her adversary's body is soft enough to allow her to withdraw her sting uninjured. "E. W.'s" query is one which cannot always be answered. It is not an uncommon occurrence for bees to quit their hive without any apparent cause.—*M. A. L.*

CLEANING OBJECTS.—Will any correspondent kindly tell me how to clean the *pedicellaria* of echini and starfishes? By cleaning, I mean getting rid of the membrane by which both the head and the stern are enveloped, and which renders them opaque, even in balsam. Water is useless, and liquor potassæ causes the three members of the head to separate and fall apart.—*W. W. S.*

INCUBATING ROBIN.—I cut the following paragraph from a Reading paper the other day; can any of your readers corroborate the alleged fact?—"A robin is now sitting on eggs in a garden near Southampton. The nest is in a hole in a brick wall, near the ground where a cat prowls. Redbreast, how ever, is safe unless she should happen to be seen by Grimalkin, for the hen bird cannot be scented during incubation—a wise provision of nature. Even the female fox, when with young, has no scent, and cannot be hunted." I have said *alleged* fact, for I have great doubts on the matter, my own experience evidencing to the contrary.—*W. I. S.*

CAPE HENS.—The Cape hen belongs to the family of the petrels, and is the *Procellaria Atlantica* of Gould, and is one of the most common oceanic birds.—*W. I. S.*

COLOUR OF BIRDS' EGGS.—A question is asked in the February number of SCIENCE GOSSIP as to whether the eggs *earliest or latest* laid are deepest in colour, or most definitely marked. Many years' close observation leads me unhesitatingly to say that the *earliest*-laid eggs possess this distinction. I have paid much attention to the subject, and on two occasions have had singularly favourable opportunities for verifying my assertion. These were respectively the eggs of the Nuthatch (*Sitta Europæa*) and the Robin. Both nests were in such a position that I could examine them daily, and I found a gradual diminution in the intensity of the ground-colour and markings in the eggs of each species, the *first*-laid egg being far darker in colour, and possessing more numerous markings. I think this is a result we might reasonably expect, for the glands secreting the colouring matter would naturally become more and more exhausted of their contents as each egg passed through the oviduct. Before I saw the query I never heard this fact questioned.—*W. I. S.*

HISSING OF SNAKE AND VIPER.—There is a difference between the hissing of these two serpents which I think is not generally known. The viper after each hiss always makes an equal noise in drawing his breath in again. The snake hisses much louder, but does not draw in again.—*W. R. Tate.*

JERUSALEM ARTICHOKE.—On page 118 I observe a query: "Does this plant ever flower in England?" In 1861 I saw several specimens in blossom in a kitchen-garden in Brompton, Middlesex; the owner looked on them as great curiosities, having previously believed that the flowers were unknown in this country. They much resemble those of the common sunflower, a member of the same genus, but are smaller in size.—*B. W. H.* says it flowers occasionally in Cornwall in hot summers, and Dr. Livett has had it flower several times during the past ten or twelve years, at Wells, in Somersetshire.

A Spider Hoax.—Several correspondents have sent us the following, which is going the round of the country papers:—"A sudden panic fell upon the worshippers on Easter Sunday in a large church at Lisbon. An enormous spider was suddenly seen to descend to an ancient web that is said to have existed for many years. The creature was so formidable, that the women began to scream, and a scene of general terror and excitement followed. When Arachne was captured, she was found to be, with legs extended, nearly five feet long. She weighed six pounds." Could this have originated in a mistake, or is it an intentional hoax? We should like to see a fragment of its web.

Bees' Remains.—The other day I saw, under a shrub, the cases of five humble-bees; the head and body were eaten away, but the fur and wings were not the least injured; and when I first saw them, I thought the bees were alive. Can you tell me what had eaten them in this artistic manner?—*A. O.*

An Aquarium Query.—Can you tell me any way of preventing the curious fungus, or whatever it is, like iron rust, which grows on the glass of *fresh*-water aquariums?—*G. R. B.*

A Viper Story.—I have a well-authenticated account of a viper following a woman from a wood across two meadows and a plank thrown athwart a stream, up to her cottage door, and even then making an attempt to spring to an upper window from which the pursued surveyed her pursuer. I can have no doubt of the fact from the character of my informant, and his wife's mother was the woman in question. The reason of the creature's pertinacity is said to be that the woman it followed was, at the period in which the circumstance occurred, suckling a child. Can it be true that a viper has a predilection for baby's food? Also, is the fat of a roasted viper a certain cure for its bite? Of this I am strongly assured.—*R.*

N.B.—It is a pity our correspondent did not observe the fact himself. However, he accepts the responsibility, and as a clergyman and a gentleman we are bound to give him credence.—Ed. S. G.

Paris quadrifolia.—In gathering some specimens of this plant I found two or three with five leaves instead of four. All the other parts of the flower had the usual number till I came to the pistil, where one carpel was deficient, so that, taking the plant as a whole, the number of parts were perfect, but the distribution of them was imperfect. Can any of your correspondents inform me whether, in the deviation from the normal condition of this plant, they have noticed the same agreement in the aggregate? —*A. Grugeon.*

Valeriana dioica.—I gathered this plant some years ago in Nazing Meads, Essex, where it was very abundant, but only obtained two female flowers. I have gathered the same plant again these last two years in another locality, and have not succeeded in obtaining even one female. Is this disparity in the sexes general, and if so, may not these same male plants in some seasons produce female flowers?—*Alfred Grugeon.*

Ants and Cineraria Maritima.—Ants seem to have a great liking for Cineraria maritima. Last year in my garden I had many plants in divers situations; some in the ground, others in vases and baskets; but no matter their situation, they were severally chosen by the ants as a temporary abode, and were built round by them like a tower, inclosing the stem to the top of the plant, which of course drooped and died under such treatment. I did not disturb their work, being curious to know why they did it.—*E. M. Edmonds.*

Asclepias Seeds.—I have a small lot of American silkweed or milkweed seeds (*Asclepias Syriaca*) lately suggested as a new substitute for cotton, of which I shall be pleased to send a few (for microscopic examination, &c.) to *those* inclosing a stamped directed envelope to *W. E. Williams, Jun., M.D., Corsham, Wilts.*

Ornithological Queries.—Will any of your travelled readers tell me if they have ever seen, or heard from reliable authority, of *swallows* being seen in any numbers migrating towards Europe, in the spring of the year, across France or Spain? Also, if they have ever seen, or heard, of *swallows* existing in New Zealand? I ask these questions, as I cannot, with all my research at the British Museum Library, discover affirmative evidence of the former fact, whilst I find it stated by Mr. E. Layard, the naturalist, that "no swallows visit New Zealand, though they abound in Australia, 1,200 miles distant therefrom." And another naturalist, Mr. O. Salvin, reports that on his voyage to South America in the steamer *Atrato*, May, 1859, "they encountered swallows (the *Hirundo rustica* species) 180 miles to the N.W. of the Azores," or, in fact, 1,400 miles from the *west* coast of Africa, whence they were *migrating* (Qy. to Europe or North America?) As the swallow is found in North and South Africa, from Tunis to the Cape of Good Hope; in North and South America, from Cape Horn to the Mackenzie river, within the Arctic circle; and throughout Europe and Asia, as high up as Bodöe, in the former, lat. N. 67°, and Pekin in the latter, why should it shun New Zealand so exceptionally, with its temperate climate and its food-abounding lakes and woodlands?—*H. E. A.*

Hedgehogs eating Eggs.—I kept one for a time, and used to give it birds' eggs as a treat, which it appeared to enjoy very much.—*H. Bunnyard.*

Natterjack.—"This word is a corruption of two German words, *Natter*, 'an adder,' and *jack*, 'cut short,'" writes Mr. W. R. Tate in reply to the query at page 118. We think that *Natter* is in itself probably derived from *Nieder*, Anglo-Saxon *Nædre*, "nether" or "lower," from the creeping habit of the adder to which it belonged, under the form of *eddre;* and *jager*, "one who runs," is very applicable to such a running reptile as the Natterjack. Moreover, words compounded of *nieder* have the signification of some place or object lying low, and *jager* or *jagd* in such a combination would not be inapplicable to the Natterjack toad.

Salmon Maut.—In answer to the note at page 119, R. A. quotes from an old "Art of Angling" published in 1774: "Those (salmon) that are taken in the river Mersey in Cheshire, the first year are called *smelts*, the second *sprods*, the third *morts*, the fourth *fork-tails*, the fifth *half-fish*, and in the sixth, when they have attained their proper growth, are thought worthy of the name of *salmon*."

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."

Suppressed Names.—Our correspondent Mr. Ralph Tate regrets that writers should suppress their names, because publication would authenticate the facts narrated, and suppression could scarcely be justified when the interests of science are regarded. Other correspondents have communicated similar views. We do not insert any communications unless guaranteed by the name and address of the writer; and wherever facts are recorded, would always prefer publishing the names of the respective contributors, but we cannot make it imperative. In "Notes and Queries" we think that querists are entitled to employ initials only.

Infusorial Earth.—A correspondent has a little from Algeria, which he is willing to exchange for deposits from other localities. Address F. White, 1, New Road East, London.

Carbonile.—T. B. T. is referred to page 96.

J. M. McV.—No good can accrue from re-opening the Snake-stone controversy; it has been widely discussed, and, in default of fresh facts, would only occupy space which might be better filled.

E. R.—We can only afford space to record *facts*, and must leave the deductions therefrom to our readers.

J. A. N.—The siskin was not included in our list of migratory birds, *because* a few remain with us through the year.

W. A.—It is an occasional occurrence.

W. G. S.—It is clear that the entire paragraph alluded to at page 88 was erroneous. See also note on page 114.

P. H. B.—We gave a list of works on shells at page 48.

W. B. D.—There are many places and many prices at which land tortoises may be purchased in London. You had better commission some friend in town to procure you one.

H. G. S.—See our reply to H. G. at page 96. Newman's Butterfly number of "Young England" may be had either of the author, 9, Devonshire Street, Bishopsgate, London; or of the publisher, Tweedie, Strand, London.

A. E. L.—(1.) At present we cannot. (2.) Because cinders, having been burnt, contain no spores or mycelium of fungi.

W. A. L.—Aquarium article declined with thanks. The fragment on "Zoology at the Exhibition" we scarcely think advisable to publish.

G. L. and R. B.—So many methods are recommended, and all but partially successful. Beetle wafers, phosphor paste, crickets, tortoises, hedgehogs, traps, cucumber parings, &c., all have their advocates. None, we believe, so effectual as the hedgehog.

E. M. E.—The Society of Amateur Botanists meets at 192, Piccadilly. Ladies *are* eligible. Write to the Secretary for a prospectus at the above address.

R. D. B.—A continuation of growth, for a limited period, of such aquatic plants, when separated from their roots and placed in water, is by no means extraordinary.

T. P. B.—Your suggestion might be entertained, but for the regulation at pp. 24 and 96, whence you will observe that lists are inadmissible, and we have no desire to depart from this feature in our plan.

H. F.—It is a common circumstance, unfortunately, for fish in aquaria to be thus attacked. See our present and previous numbers.

Salamanders.—Mr. G. H. King, of 190, Great Portland Street, informs us that he has plenty of these reptiles to dispose of.

P. H. B.—Some fungi are very difficult to preserve. The methods employed are detailed in Cooke's "British Fungi," published by Hardwicke, 192, Piccadilly. Price 6s. Yours is probably a morell, and, if suspended by a string, will dry in a current of air, but shrivel a little in the process.

W. W. K.—Your nut is called "Coquillo," and is the fruit of a palm known to botanists as *Attalea funifera*. The insects *Margarodes formicarum* belong to the Coccidæ, a family of beetles.—*J. O. W.*

P. C.—We know of no means of acquiring the names of plants without application. There is no "royal road to knowledge." We should think Bentham's "Handbook of the British Flora," published at 12s., the easiest and best for your purpose.

E. M. W.—The book you refer to is E. W. Janson's "Beetles," 29 plates, 4to., with many figures on each. It could be obtained through any respectable bookseller. The "rose linnet" is the "common linnet" in its nuptial dress.

G. Day.—The Entomological Society of London consists of members (who pay an admission-fee of two guineas and an annual contribution of one guinea) and subscribers (who pay the same annual contribution, but are exempt from any admission-fee). For further particulars apply to the Secretary, 12, Bedford-row, London, W.C.

Watford.—The poison of wasps and their allies is only injurious when it enters the blood. In the case referred to the child must have been stung internally. The stings of wasps and bees are active for ten or twelve hours after the death of the insect.

R. S. S.—Your iridescent green beetles are called *Chrysomela fastuosa*, Linn. Their family is *Chrysomelidæ*. We are not aware that they have any economic application.—*F. M.*

A. L. D.—It is difficult, from so brief and general a description, to say what bird it was. It might possibly be a "siskin."

J. C.—Eggs of the chaffinch are occasionally found of a uniform dull blue colour.

C. Capron.—Your specimen, sent some time since, on ash-bark, is one of the incomplete or transitionary Coniomycetal fungi, possibly only spermogones, and, in that state at least has not been named or described. The asci, of course, are wanting; spores free, fusiform, quadrilocular, hyaline. If you are very desirous of a name, call it *Septoria fraxinicola*.

H. S.—There is no doubt about this microscope being still to be had. We desire to give no opinion concerning any particular instrument or maker.

E. S.—Your moss appears to be a variety of *Bryum cæspiticium*, but will be worthy of a re-examination when the capsules are more mature. It is, at any rate, an interesting variety.—*J. E. W.*

E. F. M.—Ozone test-papers may be had on application to Haselden & Co., 18, Conduit-street, London.

W. (*Ross*).—Your name and address is lost. Please to replace it.

Amateur Microscopical Society.—Gentlemen willing to join such a society, should it be instituted, are solicited to contribute their names to W. G., care of Editor of Science-Gossip, 192, Piccadilly.

A Hint for Contributors.—If our contributors will oblige us by always using the common names of plants, animals, insects, &c., wherever there is a common name in use, to be followed by the scientific name in brackets, this will save us a large amount of trouble in sending their manuscript to press. As we do not pretend to address scientific readers alone, vernacular names are indispensable.

Communications Received.—S. A. J.—R.—W. W. K.—J. C. H.—R. T.—W. G.—M. J. C.—M. McV.—H. L.—W. A. L.—F. W. M.—W. H. G.—G. R. B.—R. S. S.—L. W. G.—R. B.—A. L.—R. Bl.—W. W. S.—P. H. B.—A. E. L.—R. A.—E. M. E.—E. M. W.—G. L.—J. B. F.—F. K.—S. W.—E. R.—J. H. B.—T. S.—H. F.—A. G.—Watford.—G. H. G.—W. E. W.—J. S.—H. W.—W. G. S.—T. P. B.—W. J. B.—H. B.—J. H.—R. H.—W. W. K.—J. C.—A. M. B.—J. B. A.—H. E. A.—J. F.—B.—E. M.—E. F. M.—W. B. D.—R. D. B.—W. M.—T. B. T.—W. A.—D. R.—R. S.—W. R. T.—E. H.—A. J. R.—A. D.—R. T. S.—E. G.—A. R., Jun.—J. G.—M. A. B.—J. J. S.—S. O.—B. J.—W. W. C.—G. G. L.—M. P.—H. Janson.—R. H. M.—McI.—J. A.—G. H. K.—E. M.—B. B. S.—A. H.—W. H. R.—J. E. W.

Local Names.—Richard Tyrer.—B.

BOOKS RECEIVED.

"Geology as a Branch of General Education." By David Page, F.R.S.E., F.G.S., &c. (London. W. Blackwood & Sons.)

THE CIRCLE OF LIFE.

Hamlet. To what base uses we may return, Horatio! Why may not imagination trace the noble dust of Alexander till he find it stopping a bung-hole?
Horatio. 'Twere to consider too curiously, to consider so.
Hamlet. No, faith, not a jot, but to follow him thither with modesty enough, and likelihood to lead it.
Shakespeare's Hamlet.

POVERTY makes a man acquainted with strange bedfellows, and philosophizing, or indulging in day-dreams, will often lead a man's thoughts in a very tortuous direction, and terminate in some unexpected climax. It appears, for instance, almost as absurd as to say that "black is white," to affirm that literally "all flesh is grass." Yet, curious enough, the "circle of life" passes from the mineral, through the vegetable, to the animal world, until it returns to "mother earth" again. The old doctrine of "transmigration of souls" may find but few believers in the West, but the transmigration of bodies is one of the facts of science. We might trace the hand that holds these pages, and the lips that smile over them, to the green grass of the meadows, the waving corn-field, the strawberry-bed, and through them to the mountain torrent, the limestone rock, and the dunghill.

If we would have the facts stated in a plain matter-of-fact way, let Professor Huxley do it for us. "The plant," he says, "gathers inorganic materials together and makes them up into its own substance. The animal eats the plant and appropriates the nutritious portions to its own sustenance, rejects and gets rid of the useless matters; and, finally, the animal itself dies, and its whole body is decomposed and returned into the inorganic world. There is thus a constant circulation from one to the other, a continual formation of organic life from inorganic matters, and as constant a return of the matter of living bodies to the inorganic world; so that the materials of which our bodies are composed are largely, in all probability, the substances which constituted the matter of long extinct creations, but which have in the interval constituted a part of the inorganic world."* Herein lies, as almost in a nutshell, the philosophy of the "circle of life."

Sydney Smith calculated that during sixty years of his life he had devoured forty-four one-horse cart-loads of meat and drink more than was absolutely necessary for the support of his body. How many waggon-loads he really consumed in that period he does not tell. What an array of lowing bullocks and bleating sheep must represent, at the end of half a century's good living, the animal food a man consumes. This again represents the nutritive portion of scores of acres of turnips and pasture, and we know not how much oil-cake. A cow eats the grass in the meadow, assimilates all that is nutritious, ejects the rest to aid in producing a crop of good grass the following year. In the form of milk and butter, and calves-head, we devour the elaborated grass. The process of assimilation and rejection is repeated, until at last our bodies, like "the noble dust of Alexander," mingle with the soil, are ultimately turned over with the ploughshare, and stimulate the growth of fresh grass for cows to eat centuries hence, and supply milk and butter to a wiser generation of Englishmen, whose remote ancestors are still in the cradle.

So curious are the speculations in which such a subject causes us to indulge, that, like Frankenstein, we would fain flee in terror from the being of our own creation. We look at our hands and feet, and inquire whether atom by atom we have not eaten them; whether we have not been worse than cannibals, and devoured our own flesh and blood. Yea it would puzzle the physiologist to tell what minute portion of our body has not entered by our mouths. At the same time we day by day add to the mineral world products analogous to those which are absorbed by the grass, that feeds the cow, that gives us milk, or is eaten herself, to keep up the unceasing round of the "circle of life."

Nor is this all. This circle widens as we muse, and links us with the past as well as the future. We read of the bony framework of extinct animals, of monstrous Saurians laid bare by modern excavations, the soil surrounding which is brought to the surface, and with it the changed and modified flesh which clad those skeletons in bygone ages, and now forms an undistinguishable portion of the

* Huxley's "Lectures on the Origin of Species." London: Hardwicke.

soil. This furnishes food and support to vegetable forms, which in their turn feed the animal world. Then we, as we draw the knife through the juicy sirloin, separate atoms, which perhaps once clad the bones of monsters now reposing on the shelves of our museums, but which tenanted our island long before it *was* an island or naked British savages existed.

The philosophic Hamlet might thus muse:—

> Imperial Cæsar, dead, and turn'd to clay,
> Might stop a hole to keep the wind away;
> O, that that earth, which kept the world in awe,
> Should patch a wall to expel the winter's flaw!

But we are prepared to go far beyond him in our musings; and whereas he only contemplated the animal returning to the mineral world, we recognize it rising from the mineral through the vegetable, culminating in the animal, and sinking into the earth again, and thus completing one link of a continuous chain, one round of the "circle of life."

But, how of the future? If our bodies on their dissolution are destined to contribute to the sustenance of unborn generations, shall we not strive that our intellectual powers shall have an influence in that future? Shall we not endeavour to contribute something to the store of human knowledge, to devise some diminution of human pain, to contrive some additional source of human pleasure? Shall we not, in addition to our legacy of bones and dust, which a dead horse could bequeath as well, and which extinct reptiles have bequeathed to us, leave behind us also some memorials of a higher "circle of life"?

WHAT "KATY-DID."

(*Platyphyllum concavum.*)

TO the wanderer in the wild solitudes of a primeval forest, the voice of each animal, the note of every bird, the chirp and buzz of insects, the whispering wind, or the rolling flood, has some deep mysterious meaning. The sounds produced, whether denoting love, anger, or fear, generally bear a fancied resemblance to names that are familiar to him. Thus one of the goatsuckers (*Caprimulgus vociferus*) has been named the "Whip poor-Will;" another (*Cap. carolinensis*), "Chuck-Wills-widow;" a third, "Whip-Tom-Kelly." The Carolina quail, "Bob-white;" the rice-bunting, "Bobby-link;" an Australian kingfisher, "the Laughing Jackass;" a marmot, "the Rock Whistler;" and so on *ad infinitum.* In this way one of the most conspicuous grasshoppers (*Platyphyllum concavum*) found in North-west America has obtained the name of "Katy-did."

In the quiet evening, as the sun steals off behind the hills, and the busy hum of the insect world gradually dies away, and birds, one by one, warble their vesper hymns and settle down to sleep; then it is the plaintive ceaseless song of the Katy-did rings out from every tree and flower. Its persistent complaint, that "Katy did it—she did, she did," often recalls pleasant recollections, giving rise to many curious conjectures as to the origin and meaning of its singular cry.

Every act of animated nature, to the thoughtful mind, points out some unseen path, from the creature up to the hand that made it. Who can watch the toiling ant, the busy bee, or the little squirrel piling in its winter hoard, without growing wiser, learning contentment, and that golden lesson one should treasure through life's pilgrimage—that sure success generally follows untiring industry. Again, the metamorphosis of the crawling caterpillar into the bright and gaily-tinted butterfly, has in all ages been a source of hope and comfort, typifying a higher, a purer life. Each animated atom of creation bears the stamp of some great moral or intellectual significance, appealing alike to the poet's enthusiasm, the naturalist's all-absorbing love of nature, the philosopher's insatiable desire to penetrate hidden mysteries, and to man's universal conviction, "that naught was made in vain."

Now, what Katy-did has again and again roused up such thoughts as these. A poet, I believe an American, supposes himself to have asked this little tell-tale the cause of its continual assertion Katy-did, and in answer obtained some hints as to clandestine meetings between a Miss Katy, more fair than prudent, and her lover. He says:

> But never fear me, gentle one, nor waste a thought or tear,
> Lest I should whisper what I heard in any mortal ear;
> I only sport among the boughs, and, like a spirit hid,
> I think on all I saw and heard, and laugh out—Katy-did.
>
> I'm seen among the leaves here, when evening zephyrs sigh,
> And those that listen to my voice I love to mystify;
> I never tell them what I know, although I'm often bid,
> But laugh at curiosity, and chirrup—Katy-did.

This beautiful little insect belongs to the order Orthoptera, in English *straight-winged;* about an inch and a half in length; its wings, when fully extended, about three inches from tip to tip, of a pale green colour, and in texture like beautiful gauze. The wing-coverts are of a darker green than the wings, and so curiously veined as to exactly resemble a leaf. It is next to impossible, when the insect is at rest, to make them out to be anything but leaves. In the males, at the base of the wing-cover, is a hard glassy membrane tightly stretched, and in shape somewhat like a doll's eye. There are two of these plates, which, rubbed together by the movement of the wing-converts, produce the sound peculiar to these insects.

> So *chirps* the grasshopper one good-night carol more;
> He is an evening reveller, who makes
> His life an infancy, and sings his fill.

It is only the *males* that possess these curious sound-producing appendages, and they only can tell what Katy-did, poor Katy herself being obliged to remain silent and listen to the music of her lord. The female can be readily distinguished from the male,—having a long sword-like ovipositor at the extremity of the abdomen. This she uses for boring holes in the ground, in which to deposit her eggs; which are laid about September, and hatched in the ensuing spring. I have often watched their proceedings; and most interesting and amusing it is, and easily managed, by putting a pair of these little leaf-like gems, male and female, into a glass globe with a layer of turf at the bottom, which must be kept damp, and a piece of net, tied over the top to prevent escape.

About twilight, the female begins to lay her eggs, first boring a hole in the ground with her long ovipositor, then using it as a tube for dropping the eggs through into the hole. The male during the whole time carols away, and keeps asserting, "Katy-did it —she did, she did." By keeping this earth through the winter, in the following spring you will obtain the insect larva quite perfect in everything, but that of being destitute of wings.

The favourite home of the Katy-did is amongst the leaves of the "Tacha-mahaca" (*Populus balsamifera*). But the "Grasshopper-bird" being a full-blooded American, true to its proclivities, is given to spread, and, like a true squatter, everywhere claims its right of pre-emption. The word *Tach* means grasshopper amongst the Indians of the West and South-west, and a favourite food of the savages is the *mahaca cake*, made from the bodies of these insects, stripped of their wings, sun-dried, or baked on heated stones, and then ground into flour. Hence the tree on which the Katy-did is found to be most abundant has been named by the Indians *Tachamahaca*.

There are numerous species of the genus; as the narrow-leaved Katy-did (*Phaneroptera angustifolia*), the oblong leaf-winged Katy-did (*Phylloptera oblongifolia*), the sword-bearer (*Cenocephalus ensiger*). The tropics also supply innumerable instances, where the resemblance to leaves and twigs is so truthful that one ceases to feel surprised at the fabulous accounts that have been published of leaves metamorphosed into insects, and insects into leaves and sticks. In an American work of comparatively modern date we read, "On this continent an animated insect often changes itself into a lifeless plant by putting its feet into the ground and allowing them to take root, when they steadily become the stems of a foliated plant."

The "*Vegetable insect*," from Australia, headed several articles in our own papers some few years ago, which turned out to be only a parasitic plant, growing from the body of a caterpillar of a hawk-moth. In the silkworm a minute fungus (*Botrytis bassiana*) completely fills the interior of the worm, then bursting through the skin, covers the entire body with a white efflorescence. As a proof how simple matters of science may become magnified into marvellous stories by the uneducated, I will briefly relate a fact that came under my immediate notice.

About three years ago, when residing at Esquimalt, Vancouver's Island (then naturalist to the British North American Boundary Commission), a message reached me that a merchant at Victoria had just received a most wonderful monster, brought to him by an Indian fisherman. The messenger informed me that he had seen the beast; that it was "*half bird, half shell-fish;*" possessed a perfectly-formed beak, head, and neck, but enclosed in shell as hard as limestone, and "breathed just for all the world like a Christian." Off I started post-haste. Dreams of immortalizing myself by a grand and wonderful discovery—perhaps doing "Barnum," or giving to the world a new and unknown link in the chain of species. Imagine my disgust at being shown only a huge *rock-barnacle*, vigorously opening and shutting its valvular mouth, impatiently awaiting the anxiously-expected tide.

The owner, a "keen down-easter," literally laughed at my explanation, deeming it a ruse to obtain the wonderful bird-fish at my own price. Of course it died, and I then had it for nothing, and its shell now figures in the British Museum as a monster Ballanus. The old story of the Barnacle geese over again.

Read what quaint old Du Bartas says:—

> So slow *Bootes* underneath him sees,
> In th' icy islands, *goslings* hatch'd of trees,
> Whose fruitful leaves, falling into the water,
> Are turn'd, 'tis known, to living *fowls* soon after.
> So rotten planks of broken ships do change
> To Barnacles. Oh, tranformation strange!
> 'Twas first a green tree; then a broken hull;
> Lately a mushroom; now a flying gull.

In the vegetable world, like strange transformations, believed by the woodsman to be the work of enchantment, constantly take place. To cite one instance, where a mahogany-tree changes into a gamboge-tree, a process the mahogany-chopper believes to be due to an evil spirit haunting the woods.

The pods of the *Clusia alba et rosea* (one of the trees producing the yellow pigment known as gamboge), when fully matured, burst, and the seeds, enveloped in a thick adhesive material, descend to the ground like so many spiders or caterpillars, suspended by a fine thread-like filament. As the seeds swing, blown about by the wind, it often happens that some of them are driven against, and stick fast to a mahogany-tree, take root in the bark, and in the course of a few years change its entire character. The trunk of the mahogany-tree dies, its branches drop off, and in its place stands its usurper, the gamboge-tree. J. K. LORD, F.Z.S.

DIATOMS FROM GUANO.

THE excellent article on "Cleaning Diatomaceæ" in the number of SCIENCE GOSSIP for March leaves but little to be desired on that point. Yet, notwithstanding all the care that may be taken, many operators, especially those on guano, will feel dissatisfied with the results they obtain, on account of the mass of foreign matters which, with all their care, will still cling to their deposits, and mar the beauty of their slides. To those who may be desirous to obtain fair preparations without this defect, I would recommend a modification of a plan hinted at by Carpenter, and which I have practised with some success.

I take a slide, well cleaned, and with a dipping-tube put a narrow line of the deposit along its margin: the line should not be more than one inch long, and a quarter of an inch broad. I then place the slide under a simple microscope of moderate power, and I can easily distinguish the different diatoms, even those that are small. I select a large one at first, and with a stout needle I push it out of the water, a thin stream following towards the centre of the slide. When near the centre, I raise up gently the remote edge of the slide, and then push the diatom out a little, when it becomes "high and dry" on the centre of the slide. In a similar manner, one after another, I put out as many as I please to select, the process becoming easier as I proceed, as the water returns more readily with the needle, and leaves the diatom dry in its proper place. Having exhausted the store of select diatoms in the line, I wipe it off carefully without touching the dry diatoms, and then I put down with the dipping-tube another similar narrow line, and proceed as before. I have, in this way, on one slide, taken the choice diatoms out of twenty such narrow lines. No doubt it required time and skilful manipulation, but it became very pleasant and interesting, every fresh portion of deposit laid down affording fresh objects for search, and sometimes new prizes for preservation. The number of diatoms which I place on one slide varies according to the circumstances. On one occasion the first search gave me a specimen of *Auliscus formosus:* this I put out and mounted alone, a perfect disc, and a beautiful object, which of itself repays me for the time occupied. At another time, after putting out a number, I obtained a valve with eight highly inflated marginal processes, an example of which I have not yet seen figured. I was then satisfied, and mounted the slide; but in general I proceed until I have nearly two hundred perfect and clean discs nicely placed in the centre of a slide; and in no case have I occupied more than one long evening of a summer day in the preparation and mounting of one of my slides.

When a sufficient number of diatoms have been obtained, they appear to the naked eye as a small circular white spot on the slide. I then heat the slide on a brass table, and take some balsam on a stout wire, and place a thin circle of the balsam round the diatoms, taking care to place just so much as may be required. I then drop a circular cover on the balsam, which speedily runs in and fills the space under the cover without disturbing the diatoms. I then place the slide in a drawer, lying flat for a week or two, until the balsam becomes tolerably hard.

The advantages of the above method will be, in part, apparent from what I have said; I may, therefore, only mention, that by it the student would become quite familiar with the appearances of diatoms in water, dry, and in balsam; and it is needless to say that these appearances vary, and are instructive. Further, slides can thus be obtained, each containing only one sort of diatom, and this will be often desirable for scientific purposes.

Before closing this paper, I wish to mention a few of the results of my observation in working Peruvian guano by the method I have given. *Auliscus Peruvianus*, which has been figured in the *Microscopical Journal,* is a diatom rather small; in water it appears of an even tawny or yellow colour, delicate, and not very attractive in appearance. When dry it becomes quite opaque, and the two processes of a single valve shine brightly in the gloom of the general appearance.

In balsam it becomes very transparent, and requires a tolerably good glass and proper illumination to display the faint markings of the now interesting valve. Another diatom of the class *Auliscus* appears in water reddish and delicate—dry it seems dark and lurid—and in balsam grey, with sometimes a reddish centre when seen under a low power. Nothing could be more different than the appearances of these diatoms in the three different mediums.

Again, a small diatom of the class *Asterolampra,* when put out of water with a needle, dries quickly, becomes quite dark in colour, and then jumps like a flea, an inch or two to one side, or it may be off the slide altogether. Should it be on the slide, it can easily be pushed back dry to the others; but if the needle be so damp as to wet the diatom, it quickly dries, and then jumps again. Diatoms of this class are, for the most part, most distinctly marked when dry.

Many other things worth note might be added, but enough has been said for the present. In giving the above, I do not mean to advocate the exclusive adoption of my plan. It is well that various methods should be in use, as each may lead to the discovery of facts contributing to the mass of general knowledge. Besides, many may be deficient in patience and manipulative skill for success in its adoption; but I feel persuaded that many more who fail in cleaning their gatherings and mounting to their satisfaction, would by this way, with the ordinary patience and practice which are necessary for success in any pursuit, succeed in preparing good and clean slides, and acquire the means of opening up for themselves a fund of pleasurable and profitable microscopic entertainment, in working with guano and other fossil deposits, even in the dark and dreary days of winter, when nature affords but a limited supply of other objects for microscopic study and investigation.

Armagh. LEWIS G. MILLS, LL.B.

LONDON ROCKET.

(*Sisymbrium Irio.*)

IT is a curious circumstance respecting this plant, that after the great fire in London, in 1666, a most abundant crop of it sprung up over many acres of the ruins. Dr. Morrison, Professor of Botany at Oxford, one of our earliest writers on Systematic Botany, and who lived at that time, has a long dialogue on the subject, a translation of which (it is written in Latin) may perhaps amuse some of your readers. The parties are a Botanist and a Fellow of some society.

Bot. On the 2nd day of September, in the year 1666, began that lamentable fire which lasted three or four days, and which could not be extinguished by any human means. Indeed, it was brought about by Divine Providence; for "shall there be evil in a city and the Lord hath not done it?" The east wind, having opened (if I may so express it) the prison of the winds, raged all that time. About eight months afterwards, I was taking a walk among the ruins, which covered nearly two hundred acres, and coming near to the old Exchange, formerly called Gresham College, I observed among the fallen buildings a very large quantity of a species of wild mustard, which Columna calls the smooth rocket-leaved Irio. Returning to the same place in about two months' time, the plants had grown to such a size that they might have been reaped like a crop of wheat.

Soc. Well, whence do you suppose arose such an abundance of the plant—from sowing the seed?

Bot. What can induce you to put such a question, since all the buildings about St. Paul's and in the centre of the famous city of London have been built and stood a thousand, or at least, many hundred years?

Soc. Then I suppose that the seed, having been concealed in cellars or cavities of the earth, sprang up when exposed to the sun and rain.

Bot. Let me say, I am not a Pliny to impose upon the world the stories of other men; nor am I a Matthiolus, to invent what never existed; but if you wish, I will tell you my mind in plain unvarnished words.

Soc. Say on.

Bot. The seed of no plant, how carefully so ever kept, will grow after ten years, very rarely after five, much less after some hundreds or a thousand years.

Soc. Then some one sowed these seeds among the ruins?

Bot. I do not believe, nay I am sure, so much seed could not have been found in all Britain, nor in France, nor in Germany or Italy, in one part of which, Naples, it grew plentifully in the time of Columna: so that even had there been persons willing to sow it, so great an abundance of seed could not have been supplied from all these kingdoms.

Soc. I do not doubt it. Whence, then, do you conclude the great abundance of the rocket came from? Did it arise spontaneously? At that time you will have observed that many other pappus-bearing plants and grasses, and other species sprung up.

Bot. Yes I did.

Soc. Whence came these?

Bot. A pappus-bearing or downy seed may be carried many miles by the wind, and wherever it falls will sprout and grow up.

Soc. I do not doubt it: and grasses will spring up abundantly in any neglected soil: might not, then, this rocket spring up spontaneously among the ruins of London?

Bot. There is a difference between this rocket and the grasses. Grasses are the most abundant of all plants, and their seeds are scattered everywhere, and thus are easily propagated.

Soc. You have already told us that a perfect plant is propagated only by seed.

Bot. I have always believed, and do still believe this. I would only ask, do you suppose that this rocket was sown by some gardener, or other inhabitant of the city among the ruins?

Soc. I am sure no one would take the pains, nor could he obtain sufficient seed for the purpose. Therefore, as it came neither from sowing nor from seed by accident, from what source do you suppose it arose?

Bot. I certainly shall not endeavour to prove that it arose from some volatile or fixed salt—from saltpetre, sulphur-trampled earth and water, however mixed—in fact, I know not what to believe. Perhaps it arose spontaneously. But this opens a door to certain Rationalistic Philosophers, who hold that plants of any kind, even trees or shrubs, may arise from the earth spontaneously, without any seed. But such an opinion, as it seems to me is contrary both to sacred Scripture and to reason. However, I think I have said enough at present. What remains I leave to be discussed by your learned Fellows, whether of London or Paris. Farewell. R. W.

THE PETHERWIN BEDS.

Leaving Launceston by the western road, and taking our way over Windmill Hill, a pleasant walk of about a mile and a half brings us to a little valley, through which a stream pleasantly ripples along; green fields descend to the water's edge on the one side and the wooded slopes of Landrake rise on the other. Crossing the water by a rustic bridge, and mounting a rather hilly bit of road, by the side of the wood, we turn in through a gate on the right, and find ourselves in an old quarry, known as the Upper, Eastern, or Landrake Quarry, and one of three on the same range, which lays bare to us those peculiarly constituted rocks known as the Petherwin beds, rendered familiar to us by the labours of some of our most eminent geologists.

This quarry is a favourite retreat of ours; many happy hours have we spent in the old place, making the rocks ring to the sound of our hammer—to the amazement, and no doubt the amusement, of the cottagers below and occasional passers-by, who whisper "I wonder what he's about," and no doubt put us down as an eccentric individual, who has taken to stonecracking to ease his troubled mind.

On hammering away at the shales on either side of the valley, we are not long in discovering a marked distinction between the two; those on the Landrake side being fossiliferous, while those on the Launceston side are not so.

Associated also with the fossiliferous shales are irregular bands and nodules of limestone. Formerly much limestone was raised and burnt there, but now the kiln is in ruins, and the place quite deserted: the geologist therefore who in these latter days happens to visit Landrake Quarry will find no quarryman to apply to for fossils, but must depend entirely on his own perseverance and skilful use of his hammer. The place is, however, well worth a visit; for a suite of very interesting fossils are to be obtained there. Let us endeavour to give you some idea of the more characteristic forms drawn from our own collection.

Among *Polyzoa* may be found a pretty species of *Fenestella*; but, as is the case with all the fossils found in the shale, it is but an impression; notwithstanding, it is beautiful, its slender radiating ribs, connected with transverse bars, giving it the appearance of open network.

Among *Actinozoa*, a beautiful coral from the limestone, approaching in character to the genus *Cyathophyllum*, being marked with deep longitudinal striæ.

Among *Brachiopoda*, two species of *Orthis*, one *Leptæna*, and several *Spiriferæ*. A pretty little shale *Spirifera* (*S. unguicula*) is very plentiful in some portions of the limestone, while *S. disjuncta* is found chiefly in the shale.

The specimens from the shale are all more or less distorted, but those from the limestone are not thus affected.

Among *Conchifera*, one species each of *Pullastra*, *Cyprecardia*, and *Pecten*.

Among *Gasteropoda*, *Eremphalus* is a very characteristic form; but the fossils are generally very imperfect.

Among *Cephalopoda*, *Orthoceras* is rather plentiful; several species from the limestone, also two very imperfect specimens of (we believe) *Clymenia*.

Among *Crustacea*, one trilobite, which Mr. W. Salter (to whom, through the kindness of Mr. Vicary, the fossil was sent) pronounces to be a variety of *Phacops latifrons*. The specimen in our possession is very perfect; and as trilobites are not caught every day in the Petherwin beds, we will tell you how we got hold of it. We remember we had sauntered out to the quarry one autumn evening, and had worked away for an hour or more, with but little success, having bagged but a few Spirifers, when just at the bottom of the great rubbish-heap we came upon a few likely-looking stones, and as we carefully examined them, expecting, as Mr. Macawber did, in spite of former reverses, that something would eventually turn up. To our great joy, we espied, what we at once knew must be a part of a trilobite. True, there was but a little bit of his back visible, and that was slightly weather-worn; many perhaps would have passed it by; but we had been hunting for this fellow a long, long time, and at last our labour was rewarded—at last we could cry "Eureka!" The question now was how to make the most of him—how to get him out of his hiding-place—would the crab be crabbed, or would he yield to our gentle persuasions, and come out of his hole?

Tap, tap, very carefully with our hammer; the stone gives way, and his tail is set free again; so—well done, there is one side of his head with one eye quite perfect, every lens beautifully preserved. And now shall we let well alone, or risk one more blow? Hurrah, fortune favours the brave, see a perfect specimen of one of the last of the Trilobites.

The most abundant fossils, especially in the middle quarry, are the *Spiriferæ*. It is worth while clambering over a few hedges and jumping a few ditches to look at this portion of the beds. For several feet thick the rock is full of them; there they lie impressing one another, and you cannot split a fragment of stone without getting some trace of *Spirifera*.

Another curious feature connected with the Petherwin fossils is the flattened and contorted appearance they generally present, showing us that at some period of their history they must have been subjected to enormous pressure.

So far we have visited two of the quarries; the third it will be sufficient to mention, as very little is to be got there, and it is by no means at present a pleasant spot to work in; for it is full of water, and there is a ghostly reminiscence of a man having drowned himself there.

As to the age of the Petherwin beds, whether they are Upper Devonian or Lower Carboniferous, we leave wiser heads than ours to determine. Our aim in this little sketch has merely been to while away half an hour by showing them to you.

Exeter. Frank P. Perkins.

GOSSAMER SPIDERS.

About a week ago I happened to be wandering round the garden situated at the back of the house in which I reside. The sun was shining brightly, and in every direction threads of gossamer floated through the air, whilst other threads were stretched like fairy clothes-lines from the plants to the palings, and from thence to the bean-sticks in the adjoining garden. Observing that the threads were in much greater numbers at the lower end of the garden, induced me to commence a hunt in order to discover the spinners. A brief search soon disclosed their retreat. Clustered together like a swarm of bees were at least 300 of the tiniest spiders I ever saw. A general panic was the immediate result of my touching them. "One and all," they scampered off over the large web on which they had assembled. Some wisely endeavoured to hide under the leaves, others either fell or threw themselves from the web, and hung suspended by a delicate thread.

I captured a few of the flying host; then holding them on my hand, observed a filament of web rapidly *jerked* out until sufficiently long to sustain the little fellow; when away he went, ascending rapidly, until quite lost to vision.

Procuring a wine-glass and placing in it some strong spirit, for the purpose of killing a few of the spiders, to more carefully examine them with a lens, I was not a little astonished, on taking some of them out from the spirit after an immersion of several minutes, to find, as they lay on my hand, the rays of the sun shining on them through the pocket lens, that the little victims still had life. First a feeble kick with one leg, then another performed with two a trifle stronger; a third and fourth; and so on, until they marched away not even tipsy, as free from harm as if they had lived in spirit for a lifetime.

The spiders were the young of the garden spider (*Epeira diadema*). I relate the fact, as I was not aware the young of the *Epeira* ever floated about on their webs, a habit I imagined peculiar to a particular species; neither did I know a young spider could bear soaking in strong spirit for several minutes without causing its death. Perhaps, sir, some reader can tell us more about *gossamer spiders*.

J. K. Lord.

SIX-SPOT BURNET.

A. K. speaks of this moth as being "very numerous on a chalky spot above the undercliff," in the Isle of Wight. By the way, it *is* the true Six-spot Burnet, known to science as *Anthrocera filipendulæ*, and F. M. is right in so naming it.

This pretty little moth was very abundant last summer, not only in situations as observed by A. K., but in the fields, by the wayside, on the hedges and on and around every flowering plant that bordered the paths along the cliffs from Ventnor to Niton, and thence along the road to Blackgang. Nor were they less numerous on the heights above the undercliff; for in addition to the multitudes that fluttered across our path, every blossom was crowned with one or more of these brilliant insects.

Many specimens of these lovely moths did I take off the flowers with my fingers, so tame were they, and in every instance they proved to be the Six-spot Burnet, so that I am unable to say if the other burnet moths inhabit the localities I visited.

The Marbled White butterfly, *Arge Galathæa*, was scarcely less numerous, especially along the meadows between Ventnor and Steephill Castle. Rarely have we witnessed a more enchanting spectacle than the expanded flowers of the thistle, or the purple blooms of the teasel, upon which were seated a Marbled White butterfly or two, and one or more crimson-spotted moths, with occasionally a gorgeous Peacock (*Vanessa Io*) crowning all with his lustrous wings; while around the whole fluttered many others, eager for their share of the coveted nectar. It is a beautiful sight to see the Marbled White on the wing, and I know of no other locality where this species may be seen in such profusion and perfection as in the waste spaces along the cliffs between Ventnor and Niton. Some of the Blues are met with now and then, but I do not think they are very abundant, while the Heaths and Meadow-browns are as plentiful everywhere as flies in a kitchen; the same may be said of several species of grasshopper, the noise of their stridulation being at times almost deafening. The large green grasshopper (*Gryllus viridissimus*) is also met with in some parts of the island. One day I came suddenly and very unexpectedly upon a fine specimen of this insect; the creature was resting quietly upon the doorstep of a jeweller's shop, in the main street of Ventnor, and to my surprise he permitted me to take him up by his long legs. After a brief examination of his handsome person, I gave him his liberty, although, from his sluggish flight into a garden hard by, he scarcely seemed to appreciate it. There are multitudes of moths in the Isle of Wight, and among them many of the rare crepuscular species; but as far as my own experience goes, I believe the six-spot Burnet to be more numerous than all the others put together. W. H. Grattann.

DABCHICKS.

PROPERLY, I ought not to call them dabchicks —not at least in capitals, and at the head of my paper—for the true distinctive English name of the bird is "The Little Grebe." But "dabchick" is so happily expressive of the habits and appearance of the animal, that it recalls in a moment its nervous jerky motion on the water, and its sudden disappearance with a "flip," as if, instead of diving, it had unexpectedly jumped down its own throat.

Wriggling about everywhere, all over the pond, in a state of chronic fuss, as if they had only five minutes left to get through the work of a day, now popping up *à propos* to nothing at all, and then turning head over heels, as if to catch their tails between their legs, these birds fidgeted through life in a ceaseless bustle. Was it sheer idleness which made me love to watch them by the hour together, lying in my punt, while the rushes grated pleasantly against its sides as I moved? There is a reception of nature's truth in these seasons of seeming laziness, which, though one is not conscious of the strain of observation, stores the mind with healthy useful memories.

The family of grebes, to which the dabchick belongs, represent the freshwater divers. They remain during nearly the whole of the year in the same mere, spending a large proportion of their time under water, whence they drag the material which their nests are composed of. The grebe seldom takes to the wing, and makes a very bad hand of walking, its legs being placed so far astern as to render it difficult for the body to be supported when on dry land. It has not the sense to hold its chin up and jump along like a kangaroo.

The dabchick swims at a great pace under water, and when disturbed will remain for some time with its head alone above the surface—sometimes sticking up only bill enough to breathe with. The bird, which is reddish black, with ash-colour below the water-line, weighs about six ounces, *i.e.*, to provide a more intelligible idea, say about as much as a rook. The young ones dive from the cradle; indeed, unlike the mother of many little folks, its anxious parent takes care to keep its feet wet during the whole course of its youth. Master Dabchick is never obliged to put on dry stockings when he comes home, for the nest is always dripping wet through. The eggs, about five in number, are laid in a squashy heap of weeds; the mother, defying the danger of a damp bed, incubates in a puddle, and when she leaves the eggs even for a short time, drags a few soaking weeds over them, so that they are not dried even by the mid-day sun. The effect of this upon the eggs is remarkable; when laid they are quite white, but before they are hatched become of a dull blotchy reddish brown—exactly as if they had been smeared all over by bloody fingers and then put back. This is caused by the juices of the decaying materials of the nest. The eggs of coots and waterhens, on the contrary, are hatched dry, never change their colour, and are always left exposed when the parent quits its nest. But the dabchick's egg might set would-be zoologists together by the ears, as much as the chameleon did the opinionated travellers. 'Tis white! 'tis mottled! no, 'tis red. The dabchick flies but seldom, but when he does, he pegs away at it furiously, working his stumpy stiff-looking wings with all his might. The rapidity with which he dives enabled him to duck at the flash of the old flint guns; before the priming had fired the charge, he was off, and the sportsman saw a bubble instead of a bird on the water. It is wanton work, however, to kill these cheerful little creatures. No skill can be developed in the practice, *i.e.*, when the percussion gun is used; and when obtained they are worthless, the flavour of the dabchick being, I should think, easily realized by putting some rank fishy weeds into a wholesome dish of some other small fowl. No, leave the merry fellows alone; but if you care to watch the capricious frolics of a waterbird, you cannot choose a better than the common, but most interesting dabchick.

I cannot help making an apology to the great crested grebe for thus dwelling on the manners and customs of his small relation, the dabchick.

The great crested grebe, or loon, is a giant compared to our little friend the dabchick, and altogether makes a more respectable appearance, both in picture and pond. The habits and figure of the two birds, though, are much the same.

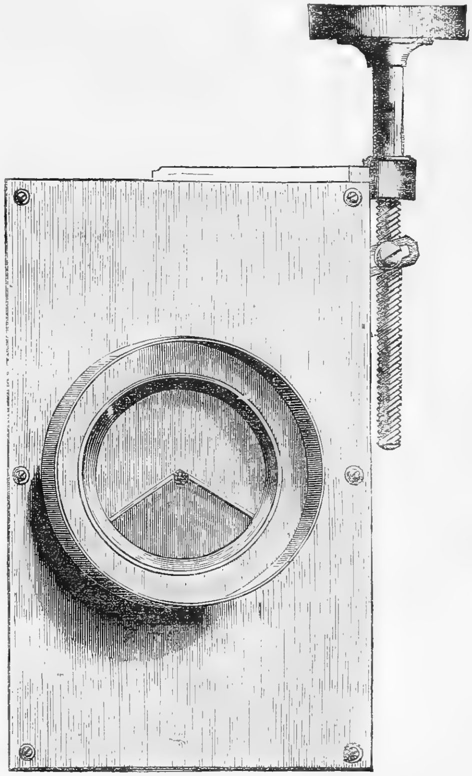
There are numbers of loons in the "broads" of Norfolk. Indeed, it is in East Anglia that I have most especially watched the dabchick. These loons, like the lesser grebes, incubate and leave their eggs in the wet, and meet with the same ridiculous failure when they attempt to walk. Like them, they are capital divers, and begin from the egg. A most accurate and patient observer and friend of birds, beasts, and little boys (the Rev. J. C. Atkinson), with whom I have had many a day's nesting and rabbiting, states that "the first lessons of the young loon in diving are taken beneath the literal shelter of their mother's wing." In this case, supposing the instinctive expectancy of the newly hatched led them to wait for the signal from the parent hatcher, and defer their infant plunge till the old bird dived with them, these young loons would prove an exacting family to a domestic hen. Possibly she might fancy them less disappointing than ducks; while in truth, like many an anxious and gratified mother, she would be attributing their abstinence to nature rather than to artificial deference, or absence of contagious example. HARRY JONES, M.A.

A GRADUATING DIAPHRAGM.

THOSE of our readers who are familiar with microscopic operations are aware how much depends, in the observation of structure, upon the method of illumination. In the investigation of the delicate markings of diatomaceæ, and the striæ of enamel and muscular tissue, an immense deal of the worker's success is dependent upon the volume of light which is thrown upon the object. If the flood of rays be very intense, the markings cannot be perceived, while if, on the contrary, the illumination be faint, other points of structure are lost sight of. There is, therefore, a necessity for the regulation of the quantity of light reflected to the object. In the instrument at present in use, this end is attained by the employment of a piece of apparatus termed "a wheel of diaphragms." This consists simply of a revolving black disk, placed horizontally between the stage and the mirror, and pierced by a number of holes (generally 6 or 7) of different sizes. The microscopist, when he desires to alter the illumination, turns the disk round till he finds a perforation which suits his purpose best. All however will agree that there are two very serious objections attending the use of the "wheel." In the first instance, though it may help to produce a more suitable form of illumination than that which results from the utilization of all the light reflected from the mirror, its number of apertures is limited, and hence also its application and utility. It not unfrequently occurs that between the two smallest apertures there are several *possible* ones which would render observation more satisfactory. Secondly—and this is a circumstance of some import,—in changing the aperture, the observer loses sight of the object, and has to trust to memory in estimating the advantage he has secured by the alteration.

These two obstacles have been overcome by Mr. Collins, of Great Titchfield-street, who has devised the diaphragm represented beneath. The instrument consists of a plate of about the size of the stage, and placed below it: this presents an aperture of the same diameter as that of the stage, so that in the illumination of objects under low powers, all the light may be employed. Beneath the first plate are two smaller ones, which move horizontally to the right and left of the stage, and have their proximal borders incised in a wedge-shaped manner. These can be either separated or approximated by means of a lever, which is connected with a screw and milled head, which is situate within easy reach of the observer's finger. When widely separated, these two plates leave a large lozenge-shaped aperture; but by the application of the screw this may be diminished in the most gradual manner till an aperture of scarcely a pin's head's diameter is produced.

In testing the new diaphragm, a full flood of light should first be thrown upon the object (some of the diatomaceæ say), and then by the rotation of the



screw the aperture should be slowly diminished till the fine markings come into view. Whether the shape of the aperture may disadvantageously affect the pencils of light as they travel to an object under examination with high powers, is a question which remains to be determined; but with such objectives as the $\frac{1}{4}$-inch, and those below it, the illumination-effects of Collins's instrument are beautiful.

HENRY LAWSON, M.D.

PROPOSED ASSOCIATION OF AMATEUR MICROSCOPISTS.—At a meeting held at 192, Piccadilly, June 14th, a provisional committee was appointed to draw up a scheme of organization, &c., to be submitted to a general meeting. We are authorized to announce that the meeting will take place at St. Martin's National Schools, Adelaide-place, Charing Cross, on Friday evening, July 7th, at eight o'clock precisely, to which all persons interested in the establishment of such a society are invited. Tickets may be obtained (free) at 192, Piccadilly; of Mr. Highley, Green-street, Leicester square; Mr. Gibson, 9, Lupus-street, Pimlico; or Mr. Bywater, 5, Hanover-square.

AQUARIAN DIFFICULTIES.

MR. RAMSAY'S "Hints for Marine Aquaria" (pp. 129, 130) are plain and sensible enough, but they will do little or nothing towards reviving a taste for private aquaria.

It is quite true that aquarium-keeping is *not easy:* it is much worse than that, for in nine cases out of ten it is a wearisome and profitless battling with difficulties, ending with failure and disgust. "Overstocking is a serious fault," says Mr. Ramsay, truly; but by far the greater number of the general mass of amateurs have no previous acquaintance whatever with natural history or physics, and have not the mildest notion of what "overstocking" an aquarium means; nor is it otherwise than very difficult to teach them what it is in so many words, because an aquarium which may be "overstocked" under some conditions may not be so under others. So also, the same quantity of water may vary in its capacity of sustaining animal life, not according to its *bulk*, but according to its *distribution,* and the amount of variation is continually fluctuating. Then, if anything like a good variety of creatures are kept, they must be maintained in several separate vessels, and this demands more *space and trouble* than can be usually afforded by persons having other demands on their premises and time. Furthermore, there are many animals which cannot be kept at all in any ordinary captivity, and these creatures are those which are oftenest obtained with facility. Others are too large for certain vessels. It is this absence of the possibility of giving *definite and arbitrary rules* for the guidance of beginners which causes the great difficulty.

Mr. Ramsay properly recommends "especial attention to temperature" as regulated by "opening or shutting doors or windows, burning gas, partially covering the tanks with damp cloths, and adopting other means;" *but most people will not do these things,* whether they understand or not why they are recommended to do them; they would much rather give up their aquaria than be put to any such trouble, and they have given them up, while the very few exceptional persons, such as Mr. Ramsay and his lady friend—personally known to me—and who are painstaking and persevering, are those only who succeed with anything like decency. They slowly and patiently work out their success by the only method in which it can be attained—actual experience and the intelligent application of broad principles. They are contented to do a little, but they do it well, while others wishing to do much with insufficient means, in the end do nothing.

If anything could be found to re-create a taste for the domestication of marine animals, it would be the discovery of some convenient and cheap mode of producing *a stream and motion in sea-water aquaria,* continuously, as the present methods of doing so are much too cumbersome and expensive for most pockets. Mr. Edwards, of Menai, has announced that he makes a machine to answer this purpose in the required manner; but nothing has come of it. The value of a current of water in a tank is very great, inasmuch that it is to an aquarium that which a fly-wheel is to a steam-engine (and even more), carrying the machine over its "dead-points;" storing up power in reserve; and smoothing down the sharp angles of all difficulties. For example, it requires extreme care in feeding the animals in a motionless marine tank, in such manner that the food or its after-consequences shall not interfere with the transparency of the water. The water is also apt to become otherwise than clear from the accidental non-removal of a dead animal, or from excess of light, and from many other causes; but wherever a stream exists, the fluid seldom becomes turbid from any reason, or if it does lose its clearness, the opening of a stopcock will allow it to run off through a filter into a reservoir below the tank, from whence the same water, bright, cool, and well oxygenated, may be again forced up into the tank. There is indeed no comparison to be made between the condition of animals kept in aquaria with and without a stream, and yet I know of only ten stream and tide aquaria to be found in England and on the Continent; and of these, five belong to public institutions and five to private persons. I think I may write on this subject with something like authority, for I have pursued it as an exclusive occupation, zealously and unremittingly, for the last dozen years, and during that period I have collected the names and addresses of not fewer than eight thousand persons interested in aquarian matters, and for these persons I have set up, under all possible circumstances, many hundreds of Aquaria (the exact number is 3,548), and out of these not more than about the odd forty-eight are now in successful operation. All the others belonged to individuals who merely took up the thing as a transient fashion, or who, knowing and caring a little about it at first, soon abandoned it from discovering that so long as aquaria are made for houses, instead of houses for aquaria, no *satisfactory* result could be obtained.

There seems to be no inclination on the part of wealthy persons to incur the necessary expense of erecting and managing great aquaria properly, and therefore the subject is left to a few persevering naturalists, who attain a certain good result by confining themselves in a small way to certain possibilities; and to two or three public bodies who find that it is a remunerative commercial speculation when it is well and largely carried out by the introduction of machinery and of all requisite appliances.

W. ALFORD LLOYD.

Zoological Gardens, Hamburg.

SEA ANEMONES.

By F. I. Foot, M.A.

The living flowers, rooted to the rock.—Southey.

THE fortunate reader who is taking his annual "constitutional" at the seaside desires that some interesting occupation shall be afforded him, and some source of amusement and instruction suggested. Is marine zoology to his taste, and does he love to sally forth with collecting-can, net, hammer, and chisel, and spend a few hours of the calm summer's day among those brilliant natural aquaria left for his inspection by the receding tide? To such an one I now address myself, and, as he will have ensconced himself in comfortable quarters near the scene of his researches, a no small desideratum to the shore collector, I shall at once take my place at his side, to share his accommodation and act as his adviser and guide.

Lovely as it is to gaze into the rockpool and watch its numerous inmates, the jealous "tide, that waits for no man," does not always allow the naturalist time for observation, sufficient for the identification of species. For this purpose an artificial aquarium, besides being a constant source of amusement, is indispensable; and as spare basins, pudding-dishes, &c., which after all make but sorry aquaria, are not always in abundance at seaside lodgings or hotels, the collector will do well to carry with him a portable apparatus which he may construct easily and cheaply as follows:—

Let him purchase at any of the glass warehouses some circular cap glasses (fig. 1) of different sizes,

Fig. 1.

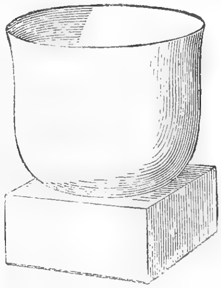


Fig. 2.

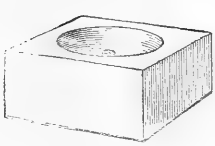


Fig. 3.

say three in number, and 8, 7, and 6 inches in diameter respectively. These will fit one inside the other, and when packed in a small hamper are easily and safely carried. Blocks of wood are necessary, on which to set up the glasses (figs. 2 and 3). These may be about six inches square, by three inches deep, the upper surface hollowed out in the form of the cap-glass, with a hole to admit the knob (fig. 3). A siphon will be found a useful adjunct, for drawing off the water when requiring to be changed. I may here observe that if it be required to carry anemones from one place to another, they must be packed in a box, in wet seaweed; the common wrack, *Fucus serratus*, being the best.

Thus equipped, and with Mr. Gosse's book on Sea Anemones for reference, if he desires to know more than we are about to tell him, let him and us to our work.

Fig. 4.

First there is the Plumose Anemone (*Actinoloba dianthus*, of a cylindrical form, ending in a simple thickened parapet, separated by a fosse from the outer tentacles. The colour is variable. I have usually found them at Spanish Point, county of Clare, my favourite hunting-ground, of an orange fawn-colour. The plaited outline of the mass of tentacles, the parapet of the column, and the single gonidial groove of the mouth, are unmistakable characters of this species (fig. 4), and it is generally distributed along the coast. In collecting this, and, indeed, most other species, care must be taken in removing them from the rock, as an injury to the base may cause death. The safest way is to remove, if possible, with hammer and chisel, the piece of rock supporting the animal. Sometimes, however, the base appears to be injured when in reality it is not, the wounded appearance being caused by the copious extrusion of the *acontia* or stinging-threads. This species does very well in captivity, where it breeds freely. Specimens may frequently be observed when dragging the base along the glass to leave a small fragment behind: in a few days this will take the form of a perfect little *Dianthus*. I may mention that I had in one of my tanks one of this species of a brownish salmon-colour, with two mouths on the one disc, the lobes of the mouths being bright orange.

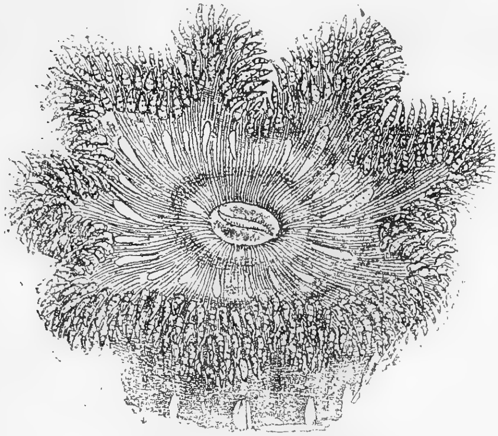


Fig. 5.

THE DAISY ANEMONE (*Sagartia bellis*) belongs to a genus of Sea Anemones which was named *Sagartia* by Mr. Gosse, in allusion to their peculiar mode of disabling their prey, by means of missile cords. Herodotus, the Greek historian, informs us that in the army of Xerxes there was a certain race called *Sagartians*. The mode of fighting practised by these men was this:—When they engaged an enemy, they threw out a rope with a noose at the end. Whatever any one caught, whether horse or man, he dragged towards himself; and those that were entangled in the coils were speedily put to death. The Sagartian of whose history I am bearing record is abundant in the localities in which it occurs. The rocky shores of Devon and Cornwall are its true metropolis; "and here the tide-pools, fissures, and honeycomb-like burrows are densely crowded with the pretty Daisy." To the list of localities furnished by Mr. Gosse I may add Spanish Point and the north side of Liscannon Bay. In the former place it occurs rather sparingly at low water, in a spot where the rock is covered by a coating of sandy mud, full of corallines and small sea-weeds. The disc and tentacles appear on a level with the surface of this sandy covering; but to remove the "Daisy" is no easy matter, for its base will be found to occupy a cavity in the rock below the sand, into which it retracts the whole body when touched. The removal, however, can generally be effected by a dexterous application of hammer and chisel, and in some cases specimens can be taken off by the thumb nail. They thrive well in a tank, and form a pleasing contrast with other species. A curious habit is possessed by this species, in common with some of its congeners, of elongating one of its tentacles to a great length while the others remain of the ordinary dimensions.

THE ROSY ANEMONE (*Sagartia rosea*) is a lovely little species, says Mr. Gosse; "when left by the receding tide, it protrudes from its tiny cavity in the overhanging rock, and droops a pear-shaped button of orange-brown, with a cluster of brilliant purple tentacles just showing their tips from the half-opened centre, and a drop of water sparkling like a dewdrop hanging from them. Then it is beautiful." And I am disposed to endorse his opinion, having met with it occasionally in the small shady pools about Spanish Point, near the limit of low water; but it is by no means of common occurrence. The individuals I observed were of a dull orange-colour, with bright rose-coloured tentacles. They frequented holes in the rock, so as to render their capture rather difficult.

THE ORANGE-DISKED ANEMONE (*Sagartia venusta*) is found at various places on the south and west coasts of Great Britain and Ireland, and is remarkable for its bright orange disc and snow-white tentacles. It occurs in large colonies at the very edge of low-water mark at Spanish Point, and at Gall and Green Islands. In collecting them, the hammer and chisel must be brought into use, as

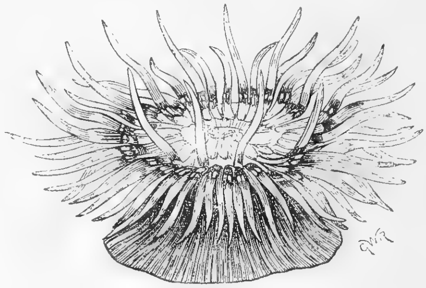


Fig. 6.

they are also frequenters of holes. In attempting once to detach, or rather scoop out a *venusta* with my thumb nail, I tore the base in two, and on examining it with my pocket lens, remarked numerous young ones amongst the acontia. I brought home the damaged parent with her untimely offspring, and placed them in the tank, where they soon made themselves quite at home, the adult taking possession of a hollow in a stone and the young ones appearing as little dull orange dots on the side of the glass.

THE CAVE ANEMONE (*Sagartia troglodytes*) is one of the most variable of all our British Anemones (fig. 6), and one of the most abundant and widely distributed, in which it differs vastly from the last two, comparatively rare, species. Notwithstanding its great variability, there is very little difficulty in distinguishing and determining it. There is a charac-

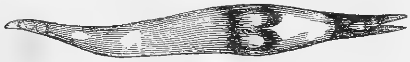


Fig. 7.

teristic mark often present on the tentacles very much like a letter B, as will be seen by the woodcut (fig. 7). These are very numerous, often reaching two hundred; and, moreover, its "troglodyte" or cave-dwelling habit, and sulky propensity of retiring within its den at the slightest provocation, are excellent features to assist in naming it. When placed in a tank, however, and allowed to see that there are other creatures in the world as well as themselves, they soon relinquish their morose habits, and adhering to a flat stone, or the glass itself, behave as well-conducted and domestic anemones ought to do.

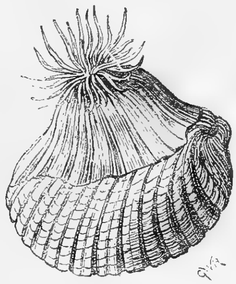


Fig. 8.

THE PARASITIC ANEMONE (*Sagartia parasitica*) is very abundant about Ballyvaughan, on the Clare shore, as well as some parts of the British coast. It is often found on dead shells, especially those inhabited by the Hermit Crab, but in the former locality I have found it usually parasitic upon the shell of the living cockle (*Cardium edule*). Almost every "cockle" gathered by the children on the strand has one or two of the parasitic anemones adhering to it, striped alternately dull-white and purplish brown (fig. 8). They are in the button state, not unlike that sweetmeat which is such a delicacy to the schoolboy, and known to him as the "bull's-eye." It was till lately supposed that this species never adhered to living shells. It thrives very well in an aquarium; the cockle soon dies, and the valves of its shell open, and then the parasite leaves it and betakes itself to the glass. A good distinguishing mark of this species, besides its parasitic habit and striped body, is the dark line down each side of the tentacle.

THE OPELET (*Anthea cereus*) is one of the commonest of our native species (fig. 9), on the south and west coasts of England, on parts of the Scotch

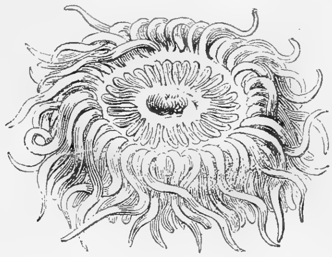


Fig. 9.

coast, and possibly all round Ireland. The variety with the gracefully waving purplish-green tentacles is the predominant one at Spanish Point. I have observed specimens collected here that have the power of retracting their tentacles to a very considerable degree, the little purple tips being alone visible.

THE BEADLET (*Actinia mesembryanthemum*) is a well-known and abundant species (fig. 10), not only on the shores of Britain, but also of Ireland. At Spanish

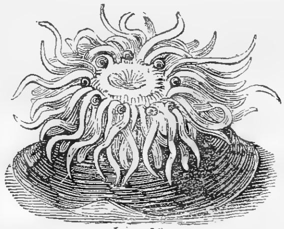


Fig. 10.

Point myriads of individuals are left high and dry by the tide, decking the rocks with every shade of red, purple, and green. One of the most beautiful varieties is, I think, that having a light blue tinge, with azure-blue base and tentacles.

At Lehinch, at the head of Liscannon Bay, the variety called the "Strawberry" is very abundant. It occurs nearer to low-water mark than the normal

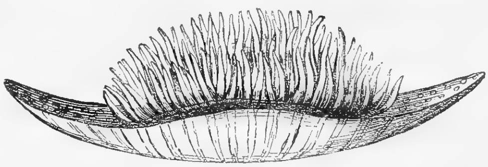


Fig. 11.

form, and attains to a greater size, often being as large as average-sized individuals of the Dahlia Wartlet (*Tealia crassicornis*); besides which it is much more easily detached from the rock, and is softer to the touch, so much so, indeed, that I could at once recognize it by the mere feeling, when the animal was concealed from view beneath some overhanging ledge, or by the dusk of evening.

The "Strawberry" is the most easily kept of all anemones, and is a great ornament in an aquarium, creeping about the side of the tank, and expanding its base into an irregularly elliptical form (fig. 11). I have seen one with its base expanded to a length of five inches and a breadth of two and a half. In this specimen the marginal spherules were pinkish white.

The Dahlia Wartlet (*Tealia crassicornis*) is abundant all round the coast, at or near the verge of

Fig. 12.

low water, and is often left dry, when numbers may be seen huddled together, with their stomachs extruded, forming unsightly jelly-like masses. But they are as often to be seen in the pools with their tentacles fully expanded (fig. 12), or with those organs retracted, and the body covered with fragments of shells and sand. I have never seen this species appear to such advantage and in such plenty as in the large pool near the "Boiling Caldron" at Spanish Point.

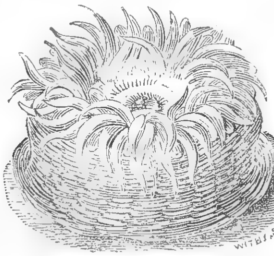


Fig. 13.

It is literally paved with individuals of all sizes and colours; some are fully six inches in diameter, if not more, and there are many with large tapering snow-white tentacles, which contrast pleasantly with the ordinary red or grey forms. The great size of this species prevents its being a desirable inmate of a small aquarium, and a slight injury to the base in detaching it is extremely likely to cause death.

I have exhausted all the space permitted to me on this subject, but I cannot conclude this brief sketch of some of the more common of these "flowers of the ocean," which are so truly animal-flowers as to have deceived insects themselves, without quoting an anecdote illustrative of this fact, as narrated by Mr. Jonathan Crouch. "On one occasion, while watching a specimen that was covered merely by a rim of water, a bee, wandering near, darted through the water to the mouth of the animal, evidently mistaking the creature for a flower; and though it struggled a great deal to get free, was retained till it was drowned, and was then swallowed."

SIMPLE OBJECTS.—IV.

The Four-horned Cyclops (*Cyclops quadricornis*).

A WIDE-MOUTHED bottle, a walking-stick, and an india-rubber band to fasten it to one end of the stick, are the only tools needed by the microscopist to enable him to secure an abundance of aquatic animals for his investigation.

The first dip into a neighbouring pond or roadside ditch, at this season of the year, will not fail to furnish him with *Daphniæ*, *Cyperides*, and *Cyclops* in abundance, sufficient, in fact, to occupy his attention for weeks to come. Such a gathering we made the other day, which, on examination, proved to be rich in that little and best-known Entomostracon, the *Cyclops quadricornis*.

Let not the reader start in alarm; the creature in question is not in the most remote way connected, except by name, with those one-eyed monsters of heathen mythology whom Vulcan employed to forge thunderbolts for Jove; but is a small one-eyed crustacean, of elegant form and jerking movements, and withal clad in a transparent horny armour, composed of many pieces dovetailed and jointed together with a skill and nicety sufficient to have excited envy in the breast of an ancient armourer. The armour in which the Cyclops is thus encased answers a double purpose. It protects the soft and gelatinous body from injury, and it serves as an external skeleton for the attachment of its various muscles and articulations. In the species before us this covering consists of ten plates or segments. Four of these encase the head and thorax in such a manner that no division, as in the *Insecta*, is perceptible between these two parts of the body. The remaining six segments are devoted to the protection of the abdomen, &c. It is in the first and largest segment, which is somewhat buckler-shaped, that we find centred the solitary eye from which the animal derives its fanciful name of Cyclops. On each side of this organ are situated the double antennæ, which gives to the little crustacean its specific name of *Quadricornis*.

In the female Cyclops (fig. 3) the superior or largest pair of antennæ are light and flexible organs, being long and tapering, with a graceful curve or sweep. The articulations, which are numerous, give off a series of delicate branching filaments termed *setæ.* These are as transparent as spun glass, and add greatly to the beauty of the antennæ. The inferior or smaller pair, which have their origin behind the first, are considerably shorter, have fewer divisions, and are much less elegant. In the males the form of the antennæ is somewhat different, and serves to distinguish the one sex from the other. They are less elegant in their outline, are also shorter and thicker, and swell somewhat towards the tips, which end in a hinge-joint peculiar to the male (fig. 1). The mandibles, foot-jaws (the latter being so named from partaking of the character of both feet and jaws), the mouth, and first pair of feet are all included within the protecting compass of the first shield-shaped segment. The remaining divisions include the swimming-feet, viscera, and reproductive organs.

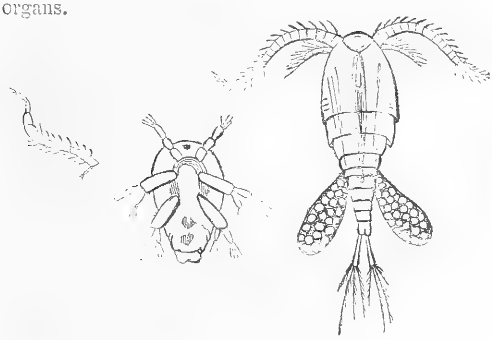


Fig. 1. Fig. 2. Fig. 3.

The general form of the *Cyclops quadricornis* is ovoid or club-shaped, being broad and rounded at the head, with a gradual tapering off towards the tail, which ends in two long lobes, embellished with delicate transparent setæ of unequal length; thus forming an elegant plumose termination to this end of the body.

In its progress through the water the Cyclops moves with a rapid jerking motion, which may be very well observed by placing the animal between the eye and the light. It will then be seen that its principal propelling organs are its oar-like feet, of which it has five pairs. Each foot, which may be said to be double, consists of a common stem, from whence arise two jointed branches, which are liberally supplied with setæ, or bristle-like appendages. The fifth pair are, however, rudimentary, and in the two sexes differ in form.

From the abundance of this little animal in every stagnant pool and ditch, we may naturally infer that its mode of increase must be exceedingly rapid. The pond from whence we obtained our supply seemed to be literally alive with Cyclops and Water-fleas. In the former the females greatly preponderated, and could be easily distinguished from the males by their external ovaries, which hung suspended on each side of their bodies like miniature clusters of grapes. The number of eggs contained in each ovary varies from thirty to forty. Jurine, who made a careful calculation to show the wonderful fecundity of this species, reckons that one female in the course of twelve months would become the progenitor of 4,442,189,120 young. As it does not appear that the eggs increase in size while in the external ovarics, although they undergo a change of colour, and as experiments have shown that they retain their vitality even when the parent has been killed, most naturalists are disposed to consider this crustacean as oviparous. Nothing can be more unlike its parent than the young Cyclops when it first escapes from the ovary (fig. 2). Indeed, so great is the dissimilarity, that the older naturalists were deceived, and formed these imperfect individuals into a distinct genus, although Leeuwenhoek had previously pointed out their true relationship. In the early days of our microscopic inquiry—why should we be ashamed to confess it—we fell into a similar error; and no one, we believe, unless he had carefully watched the Cyclops from its birth to maturity, would ever have suspected the parentage. From the observations of Baird and others, it appears that a period of seventeen to twenty days is required to perfect the form of the young Cyclops. During this period it moults three times; at every moult it assumes a form more approximate to its parent. In getting rid of its cast-off clothes, it sometimes falls a victim to the process. These exuviæ, however, are most beautiful objects when seen by the microscope, presenting, as they do, a perfect cast of the creature's form, with all its articulations and delicate plumose setæ entire. It is always desirable to mount these casts permanently, as they form instructive objects, showing the gradual approach of the Cyclops towards its perfect state or form. Perhaps the best method of permanently preserving such objects is to soak the object itself for a few days in glycerine; then place it with some of the fluid in a cell formed of Brunswick-black, and hermetically seal a thin glass cover over it with gold size. If the angles between the cover and the cell are gradually filled up with the Brunswick-black, the preparation will keep for years. The Cyclops, though exceedingly rapid in its increase, is thoroughly kept in check by the numerous enemies which surround it on all sides. Millions fall victims to trout and other kinds of fish; and the delicious, delicate flavour of the former is said to be in a great measure owing to a plentiful supply of this living food. The Hydræ, and the larvæ of aquatic and land insects, all play their part in the work of destruction, and thus lend a helping hand in keeping down that teeming abundance of life which would otherwise choke up our ponds, ditches, and streams, with animal life, until existence under such circumstances would become an impossibility.—T. K.

ZOOLOGY.

FEARLESS TITS.—The following I cut from a Sussex paper about two or three weeks ago, and thought it might be interesting to some of your distant readers. "There is now to be seen between the wall and the door-post of the Swan Inn, Chailey, the nest of a pair of tomtits containing several eggs. The door-post is considerably decayed, and is constantly moving to and fro. Last year a nest was made (it is supposed by these birds) in the same place, when, notwithstanding that on one occasion the door was shut violently, shaking some of the eggs from the nest, the fearless birds returned to their homes and successfully reared their little one." I think this is a proof that the tit is one of our most fearless birds.—*E. S.*

VIPERS SWALLOWING THEIR YOUNG.—This appears a vexed question. Whether vipers are in the constant habit of swallowing their young I cannot say; but that they can do so I am quite sure. Some years since I was shooting in a wood, and came suddenly on a viper lying on a sunny bank. As soon as the viper caught sight of me, it began to hiss, and I distinctly saw several young ones, about three or four inches long, run up to the parent, and vanish down its throat; and from the way in which the parent kept its mouth open, and the young ones glided into it, I should say they were accustomed to that sort of thing.—*H. C. S.*

SNAKE AND VIPER.—On July 18th last, I was at Sherborne, Dorsetshire. In a wood not far from thence, I was looking for ferns, with a basket and fork to dig them up. As I was going on looking further, I saw in the grass a viper, which suddenly, on seeing me approach, disappeared. I followed it to the place where it had disappeared, which turned out to be a large hole in the ground, not deep, but wide; and on inserting the handle of the fork into this, the creature came out. I immediately seized it behind the neck, and foolishly placed it in the basket, and took it to our house, which was close by. I then put the basket into a box, and after dinner took out the basket and opened it. The viper was very sluggish; but on touching it, and endeavouring to take it by the neck, as I had done before, it struck at me, and bit my left fore-finger. I immediately threw it down and stamped upon it, and sucked the place, cutting it with a knife, and putting ammonia to it. Meanwhile, my brother went for the doctor, and before he came I began to feel very faint, and inclined to vomit. When he came, he cut two incisions in the finger, and tied it up at the root, putting it into as hot water as I could bear. He also made me drink a quantity of ammonia and water, and then go to bed. The finger was very painful, and bled for a long time, and I was very feverish. The next day I got up, but was very weak, and there was a green mark all up from my finger, which was very large, to my left side, and all up my arm. The mark as far as the side was in a narrow line, but at the side it was in a large blotch. My finger was poulticed, and I had a cushion, dipped in water in which broken poppy-heads had been boiled, placed between my arm and side. The arm was much swelled, and I soon went to bed again. The next day I got up again, and from thence began rapidly to get well, and in a week had my arm out of a sling and my finger almost well. I was perfectly well by the day fortnight on which the bite occurred. These facts are, I need hardly say, perfectly true, and the more remarkable because olive oil was not used at all.

Now for the snake. About the 20th of April, I was taking a walk some way from Sherborne, accompanied by my brother, and was looking for divers water insects with a water-net. We came to a large pond, in which there were several newts; and my brother, looking into it, exclaimed, "Oh, E——, there is a snake in the pond!" I looked, and there saw it moving at the bottom. I tried to capture it in the net, but could not; and my brother shortly afterwards said, "Here, it is coming out." I went softly to the spot to which he pointed, and there, sure enough, was a snake coming up the steep bank with something in its mouth. I crouched down on my stomach, and when the snake's head came to the top of the bank, I caught hold of the neck, and, in spite of its struggles, succeeded in capturing it. I then saw that what it had in its mouth was a large black newt. I put them both into a tin box which we had with us, and on coming home, opened the box and found that the newt had disappeared—no doubt having been eaten by the snake. I have the snake alive in my possession at this very moment.—*Edwin Arthur Eade.*

DOG v. FOX.—A few weeks ago a fox was observed by a man standing on Bulkley Hill, in the neighbourhood of Cholmondeley Castle, Cheshire, in pursuit of a dog, who was making the best of his way home over the low ground at the foot of the hill. A short time previously the same dog had been sent into a hole to draw a fox, but did not succeed, the dog getting somewhat roughly used, and it is surmised the fox may have been the same with which the dog had the encounter.—*S. C. Sagar.*

SMALL BIRDS AND INSECT PESTS.—It appears from the public journals that in France cockchafers and caterpillars are making sad havoc. They have stripped trees of their leaves in the Bois de Boulogne and St. Maur, and the hills from Champigny to Sucy, which supply the Parisians annually with so many thousands of pounds' worth of excellent apples, pears, cherries, and plums, will, it is said, produce but little this year, thanks to the caterpillars. This is attributed to the fact that the peasants suffer their children to destroy the nests of the small birds, which are the only instruments that can effectually protect trees from caterpillars. It is calculated that there were formerly 10,000 birds' nests in every square league of cultivated land in France. Each nest is supposed to contain on an average four young ones, which the old birds fed with 60 caterpillars a day. The old birds were supposed to eat 60; making 120 caterpillars a day altogether. This multiplied by 10,000 nests will give 1,200,000 caterpillars destroyed every day in a square league of a well-planted country. The peasants one would suppose would have sufficient common sense to protect the birds which render them such valuable service, but they appear utterly ignorant on the subject. The only bird respected by the peasants, and especially the Norman peasant, is the wren, and that from a superstitious motive.—*Gardener's Chronicle.*

ENTOMOLOGY.

Pugnacity of Larvæ.—It is a fact not altogether unworthy of notice that several species of larvæ are possessed (apparently) of a very spiteful and aggressive nature, while others, as far as one may judge from appearance, are equally good-tempered and amiable in disposition. The larvæ of several of the Sphingidæ are very remarkable in this respect. If kept together, they soon lose the horns, which become disabled in a very short space of time. Then the larva of the puss-moth is also distinguished for its cannibal propensities, and its fondness for using the horns, supposed to be a whip to drive away ichneumons. I have had larvæ of a *noctua* that have devoured each other, and I was a long time much puzzled by their disappearance, which thus lessened numbers amazingly. Whether this propensity is induced by confinement, which necessitates their close proximity to each other, is not certain; but I am inclined to think so, as it does not seem to be the case when at liberty on their native trees.—*E. C.*

Lime Hawk-moth.—Having a brood of Lime Hawk-moths (*Smerinthus Tiliæ*) in the larva stage of existence, which emerged from the eggs on the 22nd and 23rd of May last, I have noticed them pretty closely. They cast their skins for the first time on the 28th and 29th of the same month, and they have just (June 3rd) completed that operation for the second time; but I observed that as they each got clear of their old garment they turned round and ate it up. Thinking this might be one of the "things not generally known," I communicate with you.—*A. B. F.*

Insects in Armour.—It is well known that in some of the Swedish lakes particles of pure iron are found. Dr. Sjogreen explains this remarkable phenomenon to be due to the larvæ of certain insects, which, like the caddis-worm, cover themselves with a protective coating. The coating is in this case oxide of iron, from which the insects absorb oxygen, and their bodies thus become invested with a complete suit of iron armour.—*Day of Rest.*

Early Wasp.—I take it for granted that your correspondent R. K. (page 137) is describing a queen wasp. Its appearance on March 17th is not very surprising. Leonard Jenyns, in his "Calendar of Periodic Phenomena," whilst giving April 19th as the average date of its appearance, records one being seen as early as March 3rd. In 1858 I myself saw one on March 23rd, and in 1859 on March 27th, in North Lincolnshire.—*J. B. Humber.*

Wasps.—"Vespecide" writes that he has destroyed 72 wasps, which he presumes were males as well as females. Now under the impression that all wasps which appear during the months of April and early part of May were queens, on the 22nd of April I offered a premium of 1*d.* to the garden labourers for every wasp they might bring me up to May 1st, and the result was the destruction of 1,020 wasps, for which I paid £4 5*s.* I will feel rather vexed to be informed that probably one half were males. Can you, therefore, kindly satisfy me on that point? I may add that I never saw so many large wasps as now exist, even though we destroyed about 200 nests last autumn.—J. M., *Addington.* [You may make your mind easy respecting the wasps, as males (or kings, as "Vespecide" miscalls them) are only produced in the autumn, and all die before winter sets in. The past and present have been remarkable seasons with reference to the economy of the vespiary. The hot dry summer of 1864 allowed vast numbers of wasps' nests to be formed, and in August the workers swarmed everywhere to an extraordinary extent; but an insidious disease, very similar to that known in the apiary under the name of foul brood, set in at the beginning of the autumn and entirely destroyed the brood of many nests, so that in September we were nearly freed from the winged insects. Many females must, however, have been produced since, as, soon as the warm weather set in in April last, great numbers were seen; but May on the whole was cool, and they then appeared in fewer numbers. A considerable number of the small egg-shaped paper-like nests have, however, already been brought to me; so that if we do not have heavy rains to swamp the underground nests, we shall most probably be as much infested in July and August as we were last year.]—*J. O. W.*—*The Gardener's Chronicle.*

BOTANY.

EXAMINING PLANTS.—*Never guess at a point in question;* but if the flower you are dissecting will not enable you clearly to determine the character, examine a second or third, until you are satisfied on the point under examination. If the points are so minute as to be difficult of discrimination by the unassisted eye, a pocket magnifying-glass will be necessary, and should always be at hand. A sharp penknife and a needle will be all the dissecting instruments necessary. Special care should be taken to gather good specimens with several flowers, and, if possible, a specimen which has gone to seed as well. If the stamens need to be counted, always examine two or three flowers to see if there is any variation. In a few plants the true number is only found in the terminal flower. Remember also the possibility in a flower which has been opened some little while that the anthers of some stamens may have fallen off and left only the filament. Freshly-opened flowers are, therefore, always best. Let no one attempt to "commit to memory" the meaning of terms; but for every term which is not thoroughly understood turn to the glossary. Though this will at first be troublesome, and perhaps be voted "slow," it will soon become less and less needful; for the meaning of most of the terms will become perfectly familiar after a little practice, and the *habit of careful and accurate examination,* formed from the first, will be found of inestimable value. Slovenly and careless habits of study will hinder progress exceedingly; and those who in the beginning skip difficulties, or are satisfied with guesses, will always be plagued and impeded by doubts.—*Notcutt's Handbook of British Plants.*

POISONOUS PROPERTIES OF YEW LEAVES.—The circumstances mentioned at p. 112, of deer having died from the effects of yew juice is contrary to the notions entertained by most persons as to the poisonous qualities of the leaves in question, when eaten by either *deer, sheep,* or *goats.* That yew leaves prove fatal to horses is a well-known fact; and it would be well to ascertain the truth of the paragraph (p. 112); for the yew is so frequently found in deer parks, that it would be highly desirable all owners of such should order the branches to be properly cut. I think, if I remember rightly, the yew branches in Richmond park were a few years ago quite within reach of the deer; but I never heard of any accident there. It is a singular thing that the withered branches of this tree are quite as pernicious to horses as the fresh leaves. Many tales, ancient and modern, relative to the properties of the yew tree have been recorded. Its juice was at one time considered a sure antidote to the bite of a viper, and in Germany it is even now a popular remedy for hydrophobia.—*Helen Watney.*

ORCHID RUST (*Uredo Orchidis,* Mart.).—This rust is of a bright golden-yellow, and occurs in large spots on the under surface of the leaves of some orchids. Mr. R. M'Leod has lately sent it to us on the leaves of the Tway-blade (*Listera ovata*), and on *Orchis latifolia,* collected by him at Crosby Sandhills, near Liverpool. We are not aware that it has been before recorded in Great Britain.—*M. C. C.*

VARIETIES OF COMMON PLANTS.—I take the liberty of sending you the following brief notes of a few varieties of some of our wayside flowers that have come under my observation. I shall refer to them in the order of time when found.

1. A pure white-flowered variety of *Geranium Robertianum,* found between Enfield and Edmonton, Middlesex, three or four years ago—have not examined the spot since.

2. A pure white-flowered variety of *Lamium purpureum,* found in Fulham Nursery, two years since, growing alongside the purple variety; only two plants found—seen two years in succession—not looked for since.

3. A white variety of *Geranium molle,* found this spring, at Needham Market, Suffolk—abundant on a bank mingled with a typical rosy-purple variety.

4. A pure white variety of *Spergularia marina* (or *Arenaria rubra marina,* Linn.), found this season on the banks of the Orwell, near Ipswich, with the typical form. In addition to the pure white flowers the whole plant differed from the type by being of a pale green colour, and having perfectly glabrous (not rough) peduncles and calyx.

5. One striking form of the occasional hybrid said to be produced between the *Primula vulgaris* and *Primula veris.* It seemed exactly intermediate between the two species, having the inflorescence of both in the same plant, the long single-flowered radical peduncles of *P. vulgaris* (5 or 6), from the centre of which there arose the true umbellate scape of *P. veris.* The corolla, too, was in *size* and *colour* precisely intermediate between the species named, plants of (both) which were growing around it. I regret that an accident subsequently befel the plant before a more careful examination could be made. Found in Wherstead Park, Ipswich.

6. A form of *Achillea millefolium,* presenting marked (and I should think) permanent differences from the common form. The whole plant is of a lighter green, the leaves more compound, especially at the base; the flowers much smaller, and pure white; the stems too were much less angled, and less woody. Although my description fails to indicate very marked differences, the two forms were very distinct seen growing side by side.

I shall feel happy to furnish you, or any of my fellow correspondents or readers, with any of the foregoing that I can procure.—*W. H. Ade, Ipswich.*

MICROSCOPY.

LARVA OF A GNAT.—In the "Microscopic illustrations" by A. Pritchard is a description of a beautiful transparent larva of a kind of gnat, which is to be found in clear ponds at this time of year, and in some places is very abundant. The drawings by Mr. Pritchard are very nicely drawn, and give a good idea of its appearance. But in addition to his description I find it has two jaws, and feeds on other animals—the blood-worm for one, as I found the head and part of the body of one in its stomach. Speaking of the stomach, there is a curious circumstance I have often noticed. On squeezing the larva from its tail upwards, the stomach is forced, inverted, out of its mouth, and then will be seen to be covered with rows of spines, I suppose to retain its food. The use of the shell-like bodies I cannot make out; but they are pretty objects, and beautifully spotted, hollow, and of a fibrous structure. The larva casts its skin like others, but it requires close looking to find it.—*E. T. Scott.*

MOVEMENTS OF ENDOCHROME IN DIATOMACEÆ.—During an excursion with the members of the Tyneside Naturalists' Field Club, on Friday, May 26, I made a collection of Diatomaceæ from the bed of the river Blyth, a small river which empties itself into the sea near a town bearing the same name. The stones on the bottom of the river were covered with Fragilaria for an extent of some miles, and intermixed with the Fragilaria there were many beautiful varieties of Cymbella, Cocconema, Pleurosigma, Nitzschia, Gomphonema, Surirella, &c. The *Cymbella lanceolatum* or *Cocconema gastroides*, I am not quite certain which, they are exactly alike, and the only mode of deciding the species is by seeing the Cocconema on its stipes, Cymbella being a free form. I could not in the gathering made observe the least indication of stipes, and I therefore infer that they are *Cymbella lanceolatum.* In this I saw what I had never before seen,—a free motion of the endochrome: it was as free as the motions of the granules in the desired Closterium, but not quite so regular. I examined the gathering three hours after making the collection, and saw the motion of the endochrome;—sixteen hours after, and saw it yet move freely, but only in one frustule;—forty hours after, and saw it very slightly in one frustule; ninety-eight hours after, but could not observe the slightest motion in any frustules, although I examined many of them very carefully. I infer that the best time for seeing the motions of endochrome is when the diatoms are newly gathered.—*T. P. B.*

HOW ARE LARGE INSECTS MOUNTED WHOLE?—Though the text-books explain how to mount the legs, antennæ, or other separate parts of an insect, they do not give the information necessary to enable an amateur to mount an insect whole without air-bubbles. The great object to be achieved is to discover a chemical agent which will unite with the balsam without injuring its clearness, and by which to prepare the insect before placing it on the slide. In the common process of mounting, the slide is prepared, and the insect placed in the balsam, the slide being then warmed, the clean thin glass is allowed to drop gently on the specimen. But here the great difficulty arises, for if the insect be a large one, the body is too thick to allow the glass to lie anything like flat, and even then the limbs generally break off, to the utter destruction of the work. Mr. Jabez Hogg's work on the microscope states that a clergyman at Acton Abbotts has discovered a medium which will attain the required object. The slides sold at the opticians', and mounted on three-inch circles (intended for the magic-lantern, though equally adapted under the large objectives for the microscope) are beautifully clear and perfect. How is the process performed in these cases? What is the medium used? Perhaps some of your correspondents may be able to solve this difficulty. Again: How are young crabs and moderate-sized prawns mounted *whole,—shell and all?* I have seen some so prepared at Newton's, Temple Bar, and as an amateur I should, in common, no doubt, with many others of your numerous correspondents, be glad to attempt the use of the process.—*J. H. W.*

MICROSCOPIC POWERS.—The quarter-inch object-glass of my microscope with the low eye-piece has a field of view not larger than the aperture made by an ordinary-sized sewing-needle, No. 5; yet, in that field I have seen eleven circular diatoms from guano, and these in no way crowded, but with spaces between them. Each of these tiny circles possesses markings, apertures, or elevations, of the most minute yet regular character, hexagonal or circular. I have endeavoured to count the number of apertures in the radius of one of the smallest and coarsest of these circles on my slide (*Eudicta*), and I made up the number to be twenty-five. From this I conclude that, at a rough calculation, there cannot be less than three hundred apertures in the diameter of one of the larger circles (*Coscinodiscus*), eleven of which, as I have said, scarcely fill a space equal to the aperture of a sewing-needle. This, which any amateur microscopist may verify for himself, with perhaps more wonderful results, affords a practical and ready method of explaining to many the reality of the wonderful fact, that marvellous skill in design and beauty in execution has been displayed on very tiny atoms. And it shows the extraordinary perfection and power, even of a moderate-priced modern achromatic microscope. No wonder that the instrument has become popular, and that science is the innocent and profitable subject of "Gossip" indulged in by the "Lovers of Nature."—*Lewis G. Mills, LL.B., Armagh.*

GEOLOGY.

Folk-Lore of Geology.—Geologists are well acquainted with the new red sandstone of Cheshire and the counties adjoining, and Ansted (*Elementary Geology*, 2nd edit., p. 363) remarks of it, that "the beds are nearly horizontal, the dips rarely exceeding ten or twelve degrees, and being *constantly towards the east*, or a few degrees north or south of that point." This statement is strikingly corroborated by the practical observations of the well-sinkers in the county, who, on being questioned as to the dip of the strata, invariably state that it is always "towards the rising sun."—*T. N. B., Chester.*

The Results of Two Explorations of the caverns of "Trou des Nutons," &c., near Furfooz, by MM. Van Beneden and Dupont, were laid before the Académie Royale de Belgique on the 3rd December, 1864. In the "Trou des Noutons" were found worked flints, bone implements, fragments of charcoal and wood, pieces of pottery, human bones, jaws of beaver and glutton, pell-mell with remains of bear, reindeer, goat, ox, wild boar, shrews, voles, numbers of birds, four species of land-shells (*Helix pomatia, H. arbustorum, H. lapicida,* and *H. cellaria*) and *Unio batavus*, which is still living in the river Meuse. The human bones consist of,—the "os frontale" of a child, very remarkable for the elevation of the forehead and the extraordinary thinness of the sides; an imperfect "os frontale" of an adult; humerus, femur, tibia, ilium, scapula, and clavicle, the bones of the members alike indicating two individuals of different ages. The beaver is represented by a complete, and the glutton by the middle portion of a lower jaw. The remains of bear comprise a nearly complete vertebral column, embracing the vertebræ from the 2nd cervical to the 3rd caudal; the sacrum, and most of the ribs, with a portion of the sternum. It differs from the cave bear by its much smaller size. The goat, of which an entire skull has been obtained, is of the domestic species. Remains of an ox of unknown species complete the category. The authors hope to give at an early period a detailed description of the several objects thus discovered.—*Translation, by Ralph Tate.*

The Eozoon Canadense.—The following letter recently appeared in *The Reader*, emanating from Queen's College, Galway:—

"For several weeks past we have been engaged in investigating the microscopic structure of the Serpentine of Connemara in comparison with that of a similar rock occurring in Canada, which has attracted so much attention of late. For a considerable portion of the time we entertained the opinion, in common with Sir William Logan, Drs. Dawson, Sterry Hunt, Carpenter, and Professor Rupert Jones, that the Canadian Serpentine is of organic origin, the result of the growth of an extinct foraminifer called Eozoon Canadense; it was also our belief for awhile that the Connemara rock had originated from a similar organism. Gradually, of late, however, we have been reluctantly compelled to change our opinions.

"It is now our conviction that all the parts in Serpentine, which have been taken for the skeleton structures of a foraminifer are nothing more than the effect of crystallization and segregation.

"It would have given us unalloyed pleasure, had we been able to state that our investigations have confirmed those of the eminent authorities to whom reference has been made, as it was purely in this spirit that we commenced our labours; and also, we may observe, with the desire to ascertain if the Serpentine of Connemara and the other rocks with which it is interstratified, belonged to the Laurentian period.

"We purpose at an early opportunity to lay before the public all the evidences and considerations which bear us out in our present opinion.—We are, Sir, yours very truly, &c.,

"William King, *Professor of Mineralogy and Geology.*

"Thomas Rowney, *Ph.D., Professor of Chemistry.*"

In the succeeding number of the same journal a communication was published from Dr. Carpenter, in which the claims of *Eozoon* to be considered organic were strongly asserted, and some little personality introduced. To this communication Professor King has briefly replied that the results of his investigations will soon be published, and until then he recommends a suspension of judgment.

Another Plesiosaurus.—We have to record the discovery, in the neighbourhood of Charmouth, Dorset, of another *Plesiosaurus*. This fossil, though not so perfect as the magnificent one acquired by the British Museum last year, is yet a remarkably fine specimen, and being in stone is in good preservation. Portions of the skeleton have been submitted to Professor Owen, who has pronounced them to belong to an undescribed and unnamed species. Thus this makes the second new species of this most remarkable family which E. C. H. Day, Esq., F.G.S., of Charmouth, has been the medium of bringing under the notice of the scientific world. It is to be hoped that this wonderful relic of a bygone age of life will be secured for the national collection; but at present, as we are informed, circumstances seem likely to prevent its acquisition.—*The Reader.*

FISH TATTLE.

FOX-SHARK.—A specimen of the Thresher or Fox-shark is now being shown here at the moderate charge of two-pence each, having, unfortunately for itself, got entangled in a mackerel-rope, twisting the rope round its tail, or the net never could have held it. It was towed in about nine miles from the place of capture, and still shows slight signs of life. It is this species which is reported to assist the sword-fish in attacks on the whale, the latter stabbing while the thresher administers violent blows. The tail is more than half the length of the fish, the fin running beneath it being just 7 feet long, while the total length from snout to tip is 13 feet 4 inches; the pectoral fins are 2 feet long, and the dorsal 1 foot 2 inches; two rows of rather small teeth in the lower jaw; those in the upper appear sunk in a groove. The skin is, of course, roughish when stroked "the wrong way" on the body and pectoral fins, but on the other fins it feels smooth in any direction. The individual in question is a male, and is, I believe, the first example of the species that has been taken on this part of the coast.—*G. Guyon, Ventnor, Isle of Wight.*

GREAT SLAUGHTER OF FISH IN THE RODEN.—At an early hour on the morning of Sunday, the 21st May, a large quantity of fish were found lying dead on the bottom of the river Roden, near the town of Wem, Shropshire. On inquiries being made, it was found that the careless authorities of the Wem gas company had drained an old gas tank into the street sewer which empties itself into the river. On going down the river, the fish were found dead for miles, the bottom of the river being literally strewed with dead fish. Some very fine trout, weighing from two to five pounds, and pike from two to seven pounds each, were picked from the sides of the stream. Not a single fish was seen alive. Fears are entertained of the poisonous water reaching the Severn, where, if it should not have lost its hurtful properties, great damage will doubtless be done. No better trout streams than the Roden existed in Shropshire, and the greater part of it being preserved by Sir V. R. Corbett, Lord Hill, and others, there was always abundance of sport. Actions have been commenced by some of the river proprietors against the gas company for polluting the stream. When will the legislature be alive to the necessity of preventing the recurrence of wholesale fish murders like this? Until our streams and rivers are freed from sewage there will be but small chance of pastime to the angler, and much less of obtaining that which, in these days of dear beef and mutton, would be most acceptable—a supply of fish as food for the people. —*R. A.*

REPRODUCTION OF THE EEL.—I think that W. Houghton, in your last number, does not satisfactorily account for "nothing like a roe having ever been found in the eel," as stated by "E. B." at p. 118, and I cannot consider the fringes mentioned by W. Houghton as any proof that the eel is oviparous. Surely if the eel was oviparous as other fish are, a regular roe would long ere this have been met with. I have in my time caught some thousands of eels, but never met with one having a roe, and, in fact, have not heard of such a thing. I have been informed by a party who has long been accustomed to fishing for eels, and on whose statement I can place implicit reliance, that on more occasions than one, on his return from fishing at night, he has placed eels in a tub of water, and in the morning has found lots of young eels about the length of his thumb-nail swimming about in the water, and that he has occasionally found young ones of about the same size in the bag in which he brought his eels home. The same party also informs me, that not long since, on his cutting an eel asunder, he found several young ones in its stomach. As I am perfectly convinced of the truth of the above statements, I must, of course, range myself on the side of those who consider the eel as viviparous; and I am satisfied I could, on inquiry, procure plenty of credible evidence to establish the fact to the satisfaction of any jury.—*H. C. S.*

EXTRAORDINARY VORACITY OF A TROUT.—As Mr. R. Jackson, jun., of Langdale, was on his way to the Windermere railway station, and when near to Dove's Nest, on the shore of Windermere Lake, he observed something floating on the water, which he at first supposed to be a pike; but on approaching the beach, he soon satisfied himself that it was a trout of no mean size, with not sufficient strength left to battle against the waves. With the aid of a stick which was procured near to, and by wading a short distance into, the water, Mr. Jackson succeeded in landing the now exhausted fish, which proved to be a fine great trout weighing one pound and a half, whilst tightly wedged in its throat was a perch measuring six inches in length, which the trout had been unable to gorge, and had by its voracious appetite brought itself to grief. It is a common practice to capture pike in Windermere Lake by means of a bait nearly half the size of themselves; but we think the oldest and most experienced fisherman will be unable to bring to record an incident like the preceding one, where a trout had been known to take for bait a perch weighing over three ounces.—*Kendal Herald.*

THINGS which are beautiful in themselves, independently of all association, will necessarily at al times be beautiful.

NOTES AND QUERIES.

SCALES ON WHITE CABBAGE BUTTERFLY (page 140).—I presume your correspondent, Mr. W. H. Reynolds, alludes to the singular-formed and beautiful scales of the White Cabbage Butterfly, with a tuft or sort of root at the narrow end, as in the slide enclosed; if so, he will readily find them among the other scales, on upper side of wing: there is only a small proportion—perhaps about 1 in 20—of the tufted scales.—*E. Greenhough.*

The tufted scales of the White Cabbage Butterfly (*Pieris Brassicæ*), as well as those of the Meadow-brown (*Hipparchia Janira*), are to be found upon the male insect only. I suspect that your correspondent, W. H. Reynolds, has got hold of none but females for his experiments, or he could not have failed to have found what he was looking for. This is the more likely, as the female insect is generally more abundant than the male. The dotted or "battledore" scales of the blue butterflies (*Polyommatus Argiolus, Alexis,* &c.) are also, I believe, never found except upon the male insect; at least, that has been the result of my own experience. I may here also say that the slides sold at many of the shops as "battledore scales from *Pieris Brassicæ*," are not from *Pieris Brassicæ* at all, but from the small white cabbage butterfly, *Pieris Rapæ.—Henry F. Hailes.*

The tufted scales of this insect are only found on the male butterfly: it may at once be distinguished from the female by the absence of two black spots, which the female has on the upper surface of the anterior pair of wings.—*R. C. Douglas.*

BEES' REMAINS (page 143).—The interior of the bodies of the five humble bees had doubtless been eaten by some honey-loving insect, probably other bees. When hive-bees are compelled, by scarcity of food, to cast out their own larvæ, they always suck out of their bodies the honey they contain.—*M. A. L.*

THE WEEVER FISH.—One evening, during the hauling in of the mackerel-nets to the beach, a fisherman was thrown upon the struggling fish, which, by the bye, have passed here in large and visible shoals during the past week, when he uttered a cry of pain, and on my asking him the cause, he said he was *stung* by a weever (fish), which I found to be a fish prettily striped, and about nine inches long. But to return to the man; his hand (it was the thick part of the thumb) bled very freely, and in the course of a quarter of an hour began to swell. I am told by fishermen that many instances are known of persons losing the use of a hand by this sting. My own opinion, from a slight examination of a living fish, the handling of which by myself caused no little astonishment, leads me to believe that it is only a stab from a spinous elongation of the dorsal and pectoral fins; but whether the fish has the power of emitting at the same time a poisonous liquid I cannot say. For your better guidance I cut off a dorsal fin, with spines, which I now enclose, having dipped them in brandy. Can any of your correspondents give me further information?—*A. Horace Lloyd, Brighton.*

[This is not a myth. See papers in *Ann. and Mag. of Nat. Hist.*, vol. vi. p. 161, Nov. 1840; Proceedings of Liverpool Lit. and Phil. Soc., vol. i. p. 156, May, 1849; *Intellectual Observer*, No. 28, May, 1864. The "Weever" (*Trachinus vipera*) is also called the "Sting Fish."—ED. S. G.]

WHAT DO CRICKETS EAT?—"Our cherished little minstrel enshrined in poetic fancies" is not only a savage and a Dahomey, but is also a cannibal and a Fan. A year or two back, being desirous of getting two or three crickets for anatomical purposes best known to microscopists, and not having any in my own house, I asked my next door neighbour, who was rather superabundantly supplied with them, to capture two or three for me, "dead or alive." A day or two after he handed me over the garden wall three, two of which were dead, the other, a fine large fellow, alive and vigorous. I placed them under a tumbler in a place to which no one had access but myself, and left them until the following day. When I went to take them out for execution, to my great surprise I found the living one as vigorous as ever—perhaps a trifle more so; but of the dead, nothing remained but a few small fragments sufficient to show what had become of the rest.—*Henry F. Hailes.*

FOX WITH YOUNG SCENTLESS.—Allow me to corroborate the interesting fact (noticed, with doubt, at page 142, by your correspondent W. F. S.), of the female fox having no scent. I have little doubt that this merciful provision is well known to many huntsmen; but on the authority of a gentleman, a member of the Fife Hunt, I have much pleasure in testifying to its truth. Observing, one day, a fox close in front of the hounds, he was surprised that they neither gave tongue nor chase. He immediately drew the attention of the huntsman to it, who at once said, "The fox is with young, it has no scent, and the hounds will not follow." The result justified his statement; for though the fox ran slowly in front, the hounds never disturbed or noticed it.—*A. L.*

INCUBATING ROBIN. "W. I. S." *Answer.*—It would be next to impossible to *prove* that sitting-birds have no scent; but a case which tends to support that assertion is now under my own immediate observation. A pair of hedge-sparrows have built in a bay-bush within two yards of my window; the stem of the shrub stands in an adjoining garden, separated from mine only by an open iron palisade, through which cats are passing constantly, close to the nest. The owner of the garden also possesses three or four cats, which are in the habit of climbing into the various shrubs; but the nest as yet remains undiscovered by them. In this instance, however, the perfume of the bay-leaves may be sufficient to overpower that of the birds. On the other hand, it would be somewhat anomalous that "nature" should be more careful of the welfare of the embryo than of the living young. As to the female fox being scentless when "with young" (a doubtful expression, but I suppose meaning in a pregnant state), I know nothing; but every reader of the *Sporting Magazine* must well know the interesting account of the chase of a bitch fox, which ran an immense distance, carrying a very young cub in her mouth. This happened, I suppose, some forty years since, and was a favourite subject in the print-shops, and on snuff-boxes, long after.—*R. K.*

SPARROWS AND CROCUS.—Early in the year (March) the *Sparrows* cause much annoyance in gardens, by pulling up the *Crocus* flowers. Can any of your correspondents say, from certain practical knowledge, what is their object? Are they in search of insects, or is there a peculiar juice or moisture that attracts their attention specially to the *Crocus?—W. A.*

A curious Blight.—On Sunday last I noticed many little floating particles of wool or cotton, as it seemed, in the garden, in a bright sunshine. On looking closer, I discovered that they were insects. I captured several and put them into separate pill-boxes. On looking at them some hours after, I found that there were also in each box some ten to fifteen other fawn-coloured insects, much more minute and wingless. I at first thought they might be parasites, hidden before in the cotton covering; but to-day, having again seen some specimens, I examined one under a microscope, and found that they were young, extruded from the parent; at first motionless, with antennæ and legs placed chrysalis-wise, but in a few minutes becoming active. I have never noticed this insect before; and only now on these two days. I can discover none on any plants in the garden, though they approach in character to what is commonly termed "blight." I enclose two specimens, with some of the young, which I hope will not get quite dried up. If you can tell me what they are, I should feel much obliged: they may be common, but I never before observed them.—*H. W. Livett, M.D.*

[The species sent is one of the Aphidæ, nearly allied to the woolly American blight (*Aphis lanigera*). It belongs to the genus Pemphigus, having four simple oblique veins to the fore wings, none of them being furcate.—*J. O. W.*]

Bees' Remains. "A. O." *Answer*.—I can easily explain the cause of the death of the humble-bees, having as a boy often found, more especially the large red-tailed humble-bee, crawling on the ground, disabled. On examination, I have invariably found them infested, and completely eaten into by a dark-coloured louse, which always chose the back of the bee for its point of attack. I have found living bees with holes large enough to admit a pea, and containing three or four of these parasites. Our belief was that the bee was eaten in this unvarying manner for the sake of its "honey-bag," the hole being always made in its immediate proximity.—*R. K.*

Aquarium Query answered.—In reply to "G. R. B." (page 143), the best remedy, and also preventive, against growth of the plant he describes, is three or four snails, either Trumpet (*Planorbis corneus*) or Pond Winkles (*Paludina vivipara*); they are both capital cleansers. Tadpoles are also of benefit; but not to the same extent. I am enabled to speak from experience, having been very successful with my aquariums for the past two years, although previously I think I had as many accidents and misfortunes as any one.—*Thomas Armstrong.*

[The same advice is given by G. M. Ruck.]

Exotic and British Diatoms.—Mr. Kitton (page 140) seems to be under a mistake in supposing the *Coscinodiscus radiatus* to be exclusively an exotic diatom, as I have found it plentifully in a cave attainable only at lowest water, in the face of the rocks about ten miles south of Aberdeen; more sparingly along the coast in the neighbourhood. Enclosed is a slide (I am sorry it is not a very clean one) showing the proceeds of one dip in a washing therefrom.—*H. Ambrose Smith, Aberdeen.*

Beech-trees.—Why is it that these trees injure all others encroaching upon them, but are seldom, if ever, injured in return, and will allow nothing to thrive under them?—*A. H.*

The Golden Bloomeria.—A friend of mine, who has lately returned from California, allows me to take an occasional peep at his note-book. I there I alighted on a short account of what I should imagine to be a very lovely bulbous plant, called the Golden Bloomeria, and I should much like to know if it has been introduced into this country by any botanist. The specimen of the blossom I saw was dried, and it had consequently lost the bright golden hue which marks its beauty when growing. (*Apropos* of dried flowers, I saw a remarkable group, mounted with their natural colours, exquisitely preserved, at the grand fête, on Saturday the 10th, at the Horticultural Gardens); its bloom is wonderfully lasting, I am told, continuing in flower for a month or five weeks ere it begins to fade; but I believe it is scentless. The bulb was first found in New Idria, and has been classed by a Californian florist with liliaceous plants.—*Helen Watney.*

White Sparrows in Smoke.—I am informed, by an eye-witness, that some time back a white sparrow was seen to fly backwards and forwards through the smoke of a factory chimney; and this it continued for several days, and then disappeared as suddenly as it came. I also am well acquainted with a glass-manufacturer, who informs me that for several weeks he observed a white sparrow flitting about the works undeterred by the constant noise and smoke. Can any correspondent favour me with information as to whether the white sparrow has a predilection for smoke, and prefers to live in smoky districts; also, if cases similar to the above have been noticed?—*H. A. A.*

Sea Anemones Dividing.—I had a very fine *Anthea* in a small sea-water aquarium for some months. One night I left it on a piece of rock, and to my surprise, the next morning, I found *two* in the place of one, on the same stone, with about the space of half an inch between them. They were both fully expanded, and lived for some months after; indeed, till I left home. Are *Antheas* in the habit of dividing themselves in half? and what can have been its motive? I should mention that the *two Antheas* were about equal in size.—*L. S.*

Black Beetles.—Can any one tell me an effectual method of getting rid of black beetles in a house which has been swarming with them for many years, in spite of several common remedies,—poisons, &c., of which they seem to grow shy after a time?—*A. H.*

White Corn Poppy.—I recently found a splendid pure white variety of *Papaver Rhœas* in a field between Stoke Newington and Hornsey; the petals were pure paper-white, with a purple-black blot at the base of each petal, in all other respects exactly the same as the ordinary red form.—*W. G. Smith.*

Stream Bubble-shell (*Physa fontinalis*).—Many of your readers are doubtless aware of the power possessed by this mollusc of letting itself down from the surface of the water by means of a thread which it forms for the purpose. As perhaps only a few may have had the opportunity of witnessing the phenomenon, I will attempt to describe it. Happening to look along the surface of the water in a small aquarium, I noticed a small circular spot about half a line in diameter. The centre was depressed and funnel-shaped, while to the under side was attached a thread, at the lower end of which was the *physa*. I touched the floating speck with a stick, to which it adhered, and I lifted the mollusc out of the water by the thread.—*C. A.*

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."

W. W. K.—Your plant, which is odorous when dried, is the "Sweet Woodruff," or *Asperula odorata*.

A CONSTANT READER will find some information on the American Water-weed at page 141.

E. M.—The galls are not uncommon around London on the Ground Ivy.

H. T. K.—If you will send us one of the beetles in question, we will endeavour to answer your query.

E. CAPRON.—We think the *Æcidium* on *Galium aparine* is the same as that on *Galium Mollugo*, but *not* the same as that on *G. verum;* as you observe, the colour of the spores differs.

W. S. K.—Your little reptile is the common Smooth Newt (*Lophinus punctatus*).

E. T. S.—Our correspondent must exercise a little forbearance with those who may not have acquired so much scientific knowledge. We strive to offer something for all. There are other journals devoting themselves to "dry science;" we only profess to "Gossip."

S. M. T. — Withering's Botany is quite out of date. We cannot give better advice, we think, than that given to "P. C." (page 144). Perhaps Notcutt's "Handbook of British Plants" would suffice for your purpose (see below).

J. R. E.—The small beetle is *Phyllobius uniformis*. It is tolerably common on low-growing plants.—*R. G. K.*

C. K.—The caterpillars which are making such havoc of the hawthorn hedges, and stripping them of every green leaf, are those of a little moth known as *Hyponomeuta padellus*.—*F. M.*

R. W.—The caterpillars referred to as completely stripping the foliage of oaks, ash, and hazel, according to your specimen, are those of *Hybernia defoliaria*, a moth which appears in October and November, the larvæ are not particular what they eat.—*H. T. S.* Those on the Bird-cherry most probably *Hyponomeuta Padi*.

T. H. H.—A well-known habit with the Grasshopper Warbler, in common with several other birds.

A. S.—Is there not some confusion in your names?

R. A.—You will observe that we have ceased to insert Reports of Societies, they being of little interest, except to the members.

G. D.—A "Fellow" of a society properly means a member of a chartered society who has fulfilled the requirements of the charter in that case provided. An "Associate" is also a member of such a society, fulfilling other requirements, probably less rigid and carrying fewer privileges. The title of Fellow is often assumed by members of societies not constituted by Royal Charter.

MICROSCOPICAL AMATEUR SOCIETY.—All letters on this subject were forwarded to "W. G."

NOVA SCOTIA INSECTS.—All letters were forwarded to the correspondent "J. B. F.," upon their arrival at our office.

C. A. J.—You would find your two first queries illustrated in any good work on Vegetable Physiology. The third is not within our province. Correspondents would oblige by adhering to the good old rule of "one question at a time."

L. S. informs us that she has exterminated the Herbarium insect (see page 111) from dried plants by keeping camphor with the specimens.

W. S. K.—The little black insects belong to the *Phryganidæ*, and are known as *Mystacides nigra*. It is a very common species.—*R. McL.*

E. W. wishes to know where vipers abound near enough to town to be accessible to a cockney..—Write to Mr. W. R. Tate, 4, Grove Place, Denmark Hill, Camberwell, and he will inform you of several localities.

W. W. K.—An error, by some means, insinuated itself into the reply at page 144. It should have been thus stated:—*Margarodes* belongs to the *Coccidæ*, a family of insects placed by Latreille at the end of *Homoptera*.

E. A. H.—British Orchid-tubers are too succulent to be treated in the manner you suggest. Many foreign species with pseudo-bulbs will succeed: we have seen them grow after having been kept dry in a drawer for twelve months.

P. P.—You really must forgive us, but we cannot make out the names you inquire about. A good eyesight is one of the blessings we enjoy, but to decipher such mystic hieroglyphics presupposes a knowledge of Sanscrit or Coptic. If some of our correspondents would oblige by writing *names* more distinctly, and confine themselves to one side of the paper, and one query at a time, what a Paradise they would create for us.

BRITISH HEPATICÆ NUMBER.—The special number, containing descriptions of all the species of British Liverworts, &c., with 200 figures, for four-pence, will be ready in a few days. As only a limited number will be printed, our subscribers are advised to order it without delay.

J. W. will appreciate our disinclination to mention any names of tradesmen. It gives an undue advantage to the parties named to the injury of others. This we desire to avoid.

R. Bl.—We do not observe any deviation in your *Lathrea* from the normal condition.

PARIS QUADRIFOLIA. — Correspondents appear to have fallen into error with respect to the query (page 143). We have received specimens with 3, 5, 6, and 7 leaves. This is nothing uncommon. The query referred to a corresponding variation in other of the floral organs. Has any variation been observed in the number of stamens or carpels?

A. E. L.—Ferns are much given to variation. Such sporting as you speak of has induced some botanists to regard *Asplenium trichomanes* and *A. viride* as the same *species*.

A. M. B.—Your primrose, the lower part of the floral axis being confluent half-way up, and two flowers appearing to surmount a forked peduncle, is scarcely deserving a special illustration. It is curious, but not unique.

A. L.—The caterpillars of two species of moths are very destructive to apple-trees. The one you refer to is probably that of *Clissiocampa neustria*.—*F. M.*

A HINT FOR CONTRIBUTORS.—If our contributors will oblige us by always using the common names of plants, animals, insects, &c., wherever there is a common name in use, to be followed by the scientific name in brackets, this will save us a large amount of trouble in sending their manuscript to press. As we do not pretend to address scientific readers alone, vernacular names are indispensable.

COMMUNICATIONS RECEIVED.—T. P. B.—W. S. K.—W. J. B. —H. S.—H. M. W.—G. G.—W. W. K.—Z. Z.—H. M. H. (no address enclosed).—C. A. J.—J. B.—F. P. P.—R. W.—J. H. W.—L. S.—J. R. E.—B. T.—R. B.—W. (Ross).—J. B. HUMBER.—E. G. W.—A. B. F.—R. K.—A. G. R.—Y. Y.—G. M. R.—H. C. S.—E. P.—J. K.—E. A. E.—C. S. B.—E. C. —G. D.—H. F. H.—J. B. (Leeds).—E. M. (Bath).—A. L.—H. A. S.—H. U.—A. H. L.—B. B. B.—S. C. S.—W. H. A.—J. E. M.—A. P. F.—S. M. T.—H. W.—E. T. S.—A. S.—R. T. —R. C. D.—L. G. M.—A. S. B.—C. A.—W. L. N.—J. W.—H. W. L.—J. J.—E. C. N.—G. H. P.—P. S. B.—C. K.—E. S. —E. C.—W. H. F.—A. E. L.—M. A. L.—E. A. H.—H. A. A. —G. D.—T. A.—R. E. M.—E. G.—W. A. L.—W. B.—J. McV. —H. P. S.—W. L. S.—J. W.—E. W.—W. G. S.

LOCAL NAMES.—R. W.

BOOKS RECEIVED.

"A List of Certain Plants to be met with in the Neighbourhoods of Barmouth, Dolgelly, and Harlech, &c." By the Rev. T. Salwey, B.D. (Barmouth: D. Jones.)

"Handbook of British Water-weeds, or Algæ." By Dr. J. E. Gray, F.R.S., &c. The Diatomaceæ, by W. Carruthers, F.L.S. (London: Hardwicke.)

"Handbook of British Plants." By W. Lowndes Notcutt. 12mo. cloth. 213 pp. (London: Longmans.)

"THE DEEP, DEEP SEA!"

Ah! what pleasant visions haunt me, as I gaze upon the sea!
All the old romantic legends, all my dreams come back to me.
Till my soul is full of longing for the secret of the sea,
And the heart of the great ocean sends a thrilling pulse through me.
Longfellow.

"BROADLY awake but deliciously dreaming," we cast ourselves upon the dazzling sandy beach, and gaze upon "the deep, deep sea." The sky above, so beautifully blue, is unsullied by a single cloud; "a holy calm pervades us, all is peace within." Above, below—without, within—exists a harmony of repose, and as we adjust the welcome expanse of our broad-brimmed "felt" to shield our eyes and shelter our complexion, we sink into a reverie,—

With half-shut eyes ever to seem
Falling asleep in a half-dream.

There always seems to be a mysterious influence in the sea,—itself a mystery, covering three-fourths of the surface of the globe, and hiding the earth and its inhabitants from the gaze of the "lords of creation." How little do we know, compared with the unknown, of three-fourths of the world that is buried in the sea. "We tried," says Sir James Ross, "but did not obtain soundings with 4,600 fathoms of line, or 27,000 feet," upwards of five miles. And this in "the deep, deep sea."

From the bottom of this vast expanse the plummet brings to the surface evidence of the past existence of myriads of minute organisms. "The ocean," writes Lieutenant Maury, "especially within and near the tropics, swarms with life. The remains of its myriads of moving things are conveyed by currents, and scattered and lodged in the course of time all over its bottom. This process, continued for ages, has covered the depths of the ocean as with a mantle, consisting of organisms as delicate as the macled frost, and as light as the undrifted snowflake on the mountain." And that these fragile and delicate objects repose at peace in their ocean bed is now past a doubt. "My investigations," writes Professor Bailey, "show that the bottom is so free from currents and abrading agents that a rope of sand, if once laid there, would be stout enough to withstand the pulling of all the forces that are at play upon the bottom of the sea."

Not only the remains of past life, but also the living present, exist in countless numbers in the ocean. "In examining animalculæ in sea-water," says Capt. Foster, "I have heretofore used surface water. This afternoon, after pumping for some time from the stem pump seven feet below the surface, I examined the water, and was surprised to find that the fluid was literally alive with animated matter." And what shall we say of—

The stupendous mounds of catacombs
Fill'd with dry mummies of the builder worms?

of the coral reefs reared by the combined efforts of myriads of diminutive artisans, and which Captain Flinders encountered for five hundred, and Captain King for seven hundred miles?

Some of the wonders of this vast storehouse of marvels have been transferred to the marine aquaria, public and private, which fashion called into existence in haste, and nearly abandoned at leisure. Sea-anemones, so like the flowers of earth as to deceive the insects of earth; jelly-fish, unlike anything in creation but themselves; and even the poor hermit crab doomed to forego his retirement and be gazed upon by every little "charity boy" that chooses to spend his holiday sixpence at the Zoological Gardens.

Leaving sea-serpents to assert their own identity, and prove their own existence in some remote future, by one of their family swallowing a cargo of hardware, and being stranded in a fit of indigestion, we should like to know, since the fauna of the land is continually being augmented by the knowledge of new genera and species, what can be predicated of our knowledge of the fauna of "the deep, deep sea." Surely half its wonders are yet entirely unknown.

O sea! old sea! who yet knows half
Of thy wonders or thy pride!

Still we repose upon the beach and dream, as old Neptune chides our idleness by casting at our feet seaweeds, corallines, zoophytes, shells, starfish, and many such trinkets of his, each of which would employ us many an hour fully to comprehend.

Break, break, break,
At the foot of thy crags, O Sea!
But the tender grace of a day that is dead
Will never come back to me.

THE HOUSE ANT.

LET me be cool, let me bear it all in meek and seemly resignation, above all let not my trials tempt me to launch forth a torrent of invectives against my dumb tormentors. What! though Job the patient, the much-enduring, may never have suffered at the hands, or rather jaws, of so many relentless persecutors as has done—and does do—your particularly humble servant at your service. What! though —— But why, harrowing with a tale of woe, should I aggravate, by suspense, the lacerated feelings of my already sympathizing reader. Enough: ——let me briefly to the point; my complaint is—why should I disguise it—ants! execrable, unmitigated ants!

Know, then, all men, that I, the martyr *par excellence,* have ever been the butt of insects: while yet the tenant of a cradle never, more than I, was hapless babe a victim to the midnight prowling *Cimex,* which in later years has lain in wait for me at sea-side villages: know that at the tender age of six a contest with a humble bee respecting the proprietorship of some toothsome morsel resulted in my being ignominiously be-humbled. Furthermore, be it known, that after an unwarrantable, though purely accidental, intrusion upon the inmates of a wasps' nest, into which I had most literally put my foot, a score of stings of these aculeate individuals were, once upon a time, extracted from my suffering body by aid of the inevitable key; and that, at a more advanced period of my existence, my first attempt at beetle-hunting ended in an inglorious and precipitate retreat homewards with many hundred fleas anent my person, collected promiscuously during a hasty investigation of an untenanted henhouse, which, unfortunately for me, had looked likely.

Gaunt gnats, gadflies, and a host of other double-barrelled excruciators show an invariable and undesirable preference for my surfaces, sucking my blood —— freely, for I am juicy. Bluebottles, in evident anticipation of my speedy demise, assail me with ferocity, and not unfrequently get off unscathed; while with ticks, bobs, harvestmen, and the rest of these human tormentors, excepting, perhaps, the insinuating *scabies,* and one or two others I could mention, my experience has been both practical and painful. Indeed, it would seem that most of the objectionable members of our "invertebrate zoological fauna" have selected me to perform their, maybe interesting, but, to me, excessively unpleasant, operations on. But, there——what are these compared with ants, which, now as I advance in years, are my unbidden guests.

I am not speaking of the bodily pain inflicted by the pismire, although with *that* I am perfectly familiar, but of the mental havoc played by certain little emmets in their destructive raids upon one's peace of mind and property simultaneously.

The subject of my paper rejoices in the appellation of *Diplorhoptrum molesta*; its description is——but no matter——if anyone should desire to be personally acquainted with it, I can supply him with living types beyond his expectations; suffice it, the creature is small and brown, and of a highly predaceous nature, attacking not merely stately man himself, but devouring with an avidity perfectly preposterous when the diminutive bulk of the consumer is considered, articles of consumption in daily domestic use; and, what now more nearly concerns the narrator, jubilating in the annihilation of the moth tribe, be they living or dead, in all their stages (eggs included). And here I may as well confess that my juvenile, as well as more adult, proclivities, have undoubtedly led me to work the *Lepidoptera* of my country, which reminds me that the infliction under which I groan may possibly be but a just retribution for having, in my time, stifled, impaled, and converted into specimens so many moths and butterflies; be that as it may, it is not to the point, and therefore the less said about it the better.

But to proceed. This little pest inhabits houses in various parts of London; some localities producing it in such prodigious quantities as actually to impart considerable seasoning to the viands with which it is unavoidably served up;—indeed, I have been credibly informed by one of the first entomologists of the day that, on changing his abode after a protracted residence among the house ants, he had greatly missed the flavour of them. The neighbourhood of Russell Square, a site in appalling proximity to our National Collection, appears to abound in this living commodity, and Brighton, as I see by a paper in the *Entomologists' Monthly,* also harbours it.

As to the habits of this industrious little creature, how shall I describe them? Let us imagine that, after a hard and successful day's collecting, the insect-hunter has stretched and, heedless of *Diplorhoptrum,* stowed away his treasures; we will suppose that he (said insect-hunter) has gone to roost radiant with the captures of the day, and that his slumbers are dotted o'er with phantoms of impossible new species —I say we will *suppose* so. The morrow dawns, and "O! wondrous changes of a fatal scene still varying to the last," the features of our hero now present just a trifle less of that soft expression of ineffable satisfaction which erewhile they wore, as he gazes on the wreck of what was yester-e'en a galaxy of beauty——Yes! there they are, plying their jaws, in groups around each specimen, hard at work—nibbling antennæ—trampling with a thousand tiny tarsi the "fluff" from off the wings—playing at hide and seek in the capacious sinuses already formed within the bodies of their disembowelled victims—or baiting to the death some living prisoned moth.—Poor, innocent, industrious, unsuspecting little brutes, it is your last meal. I draw a veil. But what availeth benzine, is not their name "Legion," and when one batch is no more, do no more come on?

And pray (asks somebody) what *does* our "Ento." under these, it must be admitted, somewhat ruffling circumstances?—Do rash thoughts of trying "a dance upon nothing at all," after the approved fashion of the late Mr. Müller, but unassisted by the professional talent employed in his case, occur to him?—Does he seek oblivion in the bowl, comforting himself at the bar of the "Wooden Nutmeg" with slings, smiles, cock-tails, and tangle-legs?—Does he exhaust himself in forcible, though unavailing language?—Has his landlord instant notice to quit?—Is entomology henceforth to be renounced?—To file an injunction? It would hardly do. But hah! How about writing to the *Times?* Or do ideas of trotting down to Ratcliff Highway, to see if Mr. Jamrach has a *Myrmecophaga jubata* upon hand, ever enter his head?——My dear sir, nothing of the sort; he has become inured to such occurrences, and merely smiles (faintly, perhaps) as he mutters "tck, tck, tck, well this *is* a go, but there—it can't be helped," for he's a philosopher is your flycatcher.

For some time afterwards, however, he wears a taciturn expression, if I may use the phrase, his lips being more or less compressed, and his eye evidently in search of "something"—the hawk-like precision, too, with which he spies and pounces on any object bearing the remotest resemblance to *Diplorhoptrum* is truly marvellous. He hums tunes, and retains much of his cheerful placidness of countenance, but he occupies himself more than is his wont in pouring benzine into all sorts of suspicious-looking holes and cracks, very much to the discomfiture of his aged housekeeper (that is if he happen to have one), who can't a-bear the smell of it; and what with turpentine, creosote, and various essential oils, he certainly succeeds, upon the whole, in making the ants and everybody else exceedingly uncomfortable; he even, peradventure, brings a light to see how matters progress, to the infinite risk of being arraigned on a charge of arson, and then, perhaps, alarmed at the unexpected inflammatory effects of his too readily combustible agents, confines himself for the future to the free use of boiling water, tries the virtues of some lauded vermin powder or other, or contents himself by dabbing bits of liver in various parts of the premises to the intense gratification and delectation of bottle-flies, but to the infinite disgust of any individual on the feed, and, after all, finds most relief in the conversion of his tables and cabinets into islands by means of rotting the legs thereof in gallipots of water.

You see it comes to this: what's the good of my waging a war of extirpation against antdom when my neighbours don't do likewise, and while a stray female or two are amply capable of populating (excuse the word) a mansion with their abundant offspring? Indeed, there does not appear much chance of immunity from their attacks until London shall have been laid under water (boiling water best for the purpose) for a few weeks at their most ticklish time of life, which is, of course, the "swarming season." And so—having arrived at this conviction—small wonder that I take things as they come, and that it is my fixed intention so to do until some benefitter of his species shall hit upon an antidote for my disorder, and to console myself with the fact that, though my troubles are undeniably great, I have, at any rate, learned the truth, the wisdom, and the force of the old adage, "*What can't be cured must be endured.*" H. G. K.

WOODEN COWS.

PERSONS who reside in our large towns, especially the largest, are very apt to slander the milkman, and ascribe the semi-lactescent appearance of his commodity to a free use of "the cow with an iron tail." It is not our intention to join in any such scandal, for the milk of our history is genuine and unadulterated, although not derived from a quadrupedal cow, goat, or any animal whatever. Some, perhaps most, of our readers will have heard something of the existence of vegetable cows, or plants yielding milk; it is of these "wooden cows" we purpose to refresh their memories.

The caoutchouc, or india-rubber of commerce, as it exudes from the tree, very much resembles milk in colour and density. Many other plants yield a similar fluid, and in some instances this is so sweet and palatable as to be employed by the natives for almost all the purposes of animal milk.

The "Cow-tree of Demerara" was first observed by a traveller of the ubiquitous family of Smith in an excursion up that river. It is described as a tree from thirty to forty feet in height, with a diameter at the base of nearly eighteen inches. This tree is known to botanists by the name of *Tabernæmontana utilis*, and to the natives as the Hya-hya. It belongs to the same natural order as the Penang India-rubber tree, and the Poison-tree of Madagascar (*Apocynaceæ*). It occurs plentifully in the forests of British Guiana, and its bark and pith are so rich in milk, that a moderately-sized stem, which was felled on the bank of a forest stream, in the course of an hour coloured the water quite white and milky. The milk is said to be thicker and richer than cow's milk, mixes freely with water, and is perfectly innocuous, and of a pleasant flavour; the natives employing it as a refreshing drink, and in all respects as animal milk.

The Cynghalese have also a tree which they call "Kiriaghuma," but which belongs to a different order of plants (*Asclepiadaceæ*). It is the *Gymnema lactiferum*, and yields a very pleasant milk, which is employed for domestic purposes in Ceylon.

There appears to be also a milk-tree common in the forests of Para which the natives call "Massenodendron," but of which we have no definite knowledge, except that it was for a considerable time used on board H.M.S. *Chanticleer* as a substitute for cow's milk. It was said to suffer no chemical change by keeping, neither did it show any tendency to become sour.

The most celebrated of all the cow-trees was that discovered and made known by Humboldt as the "Palo de Vaca," or "cow-tree." Singularly enough it belongs to a different natural order from those already mentioned (*Artocarpaceæ*), and to one which includes also the poisonous Upas-tree of Java. The botanical name of this cow-tree is *Galactodendron utile*, the "useful milk-tree," or, as more recently called, *Brosimum utile*. Its discoverer states that while staying at the farm of Barbula in the valleys of Aragua, "we were assured that the negroes of the farm, who drink plentifully of this vegetable milk, consider it a wholesome aliment, and we found by experience during our stay that the virtues of this tree had not been exaggerated. When incisions are made in the trunk, it yields abundance of a glutinous milk, tolerably thick, devoid of all acridity, and of an agreeable and balmy smell. It was offered to us in the shell of a calabash. We drank considerable quantities of it in the evening before we went to bed, and very early in the morning, without feeling the least injurious effect. The viscosity of this milk alone renders it a little disagreeable. The negroes and the free people who work in the plantations drink it, dipping into it their bread of maize or cassava. The overseer of the farm told us that the negroes grow sensibly fatter during the season when the *Palo de Vaca* furnishes them with most milk. This juice, exposed to the air, presents on its surface membranes of a strongly animalized substance, yellowish, stringy, and resembling cheese. The people call it cheese. This coagulum becomes sour in the space of four or five days.

"The extraordinary tree of which we have been speaking appears to be peculiar to the Cordillera of the coast, particularly from Barbula to the Lake of Maracaybo. At Caucagua the natives call the tree that furnishes this nourishing juice the "milk-tree" (*arbol del leche*). They profess to recognize, from the thickness and colour of the foliage, the trunks that yield the most juice; as the herdsman distinguishes, from the external signs, a good milch-cow. Amidst the great number of curious phenomena which I have observed in the course of my travels, I confess there are few that have made so powerful an impression on me as the aspect of the cow-tree. A few drops of vegetable juice recall to our minds all the powerfulness and the fecundity of nature. On the barren flank of a rock grows a tree with coriaceous and dry leaves. Its large woody roots can scarcely penetrate into the stone. For several months in the year not a single shower moistens its foliage. Its branches appear dead and dried; but when the trunk is pierced there flows from it a sweet and nourishing milk. It is at the rising of the sun that this vegetable fountain is most abundant. The negroes and natives are then seen hastening from all quarters, furnished with large bowls to receive the milk, which grows yellow and thickens at its surface. Some empty their bowls under the tree itself, others carry the juice home to their children."

Mr. D. Lochart also visited the cow-trees in the Caraccas, and drank of the milk from a tree which had a trunk seven feet in diameter, and measured one hundred feet from the root to the first branch. Sir R. K. Porter also paid them a visit, and his observations confirm those already recited. "The colour and consistency," he says, "were precisely those of animal milk, with a taste not less sweet and palatable; yet it left on the tongue a slight bitterness, and on the lips a considerable clamminess; an aromatic smell was most strongly perceptible when tasting it."

Other trees are known which possess similar properties to a greater or less extent. One of these is the "Tabayba dolce" of the Canaries (*Euphorbia balsamifera*). Here again we have a plant belonging to a different natural order from any of the others, namely, the *Euphorbiaceæ*, and one containing a large number of plants with acrid and purgative juices. Leopold von Buch states that the juice of this plant is similar to sweet milk, and, thickened into a jelly, is eaten as a delicacy.

A species of Cactus (*C. mamillaris*) also yields a milky juice equally sweet and wholesome. It now constitutes the type of a genus called *Mamillaria*. The milk is affirmed to be much inferior in its quality to the majority of the above.

It would scarcely be advisable for us to enter here upon the subject of the chemical composition of any of these vegetable juices, or to show their connection with those lactescent fluids which harden upon exposure, and then are known as india-rubber or caoutchouc. Although none of the cow-trees enumerated yield a true india-rubber, that substance, or one greatly resembling it, is afforded by some of their allies. It is curious to observe how, when failing to serve mankind in one direction, these trees become important servants in another. How forcibly this reminds us of the quaint lines of George Herbert—

> More servants wait on Man,
> Than he'll take notice of; in every path
> He treads down that which doth befriend him,
> When sickness makes him pale and wan.
> Oh, mighty love! Man is one world, and hath
> Another to attend him.

GATHERING SEAWEEDS.

Pleasant it is
On summer days to wander by the sea,
And view the lovely ocean plants that wave
In each translucent rock-pool.—*Anon.*

AT this season of the year, when all those who delight in a stroll on the sea-shore hasten to some favourite watering-place, there will probably be among this happy number some of the readers of the SCIENCE GOSSIP, and possibly some few who do not hold seaweeds in such utter contempt as to consider the occupation of collecting and drying them unworthy of their attention.

I have not unfrequently met with people who, although expressing the greatest admiration for these exquisite productions, rarely take the trouble to collect them; because, as they say, "seaweeds are so difficult to obtain in good condition, and very troublesome to preserve;" also, "that to dry them so as to retain their proper colour and appearance when found in their native element, requires so much time and such a variety of apparatus." All this is very true; but can any branch of science be practised, even as an amusement, without engrossing time, and requiring the employment of tools or apparatus of some kind? However, for the benefit of those who may be disposed to dabble a little in the collecting and preserving of British Marine Algæ this season, I purpose herewith to give them a few plain directions as to the most effective method of cleaning and preserving the plants which are most likely to be found by those who collect during the ebb and flow of the tide, or who confine their search to the shores, or rock-pools, or among the mass of weeds which are cast up during rough weather.

Most of the green and olive seaweeds are readily found, either in a growing state, or cast ashore, from high-water mark to extreme low-water mark, but nearly every species of red weed grows submerged, and a vast number of them in deep water only; so that, unless they are obtained by the troublesome process of dredging, it is seldom indeed that the unskilled collector meets with good specimens of red plants, unless he have the good fortune to find them soon after they are cast ashore; their beauty being quickly impaired by contact with decaying matter, and their colours destroyed by exposure to the sunlight.

Seaweed gathering, like everything else, requires practice and experience, and beginners must not be disappointed because they do not find rarities or fine specimens whenever and wherever they may seek for them. As a general rule, without reference to the season of the year, the best time for collecting is at the spring tides, or during the change of the moon; in other words, to commence a day or two before the full of the moon, and continue until two or three days after the new moon, because at this period the tide recedes much further, so that a considerable space is laid bare; on rocky shores many rare plants are, at these times, frequently met with. For instance, I may mention the Castle Rocks at Hastings, which are unapproachable except in a boat at ordinary low-water mark, and then few but the commonest red weeds are found growing upon them; and yet at the lowest spring tides I have waded out to these rocks, and on the *outer* side of several of them I have found the rare *Rhodymenia Palmetta*, and other choice red plants in tolerable abundance.

As to what species of plants are to be found in particular localities, I may observe, that with the exception of some few, which are pretty nearly certain to make their appearance regularly, I have never found all the same species of plants in the same localities for two consecutive seasons. Arthrocladia, for instance, an early summer olive plant, was very abundant one season at Hastings, and yet for three years afterwards I did not find a single specimen; hence, I may say, I go out collecting without having the slightest idea what class or character of plants I may meet with, but because of this uncertainty I always make preparations for a plentiful harvest, so that upon my return home I may lose no unnecessary time in cleaning and displaying my "treasures of the deep." Several of our popular watering-places, such as Brighton, Margate, and Hastings, have been spoken of as not very likely localities for the production of fine seaweeds, still I have rarely searched the shores at these places without finding some interesting specimens. But of all the shores I have ever visited, none can bear a comparison, either for beauty or variety of species, with the south coast of Devon; especially that rocky part which commences near the Breakwater at Plymouth, and so on for a few miles down the shore as far as the famed Mewstone Rock, the nooks and little bays of which abound with many rare species of seaweed. Again, the shores around Mount Edgcumbe and Cawsand Bay are rich in particular species; and then, if the collector hires a boat at Plymouth, and sails over to Cawsand, a delightful walk of half an hour or so, through the picturesque lanes and over the hill, will bring him to Whitsand Bay, one of the most magnificent scenes on the British shores, and one of the most productive localities with which I am acquainted. It was here that I met with the rare *Desmarestia ligulata* (usually a deep-water species) growing on rocks at extreme low-water mark, and indeed many other rarities too numerous to mention.

A few words must suffice to inform the collector that in some of the shallow rock-pools on the Hastings shore, between the White Rock and the Archway, he will frequently find that pretty little green plant *Bryopsis plumosa* in tolerable abundance. Care should be taken, in gathering this species, to remove it from the rocks by the roots, otherwise, if its tubular branches be torn or broken, much of the fine green colour will be lost, and the beauty of the specimen considerably impaired. Pretty specimens of a finely-forked olive plant, called *Dictyota dichotoma,* grow in the rock-pools near St. Leonards; and outside the Castle Rocks, off Hastings, several red species grow in profusion. At Brighton the collector should commence his search at the east end of the Esplanade, and so on towards Rottingdean. The beautiful plant known as the Peacock, or Turkey-feather laver (*Padina pavonia*), is rarely met with but in shallow rock-pools at half-tide level, where it can enjoy the full light and heat of the sun. This justly-admired species is found at Weymouth, Exmouth, and Margate; also at Shanklin, in the Isle of Wight, where it fringes the rock-pools in the greatest abundance. At Ventnor, in the early summer months, many of the finer red weeds are cast ashore, especially that grandly named plant *Sphærococcus coronopifolius.* Ilfracombe and Lynmouth are excellent localities for the handsome red leafy plants, so also are Whitby and Filey. Peterhead is famous for *Odonthalia*, or toothed sea-wort, as well as that lovely olive species known as *Ectocarpus Mertensii.* On the west coast of Scotland, the shores of the Cumbrae Islands, and Whiting Bay in the Isle of Arran, will amply repay the collector for a visit. On the shores of the last-mentioned place, among other treasures, are found in profusion *Odonthalia* and *Ptilota plumosa,* and occasionally the very rare *Callithamnion arbuscula.* The above charming localities have been mentioned as affording good hunting-grounds for amateur collectors, and because, for the most part, they present no very serious difficulties to ordinary pedestrians in obtaining a considerable number of interesting specimens.

Patience, diligence, and the capability of bearing a fair amount of fatigue, are necessary qualifications for all who undertake the search after seaweeds, because, as many of the finer kinds grow under the shade of rocks or in deep pools, some occasional rough climbing, and now and then a slip or two into cool water, must be expected as "all in the day's work."

Almost all collectors commence by mounting plants which a little experience proves to be worthless; this, however, is of very little importance; the eye soon learns to detect the difference between plants in and out of condition, and practice in mounting is equally valuable whether the specimens be good or bad.

When I think of the difficulties I experienced when I commenced the study of marine botany, especially in the collecting and drying of seaweeds, I feel strongly inclined to urge all beginners to obtain some information concerning Marine Algæ before they go to the sea-shore to collect for themselves. A very few hours of study with an experienced Algologist, or even a perusal of certain standard illustrated works on British Algæ, will save much trouble and materially assist the unpractised eye in selecting specimens for the herbarium. But if the student would prefer a few visits to the library of the British Museum, he will find in Harvey's "Phycologia Britannica" figures, with magnified portions, of every species of plant which he is likely to meet with on the shores of the British islands.

If the collector wishes to learn, not merely the names of plants, but to distinguish species, he will do well to provide himself with a copy of Harvey's little volume, "The Synopsis of British Seaweeds," and a Stanhope or a Coddington lens, by means of which he can examine portions of delicate plants as he finds them, and compare them with the descriptions given in the Synopsis; in this way, if he have any success during his excursions, he will quickly become familiar with most of the plants which are cast ashore or grow within tide-marks.

As regards collecting boxes or bags, ladies and gentlemen may suit their own convenience. For short journeys an ordinary india-rubber sponge-bag is as good as anything; but in very warm weather, a tin can with loop-handle and cover is better, because it keeps the plants cool; and the water should be changed frequently; otherwise, if a large number of weeds be kept together, decomposition among the finer species is apt to take place; and here I may observe that there is one genus of beautiful olive plants, the *Sporochnaceæ*, which must on no account be mixed with any of the delicate red plants, for they not only very rapidly decompose, but injure almost all others with which they are placed in contact; hence they should always be put in a bag or tin case by themselves. The species are not very numerous, and they may be easily recognized, after having been previously studied, from the coloured figures either in Harvey's "Phycologia," or in Bradbury and Evans's "Nature-printed Seaweeds."

Gloves are rather a nuisance than otherwise, but I would advise ladies to wear a strong leather glove on the *left* hand when rocks have to be scaled, because they are frequently coated with Balani or sea-acorns, the shells of which are sharp and apt to lacerate the hands in the event of slips now and then; but I strongly recommend keeping the right hand always bare; for there is nothing like the unimpeded touch in separating delicate branching plants from the rocks, from the coarser weeds, or from the masses of rejectamenta in which they are sometimes found. Every plant should be swilled in the nearest rock-pool, and washed as clean as possible before it is put into the vasculum; it occupies very little time, and saves unnecessary trouble at home.

As regards costume for *ladies*, in these days of crinoline and long trains, I find it difficult to dictate; but I strongly advise those who do not mind being thought "guys" to doff silks, muslins, and the like, and to don linseys or woollens, or such materials as will not be the worse for salt water. Thick worsted stockings, and shoes fitting tight round the ankles, will be found best for those who do not object to dabble in the water. Otherwise, india-rubber boots reaching nearly to the knees will satisfy all ordinary requirements.

Collectors should be cautioned against the very natural error of bringing home too many plants at once; for if they wish to avoid making a real toil of a pleasure, they must be moderate in their gatherings, or be content to risk the loss of some choice specimens which will decompose unless they are attended to before night. The first thing to be done upon arriving at home, is to empty the vasculum into a large white basin of sea-water, and to select the best and cleanest plants as soon as possible, giving each a good swill before placing it in another vessel of sea-water, and getting rid of rejected specimens at once, so that the basin first used will be available for rewashing the weeds before they are placed in the mounting-dish.

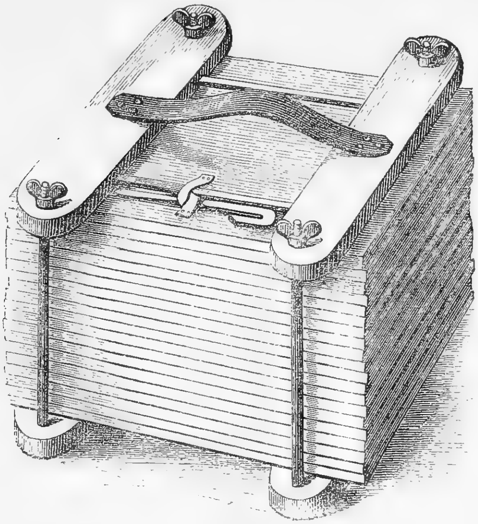
When a day is fixed upon for seaweeding, the collector should order a large bucket of clean sea-water, which, after being left to settle, should be strained through a towel, so as to be as free as possible from sand, dirt, and small marine animals. Three or four large pie-dishes will be necessary, varying from eight to twelve inches in length, the deeper the better, and white, if such can be obtained. Place these on a separate table with towels under them, and reserve a table especially for the mounting-dish and the parcels of papers, calicoes, and blotting-papers. The large white bath used in Photography is very well adapted for mounting seaweeds; the lip at one corner is convenient for pouring off soiled water, and its form, that of an oblong about two inches deep, is best adapted for receiving the papers upon which the plants are to be mounted. Beside this vessel should be placed the following implements:—a porcupine's quill, two camel's hair pencils, one small, the other large and flat, a pair of strong brass forceps, a pair of sharp-pointed scissors, a penknife, and a small sponge, an ivory paperknife, and two thin plates of perforated zinc, somewhat less than the inner space of the bath or mounting-dish.

Almost any kind of drawing-paper is suitable for mounting, but I generally employ stout unglazed paper for the large robust plants, and fine well-pressed paper for the more delicate species. The collector should be provided with three different sizes of paper, varying from six to eight or ten inches square, and these should have each a piece of calico and four pieces of blotting-paper to correspond. Some people make use of fine muslin, but for all purposes I prefer very fine calico, and that which has been frequently washed is the best. Care should be taken that the water be drained off the paper as completely as possible before the calico is laid over the plant, and this is accomplished by raising the paper on which the plant is displayed out of the bath by means of the piece of perforated zinc; then transfer it to a thin board placed in an inclined position against one of the basins, and with the large camel's hair pencil *paint* off the water, so to say, and absorb the rest around the plant with the sponge. Specimens may be left thus to drain, while the operator is arranging others. The calico should be placed upon the plant and the blotting-paper laid over it; a piece of blotting-paper should also be placed under the paper containing the plant. Almost all the branching seaweeds will require more or less pruning, or they will be troublesome to mount, and unsightly when pressed; therefore I advise their previous immersion in a deep dish of water, and their appearance when thus floating should be imitated as closely as possible when they are arranged in a flat position on paper.

With the exception of some of the Fuci, or coarse rockweeds, I never place seaweeds in *fresh* water; but with the former a few hours' immersion in fresh water is an advantage, as it soaks some of the salt out of them, and renders them more pliable. As nearly every species of Fucus turns black in drying, and few of them adhere well to paper, I arrange my specimens in single layers between the folds of a clean dry towel, and keep them under moderate pressure for a few days; when they are dry, they may be put away loosely, or gummed upon sheets of paper.

Care should be observed in subjecting plants to pressure, which, in the first instance, should be sufficient only to help the absorption of water; the first set of blotting-papers should be changed in half an hour after the whole batch of specimens has been placed in the press; these should be thoroughly dried before they are used again. After the second or third change, the plants should remain under strong pressure for two or three days; but the pieces of calico must not be removed until the plants are taken out of the press.

The ordinary employment of a few boards with a heap of stones, or a set of iron weights, for pressure, is a very cumbrous and unsatisfactory method of pressing seaweeds. Of course, where a towel-press can be obtained, the purchase of six or eight boards, about fourteen inches square and one inch thick, will be sufficient; but by far the best plan is that of a proper seaweed-press, containing about a dozen smoothly-planed boards; it takes up very little space, and in travelling, the papers, calicoes, and blotters may be placed between the boards. The figure below represents the press which I have employed for years; and on it lies the iron clamp by means of which any requisite amount of pressure may be obtained by tightening the screws, which cap the iron rods con-



necting the cross-beams of wood enclosing the pressure-boards. Residents in and around London may examine this press on application at the office of this journal.

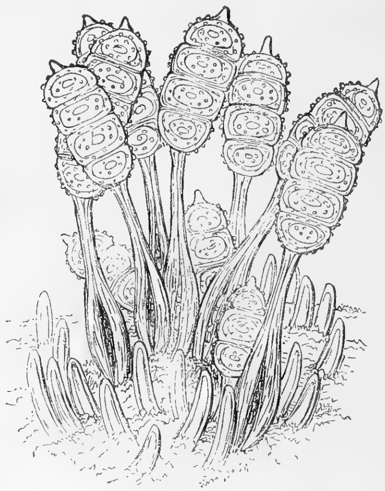
Space will not admit of any further description of the process of seaweed-mounting; but I hope that the few directions I have given will help beginners to dry any pretty plants they may meet with.

W. H. Grattann.

Enough for all!—A thousand million of men at least now live upon the earth, each one different from his fellows; for every man how many thousand animals, again most different; for every animal how many plants,—still no two quite alike. And yet for all this countless host, for every individual man and animal and plant, there is ample provision in the treasures of the earth and sea and sky; there is abundant flood of sunshine to illumine, warm, and energize the whole; a provision as varied as the wants of those supplied, adjusted carefully to each several need; a flood of sunshine everywhere alike, yet bearing in itself such diverse powers, such adaptive suppleness as perfectly to harmonize with all; sunshine which is gone almost as soon as come, which is scattered far and wide, to all appearance lost, yet in its momentary stay conferring what stupendous blessings!—*Warington's Phenomena of Radiation.*

SIMPLE OBJECTS.—V.

The Bramble-leaf Brand (*Aregma bulbosum*, Fr.).



During summer the under surface of the leaves of the Common Bramble will commonly be found spotted with a yellow rust. As autumn approaches, darker bodies will be found mixed with this yellow powder, until at last the yellow spores will scarcely be found, but large blackish spots will occupy their place, and reddish spots on the upper surface of the leaf will indicate the presence of the parasite beneath. These dark spots are clusters of spores of the Bramble brand, as figured above. The head consists of an elongated, brown, sausage-shaped fruit, apparently divided by three partitions into four equal-sized cells. (The number is not entirely constant.) These fruits are borne on long colourless stalks or peduncles, which are thickened and almost bulbous at the base.

If some of these spores are removed on the point of a sharp penknife and placed on a slide in a drop of alcohol, and before the spirit is quite evaporated, two or three drops of strong nitric acid are added, and the whole covered with thin glass; if the slide is then warmed over a spirit-lamp to *nearly* boiling-point, the fruit will be found to consist of an outer membrane, studded with tubercles, enclosing three or four cells. When the membrane is dissolved or ruptured, these cells escape. The apparent divisions of the fruit will be found to be due to the compression of the cells within the membrane. (See "Microscopic Fungi," p. 70.)

The spores may be mounted in glycerine or balsam, and form very interesting objects.*

M. C. C.

---

* A stamped envelope sent to the Editor, during the current month, will insure a specimen for examination.

PLANT-ANIMALS, OR ZOOPHYTES.

By W. Wallace Fyfe.

Insect millions peopling every wave,
And nameless tribes, half-plant, half-animal,
Rooted and slumbering through a dream of life.
The Pelican Island.

SCATTERED along the sea-shore, mingled with sea-weed, parasitic on shells, fragments of rock, or marine plants, the visitor will certainly observe a variety of curious, unobtrusive objects, which, at first sight, will seem to have but little to recommend them to his notice. It was to these that the poet Crabbe alluded when he wrote—

Involved in sea-wrack, here you find a race
Which science, doubting, knows not where to place;
On shell or stone is dropped the embryo seed,
And quickly vegetates a vital breed.

But science, no longer doubting, regards them as animals, having the appearance of plants, and calls them *zoophytes*, placing them low in the scale of animal existence. The majority of these consist of a horny sheath, exceedingly variable in size and form, which is termed the polypidom, or home of the polypes, because it encloses within it the hydra-like animal or polypus. These polypidoms are usually, when dried, of a horny texture, and of a dirty yellowish-white colour. Each frond-like polypidom contains numerous cavities in which the animals are fixed, so that one frond is a perfect colony. Of the animals themselves some idea may be formed by those who have seen the common fresh-water hydra, only that these marine hydræ have a larger number of arms or tentacles; often twenty or more.

There is, for instance, the *Tubularia indivisa*, or "Oaten Pipe Coralline" of the Frith of Forth, an animal product resembling a flourishing vegetable, dwelling at the depth of thirty or forty feet under the surface of the sea, with a living head resembling a fine scarlet blossom, and often drooping in a pendent cluster, like grapes; having, in fact, the ornamental aspect of a bouquet of vivid flowers, fresh from the hand of nature (fig. 1). These creatures, by the way, are generally found on shells, entire or decayed—empty or tenanted. A brilliant group was on one occasion seen on a shell carried along by the crawling inhabitant. The reproductive powers of these zoophytes are deeply interesting to the naturalist, who can now so readily domesticate them for observation in the aquarium. But long before this popular drawing-room illustration of living nature was known or thought of, I knew an enthusiast, the late Sir John Graham Dalyell, Bart., who, by means of glass vessels filled with sea-water, from the size of a watch-glass upwards, carried on for years the most curious practical observations of the mysteries enveloping this kind of animal life. Sir John retained artists to figure and delicately colour the appearances of his zoophytes; the results were given in two elaborate, profusely-illustrated quarto volumes, privately printed, however, and not likely to be in the hands of many; and the fastidious

Fig. 1. Oaten Pipe Coralline.

anxiety evinced for scientific accuracy renders these artistic representations almost as acceptable as the living specimens. The Branched Pipe Coralline (*Tubularia ramea*) especially excited his admiration. This he pronounced "a splendid animal production —one of the most singular, interesting, and beautiful amongst the boundless works of nature." Some-

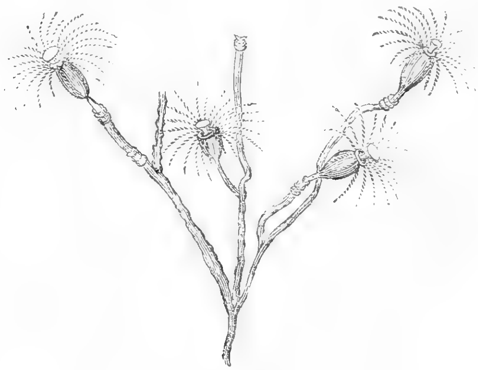


Fig. 2. Branched Pipe Coralline, magnified.

times, he adds, it resembles a splendid tree, blighted amidst the war of elements, or withered by the deep corrosions of time; sometimes it resembles a vigorous flowering shrub in miniature, rising with a dark brown stem and diverging into numerous boughs, branches, and twigs, terminating in so many *hydræ*, wherein red and yellow intermixed afford a fine contrast to the whole (fig. 2). The glowing colours of the one, and the venerable aspect of the other, their intricate parts—often laden with prolific fruit, and their numberless tenants—all highly picturesque, are equally calculated to attract our admiration to the creative power displayed throughout the universe, and to sanction the character of this product as one of uncommon interest and beauty. A very fine specimen was recovered from rocks in a cavity in the bottom of the Frith of Forth, at about 150 feet from the surface. It was not, however, a tree, or shrub, or anything else, save in miniature, being, though recovered entire, only 7½ inches in height.

Fig. 3. Sickle Coralline.

Most interesting of all are the Protean changes of the *Sertulariæ*. A luxuriant specimen will at one moment resemble the richest of our floral productions in the flush of summer, and anon appear shorn of its flowers and foliage as in the winter season. The whole seems now still and lifeless, hastening to decay; but, left alone, it may in a few moments be found covered with innumerable animated blossoms issuing forth from their concealment to the light, which, after seeking their enjoyment in the fulness of display, again vanish in an instant into their retreats. The truth is, that a multitude of cells, some little more than a simple orifice, some shaped like a tooth, a cup, a flask, or a bell, with smooth or serrated lip, as the case may be, are placed on the stems, boughs, and branches of these *Sertulariæ* to afford retreats for its *hydræ;* and the specimen possessed of a hundred or a thousand different *hydræ* is also possessed of a hundred or a thousand different receptacles to shelter them.

The Sickle Coralline (*Plumularia falcata*) is a very common but elegant species, six inches or more in length, with slender branches, and twisting about itself in a spiral manner: along the branches are cells which contain the polypes (figs. 3, 4). This elegant feathered coralline adheres to rocks and shells by little wrinkled tubes, and rises from

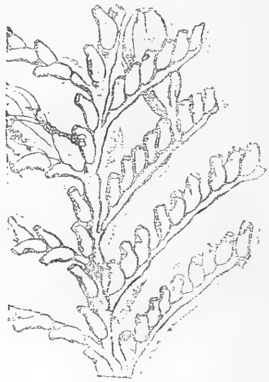


Fig. 4. Sickle Coralline, magnified.

them into erect stems, which are surrounded from bottom to top with pinnated branches; the smaller divisions of these have rows of little denticles or teeth, or cells, on the side, and bend inwards, as they become dry, in the form of a sickle.

The Sea Fir (*Sertularia abietina*) occurs on old empty shells. I see specimens of them at this moment flourishing on oyster-shells from Dorchester market-place. The sea fir is named *abietina* from its fancied resemblance to some species of fir (figs. 5, 6). It rises from nine to ten inches high, by a slightly waving stem, with branches on each side, so

Fig. 5. The Sea Fir.

that the extreme expanse is about three inches, the branches gradually shortened towards the apex. The sides of the whole stem and branches are clothed with cells, which swell in the middle, each enclosing its hydra. These animals are grey or white, protruding a long cylindrical neck and head, with about twenty-four tentacles.

The Lily Coralline (*Sertularia rosacea*) is a parasite on other zoophytes. A pure white, or faint-grey creature of the element, it spreads rapid destruction around the place of its vegetation. It is only from one to two inches in height, and is exceedingly slender and delicate (figs. 7, 8). The vesicles

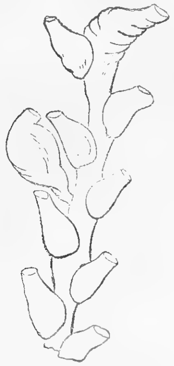


Fig. 6. Sea Fir, magnified.

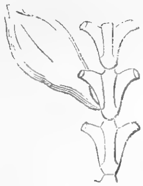


Fig. 8. Lily Coralline, magnified.

have been compared to a lily or pomegranate flower just opened; but they seem to vary with age. It sometimes grows on sea-weed and old shells, but is far less graceful than when growing on kindred zoophytes.

Fig. 7. Lily Coralline.

THE SEA-OAK CORALLINE (*Sertularia pumila*) is of a greenish colour, and occurs in considerable abundance as a parasite on some kinds of sea-wrack (figs. 9, 10), the common *Fucus serratus* being invested by such quantities of it as almost to weigh down the fronds near ebb tide. The shoots are seldom more than half an inch in height, thread-like, and sparingly branched. The animals have fourteen or sixteen tentacles, and when these are displayed, the hydra usually extrudes its body far beyond the rim of the cell.

There is also the Snail Trefoil Coralline (*Sertularia rugosa*), which is found as a parasite on the fronds of the "sea-mat," as well as sea-weeds. Also the Sea-hair Coralline (*Sertularia operculata*), which is common on all parts of the coast, growing attached to sea-weeds (figs. 11, 12). It reaches from three to six inches in height, and, after a storm, lumps as large as a child's fist are washed ashore.

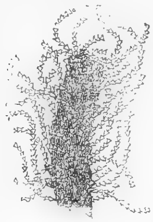


Fig. 9. Sea-oak Coralline.

Fig. 10. Sea-oak, magnified.

The slender branches grow in tufts, like bunches of hair.

"It was from the great resemblance," says Dr. Johnston, "of the vesicles to the capsules of mosses that the early botanists drew an additional argument in behalf of the vegetability of the corallines themselves." And a Darwinian might be, perhaps, forgiven, were he even now to feign how the Nereids

Fig. 11. Sea-hair Coralline.

Fig. 12. Sea-hair, magnified.

stole them from the mossy habitats of Flora's winter and vernal shows, to deck and gem the arbuscular garnitures of their coral caves.

> Nymphs! you adorn, in glossy volutes rolled,
> The gaudy couch with azure, green, and gold.
> You chase the warrior shark and cumbrous whale,
> And guard the mermaid in her briny vale;
> Feed the live petals of her insect-flowers,
> Her shell-wrack gardens, and her sea-fan bowers;
> With ores and gems adorn her coral cell,
> And drop a pearl in every gaping shell.

THE SEA-MAT (*Flustra foliacea*) is by the Scottish fishermen in their meagre vocabulary denominated "sea-caff,"—probably implying "chaff," something waste and worthless (figs. 13, 14); but they have in general no better designations for the numerous tribe of zoophytes than "sea-weeds," "flowers," or simply "growth." It is in the *Flustra hispida*, though amongst the most common and apparently worthless objects on the rocks, that the eye of the naturalist has detected beauties and marvels. Nay, on the common *Fucus serratus*, or "sea-ware," dark brown, consistent-like, gelatinous patches are frequently found on one or both sides of the leaf, occasionally also encircling the stem. Sometimes these occur in such profusion that the leaf is weighed down by them, or if reft from its site, feels heavy in the

Fig. 13. Sea-mat.

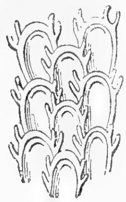


Fig. 14. Portion of Sea-mat, magnified.

hand. What, then, are these excrescences? The numerous inequalities of the surface, both to the naked eye and viewed by a magnifier, offer some resemblance to artificial manufacture, and in some measure justify the name of "rough sea-mat." Another zoophyte of the Mediterranean Sea passes by the same name, but does not correspond in form. But to recur to the wonders of the *Flustra hispida*. Plunged amidst recent sea-water during genial temperature, a pale thin cloud will speedily be interposed betwixt its dark irregular surface and the spectator's eye; but on the vessel receiving it sustaining a shock, this cloud is instantaneously dispelled, whilst the brownish fleshy substance of the *Flustra* remains prominent as before. This illusion may be frequently repeated, for the cloudy semblance is produced by *hydræ*, drawn from the cells into which they had retreated, to revel in the freshness of the renovated element—and the misty shade is caused by the motion of their pale tentacles over the dark ground of the *Flustra*. So timid and endowed with caution are these minute and active beings, that they sink into concealment on the apprehension of danger, and show by their re-appearance their relief from alarm.

But I must proceed no further with this very incomplete notice of a large and interesting group of the wonders of "the deep, deep sea." As cast upon the shore the polypidoms are usually only the uninhabited houses, the inmates dead, and their remains dispersed; but even the untenanted habitations are well worthy a little minute examination, and the living zoophytes will afford a world of delight to the microscopist, and while away many a weary hour of a lounge at the sea-shore.

THE DIET OF WORMS.

MANY persons are not aware of the fact, that the earthworm really does live upon earth. It is sometimes stated in popular works on zoology that the worm picks out portions of leaves, grass, &c., and devours them; but this is quite a mistake —the earthworm lives upon earth. It must not be supposed that it assimilates the mineral constituents of the soil; its gastric and biliary secretions dissolve the decomposing animal and vegetable matters which are invariably contained in rich soil, and it is these which are assimilated. The earthworm could not live upon earth that had been burnt and deprived of its organic constituents. In a similar way the arenicola, or lug-worm, which lives in the sands exposed by the action of the tide, gorges itself with that substance, and extracts the matters which it contains fit for nutriment. More frequently, however, the "lug" lives in the rich clays of creeks and saltings which abound in animal and vegetable matters. It is worthy of observation that a very large quantity of earth or sand, as the case may be, has to be gorged before any appreciable amount of nutriment is extracted; at the same time the swallowing of earth is an assistance to the worm as it burrows in the ground, inasmuch as large quantities of material are thereby removed from its path and ejected behind. The appearance of those curious little masses of digested earth on the surface is thus caused, by means of which the earthworm effects such wonderful changes on the surface of the ground, turning up the earth, burying the stones, and producing a fresh and fertile soil where formerly was a barren waste. The mode in which the earthworm swallows the earth is somewhat curious: its pharynx is extremely muscular, and provided with an internal muscular tunic, which acts within like the piston of an air-pump; anything to which the mouth is applied is thus sucked in and passed on by the action of the muscular walls of the pharynx and œsophagus. There is no doubt that worms do an immense deal of good by their feeding on the earth; and as to their biting the roots of plants and shrubs, as is sometimes said of them—why, it is all nonsense. They could not do it, if they wished, as they have no teeth; they are quite satisfied with the earth, and if it is freshly manured, they like it all the better. It is this last fact which brings them round the roots of trees, and has made some people suppose that they come to bite *them*; whereas they really come after the accompanying manure.

E. Ray Lankester.

ANECDOTES OF BIRDS.

A CORRESPONDENT from Coniston gives a curious account of the effects produced on the birds by the very severe cold, and long continuance of snow on the hard frozen surface of the ground in January and February, 1865. Four species of Titmouse (*Parus*) were familiar visitors, and greedy after any sort of kitchen refuse. That well-known and now deeply regretted benevolent observer and naturalist, Sir John Richardson, erected, at Lancrigg, a strong pole with a crossbar, to one end of which he tied a basket filled with crumbs of bread and such like dainties, for the refection of hungry Linnets, Robins, Chaffinches, and a miscellaneous company of visitors to the welcome feast; at the other end of the crossbar was a net-bag, containing lumps of fat, which proved particularly attractive to the Titmouse family (*Parus*). The beautiful blue Tit, whose lively manners have been so well described by White, and which, whatever may be said of him, is really a great friend to gardeners, by destroying quantities of insects, is rather numerous in Westmoreland, and must be dear to all lovers of roses for its active assistance in waging war against the *Bracken Clocks*, a sort of minute beetle (*Chrysomela*) with shining metallic wing-cases, which seem to descend in clouds from the neighbouring heath-and-fern-covered mountains as soon as the roses begin to open; and bright and beautiful to the eye as is this glittering shower of sparks of emeralds, rubies, and diamonds that "dazzle as they pass" through the sunshine, we soon lose all admiration for the false and fair visitants, who ruthlessly bury themselves among the petals of the roses, and mutilate and devour the choicest blooms in the most aggravating way. So, if the Tomtits help us a little to keep down these pests in the summer, they well deserve their regale of fat to help them through the season when no insect larvæ can be found.

But during that very severe weather, not only tribes of small birds, but even the very Rooks came to be fed, and enjoyed picking bones, especially a bone from a sirloin of beef (which had been previously boiled for soup for the poor)—the smaller bones the Rooks flew away with to enjoy in their own selfish corners, like "little Jack Horner," without allowing a taste to a hungry brother—peevish, quarrelsome among themselves, yet how is it that such regular discipline can be maintained as to keep a sentinel ever strictly on the watch to give signals of any approaching danger? Is the sentinel some grave old patriarch of the flock, who shows his chieftainship by watching over the safety of his tribe; or is he some unlucky junior, who dares but obey his elders, and remain patiently at his post of observation, even if it excludes him from his share in the feast?

Another strange pensioner was a Water-hen (*Gallinula*), starved out from her accustomed reedy haunts on the edges of Coniston Lake; she came in haste to partake of any fragments of food within reach, and then as hastily departed to her hiding-place. Being heavy on the wing, but a swift runner-away, she scudded over the snow, with her large yellow feet acting like the Laplander's snowshoes.

I once had the opportunity of watching a pair of these birds in the fenny districts of Buckinghamshire, in an old orchard filled with grotesque old trees, thickly coated with grey lichens, and yet very productive of good apples and enormously large stewing pears; there was in one corner a dark pond, the remains of part of an ancient moat, fringed and almost hidden by sedges and brambles. By the edge of this, and fastened to an overhanging branch, the Gallinules built their cradle-nest of sticks. The female sat very closely under cover of the shrubs, but by stealing gently round behind the bushes, I every day threw near her the crumbs and scraps from the children's dinner, which were always eaten, and by-and-by I had the pleasure of seeing a flock of six or eight such beautiful silky little black balls darting and squirting about in the most lively and restless manner, caring little for the shelter of the mother's wing. But in a day or two the whole family had disappeared. The Ouse was out, a very common occurrence with that sluggish, lazy river, and probably the pretty Gallinules had adjourned to the wide swampy fishing-grounds to seek their living in company with the lordly crested grey Heron, who would stand there for hours, with meekly bowed head on his breast, one foot tucked under his feathers—one might imagine to warm it, if he only changed his feet now and then—but no, on one long bare leg he stood, and it seemed to be always on the same leg, in the shallow water, balancing himself in perfect stillness till he pounced on his prey and secured his fish, with that same sharp hard bill wherewith his ancestors have stilettoed so many a noble Falcon, in the olden days of that sport.

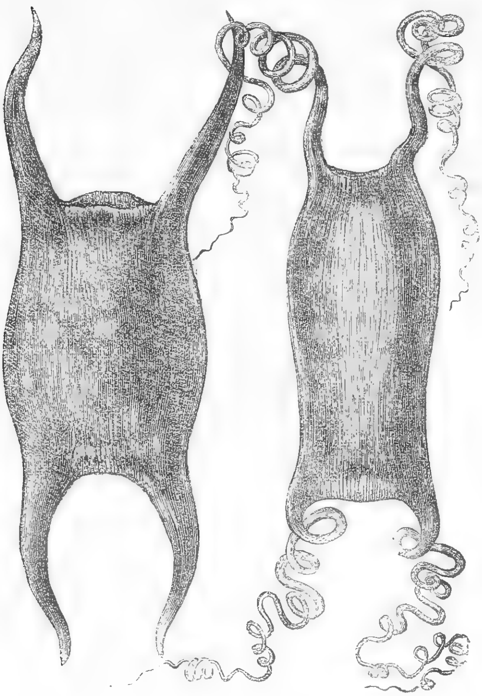
P. S. B.

The flea, grasshopper, and locust jump 200 times their own length, equal to a quarter of a mile for a man.

PIXY PURSES.

ALMOST the commonest objects of the sea-shore, all around our coast, are the curious inflated "Pixy purses," or "Fairy purses," or "Mermaid's purses," which often draw from young folks the inquiry, "What is it?" To save the trouble of a long explanation from such as may not feel disposed to enter upon the subject with their young friends, we have given figures of the two common forms.

The figure with the long twisted tendrils at each corner represents a pale horn-coloured bag or



"purse," generally found empty and inflated, or partly filled with sand. It is almost transparent, rigid, and shining when dry, and often with the tendrils entwined around pieces of sea-weed. This is the egg-case of the spotted dog-fish, or nurse-hound (*Squalus canicula*), one of the Shark family common on the coast. It is a very voracious fish, and preys upon almost any kind of animal substance. In length it is between three and four feet, and comparatively thin. The fishermen are not at all partial to it, for besides devouring a large quantity of small fish, it is very apt to tear large holes in their nets.

The other figure represents a still commoner object, in which the tendrils are absent, but each corner is prolonged into a kind of spur; these are broader than the other kind of purses, and of a darker colour. They are most common during winter and spring, but one may often be turned up with the sand at other periods of the year. They are also the egg-cases of a fish, but of a very different kind to the other, and belong to one of the Ray family, which are as broad in proportion to their length as the dog-fish are narrow. The species in this instance is the common skate (*Batis vulgaris*), which has a lozenge-shaped body ending in a slender tail. It is one of the commonest fishes of the coast, and, under the name of "maids," small specimens may often be seen in our fish-markets, but it is not much valued as food. It is recorded that a single fish of this species, weighing two hundred pounds, was once dressed by the cook of St. John's College, Cambridge, and satisfied the appetites of one hundred and twenty learned gentlemen. Fishermen usually cut them up as bait for crabs and lobsters.

PROLIFEROUS DAISY.

THE "Hen and Chickens" Daisy of our gardens is very well known, but the proliferous form of the common daisy is rare. A correspondent (J. S.) has sent us a specimen collected by him by

the roadside at Bute, in which ten miniature daisies, borne on short peduncles, sprang from the involucre, and surrounded the parent daisy. The stalk was fully six inches in length, whilst two other flowers of the normal form, and with stalks scarcely half the length, proceeded from the same root.

Beauty in Nature.—The greater part of beautiful forms in nature are to be found in the vegetable kingdom, in the forms of flowers, of foliage, of shrubs, and in those assumed by the young shoots of trees.—*Alison on Taste.*

ZOOLOGY.

Is the Great Black Woodpecker British?—In reference to the supposed occurrence of this species in Britain, Mr. Stevenson (*Zoologist*, 9249) has shown that the two birds killed at Scole were undoubtedly the large spotted woodpecker. In Latham's "General History of Birds," amongst other works, it is stated, "one was killed in Lancashire by Lord Stanley;" but Mr. Newman (*Zoologist*, 9627) says, "In the edition of Latham annotated by the late Earl of Derby, and now in the possession of the present earl, this passage is erased, and in the margin is written, in his lordship's own hand, '*a mistaken idea.*'" Several other occurrences have been recorded, and it would be well that all these should, if possible, be investigated.

White Sparrows in Smoke.—I recollect last summer seeing two white sparrows flying through the smoke from the tall chimney of a cloth-mill at Road—a short distance from the scene of the noted Road murder.—*W. E. Williams, Jun., M.D.*

Whiskered Tern.—Mr. Gatcombe has recorded the occurrence of this rare bird near Plymouth a short time since. It was picked up alive on the water by some fishermen and brought ashore, but soon died. It is now in the collection of Mr. F. C. Hingston, of Plymouth.

Myriad Zoophytes.—In one species found on the Irish coast, and with cells upon one side only, Dr. Grant calculates there are more than eighteen cells in a square line, or 1,800 in a square inch of surface, and the branches of an ordinary specimen present about ten square inches of surface; so that a common specimen of *Flustra carbasea* presents more than 18,000 polypi, 396,000 tentacula, and 39,600,000 cilia.

Novel Nest-building.—At Shilford, a farm on the banks of the river Tyne, near the Stocksfield station on the Newcastle and Carlisle Railway, a pair of bluecaps built their nest in a somewhat curious place. A farm labourer who is accustomed to wash sheep in the Tyne, owns a pair of old boots, which he uses for the purpose of protecting his feet during the process of sheep-washing. These boots are each year tied together and suspended on the lower branches of an ash which grows near the edge of the river. This season, on taking down his boots, he was surprised to find several eggs roll out, and that a pair of bluecaps had built their nest in one of his boots. He restored the eggs to their nest, hung up the boots without using them, and in the course of a few days a colony of young bluecaps issued from the pedal envelopes which had been this season at least put to a novel purpose.—*T. P. Barkas.*

The Notes of the Cuckoo.—In White's "Selborne" the following memorandum from the 7th vol. of the "Transactions of the Linnæan Society" is quoted:—"The cuckoo begins early in the season with the interval of a minor third; the bird then proceeds to a major third; next to a fourth, then a fifth; after which his voice breaks without attaining a minor sixth." It is added, that the circumstance had been observed long before, certainly as far back as the publication of Heywood's Epigrams, 1587. But surely this is unsatisfactory. No mention is made of the interval of a tone, which one has heard times out of number; three times certainly I heard it to-day, June 15th. Besides which, at least in this neighbourhood (*i.e.* near Farnborough station), minor thirds, major thirds, and fourths, have been all of them heard plentifully during the whole time that cuckoos have been singing. A fifth I have never been fortunate enough to hear. Strangely enough, the idea occurred to me some years ago, that possibly the interval might widen with the advance of the season; and for some ten days or so (I did not observe with any accuracy, not having any real expectation of finding it thus) I did hear minor thirds, then major thirds, then fourths, successively. But as I began to suspect there might be something in the idea, a whole sermon of tone-intervals, minor thirds, major thirds, and fourths, was all at once preached at me upon the text of "hasty induction." I was therefore greatly surprised afterwards in reading the quotation from the "Transactions of the Linnæan Society." As we are said to have one species only of the cuckoo, is it possible that each bird follows the order referred to? If so, some begin late, or are very long over their first lessons.—*S. C.*

The Arctic Clio.—This little mollusk (*Clio borealis*) is about an inch in length, and so abundant in the Arctic seas, as at times to colour the surface for leagues, and to form an important supply of food to the great whale. The head is furnished with six retractile appendages, which are of a reddish tint, from the number of distinct red spots distributed over their surface, and amounting on each to about 3,000. When examined under a high magnifying power, each of these specks is found to consist of about twenty suckers, each mounted on a footstalk, so as to be projected beyond the edge of their sheath, and applied to their prey. Thus there will be 360,000 of these microscopic suckers upon the head of one *Clio*; an apparatus for prehension perhaps unparalleled in the creation.—*Paterson.*

The Roller.—A beautiful male, in perfect plumage, was taken alive on board a vessel off Yarmouth about the 25th May, as recorded by Mr. Stevenson in the *Zoologist* (p. 9664).

Food of the Dipper (*Cinclus aquaticus*).—I am afraid that we cannot entirely acquit this bird of occasionally destroying the fry of fish; but I know of no reliable evidence to prove that it takes the ova. In three specimens, the gizzards of all contained Entomostraca, and one of them a Gordian (*Gordius aquaticus*). In others that I have dissected, I have discovered chiefly Entomostraca and the larvæ of *Phryganea;* indeed I have found that its food is very similar to that of the young salmon. —*E. Crisp, M.D.*

Mischievous Rats.—The other day the verger of my church, going in to prepare for service, was met by a great smell of gas. It spread all over the building. Following an experienced nose, cunning to detect shades of stench, he was led into an inner vestry-room, and brought to a stand at a skirting-board under a table. He got a carpenter, and pulling this down, found a long hole in a gaspipe, made as if with a rough blacksmith's rasp. The marks of the tool were quite fresh in the metal; but how came the hole to be made? The pipe was protected by wood, which was undisturbed. There was no friction against any iron-work to account for the leak. On closer examination, it was proved that the pipe had been gnawed by rats, the scorings of whose teeth showed like the cuts of a rasp. The curious thing was, that the rats must have gone on gnawing for some time after the gas had begun to escape under their noses and into their mouths. The rush of gas from the hole was considerable; but the rats had long gaped over it, and must have swallowed a large quantity, before they gave up their mischievous freak. That is some satisfaction, truly; but such nasty persistence as theirs may go far to show the cause of many apparently unaccountable fires. Had the verger not detected the smell, or had he gone into the inner vestry-room with a lighted candle, it is probable that the public would have heard of the result as a "terrific explosion" in the neighbourhood or the papers, and not through a simple little note in a corner of your Science Gossip.—*Harry Jones.*

Common Crane in Shetland.—During the latter part of the month of June three individuals of the Common Crane (*Grus cinerea*) had been observed in the island of Unst, Shetland; one of these was shot at Haroldswick on the 24th of June. It is now in the possession of Thomas Edmonston, Esq., of Buness, who is about to present it to the public museum at Lerwick. The height of the bird was 4 ft. 7 in.; the spread of wings, 7 ft.; the length from the point of the tail to the bill was 3 ft. 10 in. There are records of the appearances of this bird in the Shetland Isles in the years 1807, 1831, and 1832; but it has not been seen so far north as in the present case.—*Ralph Tate, F.G.S., &c.*

The Great Butcher-bird.—I remember finding, when at school in North Yorkshire, three nests, one of what we called the little, and two of the *big* butcher-bird. As the country around affords unusual facilities for bird-nesting, and the boys, I am sorry to say, were not slow to take advantage of them, it may be presumed that when captures were pronounced rare, as mine were, the verdict was a sound one. Indeed, to judge by the rush there was to see my eggs, I might have achieved something very wonderful. I was therefore a little startled to find "H. S. S." (p. 64) seriously doubting whether the great shrike has ever been known to breed in England. Bewick describes the eggs, but makes no mention of the place of breeding. The Rev. J. G. Wood, in "My Feathered Friends," says, "The great grey shrike is said not to breed in this country, but I have certainly seen eggs which their owner told me were taken from nests found in England." I have in my collection an egg which I believe is one of those I found when at school; and a young friend there now says that nests have been found since he went, though not the last half-year.—*Edwin Green.*

The Roller and Hoopoe.—On the 14th of June a beautiful roller was shot by a gamekeeper at Little Chesterford Park, near S. Walden. The bird was carried to Walden to be stuffed by Mr. Joseph Travis. A pair of hoopoes were also sent to him which had been shot a week or two previous; the male was shot at Mildenhall, Suffolk, and the female at Peverell's Wood, Saffron Walden. The bill and feathers on the neck of the hoopoe were all gummy with the yolk of eggs it had just eaten.—*W. R.*

Rabbits and their Friends.—Mr. C. Gould, in a communication, published in the "Proceedings of the Zoological Society," writes:—"In the course of my walk yesterday, I came close to a sand-pit rather suddenly; a number of rabbits were playing about, who scampered off as soon as they became aware of the dread proximity of man, leaving behind them six or seven nondescript companions about their own size, sedately playful, awkward, and grotesque. At the distance at which I first saw them I was quite at a loss to imagine what they were. Finding they were curious rather than shy, I approached nearer, and found them to be young fox-cubs; they allowed me to venture within about fifteen yards of them, and then retired, without any indecorous haste, one by one into their holes."

Great-Auk Eggs.—The four egg-shells of this extinct bird, recently sold by public auction, realized £122. 10s. in separate lots; viz., £33, £31. 10s., and two at £29 each.

ENTOMOLOGY.

Suffocation of Bees.—The following case of an entire swarm being destroyed by suffocation happened a few weeks since in the aviary of a clerical friend. Having a Nutt's hive, the centre box of which was tenanted by a weak stock of bees, he was desirous of adding to its population, and accordingly very injudiciously hived a swarm in one of the side boxes, with the intention at some future time of effecting a junction between the two families. He saw the bees apparently quietly settled in, and left them, as he thought, all right. He had occasion to go away until the evening, and on his return, to his great grief and mortification, he discovered that the whole of the bees were lying at the bottom of the hive in a state of suffocation. Every means likely to restore them to animation were resorted to, but in vain: they were all dead or dying. Being certain in his own mind that he had given them means of egress and ingress, for a long time he could not account for their dying of suffocation. On examining the hive, he found that the entire aperture of the entrance was effectually filled up by *Mason Bees*, so that all exit was effectually prevented, and no admission of air could take place. The consequence was the loss of a valuable swarm of bees; but my friend was far more affected by the seemingly cruel manner by which they met their death.—*Apiator, in Gardener's Chronicle.*

Earwigs.—The present hot dry spring has produced earwigs in immense profusion, or, to speak more properly, has offered no check to the hatching of the eggs and growth of the young. At the present time (June 21) all the specimens visible (and they swarm even in the museum here) are in the pupa state, with rudiments of wing-covers. Small bits of elder-twigs, with the pith scooped out, laid about the flower-beds, or hung against the walls, are excellent traps. The females deposit a comparatively small number of eggs, in holes in the earth, and brood over their young when hatched like a hen over her chickens.—*J. O. W., Oxford.*

New Gall Insect.—Mr. W. Couper has recently described a parasite on the common creeping rye-grass. It belongs to the Hymenoptera or Bee order of insects. As soon as the larva issues from the egg, it places its head downwards in the gall, remaining in that position till it eats its way through. About the end of September it ceases to feed, and prepares to meet a Canadian winter. By this time the gall is hardened, and the larvæ remain in a torpid state, becoming active again in the spring, and changing to perfect insects in time to attack the young grass of the season. Baron Sacken regards it as belonging to the genus *Eurytoma.*

Deformed Swallow-tail.—A few days ago a "swallow-tail" (*Papilio Machaon*) in my possession emerged from its pupa-case, and I was annoyed to see it defective, as I have been waiting for its development some little time. It had only two wings, and these were both on one side, and were perfect. A piece of shrivelled membrane, on which but few scales were visible, replaced those on the opposite side. But making the best of a bad bargain, I cut it up for the microscope instead of preserving it. I also mounted the spiracles on either side of the pupa-case, and on their examination I saw what I believe to be the cause of the disaster. The spiracles on one side were perfect, but those on the other were malformed and undeveloped. Instead of being oval, they were roundish, and no perforation was visible; moreover they were placed at nearly a right angle to the others. Of course neither air nor moisture could be absorbed; and hence I suppose the absence of wings on that side. Wood, in his "Common Objects of the Country," mentions a similar case, but gives as a probable cause "insufficient moisture" (*vide* page 115). I may mention that in the box where I kept the chrysalis I had a watch-glass containing water to supply the requisite moisture.—*John Davis.*

American Blight.—This common insect (*Aphis lanigera*), which infests apple-trees, produces in the course of a season eleven broods of young. The first ten broods are viviparous, or are brought forth alive, and consist entirely of females. These never attain their full development as perfect insects; but, being only in the larva state, bring forth young, and the virgin aphides thus produced are endowed with similar fecundity. But at the tenth brood this power ceases. The eleventh does not consist of active female larvæ alone, but of males and females. These acquire wings, rise into the air, sometimes migrate in countless myriads, and produce eggs, which, glued to twigs and leaf-stalks, retain their vitality through the winter. When the advance of spring again clothes the plants with verdure, the eggs are hatched, and the larva, without having to wait for the acquisition of its mature and winged form, as in other insects, forthwith begins to produce a brood as hungry and insatiable, and as fertile as itself. Supposing that one aphis produced 100 at each brood, she would at the tenth brood be the progenitor of one quintillion of descendants (1,000,000,000,000,000,000).—*Paterson.*

The Ants of Great Britain.—*The Entomologist's Monthly Magazine* for July contains a paper by Mr. F. Smith on the British *Formicidæ*, in which all the British species of ants (thirty-two) are enumerated, with the situation of their nests, period of swarming, and localities where found.

BOTANY.

POSSIBLE INCREASE OF AN ORCHID.—An acre of land would hold 174,240 plants of the spotted orchis (*Orchis maculata*), each having a space of six inches square, which is rather closer than they could flourish together; so that, allowing twelve thousand bad seeds, an acre would be thickly clothed *by the progeny of a single plant.* At the same rate of increase, the grandchildren would cover a space slightly exceeding the island of Anglesea; and the great-grandchildren of a single plant would nearly clothe with one uniform green carpet the entire surface of the land throughout the globe.—*Darwin's "Fertilization of Orchids."*

ANCIENT TREES.—The celebrated chestnut (*Castanea vesca*) on Ætna must be a thousand years old at least. The Baobab trees (*Adansonia digitata*) of the Green Cape demand of us, according to their thickness and the number of zones in some of their branches, an age of 4,000 years or thereabouts. The gigantic cypress (*Cupressus disticha*) at Santa Maria del Tule, six miles east of Oaxaca, in Mexico, has a cicumference of 124 Spanish feet, about 40′ in diameter. Now, suppose that every annual zone measured 1‴, the tree must be nearly 3,000 years old. It is historically certain that it is older than the conquest of Mexico by the Spaniards. The age of the great dragon-tree (*Dracœna draco*) at Orotava, in Teneriffe, is supposed to be 5,000 years. These examples are quite sufficient to prove the possibility of a compound plant living on without end.—*Schleiden's "Principles of Scientific Botany."*

TWINING PLANTS.—A greater number of twiners revolve in a course opposed to that of the sun, or to the hands of a watch, than in the reverse course, and, consequently, the majority, as is well known, ascend their supports from left to right. Occasionally, though rarely, plants of the same order twine in opposite directions, of which Mohl gives a case in the Leguminosæ, and we have seen another in Acanthaceæ. At present no instance is known of two species of the same genus twining in opposite directions; and this is a singular fact, because different individuals of the Bitter-sweet (*Solanum Dulcamara*) revolve and twine in both directions: this plant, however, is a most feeble twiner.—*Darwin on Climbing Plants.*

BRITISH LICHENS.—The Rev. W. A. Leighton has commenced a series of papers, to appear from time to time in the *Annals of Natural History*, containing notes and illustrations of new or recently discovered British lichens, or such as have not been figured and described in Sowerby's "English Botany." The first paper was published in No. 91, for July, 1865.

BRITTLE INDIA-RUBBER.—Mr. Spiller has recently shown (Chemical Society, February 16, 1865), in a paper on the oxidation of India-rubber, that this substance, when exposed to the air in a fine state of division, gradually becomes converted into brittle resinous matter, very similar to shell-lac.

TO DRY FLOWERS WITH THEIR NATURAL COLOURS —"A vessel with a moveable cover is provided, and having removed the cover from it, a piece of metallic gauze of moderate fineness is fixed over it, and the cover replaced. A quantity of sand is then taken sufficient to fill the vessel, and passed through a sieve into an iron pot, where it is heated, with the addition of a small quantity of stearine, carefully stirred, so as to thoroughly mix the ingredients. The quantity of stearine to be added is at the rate of half a pound to one hundred pounds of sand. Care must be taken not to add too much, as it would sink to the bottom and injure the flowers. The vessel with its cover on, and the gauze beneath it, is then turned upside down, and the bottom being removed, the flowers to be operated upon are carefully placed on the gauze, and the sand gently poured in, so as to cover the flowers entirely, the leaves being thus prevented from touching each other. The vessel is then put in a hot place, such, for instance, as the top of a baker's oven, where it is left for forty-eight hours. The flowers thus become dried, and they retain their natural colours. The vessel still remaining bottom upwards, the lid is taken off, and the sand runs away through the gauze, leaving the flowers uninjured."—*Journal of Society of Arts.*

THE PERIWINKLE.—But for all wonder-working herbs commend us to that seeming simple inhabitant of our gardens, the periwinkle. The list of virtues belonging to this wort are completely overwhelming; and if one's whole lifetime were devoted to the plucking and distributing of this herb amongst one's fellow-creatures, it would scarcely be wasted—only supposing the Saxon herald of the magician periwinkle to have spoken sooth. "This wort, which is named priapiscus, and by another name vinca pervinca, is of good advantage for many purposes; that is to say, first, against devil-sickness, and against snakes, and against wild beasts, and for *various wishes*, and for envy, and *for terror*, and *that thou may have grace:* and if thou hast this wort with thee, thou shalt be prosperous, and ever acceptable."—*Once a Week.*

POLLEN OF CROWFOOT.—Mr. G. Gulliver has called attention to the difference in the pollen grains of all the British species of yellow-flowered Ranunculæ with divided leaves. The variations in size lie between $\frac{1}{888}$th and $\frac{1}{470}$th of an inch in diameter in the six species examined. Those of the Corn Crowfoot are rough, whilst those of the others are smooth.

GEOLOGY.

In how little lies the Past.—History tells us of populous nations, now extinct, that flourished for ages: do we not find their remains crowded into a few streets of sepulchres? 'Tis but a thin layer of soil that covers the ancient plain of Marathon. I have stood on Bannockburn, and seen no trace of the battle. In what lower stratum shall we set ourselves to discover the skeletons of the wolves and bears that once infested our forests? Where shall we find accumulations of the remains of the wild bisons and gigantic elks, their contemporaries? They must have existed for but comparatively a short period, or they would surely have left more marked traces behind them.—*Miller's "Old Red Sandstone."*

Relations between the Present and Past.—In the collection brought to Europe from the caves of Brazil by MM. Lund and Clausen there are extinct species of all the thirty-two genera, excepting four, of the terrestrial quadrupeds now inhabiting the provinces in which the caves occur; and the extinct species are much more numerous than those now living. There are fossil ant-eaters, armadillos, tapirs, peccaries, guanacoes, opossums, and numerous South American gnawers and monkeys, and other animals. This wonderful relationship in the same continent between the dead and the living will, I do not doubt, hereafter throw more light on the appearance of organic beings on our earth, and their disappearance from it, than any other class of facts.—*Darwin's "Journal of Researches."*

Sponges and Corals.—While the green sand, the upper chalk, and the Kentish rag were forming, corals and sponges grew in every sea. One beautiful variety, shaped like a toadstool, is found in the upper chalk of Sussex. The Kentish rag is so full of them that the hands of the quarrymen are often fretted with their fossil flint splinters. At Warminster, cup-shaped sponges swarmed in myriads, and a peculiarly fine pear-shaped sponge is found in the green sand of Blackdown. The Brighton pebbles and the Wiltshire flints are principally petrified sponges. At the first glance it seems as though it must have required ages on ages for the climate to have so changed from the times when the sponges of tropic seas grew in our blue lagoons, fringed with coral reefs; yet so brief is the space in the history of the crust of our earth, that in the fields about Steeple Ashton every stone turned up by the plough is a coral, and the structure of coral banks may be studied in the lofty cliffs of Cheddar as well as in the upheaved islands of southern seas. —*Milton's "Stream of Life."*

Foraminifera.—Plancus collected 6,000 shells of Foraminifera from an ounce of sand from the shore of the Adriatic. Soldani collected from less than an ounce and a half of rock from the hills of Casciana, in Tuscany, 10,454 fossil shells. Several of these were so minute that 500 weighed only a grain. And D'Orbigny found 3,840,000 specimens in an ounce of sand from the shores of the Antilles.

Abnormal Fossil Ferns.—I have a partiality for "bad specimens," just as I have for abnormal plants, and I believe they are much more likely than good ones to reveal something not previously noticed —to bring to light some little peculiarity which in better specimens might not be observed. It would bring to light another link between the past and the present, if we could prove that the ferns of the carboniferous period shared this propensity to become crested with the plants which still exist. I confidently believe, that with care in searching for examples this will be found to be the case.—*Mackie's "Geological Repertory."*

Mountain Limestone of Shropshire.—At the May meeting of the Severn Valley Field Club, a paper was read by G. Maw, F.R.S., on "the relation of the mountain limestone of Shropshire to its development in other parts of the kingdom." The points noticed were, 1, the total absence of the limestone from large areas in the Midland counties; 2, its exceptional thinness in the Wrekin district and South Shropshire as compared with other districts; 3, the prevalence of mountain limestone fossils in the lower coal-measures of Shropshire, and the synchronism of these deposits with the mountain limestone of other districts; and 4, whether the carboniferous rocks rest directly on the north-west line of basalt, or whether they are separated by beds of the Devonian age. After reviewing the existing evidence on these points, Mr. Maw said they must be still considered as questions in suspense, lithological character being not always reliable as indicative of age, and only of importance when existing in connection with the surer testimony of organic remains.

Rhinoceros at Ilford.—A very fine skull of the *Rhinoceros leptorhinus*, Cuv., has recently been found in the Uphall brickfield, Ilford, and in close proximity to the spot where the skull and tusks of the Mammoth were discovered.

The memories of some men are like the buckets of the daughters of Danae, and retain nothing; others have recollections like the bolters of a mill, retaining the chaff, and letting the flour escape.

Many minds keep tavern; they entertain every thought that chances to come along; like the promise of the old road-side signs, they make welcome man and beast.

WINDOW GARDENS AND AQUARIA.

Fresh-water Aquaria.—I shall feel much obliged if you or any of your readers can give me a few hints about fresh-water aquaria. My first difficulty is with *minnows,* which are always stirring up the gravel in search of food, and the water is filled with a cloud of white particles, which, under the microscope, appear like masses of fibre swarming with Infusoria. I washed the gravel and weeds most carefully before putting them in, and have tried changing the water without success. The white cloud completely spoils the aquarium, and I fear may injure the fishes, though at present they seem in perfect health. I feed them on vermicelli, which they eat greedily. I should be glad to know if *animal* food is essential, and what kind to use, for I cannot procure the small red worms recommended in books, and the supply of young snails, &c., from my glass jars is barely sufficient for the stickle-backs, which will not eat anything else. I have been advised to leave them without food; but I cannot think the Infusoria in the water would be sufficient for them, and am afraid to introduce snails, beetles, &c., lest they should die, and lie hidden among the gravel to do mischief. The stickle-backs do not stir up the gravel, and the water in their vase is quite clear; but they do not live more than a few weeks, even when alone, and so unable to fight. My caddis-worms also die after a short time, and I do not know how to feed them. I should be glad to know whether a piece of charcoal kept in the aquarium is of any use in purifying the water.—*F. C.*

Insect Vivarium.—Knowing the horror with which some people regard killing insects, and yet like seeing them more closely than on the wing, I should suggest a vivarium, one of which I have kept for more than three months. It is made thus: *the bottom* of slate, like that of an aquarium, only pierced with holes for drainage. The height is $2\frac{1}{2}$ feet, and the breadth $1\frac{1}{2}$ foot; halfway up a division is made in the glass, the upper piece of both front and back lifting up like a window; *the sides* are composed of perforated zinc, painted a pretty light green. Put any pretty fancy top you like, only it must be made of zinc like the sides, for the sake of the air. Plant it with any flowers you like; ferns mixed in look very pretty, and three bird's nests suspended from the top greatly add to the effect; they do best filled with flowers which do not require much water. About every other day take out one window and put a piece of net over instead to air it. I have had several Burnet moths, and now have a Tiger moth, and a Humming-bird moth, and Bees do very well in it.—*E. H.*

Cinders in Cultivating Ferns.—Having been asked why, in the fifth number of Science Gossip, I expressed a preference for cinders in the propagation of ferns from seed, I would remark that sandstone almost invariably contains the germs of fungi which hinder and very frequently prevent the development of the fern-spores, and peat, unless prepared by dipping in boiling water, and thus destroying all vegetable life therein, is open to the same objection. Now, if cinders (which, if fresh, contain no fungi) are used mixed with a suitable quantity of peat subjected as above, the ferns will have a fair chance of proper development; for it is highly improbable fungi will obstruct their growth. I have found that peat, if used alone, becomes soddened; and as ferns, like all other plants cultivated in pots, require good drainage, that essential is obtained by the use of cinders mixed therewith.—*Helen Watney.*

New British Sea-Anemone.—Mr. P. H. Gosse has described and figured a species of anemone which he considers entirely new (*Ann. Nat. Hist.*, No. 91), and which he has named *Ægeon Alfordi.* "Here is an anemone with high standing column like an *Aiptasia,* but with the surface warted, and with tentacles like the richest green velvet, throwing into the shade the brightest of *Antheas.* Moreover the tentacles are of the same colour to their very tips, without the least tint of pink or purple." To which is also added, "Several circumstances indicate that this charming species is very eligible for the aquarium."

Aquarium Difficulties.—It certainly is no easy matter to keep an aquarium in good order. I had one for a considerable time, in which plants, animals, and fish did very well. I used to keep a condensing syringe with a small tube to reach the bottom of the tank, and every now and then in the day, if I went near, sent a stream of air through the water, which not only agitated the water, but stirred up any injurious matters, which I removed with a small fine muslin net. The fish seemed quite indifferent.—*E. T. Scott.*

Streams in Aquaria.—Mr. E. Edwards, of Menai Bridge, has written us taking exception to the remarks of Mr. Alford Lloyd at page 118, in which it is stated that "Mr. Edwards has announced that he makes a machine to answer this purpose, but nothing has come of it." Mr. Edwards requests the data for this assertion, and adds—"my apparatus is all that is required for the purpose intended. I do not claim any new invention in its construction, but such a combination of old principles so arranged as to cause it to do its work in an efficient manner." We insert this in justice to Mr. Edwards, without any desire to open a controversy on the subject.

MICROSCOPY.

DIAPHRAGM FOR MICROSCOPE.—I find the diaphragm of which I have sent a model of the working part, a very good one, as it is very easily and cheaply made, and the aperture can be increased or decreased to *any* degree, still keeping the same shape; and by moving one slide lower than the other, the light can be directed to either side of the field of view, which is sometimes useful; though I don't think a much better one can be used than the common kind, only made to slide up and down.

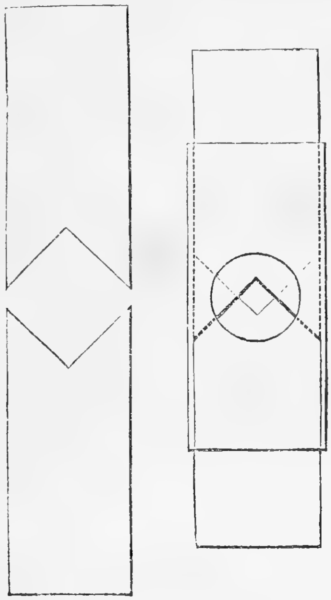


Fig. 2. Fig. 1.

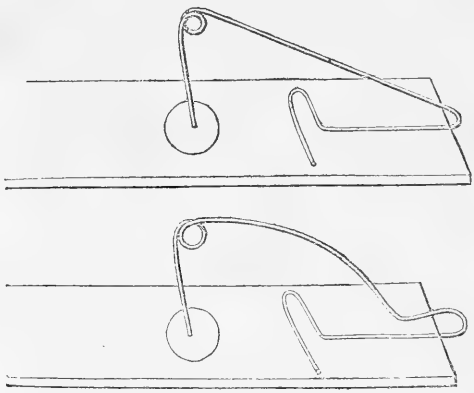
Fig. 1 represents the diaphragm with the notched plates working freely one over the other.

Fig. 2, the two plates *a* and *b* removed. In proportion as the inner angles of these plates approximate or recede from each other, the orifice is diminished or increased, having the quadrilateral form indicated in fig. 1.—*E. T. Scott.*

FISH MOULDS.—At the Dublin Microscopical Club, Mr. Archer recently showed specimens of *Aphanomyces stellatus*, one of the curious moulds allied to that described and figured at page 134, and at the same time pronounced his own opinion in favour of regarding them as Fungi, and *not* Algæ, as some have supposed.

FACETS IN THE EYE.—Hooke counted 7,000 in the eye of the house-fly; Leeuwenhoek more than 12,000 in that of a dragon-fly; and Geoffry cites a calculation, according to which there are 34,650 of such facets in the eye of a butterfly.

IMPROVED CLIP.—In the *Microscopical Journal*, Dr. Maddox describes and figures a new spring clip for holding the thin glass cover in place during the drying of the cement, &c. (fig. *a*). It appears



to me to have one drawback, viz., it cannot be moved longitudinally along the slide; so that if your object is not exactly in the centre of the length of the slide, the pressure cannot be properly applied. To overcome this difficulty I would suggest a slight modification in the shape of the lower portion, which forms the spring (fig. *b*). This trifling alteration in the form will give the clip above a quarter of an inch of longitudinal motion.—*C. A.*

THE QUEKETT MICROSCOPICAL CLUB.—At a General meeting called for the organization of this Club, held at St. Martin's Schools, Charing Cross, on the 7th of July, the following resolutions were adopted:—

That this association be called "The Quekett Microscopical Club."

That its ordinary meetings be held on the first Friday in each month, at eight o'clock in the evening.

That the terms of subscription be ten shillings per annum, payable in advance, on the 1st of July in each year.

That the business of the Club be conducted by the following officers, to be elected from the members:—A President, two Vice-Presidents, a Committee of twelve (four of whom shall form a quorum), a Treasurer, and a Secretary.

That the Provisional Committee continue to conduct the business of the Club until the above officers are elected.

That the next meeting be held on the first Friday in August, at the same place and hour, for the election of members, officers, and other business.

Several gentlemen joined the Club, and others willing to do so previous to the next meeting may pay their subscription to Mr. Hardwicke (Treasurer *pro tem.*), 192, Piccadilly.

NOTES AND QUERIES.

Sea-Anemones Dividing.—I think "L. S." must have had another anemone in his aquarium without knowing it, as I have kept them for a length of time, and have often watched the young expelled from the mother's mouth (which is a curious sight) in quite a stream, but never saw any appearance of division take place.—*E. T. Scott.*

The Swift (*Cypselus apus*).—This curious and interesting summer visitor is much less frequent in the part of North Lincolnshire where I reside than it used to be. Twenty or thirty years ago they used to build in many of the village churches, where none are to be seen now. They appear to be forsaking the country for the towns, as many of their *unfeathered* biped brethren are doing. Does the experience of your readers tally with mine, and have they any explanation of the fact to suggest? My own idea is, that the better care bestowed upon our village churches is the cause of the change; but I should like to know what others have to say.—*J. B. Humber.*

Blighted Beech-leaves.—The leaves of a beech-tree have been sent us from Saxmundham, which are blackened and shrivelled, containing minute yellow grubs in the folds. The leaves affected are those terminating all the branches, and consequently are the young leaves. They look at first sight as if frost-bitten. The grubs and leaves have been submitted to a competent authority with the following result:—"The small yellow grubs are the larvæ of some species of gall-midge (*Cecidomyia*)."—*J. O. W.*

Stalked Eggs.—I enclose a vine-leaf, with a number of minute insect-eggs attached thereto by means of fine stalks or tubes. Can you inform me what they are?—*R. R.*

The eggs sent are those of some species of Lace-wing fly (*Chrysopa*); but in the absence of the insect that deposited them I cannot state precisely which species, there being about twelve in this country. The larvæ are very serviceable to the horticulturist, as they feed entirely upon aphides, of which they devour great quantities.—*R. McL.*

Sexes of Lepidoptera.—"A Beginner" desires to know by what means to distinguish sex, apart from size and colouring; also the title of a "Manual" of Lepidoptera. He must obtain "Stainton's Manual of Moths and Butterflies" (Van Voorst), and seek the distinguishing features of sex in the tarsi of diurnal and the antennæ of nocturnal Lepidoptera.—*F. M.*

Tusseh Silk of India.—"R. S." inquires, what is the species of insect which yields the wild silk known in India by the name of Tusseh?

The Tusseh silk-moth is *Antheræa Paphia*, L., and is very common in Bengal, Assam, &c. It is figured in the "Technologist," vol. i., and an account will be found at p. 353.

Blight of Larch.—E. G. sends us specimens of a white cottony substance, which he found covering fir-trees so as to have the appearance of a slight snowstorm, and concerning which he seeks information. The aphis on larch-trees, forming small patches of white downy matter, enclosing the females and eggs, is the *Chermes Laricis.*—*J. O. W.*

Pheasants' Eggs in a Partridge's Nest.—I have seen this season two eggs of a pheasant in a partridge's nest containing six eggs. After this number had been laid, the nest, for some cause or other, was forsaken. I have read of similar instances; for example, Morris, in his "British Birds," gives such. I should like to ask your readers whether such occurrences are frequent.—*J. B. Humber.*

Alexander's Rust.—A mycologist would be glad if any botanical friend, who meets with "Alexanders" (*Smyrnium olusatrum*) this summer and autumn, would search the lower leaves, and if he finds any of them infested with a kind of rust, which appears in little brown spots, would collect and forward them to the Editor.

Volvox Globator.—Can any "Gossiper" inform me what is considered to be the cause of the constant motion and rotation of the Volvox?—*T. Armstrong.*

The Stinkhorn.—As I was perambulating my garden, my nose was assailed by a most disgusting odour, resembling that of a "drain" in a bad state of repair. At length I discovered the cause under a bush, which at first looked like a bleached bone; but which proved to be a fungus. The stem was creamy-white, hollow, and cellular, the upper and lower portions appeared to be membranous expansions containing a viscid fluid, which oozed out when the membrane was ruptured. A more loathsome visitor to a garden one could not wish for. Will you favour me with its name?—*J. G. Braden.*

Your fungus is assuredly a common one, but possesses neither beauty of form nor pleasurable odour to recommend it. The vernacular name is "the Common Stinkhorn," and the scientific *Phallus impudicus.*—*M. C. C.*

Marine Phosphorescence.—At a recent meeting of the French Academy of Sciences, M. Corenwinder, in a paper on the gulf-weed (*Sargassum bacciferum*), sought indirectly to prove the existence of phosphorus in the ocean by an analysis of sea-weeds gathered far from the shore. His results showed that this sea-weed contains 1·026 per cent. of phosphoric acid, which, it was argued, could only have been derived from the sea.

Preserving Hyacinth Bulbs.—As soon as the flowers wither, take the bulb out of the earth or water in which it has bloomed, wash it and the roots clean, and lay it on the lid of a hamper, or on clean straw, in an airy, shaded, but dry place. Turn the bulb frequently, and when the roots and leaves, &c., have dried up, trim them off, remove loose scales and ripe offsets, and, when the bulb is perfectly dry, lay it by in a drawer, closet, or basket, until the following autumn. By this method the exhaustion of the bulb after flowering is saved. Bulbs planted in September yield better flowers, and bloom, if anything, later in the spring.—*Rev. Gerard Smith.*

Hart's-tongue Fern.—I lately asked a man in the parish of Hatchford, near Cobham, Surrey, whether the Hart's-tongue Fern grew anywhere in the neighbourhood. He did not know it by that name; but, on my describing it, said, "Oh, you mean the *Seaweed-fern.*" I think that a very appropriate name for it.—*W. R. Tate.*

Mounting Insects Whole.—In reply to J. H. W. (p. 163), respecting the method of mounting large insects whole for the microscope, though I am not aware what process is practised in mounting for the trade, I may describe the mode of proceeding which has been in my own hands very fairly successful. The great object, as many of the insects are of considerable thickness, is to prepare them to endure the requisite flattening without injury. For this purpose I soak them for a longer or shorter time in liquor potassæ, and it is in this part of the process that the chief danger lies. If the insect has not been immersed for a sufficient time, and is of hard texture, it is probable that the more convex portions, as the head and thorax, will split when pressed down by the thin glass cover. On the other hand, should the soaking period be extended too long, the object will be rendered so tender, that some of the limbs will very likely tear away during the necessary manipulation. As the time of immersion differs according to the firmness of the insect's covering, no precise time can be given. A hard beetle will require as many weeks' soaking as a soft spider would need days. Another evil attending too long a period in the solution of potass, is that the colour of the insect will be entirely discharged, and if mounted successfully, the result will be only a filmy effigy of the creature. I have an earwig so treated, which looks just like the ghost of an earwig according to the popular notion of ghosts' appearance (how difficult it is, by the way, to imagine the ghost of a fat punchy man). If the right period is hit, the insect will be sufficiently softened to stand flattening (with care), without being rendered unpleasantly colourless. It should be pressed gradually between two glass slides in water, till the contents of the body are washed away and it is flat enough for mounting. It should then be arranged in proper position on one of the slides, and suffered to dry for three or four days; of course protected from dust. When quite dry, it may be immersed in turpentine, or floated over with the same under a glass cover, being careful that no water remains lodged in any of the limbs, &c. It should be kept covered with turpentine till all air-bubbles have disappeared, which will usually take place in three or four days, when the object may be mounted in Canada balsam in the usual manner. Bubbles will often disappear some time after the insect has been mounted, if the balsam is not too hard, and the object is kept in a warm place; and I believe many a slide has been hastily discarded from the presence of bubbles, when time and warmth would have made all right. A good-sized spider which I had mounted was so disfigured with air-bubbles that it was very near being thrown away; it was put on a warm mantel-shelf, and as it was observed after a few days that some of the bubbles had disappeared, it was suffered to remain there till every bubble was gone, which was not until nearly a month had elapsed. I fancy that the oscillating temperature of night and day, where a fire is regularly lighted each morning, is favourable to the removal of air-bubbles by alternately expanding and contracting them. I may perhaps add that I described this method of mounting insects whole in the third volume of "Recreative Science."—*George Guyon, Ventnor, Isle of Wight.*

Insects feeding on Wheat.—I have seen it stated that there have been collected in Europe no less than 27,000 species of insects preying upon wheat. Is there good reason for supposing that such an assertion is approximately correct?—*A. O. F.*

Sex of a Viper.—The gamekeeper on Wisley Heath, who is constantly seeing vipers, tells me that those with a *light* ground-colour are males, and those with a *dark* one females.—*W. R. Tate.*

The Hermit Crab.—The Hermit Crab does not always choose the empty shell of a univalve mollusk for its house, for on one occasion I saw a small hermit (*Pagurus Bernhardus*) which had fitted its hinder part into the empty hand belonging to the first right leg of another and larger hermit, the latter having previously exuviated. Soon afterwards I saw another and still smaller hermit, which had converted a fragment of the tube of *Serpula contortuplicata* into a home. In both instances there were no empty univalve shells present, and therefore necessity became the mother of invention. These things took place in the Hamburg aquarium.—*W. Alfred Lloyd.*

Gossamer Spiders.—Although it is not very probable that many readers of Science Gossip can tell Dr. Lord a very great deal about Gossamer Spiders he does not already know, he may perhaps kindly reply to a few questions, and thus enlighten other folks. What are the tiny creatures doing in the air? Are they, like swallows, floating about in search of insects? I have seen the little voyagers in the spring, as well as in the autumn, darting out their gossamer filaments, and sailing up aloft like so many fairies. Since we are upon the subject of spiders, there is another question I want to ask Dr. Lord. Is it true that spiders (house spiders) are musical? Did the author of Verses to a Spider, which are to be found in the *Anthologia Borealis et Australis*, write from fact when he said the insect came down from the ceiling every day to hear him play, I wonder? I wish some young lady, who is not afraid of a spider (if there be so courageous a feminine), would try the experiment of playing her sweetest melody to one of Arachne's descendants, and give us the result. I am no musician, or I would solve the point myself.—*H. W.*

Light of the Lantern Fly (*Fulgora lanternaria*).—At a recent meeting of the Entomological Society, Mr. Evans read a letter from Belize on the subject of the luminosity of this insect, to the following effect:—"I have succeeded in my entomological researches about the lantern-fly. I had one given me, caught here, alive, and I saw it myself giving light. I kept it in a tumbler for about a day, and it sometimes did not give it, but at others it did."—*Athenæum.*

Fire-fly Light.—In reference to the discussion whether the fire-flies flash out their light simultaneously, Mr. Clark read the following extract from a letter at the last meeting of the Entomological Society:—"I can confirm your observation that the fire-flies, of the genus *Aspisoma*, flit at night in great numbers over low-lying, damp fields, chiefly near water, emitting light by short flashes, at intervals of three or four seconds, the majority keeping time with each other, as if in obedience to the *bâton* of a leader. I think it is only the fire-flies of that genus who practise it. The numerous fire-flies common in Mexico and North America belong chiefly to the genera *Ellichnia* and *Photuris*, whose habits are different, so far as I have had opportunity to observe their congeners in Brazil."

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."

British Hepaticæ.—The "Guide," uniform in size and price with this journal, may be had of the Publisher, 192, Piccadilly. Every subscriber to Science Gossip should procure a copy to bind with his volume. It contains descriptions of one hundred and thirty-six species of Hepaticæ, illustrated by two hundred woodcuts.

A. M.—You cannot have a more useful little book on the Mounting of Microscopic Objects than that by T. Davies, published by R. Hardwicke, at half-a-crown.

Books on Sea-weeds.—"R. S." is informed that many books at many prices, and of varied merits, have been published on this subject. Such as, "Nature-printed Sea-weeds," 4 vols. 8vo. (Bradbury & Evans); Harvey's "Phycologia Britannica," 4 vols. royal 8vo. (Reeve); Harvey's "Atlas of British Sea-weeds," 4to. (Reeve); Harvey's "Synopsis of British Sea-weeds," 12mo. (Reeve); Landsborough's "British Sea-weeds" (Routledge); Gifford's "Marine Botanist;" Gray's "Handbook of British Water-weeds" (Hardwicke), &c. &c.

S. A. S.—The London Catalogue of British Plants may be had of Dulau, Soho Square. We think that the list of British Mosses referred to is "out of print."

Repairing Insects.—"W. H." will find shell-lac dissolved in spirits of wine a very useful cement for this purpose.

R. S.—You will find it preferable not to fix your eggs for your cabinet in any way, either on wood or cardboard, but place them on cotton wool in little boxes or compartments.

L. L.—It is a plant of the Pine-apple family called "New Orleans Moss" (*Tillandsia usneoides*), and is used for stuffing, as a kind of substitute for horse-hair.

J. W.—Your observations are only confirmatory, in fact, of what has been before recorded. Your deductions are scarcely so correct.

A. G. has fallen into error in thinking us interested in ordnance. Our science is essentially that of peace, and not of war.

F. L. S.—We suppose that your insect was the Gold-tail Moth (*Porthesia auriflua*), a very common species.

J. P.—What bird do you call the Red Sparrow-hawk? Is it the Kestrel?

A. F. C.—Only the *image* of the object is enlarged by drawing out the tube; there is no true increase of power.

E. G.—Many of our birds rear two broods in a year.

S. D.—1. The siliceous cuticle of grasses may be obtained by maceration in nitric acid, and afterwards carefully burning to a white heat. 2. Probably the sudoriparous glands; but it is mere speculation to answer without seeing the object.

T. P.—We regret that we have no space for your communication. It will be better published when the experiment is complete. An agricultural journal would then be a more suitable medium.

Aquaria.—Our notes on aquarian topics are so many and so long this month, that some will have to stand over. Correspondents will please to note this, and excuse the delay.

Firefly will please to take notice, and all other like offenders, that for no purpose whatever can we recognize a *nom-de-plume*. Already the same announcement has been made twice or thrice, and our good friends will oblige by not repeating the dose. We believe that we have good reasons for persisting in this regulation.

E. M. W.—The publisher of "Janson's Beetles" is Bell, of Fleet Street, London.

P. S. (Harrow).—We admit no *nom-de-plume*. The science you name does not come within our interpretation of natural history.

W. W. K.—You will find the name in the article, of which your extract is a portion, in *All the Year Round*.

F. A. B.—A paragraph appears in the present number which will probably assist you. Some flowers are very difficult to manage in drying.

Zoophytes.—The best work on this subject is Dr. Johnston's "British Zoophytes," published by Van Voorst, in two vols. 8vo. There is a smaller work by Dr. Landsborough, which is published by Routledge. Sir John Dalyell's "Remarkable Animals of Scotland," two vols. 4to. (Van Voorst), also contains Zoophytes.

W. P.—As we answered our correspondent, the subject is closed. Why not insert an advertisement?

F. A.—Write to Mr. W. R. Tate, 4, Grove Place, Denmark Hill, Camberwell, and he will furnish you with all the information you desire.

Limpet Tongues.—J. B. R. has a number of dissected limpet tongues unmounted, and will be happy to exchange them for other interesting microscopic objects.—115, Newgate Street, London, E.C.

W. E. Williams, Jun., offers silkworm eggs and seeds of the *Catalpa* tree as microscopic objects.—Corsham, Wilts.

Petherwin Beds.—Please correct p. 150, 1st col., 4th line from bottom, for "shale" read "shell *Spirifera unguicula;*" 2nd col., 6th line, for "*Eremphalus*" read "*Euomphalus.*"

F. P. P.—"What's the use of It" is declined with thanks.

Y. Y. had better forward us a specimen of the moth in question.

Cabinet Labels.—We have seen a sheet of labels for small Cabinets of Microscopic Objects, designed by Mr. John Bockett, 10, Willingham Terrace, Kentish Town, which is likely to be very useful.

A Hint for Contributors.—If our contributors will oblige us by always using the common names of plants, animals, insects, &c., wherever there is a common name in use, to be followed by the scientific name in brackets, this will save us a large amount of trouble in sending their manuscript to press. As we do not pretend to address scientific readers alone, vernacular names are indispensable.

Communications Received.—S. E. B.—F. J. F.—E. R. L.—W. H. G.—T. P. B.—E. Y. S.—E. G.—M. A.—P. S.—J. H. W.—J. S.—H. G. K.—F. A. B.—T. A.—W. W. K.—M. H. L.—G. R. J.—G. D.—E. T. S.—P. F.—W. R. T.—J. B. Humber.—B. H.—F. C.—J. D.—A. G.—J. P.—H. W.—E. S. S. G.—R. G. K.—J. B. R.—E. M. E.—F. R. P.—A. G.—C. A.—J. S.—E. S.—E. H.—R. B. S.—J. A.—R. K.—W. N.—E. G.—E. H. (Richmond).—A. F. C.—B.—E. E.—G. G.—J. P.—F. L. S.—S. D.—T. P.—A. R.—F. W.—R. T.—J. B.—T. W. W.—Dr. L.—W. T. H.—C. A.—F. A.

Too Late.—Correspondents are reminded that the majority of the above communications arrived too late for notice in the present issue.

Popular Names.—R. E. D.—C. A.

BOOKS RECEIVED.

"The Phenomena of Radiation as Exemplifying the Wisdom and Beneficence of God." By George Warington, F.C.S. 12mo. cloth, 186 pp. (London: W. Skeffington.)

The *Popular Science Review* for July, 1865. (London: R. Hardwicke.)

THE BALANCE OF POWER.

Naturalists observe, a flea
Hath smaller fleas that on him prey,
And these have smaller still to bite 'em,
And so proceed *ad infinitum.—Swift.*

IT requires some faith in the operations of Nature to arrive at the conclusion that "all will come right in the end," if she is permitted to pursue her own course without hindrance, or by a little assistance in the direction she indicates. The most conclusive facts will scarcely convince many an agriculturist that his view of the "small bird question" is a false one, when it takes the direction of extirpation. Neither will some believe in insects of any kind being less than unmitigated pests, sent expressly to worry the gardener, or drive the farmer out of his wits. It is of no use talking to them of the balance of power, when they are thinking of the balance at their banker's. That is, provided they are blessed with the luxury of a banker's account. We confess it is aggravating enough to see acres of green turnips cleaned off by myriads of "black jacks;" but, instead of grumbling, would it not be better to study the "black jacks" a little closer, and wring from them the secret of their preponderance over their own enemies, the devourers of little caterpillars; or perhaps some foe, in another stage of their existence, the encouragement of which might restore the balance of power?

If we confine our observations to the insect world we shall meet with plentiful illustrations of the fact, in the faith of which we are strong, that there is no such a thing as chance in the operations of Nature, but that, in the greatest apparent disorder, there is harmony at the foundation. Why stand amazed at some sudden and unexpected effect, and heed not or seek not the cause?

We have every respect for the men who grow our "bread stuffs" for us, and would by no means say anything "to hurt their feelings or wound their susceptibilities;" but whilst they sneer at the fly-catching Cockneys, who now and then traverse their broad acres with bag-nets dangling at the end of walking-sticks, it may be true that these same despised fly-catchers may know a thing or two about the habits of insects which it would not be beneath the dignity of a country farmer to learn. Small truths sometimes produce great revolutions, and a little knowledge may become a large power. A homely illustration of this we remember to have heard in the person of a Scot who, on one occasion, mingled with a crowd that had collected around "twa dogs" fighting in the street. Whilst by thumping and tugging some were fruitlessly endeavouring to separate the combatants, our Scot stood by and calmly sniffed his pinch of snuff. This operation completed to his satisfaction, he discharged the contents of his box about the noses of the belligerents. The desired effect was at once produced, both dogs beat a hasty retreat, and the Scot, as he moved majestically on his way, reminded the bystanders that "knowledge is power."

We have already indicated (p. 185) the extraordinary fecundity of those mischievous little insects the *Aphides,* or plant-lice. "Supposing a single *Aphis* to produce only fifty young ones—which is certainly below the average—it follows that one of these insects beginning to breed in spring would give rise in the course of a summer to no less than 4,000,000,000,000,000 of larvæ, which would cover a space of at least forty-eight thousand square yards, or ten acres. The entire surface of the globe would be covered with *Aphides,* were it not for the number and voracity of the animals which prey upon them."* On the other hand, we have Lady-birds in great numbers, and these romantic little associates of our childhood and nursery rhymes, both in the larva and perfect state, feed with avidity upon the plant-lice, appearing to increase in equal proportion. Then there are the Lace-wing flies, which in their larva state feed entirely upon *Aphides,* destroying them in immense quantities. When noticing the unusual blight of insects which infested lettuces in 1844, the Rev. L. Jenyns adds, "amongst the larvæ at the root of one lettuce, I observed a single specimen of the larva of some other totally different insect which appeared to be feeding upon them." The larvæ of the little *Syrphi,* bluish-black flies, allied to the common fly, feed also upon *Aphides,* transfixing them with a sort of trident springing from the lower part of the mouth, and

* Quatrefages' "Metamorphoses."

then raising them into the air and devouring them. Many other insects also aid in the work of destruction, and assist in checking the undue preponderance of *Aphides* by maintaining the balance of power.

It is the same with other insects. Smaller species of *Anthomyia* are also very destructive to vegetation; but dung flies, in their perfect state, devour them with greediness, seizing them with their fore-feet, piercing their heads and sucking the juices. Who shall determine the check which injurious insects receive from Ichneumons and *Tachinæ*, and such parasites?

In a paper published in the Proceedings of the Entomological Society of Philadelphia, Mr. Walsh directs attention to the number of species of insects which haunt one kind of willow-gall (*Salicis brassicoides*). In this, besides the *Cecidomyia*, which is the maker of the gall, he enumerates four other insects of the same genus, one saw-fly, five species of minute Lepidoptera, two or three beetles, a *Psocus*, a heteropterous insect, an *Aphis*, the larvæ of a *Chrysopa*, and a *Syrphide*, besides four or five species of *Chalcididæ*, one Ichneumon, and one of *Tachinidæ*. Altogether about two dozen species, distributed through eight orders, and all dependent one upon another, and upon the fostering gall.

We have said enough to indicate the truth of Mr. Dallas's observation that "Nothing is more remarkable, or more conducive to show us the intricacy of the mechanism by which the balance of power is maintained in the economy of nature, than the circumstance that many of the species of these parasitic insects, whose duty is evidently that of keeping down the excessive increase of their vegetable-feeding brethren, are themselves kept in check by other species, which, by some infallible test, discover the concealed abode of their larvæ, and thus avenge the hapless victim upon whose substance they are remorselessly preying."

KLEPTOMANIA.—I had a good reason for disliking cats. When I was a boy they used to steal my young rabbits. We had a hole like a saw-pit, boarded and covered over with wooden bars, in which we kept, or rather tried to keep, our rabbits. One day, however, the gardener caught two cats working together at the theft, the thinnest getting down, and handing up the young rabbits to the accomplice. This was his account of the matter, and I can well believe it; for Argus — a red-eyed, evil-favoured Newfoundland we had—was once detected lamb-killing, then washing himself in a pond, and finally getting back to his kennel, and putting his head in the collar before he thought any of the household were up. There he was before our breakfast, with no evidence of guilt about him beyond the pleasant secret sense of early digestion begun in his own inside.—*Jones' Holiday Papers.*

THE "BREEZE-FLY."

THERE lives no greater pest to the wanderer and his horses and mules, than the Breeze-fly; by *Breeze-fly* I mean flies belonging to the genus *Tabanus* (order, Diptera, or two-winged), not those of the genus *Œstrus*, with which it is frequently confounded. The latter—commonly called Bot-fly, which is also a terrible pest, alike avoided by both horse and ruminant—deposits its eggs sometimes on the hair, and sometimes underneath the skin; hence animals, guided by a natural instinct, or having been the victims of a past and painful experience, all, at the sound of his dreaded trumpet, make the best of their way to the nearest water, into which they plunge.

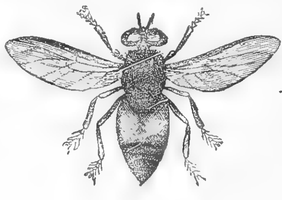


Fig. 1.

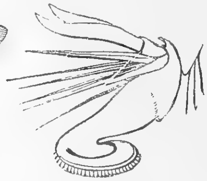


Fig. 2.

On the contrary, in the Breeze-fly we have to do with a veritable *blood-sucker*, more ravenous than would be any winged leech. There are three species, all three by far too plentiful for the comfort of either man or beast, and widely distributed in North-west America. These insects have an apparent ubiquity, and are literally everywhere. Ascend to the regions of eternal snow, there are hungry Breeze-flies awaiting one's arrival; by the rushing torrent, on the shores of the placid lake, under the deep, damp shadows of the pine-trees, or on the open flower-decked prairie, there are sure to be Breeze-flies. One barely hears the sound of its "clarion shrill" and hum of the rapidly-vibrating wings, ere one feels a sharp prick, as though a red-hot needle had been thrust into the flesh; stab follows stab in quick succession, and unless active measures of defence be resorted to, the skin speedily assumes the form of wire-gauze.

Your horses and mules, if you have any, give immediate notice of the enemy, by viciously throwing up their heads and heels, snorting, and, very possibly, indeed I may say generally, summarily discharging their loads, be they human or baggage, over their heads. Whether success attends this disagreeable habit or not, in any case a hasty retreat is made for the nearest water, where both man and beast well know the Breeze-fly seldom or never follows. I have frequently had a train of pack-mules completely scattered by these formidable pests.

The largest and fiercest is the Black Breeze-fly (*Tabanus atratus*). His body is like glossy black velvet, frosted over with a delicate white bloom, like a freshly-gathered Orleans plum; it is about an inch in length; the wings, like pale blue gauze, when at rest are always kept in a horizontal position; the alulets are large and strong. The eyes are exquisitely beautiful, in colour dark-blue, but glittering with the lustre of highly-polished gems, and nearly covering the entire head.

The next in size is the Belted Breeze-fly (*Tabanus cinctus*), about one-third smaller than his sable brother. He is clad in bright orange livery, banded with stripes almost black; and has a most showy appearance, being decidedly the best dressed fly of the family. The eyes are emerald green, and, when viewed in the bright sunlight, have the appearance of being cut into numerous facets.

The third or smallest is the Lined Breeze-fly (*Tabanus lineatus*); of a bluish colour, and only conspicuous from having a white line along the top of the head. In this fly the eyes are of bluish-green, and quite as beautiful as in the two preceding.

The lady Breeze-fly, I am grieved to say, is far more to be dreaded than her lord. These insects can never, one would suppose, enjoy the luxury and delight, or whatever may be the proper term applicable to such a universal habit as kissing. How could a winged lady, I should like to know, be kissed by a winged wooer when her lips are a bundle of lancets, six in number, and as sharp as a surgeon's? True the male has four blade-like instruments arming the mouth, but it is questionable whether he uses them for other purposes than that of sucking nectar from flowers. The apparatus of the female is beautifully adapted for puncturing the skin and then pumping up the fluid through the sheath of the lancets, that acts as a tube or canula. It would be of trifling interest to advert more in detail to the minute anatomy of these insects; that can be better learned from works on structural entomology; the habits of the insect in far-away lands, sketched from personal gleanings, being more strictly "Science Gossip." The rambler alone has an opportunity to investigate the haunts and watch the habits of strange beasts, birds, and insects; to the anatomist at home, in cosy closet, belongs the task of developing, with scalpel and microscope, the complicated machinery by which life's varied duties are carried on.

The larva lives in the earth, a grub easily dug up in the moist prairie lands; of an elongated subcylindrical form, tapering off towards each extremity; its colour a dingy yellow; destitute of feet; having a body divided into twelve segments, each segment being banded with a row of minute horny hooks—an admirable contrivance, enabling it to drag itself along through the earth. The head is horny, and brownish-yellow in colour, also armed with hooks to aid in progression. The pupa I have never seen, but De Geer tells us the pupa of *Tabanus bovinus* is "naked, incomplete, elongated, sub-cylindrical, with six spines at the end of the body, the margins of the abdominal segments ciliated, and the forehead bi-tubercled."

Where or when the eggs of the *Tabanus* are deposited is not generally known, but it is more than probable on the stems of plants, to which they are fastened by a glutinous secretion; the grub when hatched, falling on the ground, at once buries itself. Neither is it known how long a time the larva remains in the earth ere it changes to the pupa form.

I remember once being busily occupied all day collecting beetles and other insects, in the dense, shady pine-forests, close to a small stream called the Mooyee, that flows down the western slope of the Rocky Mountains: boxes, bottles, bags, even my hat, indeed every available locality about my person was appropriated to the stowage and transport of the proceeds of my hunt. My horse, rather a wild Mustang, had been tethered close to the water, and thus kept clear of the Breeze-flies during my absence; soon, however, after mounting him to return, emerging from the forest, I came on a small patch of open prairie land, but no sooner was I clear of the timber than the pests were at us. My beast commenced practising every species of jump and leap that it was possible for a horse to execute, and several of them of a nature so extraordinary that one would have thought no animal that ever went on four legs could accomplish; he pranced, shied, kicked, leaped forward, backward, sideways—in a word, performed such demoniacal pranks, that, although a practised horseman, I found it a most difficult matter to keep my seat. As a finale, off he went like a mad creature, caring nothing for all my efforts to stop him; then, as if from sheer madness caused by the punctures of the flies, that followed like a swarm of enraged bees, he stopped suddenly short, viciously threw his head between his forelegs, and at the same time elevated his hind ones into the air; the whole being performed with such sudden and savage violence that I was pitched clean out of the saddle: boxes, bottles, bags, together with all my insect treasures, lay scattered over the prairie and ere I could regain my feet I had the satisfaction of seeing him put his legs into the bridle-reins, drag it clean off his head, and, with a snort that sounded mightily like a derisive horse laugh, he galloped off leaving me to my own devices. I mention this little adventure to show how terribly these pests can madden an animal.

From an intimacy by no means sought, or on my part cultivated, with the *Tabanidæ*, or Breeze-flies, I am disposed to think the fly called *Zimb*, and described by Bruce, belonged to this family, and was not an *Œstrus*, as many have supposed. Speaking of the *Zimb*, in reference to the camel and elephant: "When the first of these animals are attacked, its body, head, and legs break out into large bosses, which swell, burst, and putrify, to its certain destruction." Just such effects have I again and again seen amongst horses and mules. One mule we had to abandon on the prairie (a disabled foot preventing its travelling any further) was, when we returned for it, so stung by the Breeze-flies as to be one mass of small ichorous ulcers from head to hoofs; so pitiable was the poor beast's plight, its injured limb having precluded all chance of escape from the flies, that, as a mere matter of humanity, it was at once shot. I have also frequently seen tethered horses so injured by the punctures of the Breeze-fly as to be rendered useless for many months. Their favourite places for puncturing are on the front of the chest—where the saddle goes,—and inside the thighs. If a man were tied, or otherwise disabled, so that all chance of beating off or escaping from the Breeze-fly was out of his power, I have no hesitation in asserting my firm conviction that they would rapidly kill him.

The illustration (fig. 1) will give a good idea of the Belted Breeze-fly—a lady charmingly dressed in orange flounced with black, very attractive when you see her sunning herself amid the petals of some prairie flower, but a closer acquaintance destroys the charm, as she soon lets you feel her power of wounding.

Fig. 2 exhibits the proboscis and its armature of six lancets terminated by two large fleshy lip-like lobes, further protected at the sides by the maxillary palpi.

Travelling in Oregon one constantly finds himself on the banks of a wide glassy lake; gazing over its unrippled surface, the eye suddenly rests on what, to the inexperienced in hunter's craft, appears to be small clumps of twisted branches, dead and leafless tree-tops, the trunks of which are hidden in the water; but the Indian or "trapper" discerns in a second that the apparent branches are the antlers of a herd of Wappiti that have been driven into the water by Breeze-flies. Wild cattle seek a like means of protecting themselves against such terrible foes: a perfect forest of horns may frequently be witnessed in a pool, but not a vestige of the bullocks, save their noses, kept above water for the purpose of breathing. Virgil clearly alluded to the Breeze-flies, and not to the *Œstridæ*, when writing about the *Asilus*:—

> Through waving groves, where Selos' torrent flows,
> And where, Alberno, thy green Ilex grows,
> Myriads of insects flutter in the gloom
> (*Œstrus* in Greece, *Asilus* in Rome),
> Fierce and of cruel hum. By the dire sound
> Driven from the woods and shady glens around
> The universal *herd* in terror fly.

The same thing goes on now as of old: Breeze-flies puncture the toughest hides for blood, and as in the days of Greece and Rome, and, it may be, ages and *æons* before that, the "universal herd in terror flew" on hearing the shrill blast of the Breeze-fly's trumpet.

J. K. LORD, F.Z.S.

SEA ANEMONES.

(*Sagartia parasitica* and *Adamsia palliata.*)

I AM not aware whether any one has published an account of the mode by which so slow an animal as the Parasitic Anemone contrives to mount on the shell, which forms the house of so active a creature as the Hermit Crab, but I have seen repeatedly how it is done, in the Hamburg Aquarium. So long as the Anemone is associated with the Crab, and is carried about by it, and gets its share of food, it is happy; but when the Hermit changes its shell, and leaves the Anemone behind on the old shell, the Anemone will (unless it is again taken up by another or the same crab) usually loosen its hold from the shell, and lie down on its side on the floor of the tank. Then when a crab—particularly if it be a Hermit Crab—passes within reach of the Anemone's tentacles (which are unusually quick and strong in their action), they grasp any part of the shell, and then the base of the Anemone is quickly turned round and securely fixed, the body being strongly curved so that the hold of the tentacles is not relaxed before the base, or a part of it, is secure. In this way I have seen as many as three Parasitic Anemones attaching themselves in the course of an hour, to the shell of one unusually large and very active Hermit; and I have noticed not less than five fasten themselves by the same manœuvre to the carapace and legs of a Spider Crab—a large *Hyasaranea*,—and he carried them about for many weeks, and when at last he changed his shell, and left the Anemones behind, sticking to the old left-off and motionless shell, the Anemones, after a time, *found him out again and re-attached themselves as before.*

If there had been any Hermit Crabs in the same tank, they would, doubtless, have fastened to them, in preference to the Spider Crab. To be carried about by some other animal seems to be an enjoyment to them, and yet I have known them to remain attached to motionless objects tranquilly for five or six months at a stretch, in a tank where Hermit Crabs and Spider Crabs were also contained. A capability of detaching and attaching themselves *quickly* by the base, seems to be one of the special peculiarities of both the Parasitic Anemone and of the Cloak Anemone (*Adamsia palliata*), and I once saw the latter become free from the shell inhabited by another Hermit Crab (*Pagurus Prideauxii*), and then become quite and securely fixed to another shell, *not less than twelve times in two consecutive hours,* as the crab was fidgetty, and changed his shell that number of times, and each time he took his companion Anemone with him, giving it material assistance at every transfer. This has also been observed by Mr. Gosse and by Mr. Holdsworth. In this case (of *Adamsia* and *Prideauxii*) the Crab and the Anemone certainly seem to recognize each other; but in the other instance (of *Sagartia* and *Bernhardus*), the Anemone seems only to recognize the Crab, and not the Crab to be conscious of the Anemone; for even when *Bernhardus* has been burdened with three *S. parasitica* on its shell at one time, I have never seen it seem more anxious to change its shell than when it has only a shell alone to carry. In further proof of this recognition being natural in the one case, and one-sided in the other, I have to state that though I have had brought me many thousands of the common Hermit Crab (*P. Bernhardus*) without any Anemone (*S. parasitica*), I have never got a single specimen of the less common Hermit (*P. Prideauxii*) without its special Anemone (*Adamsia palliata*). I also have to observe that the manner in which *P. Prideauxii* assists the transfer of *Adamsia* from one shell to another, reminds one exactly of the manner in which a person would remove and then re-fix a sticking-plaister to his or her chest, first loosening and picking it away at the edges, and then gradually peeling it off entirely, and afterwards broadly applying a new plaister with both hands, smoothing and working it down in places, and taking particular care in making it adhere firmly all round the margins. The action is all the more suggestive because the relative positions of a man's hands, arms, and chest correspond with much precision to the relative positions of the two first (right and left) legs of the crab, and to the part of his shell to which he desires to affix the Anemone.

Has any one ever seen a very small specimen of *Sagartia parasitica*, or of *Tealia crassicornis*;—as small, I mean, as the young ones of any other common Sea-Anemone? I never have; and the least of those two species which I recollect to have observed, was as large when close, as a small cherry.

W. ALFORD LLOYD.

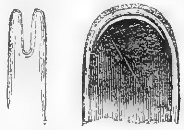
Zoological Gardens, Hamburg.

MORE NOTES ON THE HAIRWORM.

WEARY and dusty, after several hours' work among the flint and chalk on the new line of railway between Walden and Wenden, I began my way home. To escape censure for looking like a bricklayer's labourer, and not wishing to offend the public taste, I threw my bag of fossils on the bank of the classic Cam, which, at midsummer, is here a mere stream, and sought by water to cleanse me from offence. Amid my cooling ablutions, two hairworms attracted my attention, which I immediately captured, placed in a piece of paper, and carried home in my waistcoat pocket, to examine at my leisure.

This worm was the subject of a brief but interesting paper at page 107. It belongs to the Nematoid order of Entozoa, and bears the name of *Gordius aquaticus*. Would not the kingly spirit who once ruled in the flesh over the Phrygians feel himself humbled that his name should be mortalized in such a worm? That is, if spirits wander and wonder at all. This worm, no doubt, got its name from the extraordinary manner in which it knots itself, and is thus supposed to resemble the leather harness of Gordius, which was so intricate that there was no finding out where it began or ended.

One of my humble acquaintances measured no less than $8\frac{7}{10}$ inches in length. It has no jointed skeleton internally, but a jointed covering, as in insects. It is said that these creatures live a parasitic life in the body of some unfortunate insect, of an astonishing small size when compared with the great length of the worm. When mature they quit the body of the insect at whose expense they have lived, for some moist place or watery spot, to deposit their ova, which is accomplished in long chains. It has been stated of this species, that, on quitting its parasitical home for a terrestrial habitation, should it find dry weather—a state of things by no means congenial to its nature—it will shrink up into a perfectly hard and dry substance, and wait for a more favourable season. These worms draw their nourishment for the support of their bodies through the skin by absorption. I removed one of my specimens from its aquarium, which I had extemporized in a tumbler, and subjected it to a scorching mid-day sun. It soon adapted itself to altered circumstances, and what was a few minutes before a round-bodied, graceful worm, grew flat, rough, and contracted; slowly knotting itself till at last it became small and motionless, and blown about by the faintest breath of air. Satisfied that it had undergone sufficient scorching, if possible to deprive it of life, and of ever again sporting its hair-like body in my glass, I returned it thither again after about three hours' exposure to the sun's rays. You will not wonder that I watched it with an earnestness that would have done honour to a more weighty matter, as it absorbed moisture and gave off little air-bubbles from almost every joint. It gradually assumed its former shape, gave signs of life, and, to my no small joy, soon sported its long body with becoming jollity at being restored—if not to life, at least to the element most compatible with its notion of comfort. The figures represent the head (*a*) and tail (*b*) of female magnified.



b. *a.*

Some weeks after the above event I revisited the spot, and found the little water that remained apparently alive with these small creatures. The water-plants were really matted together by countless numbers, and I could have secured hundreds.

Another species of this genus, *Gordius mediensis,* common in warm countries, often measuring as many feet as our little friend does inches, has a nasty habit of entering the flesh of human beings, and if not carefully extracted, and every portion of its body removed, is productive of the most fatal consequences, producing ulcers, gangrene, and death. We are therefore thankful that our British species are harmless. J. James.

I noticed with unusual interest Mr. Baily's remarks on the Hairworm (p. 107).

This recalls a circumstance which had long ago passed from my mind, but which, being recalled, is as vivid in my recollection as if it had but just occurred; that one day, observing one of those long dark-coloured "clocks," or beetles, making its way from the garden to the house, I, with childish aversion, resolved upon its being drowned, and it was shuffled into a basin of pure water for the purpose.

Relentingly watching the creature sink, as it did immediately, to my infinite consternation, there began to protrude from the posterior end of the body a dark hair-like object, which lengthened and lengthened, till it finally emerged a living worm, now apparently in its natural element.

I well remember the almost breathless awe in which I ran to communicate the wonderful thing to my family.

The Hairworm—for such it was, but slenderer than Mr. Baily's figure—was taken to a gentleman who had the credit of being an authority in natural history—a kind of factotum, indeed,—and he, not having that faith which my father had in the veracity of his child, quietly smiled it down as a thing impossible—wholly unworthy of credit! and it was dismissed accordingly. I am naturally pleased, therefore, to see, after the lapse of many years, this long-forgotten first wonder of my youth corroborated; and naturally also regret that they should have for ever passed away to whom it might have afforded equal pleasure. E. Hodgson.

NOTES ON THE HAWTHORN.

The berries of the hawthorn (*Cratægus oxycantha*) are in Cheshire not called "haws" but "hægs," pronounced "hagues." This is the old Saxon name of the plant. The same word is in use in Lancashire, as Mr. Grindon tells me that a Lancashire writer, Brierley, speaking of the flowers of the hawthorn, calls them "hague-blossoms," and that the word is also to be found in Shakespere and in Bacon. The modern German name for hawthorn is "hagedorn." Our word "haw" is of course derived from "hæg," but our Cheshire and Lancashire men retain the original Saxon word. They are also probably more correct in pronouncing it *hay*thorn; than educated people in calling it *haw*thorn; for haythorn is merely an easy way of pronouncing hæg-thorn.

There are fields in Cheshire called "Hag-hay." Many fields are named after particular plants that are found in them; as Gorsey-patch, Crabtree-lands, and Blue-buttons (the last from the prevalence of Devil's-bit Scabious, *Scabiosa succisa,* called "blue-buttons"); and "hag-hay" may originally have been "hæg-haga," the field where hawthorn grew; for "hay" or "hey," a very common name for a field, is derived from the Saxon "haga," and means an *enclosed* field. Hag-hay might, however, with equal propriety mean "Goblin-field."

It, however, seems most likely that all fields now called "hays" or "heys," as cow-hey, horse-hey, hag-hay, and such places as Green-heys, in Manchester, were enclosed fields so long ago as the time of the Saxons; and such fields were very possibly called "haga" because the hedges were planted with *hægs:* indeed, the word "hedge" itself, Saxon "hegge," German "hecke," seems to me to be probably derived from "hæg," because it was made of that plant. If this be correct, a hedge means, *par excellence,* a hawthorn hedge; and the hawthorn derives additional interest from the fact of its having been used in England for the same purposes as at present for perhaps a thousand years; indeed, it is not impossible, taking into consideration the very slow growth of the plant, that many of the gnarled and twisted hawthorn stumps, cut down and sprouted out again and again, which we see in old-fashioned, crooked, and untidy hedges, especially if the field be called "hay," may be the identical "hæg dorns" planted by our Saxon ancestors.

Haigh and Hague are two not uncommon surnames in Lancashire, and are doubtless derived in some way from the Saxon name of the hawthorn tree.

Mobberley, Knutsford. Robert Holland.

Plants Consumers of Oxygen.—From a paper recently read in Paris it would appear that the green leaves of plants absorb carbonic acid and give out oxygen, and the flowers do the reverse. The action of flowers on the atmosphere appears to be very much the same as that of the lungs of animals, and is the more or less intense according to the greater or less vitality of the flowers. Buds give out more carbonic acid for their size than fully developed flowers, and require more oxygen. "Scentless" flowers are less "active" than those with a strong perfume. The stamens and pistils, the most vital parts of the flower, consume most oxygen, and produce most carbonic acid.—*The Reader.*

THE BLUE WREN.

(*Malurus cyaneus.*)

THE changes of plumage which occur in some of the birds of our own country will be familiar to most of our readers. In nearly all birds a manifest increase both in the colour and brilliancy of their plumage takes place at the commencement of the breeding season, and afterwards is lost, gradually in some species, more suddenly in others. The golden-coloured specks on the feathers of the common starling are thus lost after the breeding season, by the extreme tip of each feather breaking off. In some of our native birds the assumption of additional colours in the spring is made with great rapidity, as in the black-headed bunting and the black-headed gull, especially in the latter.

None of our British birds can, however, vie for a moment with the Blue Wren of Australia, either in the extraordinary changes of colour, or in the rapidity with which they are assumed, and I have often witnessed the transformation with wonder and admiration.

In his ordinary dress (for it is only in the male that the change takes place), our friend is a very unostentatious little fellow, dressed in a suit of plain russet from head to foot. His disposition is in harmony with his dress, he makes no attempt to attract attention, but quite content to pursue the "even tenor of his way," he sings his hurried strain, caring little whether it is applauded or not.

This we may call his normal state, but no sooner does his little breast feel the first glow of love than all is changed—plumage, disposition, and manners. Like human lovers, he is desirous of placing himself to the best advantage in the eyes of the fair one he has chosen; and, in addition to other attractions, personal appearance must have due attention. And now comes the marvellous transformation: his russet suit is exchanged for a sky-blue satin vest, which glows with a metallic lustre, and a black velvet coat (of course of the richest Genoa), while his head is adorned with a graceful covering of the same resplendent blue.

But love's transforming power extends to his disposition as well as his dress; his whole nature seems to have received a new impulse, and his unobtrusive bashfulness is replaced by a confident boldness, as if aware that he had become the "cynosure of neighbouring eyes." Now sprightly and vivacious he pours forth his song unceasingly, bounding along with rapid, elastic hops, as if he knew not how to contain his joy.

This remarkable change continues until the lady he has chosen has concluded her maternal duties, but no longer. He doubtless feels that velvets and satins are too fine for workday duties, and, like a prudent paterfamilias, his holiday apparel is put away till another season, and the homely russet once more resumed.

My readers must understand that if my language has been somewhat figurative, I have been simply describing facts.

The ordinary plumage of the Blue Wren is plain brown, the tail feathers being of a darker hue.

During the winter season they assemble in small flocks, but as the spring approaches they separate into pairs, and the male bird then undergoes the extraordinary transformation I have described.

In precise language, his nuptial dress is as follows: Crown of the head, ear-coverts, and a lunar-shaped mark on the upper part of the back, like a tippet, bright sky-blue, with a metallic hue and texture; lores, line over the eye, occiput, scapularies, back, rump, and upper tail-coverts, rich velvety black; throat and chest, bluish black; tail, blackish blue, tipped with white; wings, brown; under surface, buffy white, tinged bluish on the flanks.

The rapidity with which this brilliant additional plumage is put on is surprising; about a week or ten days sufficing for its production, and after a few months wear, it is thrown off with equal or greater rapidity.

It is a pretty sight to watch these little fellows in their gay attire, and often as I have seen it, it has always been with fresh pleasure. It is fond of wild, scrubby districts, where brushwood alternates with open spaces. It is plentiful in the extensive botanical gardens on the bank of the Yarra, at Melbourne, and may be seen there to great advantage, for it is secure from murderous guns, and seems to understand and appreciate its security.

There are six species, inhabiting various parts of the Australian continent, and all are remarkable for the same changes of plumage. One or two species found in the northern parts have the colours more richly diversified, a rich cinnamon brown being added to the black and blue.

W. J. STERLAND.

THE SPIRACLES OF THE FLY.

ON a fine summer evening, a few years ago, with a careless stroke, which happened with rather true aim, I brought down a noisy blow-fly that was buzzing about me. Seeing it not likely to recover the effects of the blow, I thought it better to put it out of pain, and kill it outright. To do so, I took up a penknife and cut off its head, supposing that to be a very short way to effect this object. The fly thus decapitated gave several energetic whirls on its back, and then became quite still and motionless. A few hours after I touched the headless trunk, when, to my astonishment, it whirled round again as briskly as ever; and for many a day I wondered how it could be that any insect could live for hours without its head. No doubt many a young reader, and perhaps some old ones too, will wonder at this fact, and look for an explanation.

The fact becomes interpreted when it is known that flies, in common with other insects, do not breathe through their mouths and heads, but have a special and peculiar organization for carrying on this important and natural operation of life.

The head of the fly contains the compound eyes with which it sees; the mouth and tongue, with which it feeds, but cannot make sounds; and the antennæ, which are variously set down as organs of hearing, smelling, and feeling; whilst some say that they may be organs of a sense of which we may have no idea.

The body it is which contains the breathing apertures; these form a series of pores along each margin of the under surface, and are called spiracles, or stigmata.

The spiracles of insects form beautiful microscopic objects, and the amateur frequently makes the attainment of a number of them from different insects, one of his first designs in his earliest efforts at the preparation and mounting of objects. This, no doubt, arises from the great beauty of the preparations, and the ease with which subjects are obtained for dissection.

One of the best microscopic handbooks says that the "spiracles are generally visible on the exterior of the body of the insect, especially on the abdominal segments," and that "they are easily dissected by means of a knife or a pair of scissors."

This statement, generally correct, and sufficient in the case of the Water-beetle (*Dytiscus*), the Cockchafer, and other insects, fails in the case of the Blow-fly; and the amateur will have much trouble and frequent disappointments in his endeavours, under this guidance, to discover the spiracle of the fly, so beautifully figured in the same handbook.

I make these observations, not to find fault with my handbook, which I value as one of my best books, but to show the necessity and utility of such practical hints as can be best given through the medium of such a publication as Science Gossip.

The spiracles usually mounted are situated in the thorax, near to the head.

There are four spiracles in the thorax, two near the head, and two near the wings; they are not easily seen, and may be mistaken and not found.

To obtain them, first steep the fly in liquor potassæ for a week, then remove the head and abdomen, and divide the thorax into two parts, cutting it down along the centre of the back. The muscles, &c., can now be easily removed, leaving the two portions of skin tolerably clean; these must be well washed in water, on a glass slide, with a camel-hair pencil, until every remaining portion of muscle and trachea be completely removed. The spiracles will now appear under the microscope, or even to the naked eye, if they be held up against the light, as small oval openings in the skin.

The cleaned skin should now be placed on a glass slide and covered with a piece of strong glass, and subjected to gentle and constant pressure until it becomes nearly quite dry. It should then be steeped in clean turpentine for a few days (prolonged steeping bleaches too much), when it may be taken out, trimmed round the edges, and mounted in balsam.

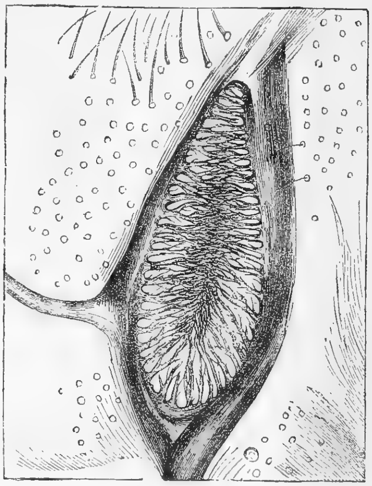


Fig. 1. Spiracle near the head.

The spiracle near the wing I have never seen figured in the handbooks, or mounted by the professional artist, yet it is interesting from its peculiarity. In it the branching proceeds from one side only; and its position in the body of the insect is not symmetrical, being placed perpendicular rather than parallel to the direction of the spiracle near the head. There are spiracles in the abdomen also, but they are very small, and not worth mounting.

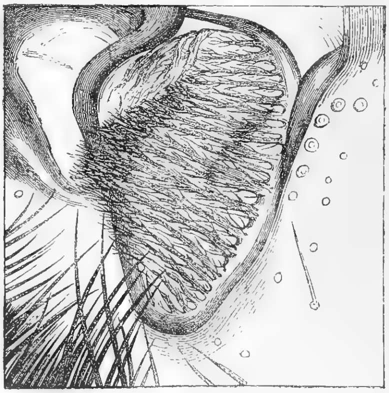


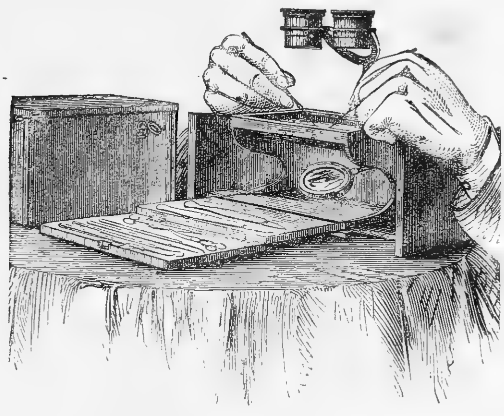
Fig. 2. Spiracle near the wing.

I would fain give some directions to the inexperienced amateur in microscopy as to the spiracle of the larva of the fly, but I find I have done enough for one occasion. The subject, though humble, will not be despised by the readers of Science Gossip, however learned; and if it may chance to meet the eye of one immersed in the speculations of gain, or given up to studies he may fancy more noble and exalted, and who may be disposed to treat with indifference subjects seeming so lowly and common, let his rising contempt be checked by the reflection, that the humblest thing in nature becomes an exalted subject of human study, when considered as an object for which Infinite Wisdom has exercised design, and upon which the finger of Omnipotence has put forth its power.

Armagh. Lewis G. Mills, LL.B.

A NEW BINOCULAR DISSECTING MICROSCOPE.

In making dissections of the lower animals, I have frequently found that much more satisfactory results are attained by the employment of low magnifying powers of considerable penetration, than by the use of the inch and half-inch lenses of such instruments as the Quekett microscope. The advantages of low powers are:—1st. That an abundance of room is left between the lens and the object, so as to admit of freedom of action of the operator's hands; 2nd. That the object may be easily and well illuminated by means of the "condenser;" and 3rd. That several structures situate at different levels are brought simultaneously into view. From a knowledge of the qualities I have alluded to, I was led to think that an arrangement of simple lenses for the production of binocular vision would be of infinite service to the anatomist. I therefore caused such a combination to be effected, and, having added to it a few contrivances calculated to facilitate dissection, I now submit the result to working microscopists.



The microscope when closed and packed, with its various apparatus, forms an oblong mahogany box about six inches long and three and a half inches deep, provided with a lock and key. When unlocked, the cover and one side, which are connected by hinges, unfold so as to lie out in front of the operator, displaying, at the same time, the lenses, mirror, and dissecting instruments. The stage consists of a gutta percha trough, having a small circle of glass cemented into its centre, and placed (when in use) upon ledges attached to the two ends of the case. The objects of this species of stage are:—(*a*) to enable mollusks and similar creatures to be dissected under water; (*b*) to allow the object to be fixed by means of pins which may be driven into the gutta percha; and (*c*) to permit light, when required, to travel through a tissue, by being reflected from the mirror to the glass circle. Outside the real ends of the case, which sustain the trough, there are two false ones, slightly bevelled above and connected below with horizontal pieces, which slide easily and uniformly into the bottom of the case. These are intended as supports for the wrists of the anatomist, and can be drawn out for a distance of six inches or less on either side. The lenses, which are two in number, are fixed in movable eye-pieces, and these are sunk in an oblique arm, which has the power of vertical rotation on the perpendicular bar employed in producing the proper focus. This vertical bar slides freely and steadily in a brass fitting which perforates the back of the case. By means of the rotating power to which I have referred, the arm bearing the lenses is, when not intended for use, depressed so as to fit into the centre of the case. The trough also slides beneath the mirror. When the object examined is opaque, a "bright spot" of light is thrown upon it by the condenser which springs from the front angle of the case. The dissecting instruments are placed in depressions in those portions of the case which unfold upon the table; they consist of two pair of scissors ("curved" and "straight"), two curved and two straight needles, and a pair of scalpels of forms adapted to the requirements of the dissector.

The magnifying power, with the binocular arrangement, does not exceed six diameters, but the field of view is so large, and the "relief" of the object under examination so well and clearly marked, that it is not without some degree of confidence that I ask the readers of Science Gossip to pronounce their opinion upon the qualities of the new binocular.

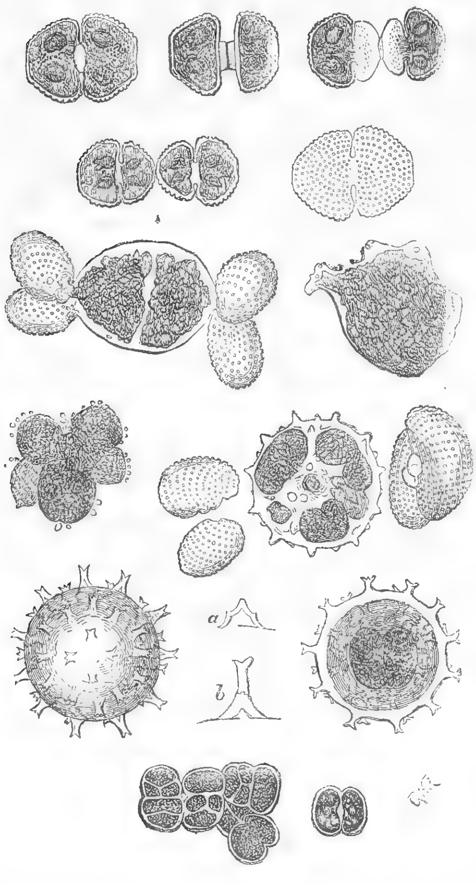
Henry Lawson, M.D.

SIMPLE OBJECTS.—VI.

(*Cosmarium botrytis.*)

The pretty green frustules of *Cosmarium botrytis* may be found in almost every pond, and form very interesting objects for the microscope. Each frustule is a perfect plant; and consists of a single cell, having a deep constriction across the middle, and regularly covered with minute tubercles. The green contents are arranged round double nuclei, on each side of the constriction; and at times (probably before the increase by cell-division takes place) dark-coloured particles, having a peculiar "swarming" motion, may be seen between each pair of nuclei. Perhaps in no plant can the processes of cell-division and conjugation be more readily traced.

Figs. 1 to 4 show the mode in which cell-division takes place. The constriction across the frustule



becomes wider, and a small protuberance appears between the two half cells, across which a wall of separation seems already to have been formed. The parts of this protuberance gradually enlarge, at first containing only the "swarming" particles; then assuming the form and colour of the corresponding half cells; and at length, when the growth is complete, separating into two perfect frustules. In these the process of cell-division is again repeated, so that the multiplication of these simple plants under favourable circumstances must be exceedingly rapid; though there is, doubtless, a limit beyond which the multiplication does not extend.

In conjugation two cells, which are near to one another, each divide at the constriction, and pour out their contents into one common mass (fig. 6) which is held together by a gelatinous envelope. This mass, which at first is of irregular shape (figs. 6, 7), and contains small transparent, colourless globules (possibly of oil), gradually obtains a more regular form (fig. 8), and at length becomes a spherical sporange, convered with forked protuberances (fig. 10*).

The contents of the sporange at first seem to consist of irregular, rounded green masses. Afterwards these become either uniformly blended, or else increase so as to fill up the sporange, which then presents a dark green aspect. Subsequently the contents appear as a central, green mass, surrounded with purplish matter; and, being to some extent, less in bulk, make the surrounding cell-wall very apparent.

That the sporanges, after a time, break up and produce new plants is very evident; though it is difficult to detect when or how this takes place. A mass of cells (fig. 12) may, perhaps, be an early stage in their development; for such masses occur abundantly in the water in which the *Cosmarium* is kept, and bear a considerable likeness to the perfect frustules. J. S. TUTE.

THE COMMON DORMOUSE

(*Myoxus avellanarius.*)

I THINK I am right when I say that very few persons know the great interest this little animal is capable of affording, except, of course, those who have cultivated its acquaintance by keeping it as a pet,—interest not only as regards its habits and mode of life during both summer and winter, but also as to the variety of food it requires, and the enormous quantity of that food which, for so small a creature, it will consume; together with the amusement produced by watching its innocent gambols during its hours of feeding.

The Dormouse is indeed, as described by Milne-Edwards, in his work on Natural History, a pretty little animal, with soft hair, velvety tail, ever tufted, with a lively look, having a strong analogy to the rat; it belongs to a genus of the Linnæan order *Glires*, and it inhabits temperate and warm countries, subsisting entirely on vegetable food. In Varro, *De Re Rustica*, we find that the art of rearing and fattening great numbers of this genus was practised in Roman villas, as a profitable article of rural economy; and again in Brotier, the last edition of Pliny, we read that the excessive demand of them for luxurious tables was increased by the foolish prohibitions of the censors; and it is reported that they are still esteemed in modern Rome, being frequently sent as

* Fig. 10—*a* is the earlier, *b* the more perfect form of these protuberances.

presents by the Colonna princes. They generally bring forth three or four at a time, and the little ones are, of course, uncovered by fur, being usually quite blind, and remaining so for a few days after birth.

It frequents woods and thick hedges, building an almost round nest, lining it with moss and dead leaves, and placing it in the hollow of a tree, or at the root of some thick shrub; it will sometimes take possession of a deserted hedge-sparrow's nest, and this it will make its home, and will form a magazine of nuts, acorns, beans, &c., on which to subsist during the inclement season of winter. When this period of the year comes round, it retires to its prepared abode, and, having provided itself with a good store of food, will roll itself up into a ball, similar to the marmots, and fall into a torpid or lethargic state till winter is over, and when the more genial sunshine of spring causes the buds and flowers to burst forth in all their beauty, the little Dormouse may be sometimes seen sporting about on the boughs of the willow or the hazel, eating the catkins which are then in their prime, rejoicing with all nature at the return of warm weather. It was formerly believed that this state of hybernation was a continual profound sleep, extending from the period of retirement in the fall of one year to the commencement of spring in the next; but this absurd notion was very properly exposed by Buffon, and the error may be observed by any one who will keep and watch a dormouse through the long winter months, from the fact that it will occasionally wake up, and having satiated itself from the food that, if in captivity, must always be kept in readiness in its cage, but which, if in the wild state, it will have stored up,—it will speedily fall asleep again as fast as ever.

As regards its instinct, this little animal seems to be warned by nature not to venture out during the day, in search of food, since, by so doing, it would run the risk of falling a prey to hawks, owls, stoats, and such-like creatures, which, as the ancient Romans *were*, are very fond of them; and I think from the fact of their large, black, prominent eyes, which are rarely or never seen to blink, being so sensitive to strong lights, together with their wonderfully acute sense of smell, we can rightly conclude that they were originally intended by the Divine Creator to be nocturnal feeders. I do not mean to convey that they never do come out and feed by day, because I know instances where they have been seen (my father himself caught one regaling itself on the catkins of the hazel on a fine day in early spring); but that as a general rule you will find that they remain concealed during the day, and at night emerge from their hiding-places to take their food.

When I first imprisoned a Dormouse, some years ago, I knew little or nothing about it. I fed it with food which I now perceive to have been wholly unfitted for it, and I am convinced that the chief reason of the sickly appearance and subsequent death of my little captive, was the style of food, and the limited supply I gave it, for I had then no idea of its enormous digestive powers, or of the variety and quantity it requires. At the present time, however, I have three, lodged in a tolerably spacious cage, fitted with sticks placed in various positions, on which they sport and gambol very prettily indeed. They rarely or never come out during the day, although they have no enemy to fear; but as soon as it grows dark, one by one they creep out of their nest and search for the food they most enjoy. I give them a variety every night, of such things as wheat, hawthorn-berries, familiarly known as "haws," with nuts or almonds. Of the nuts they eat as many as eight or ten during the night, gnawing with their teeth a singularly round hole in them, and entirely cleaning out the contents. I have noticed, too, that if they do not make a symmetrical hole, there is generally something the matter with them. I cannot help thinking this is rather curious. Of the almonds they always eat ten, and sometimes as many as twelve. Besides the above dry food I give them each night a dandelion or a sow-thistle, the milky juice of which they like very much; you may, in fact, vary their supply greatly; any vegetable they are fond of, peas and beans especially; and I am certain, from the experience I have now had, that the more you do vary the supply the happier and the more contented will your mice be in their captivity. I sometimes take mine out of their cage, feed them from my hand, and put in their way butter and milk; and the avidity with which they seize on these articles is very amusing. During the last winter session, I had a pair with me in town, and after I had finished tea one evening, I let one out: it discovered a box of sardines, or rather where sardines had been, for luckily I had finished them, as my mouse was into the oil before I could look round, and it lapped up a good deal before I took it out. It made itself, as you may suppose, in a very deplorable state, and not till some time after, from its own exertions coupled with mine, did it become quite clean. I used to put it in my hand and gently rub its fur with a piece of flannel, and after I stopped, it would immediately begin working away with its tongue and feet, and at last it seemed to become so alive to my rubbing, as if it could understand why I was doing it—that it would continue its mode of procedure whilst I was using mine. I would not, however, advise the administration of this oil, as being beneficial to it, since I had to watch and feed my mouse very carefully for some days after the occurrence just stated, and at last I was rewarded by finding that it was getting over the bad effects produced by the oil; it recovered, and now, together with two others, which my brother brought from school last Christmas, it exists in the cage I mentioned above, the finest and fattest of the three.

A. H.

SEA-WRACK.

Ever drifting, drifting, drifting,
On the shifting
Currents of the restless main;
Till in sheltered coves, and reaches
Of sandy beaches,
All have found repose again.
Longfellow's "Sea-weed."

OF all the objects which the ocean casts upon its shores for the amusement of visitors from town, none are better known than the heaps of coarse black sea-weed which some call "wrack," and some call "tang," and some know not what to call. Sea-weeds are classed in three groups—the red, the green, and the olive. The species under notice belongs to the last of these. When found lying upon the beach it certainly looks as much like black as a lump of charcoal, but when growing in the sea is as decidedly olive. But we are speaking of it as though there were but one species, whereas two, three, or four, are often mingled in the same heap, and our object is to point out the differences, and furnish names whereby they may be distinguished.

First, there is the Black Tang, or Bladder-wrack (*Fucus vesiculosus*), with long fronds sometimes two

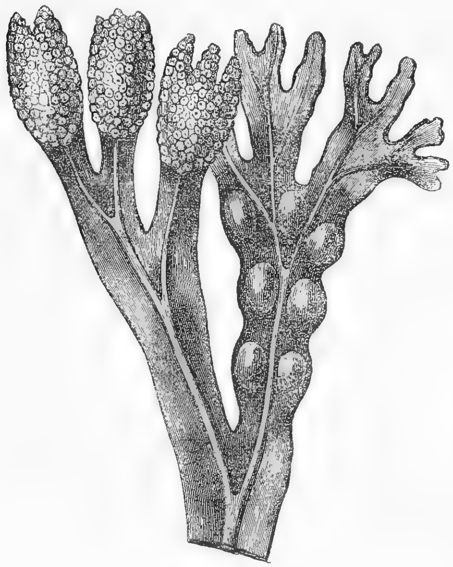


Fig. 1. Black Tang, or Bladder-wrack (*Fucus vesiculosus*).

or three feet in length, forking again and again into what we may call branches, with a stout midrib running down the centre, and covered with warty tubercles, or bladders, arranged in pairs (fig. 1). These are hollow, and filled with air, so as to render the "wrack" buoyant in the water. The tips of the fronds will sometimes be noticed swollen, and covered with little tubercles, scarcely raised above the surface. These contain the fructification. Let us pause a moment to examine them more minutely. We shall observe that each of these little frustules has a minute opening through which their contents escape. Cut one of these tips across, and each frustule will be seen to represent a cell or internal cavity (fig. 2, *a*), enclosing, in one plant, what are called the *antheridia*, and in another the *spores*. The former of these we may regard as the male, and the latter as the female organs. Both are always produced on separate plants. The *antheridia* are little bags or vesicles, containing small bodies called zoospores (*b*), which no sooner escape than they move about in the water as if endowed with life, and conduct themselves like little animals. The spores are little grains, of an oblong shape, which ultimately separate into a definite number of parts (*c*); these perform the functions of seeds, which are fertilized by the zoospores, as the ovules are fertilized by the pollen of flowering plants. We cannot, within our present limits, enter upon the mysteries of increase and multiplication in sea-weeds, but must content ourselves with indicating what any good book on the subject will more fully explain.

The Serrated Wrack (*Fucus serratus*) resembles

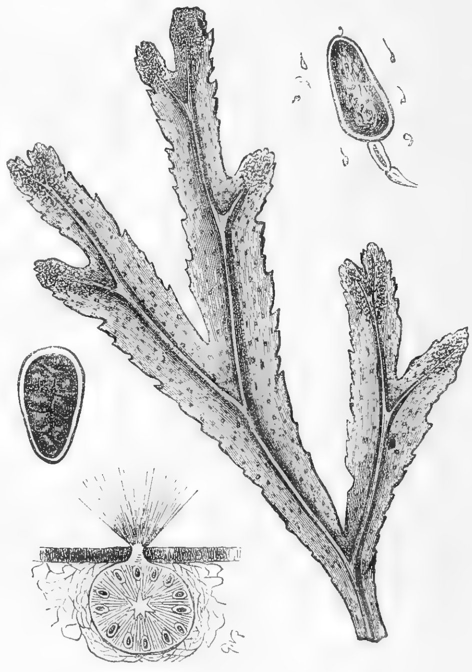


Fig. 2. Serrated Wrack (*Fucus serratus*).

the last in form, but there are no air-bladders, and the edges of the fronds are jagged or serrated, like the teeth of a saw (fig. 2). In like manner the fruit is borne at the tips of the fronds; and this species is recommended as the best for microscopical examination. Professor Harvey advises that fresh specimens should be collected in winter or early spring, and, being removed from the water, should be left till partially dry. As the surface dries there will exude from the pores of the receptacle drops of a thick orange-coloured fluid, which, on being placed under a microscope and moistened with salt water, will be found to be composed of innumerable cellules, from which will issue troops of these atoms, that are no sooner liberated than they commence those singular motions which the naturalist finds it so difficult to reconcile with vegetable life.

But the species best known and most highly appreciated by juveniles, though not the most

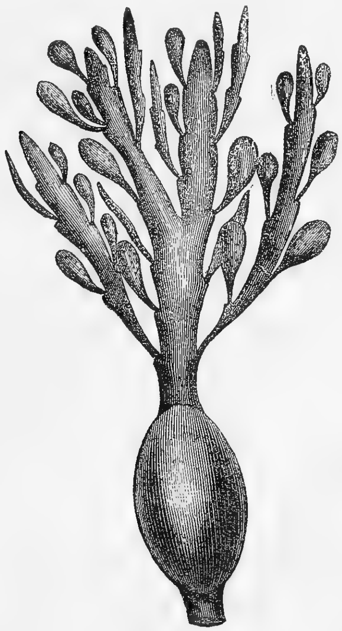


Fig. 3. Knotted Wrack (*Fucus nodosus*).

common, is the Knotted Wrack, or "Crackers" (*Fucus nodosus*). The air-vessels are very large, and on being thrown into the fire burst with a loud report; herein lies the cause of the popularity alluded to. No distinct midrib runs up the fronds, which are narrow and thickened. The receptacles which bear the fructification are not terminal, as in the former species, but borne on stalks or pedicels issuing from either side of the fronds. In the present species the spores separate into *four*, and in the Serrated Wrack into *eight* parts or sporules. A parasitic sea-weed often grows upon and nearly covers the Knotted Wrack.

There is also a much smaller kind of wrack (*Fucus canaliculatus*), the fronds of which are only a few inches in length. The fructification is borne at the tips of the fronds, and the spores separate into *two* sporules. Two other species belonging to the

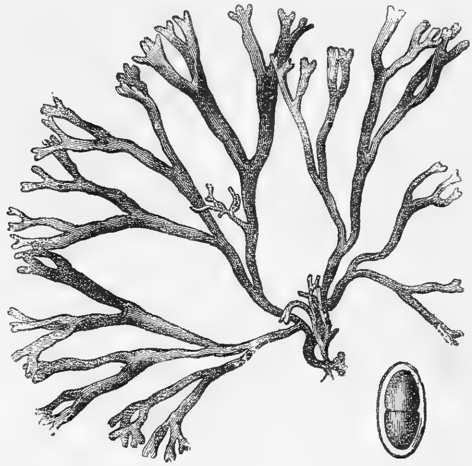


Fig. 4. Small Wrack (*Fucus canaliculatus*). *a*

same genus are found on our shores, but are less common.

Apropos of the name of "wrack"—which is commonly given to these plants of the sea,—in the Channel Islands it is *vraic*, and this is derived from the French *varec*, signifying *sea-weed*. So that in using the word "wrack" we are employing a corruption of the French word for "sea-weed."

If this brief notice of some of the common objects of the shore should lead any to examine for themselves what they have never observed with any interest heretofore, and to gather instruction from what they have almost despised, our design will be consummated. "There is nothing in nature so common, but we may always learn something from it, if we will but take the trouble to learn."

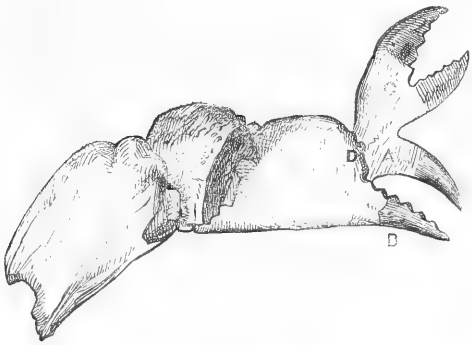
Cultivation of Butterworts. — *Pinguicula vulgaris*, and, indeed, any of the other species, may be easily treated in a state of cultivation, by attention to the following method, successfully adopted in our North Wales Botanic Garden. Collect the plants while in a state of hybernation, any time between November and March; at that period of the year they resemble bulbs, and can be picked off the surface of the bogs and moors in abundance. Fill a saucer with finely broken pieces of peat, and as much water as can be absorbed by the peat, and then place the bulbs simply upon its surface, without burying them in, or beneath it; just steady them and keep them supplied with moisture, and they will soon strike their fibres downwards and spread their leaves upon the surface, and make a beautiful appearance during the season.—*W. P. in Botanists' Chronicle.*

ZOOLOGY.

KESTREL (*Falco tinnunculus*).—I witnessed some time since, what struck me as a curious incident with regard to this hawk. While staying in the north of Devon, at a farm-house, I went out one evening shooting, and walked in the direction of a solitary old barn: while passing it, a hawk flew from a hole in the mud wall, about seven feet from the ground; I fired, but as its flight was so swift, I missed. Returning in about an hour, I saw one of the birds coming out of the hole in a very "hobbling" manner, holding something in its claws; it commenced its flight, but this time I was too quick for it: it fell, and I saw an egg distinctly drop from it, which I found broken by the fall.—*J. P.*

SQUIRREL MONKEY (*Callithrix sciureus*, L.).—A pair of these very interesting little monkeys from Brazil, have recently been presented by the Prince de Joinville to the Zoological Society, and may be seen in one of the side cages in the new Monkey-house, at the Society's Gardens, in Regent's Park.

CURIOUS CRAB-CLAW.—I enclose a rough sketch of a deformed claw of the Edible Crab, *C. Edulis* (or *Platycarcinus* of Milne-Edwards). The crab was



EXPLANATION OF FIGURE.

A. Moveable or upper mandible.
B. Fixed or lower mandible.
C. An extra or false pincer mandibles, which are both fixed, but work together with A at D joint.

caught here on the 23rd June, and its claw is in my possession. Believing it to be of rare occurrence, I thought it might be of interest to some of your readers.—*H. H. K.*

COMPARATIVE INCREASE IN SIZE.—At the age of twenty, man is rarely four times as long as the new-born infant; and his average weight is hardly thirty times greater. The Teredo larva, which is about to undergo a change of form, is four thousand times larger than when it sprang from the egg, and is still many million times smaller than its mother. —*Quatrefages' Metamorphoses.*

PIGEONS ROUTED BY SWALLOWS.—A pair of pigeons have for the last two years made their nest in a box attached to the wall of an outbuilding, the door of which is regularly closed at night. Two swallows attached their nest to a beam of this building, and so persecuted the unfortunate pigeons that they were suddenly compelled to retreat and establish a home elsewhere. The circumstance did not come under my notice until the swallows had hatched their eggs, when the swallows' nest was removed and placed outside the building, under a spouting which protected it from the wet, and the pigeons reinstated. The old ones continued to feed the young, and the swallows soon were on the wing. The pigeons, however, did not long enjoy their quiet, for, having laid more eggs, they were again attacked by the swallows, who made great efforts to build a second time on the beam, but were prevented by my servant. It was very curious to witness the attacks made on these unwieldy pigeons. The persecutions were not confined to the building, but wherever these unfortunates were met, down the swallows were upon them, skimming the air, and with the rapidity of lightning, pouncing upon them, and removing a lot of feathers with their beaks. Whilst the larger birds were turning round to make their attacks, the smaller ones were far out of reach.—*Charles Wotton, M.D.*

THE NATTERJACK AT COOMBE.—I lately caught a few Natterjacks on Coombe Warren, on the hill by the back road between Wimbledon Common and Kingston. A shepherd boy in the neighbourhood had some time before told me there were "spotted toads that run very fast" sometimes to be seen about. Mr. Bell in his work says they are found at Selborne, and I have heard of their being about Shalford, west of Guildford, so that they have several habitats along the Portsmouth road, but are nowhere so abundant as on Wisley Heath. They are noted in the "Penny Cyclopædia" as occurring at Hillingdon, Middlesex, but I lately showed a pair to two or three villagers there, and they did not know them. They are found about Berkhampstead, Herts.—*W. R. Tate, Camberwell.*

FLOWER-LOVING SPIDERS.—A white species is very common on the flowers of the "ox-eye," and sometimes frequents the wild roses; another I saw on an orchis, but it hid between the blossoms. They often had hold of a large fly, or even of a bee, which they had surprised at the flower; and one day noticing on a flower of one of the yellow vetches an example of *Vanessa urticæ* with its wings spread out, which did not seem to move on my approach, I looked more closely, and found that it was held by the head by a large bright yellow spider, of almost exactly the colour of the flower.—*C. G. Barrett, in Entomologists' Monthly Magazine.*

Ingenuity of the Thrush.—On the 1st instant was pointed out to me a thrush's nest built in the fork of a mountain ash, so near to a bed-room window as to be under the close inspection of an invalid lady, who, with her husband and her nurse, were much interested in watching the daily progress of the family. The young birds were hatched on the 20th of June. For several weeks no rain had fallen till the 29th, when a heavy downpour set in, which lasted, with very slight intermission, throughout that and the following day. The parent birds were much distressed to give shelter to their young, and despite all their care they failed in their efforts, until, struck with a happy thought, they succeeded in placing a stick across the nest, then availing themselves of this extemporized perch, and simultaneously spreading out their wings, they formed a complete and effectual canopy. On the following day the perch had disappeared; with the return of sunshine both parents, relieved from all anxiety on account of the weather, were busily plying their brood with grubs and caterpillars, so that I had no opportunity for seeing the happy contrivance; but the three more fortunate observers bore testimony, in terms of high admiration, to the skill and patience exhibited by the thrushes, who never deserted the perch so long as the rain continued, although their own feathers were dripping with water. Throughout the second day of trial the cock bird brought food to his mate, who distributed it amongst her nurselings, taking, of course, her own well-earned share. I asked my friends how the birds contrived to carry up the perch more than fifteen feet from the ground, but neither had been so fortunate as to witness what must have been a clever piece of engineering.—*E. Y. S.*

Snakes at Dinner.—During the present summer I have kept two snakes (*Natrix torquata*) in a glass case for the purpose of observing their habits; one of the most interesting is the method by which they take their food. Bell, in his "History of British Reptiles" (and after him most writers), states that it seizes frogs generally by one of the hind legs, or should the frog be taken by the middle of the body, it invariably turns it until the head is directed towards the throat, when it is swallowed head foremost. Wishing to test the validity of this statement, I supplied my snakes with a number of small frogs, and to my surprise I found that they were generally swallowed as taken—*i. e.*, if seized by the hind legs they went down backwards; if by the head, head foremost; and if taken sideways (as several were), they were swallowed in that position. Bell, in the work before cited, states that when a frog is seized all its struggles *generally* cease at once; this I cannot credit, for I have *repeatedly* noticed them struggle violently, and only cease to do by being swallowed. I have frequently noticed my snakes mistake small stones for frogs, actually biting at them, while the frog they were in chase of was scarcely an inch off, and which by lying quiet generally escaped, but the instant it moved the snake was after it again. From this I am forced to believe the sight of my reptiles cannot be good: is it so in their natural state?—*F. P. D., Birmingham.*

Birds and an Eclipse.—In Mr. Bennett's "Wanderings in China" (1833), we find an elaborate description of an aviary, and the following paragraph appears curious. Other persons may have made more ample examination of the same phenomenon. "It once happened during a total eclipse of the sun, that as that luminary became overshadowed, the feathered colony, if not in consternation at the event, was exceedingly perplexed at the rapid and untimely termination of the day, and all retired supperless to bed; they received, however, a second surprise at the briefness of the night; for before they could be well asleep, the cocks crowed at the reappearance of the sun, and all again resumed their daily amusements and occupations." —*P. B. St. J.*

White Hedgehog.—On the 15th of last month (July), when walking to London, seeing a number of working men examining some curious-looking animal which one of them had in his hand, I asked to be allowed to see it also, and to my surprise found it to be a white hedgehog, with red eyes, the same as a white rabbit or white mouse; it was gentle, and apparently very tame, and full grown, and in good health. One of the workmen observed to the others, that though in his life he had seen scores of hedgehogs, yet he had never met with a white one before; an observation that I could fully endorse; but whether it is so unusual a fact as I think, I am by no means sure. The colour was one uniform pale nankeen colour, both hair and spires.—*Aug. Gaviller, Stamford Hill.*

FISH TATTLE.

Hammer-headed Shark (*Zygæna malleus*).—About 1 p.m. July 31st, a large object was observed floundering among the rocks near the ladies' bathing cove by the boatmen on the quay-head. With great difficulty and some risk it was secured by ropes, and triumphantly towed into Ilfracombe harbour; it was then placed on a cart and drawn through the streets. For a small amount I obtained the carcass, and had it placed in the small garden behind our house. On measurement it was found to be 13ft. 7in. in length, 7ft. 2in. in girth behind the pectoral fins, 3ft. 3in. between the orbits of the eyes, which were nearly covered by crustacean parasites. On opening the animal the remains of two thornbacks and a bass were found, together with a number of intestinal worms of enormous size. There is only one recorded appearance of this remarkable fish on the British coast, at Caistor, near Yarmouth, in the year 1825. It is figured in Yarrell's *British Fishes*, p. 223, Part 49.—*G. P. O. Richardson, Ilfracombe.*

[N.B.—One was taken at Newlyn, in Cornwall, in 1834, and one at Tenby, in Wales, so that the present is the fourth recorded capture of this fish in the British Seas.—Ed. Sc. G.]

Glengariff for Ichthyology.—The Rev. J. Kingston thus commends this spot to our readers:—"Numerous as are the charms that Glengariff possesses for all, it offers special attractions to the ichthyologist. *His* days can be spent most delightfully. He has only to get on board one of the trawling boats that abound on this coast. After a day's sailing about a harbour that will furnish the lover of grand scenery with intense and pure delight, he will, when the trawling net is drawn up, indeed find that it has been worth his while to journey hither. Fish of every kind (mixed up with splendid specimens of Algæ) of which he has read, but which, perhaps, he has never seen, are spread on the deck for his inspection. Sure I am that every one who visits this highly-favoured spot will return to his home with renewed vigour of mind and body, and an increased love for the pleasant study of ichthyology."

The Basse.—The basse, called also the "sea perch," "sea-dace," "dace," and "salmon-dace," is a large salt-water fish, of very curious habits, and having externally many of the peculiarities and attributes of the salmon, perhaps more closely resembles the river-barbel in its ways than it does any other fish. Like the barbel it is fond of running outlets, and as the barbel delights in old wooden piles, or mill-boards (or anywhere, in fact, where there is wood-work), so does the basse frequent sea-piers and jetties, constructed rather of wood than of stone or granite. In such places, when the water is clear and the bottom rough and shingly, large basse may be seen poking their noses in the ground precisely after the fashion of the barbel; indeed a pig itself could not well be a more consistent groper than is the basse.—*Once a Week.*

ENTOMOLOGY.

Humming-bird Hawk-moth.—This insect is everywhere common this season, even venturing into the heart of London, and sporting in Temple Gardens and the courtyard of the British Museum.

Increase of bulk in Larvæ.—According to Rédi, the larva of a meat-fly (*Musca carnaria*) becomes, in the short space of twenty-four hours, from a hundred and forty to two hundred times heavier than it was before. Lyonnet has shown, by direct observation, and by calculation, that the caterpillar of the goat moth (*Cossus ligniperda*) is *seventy-two thousand* times heavier in the chrysalis condition than when it emerged from the egg.—*Quatrefages' Metamorphoses.*

Larva and Imago.—If you open a caterpillar's skin two or three days before it is converted into a chrysalis, you will perceive the wings, antennæ, and proboscis of the butterfly; and if you cut off one of this caterpillar's scaly feet, the butterfly will be lame.—*Swammerdam.*

Death's-head Moth (*Acherontia atropos*).—From numerous communications on the subject, we infer that this insect is more than usually common this year.

Death's-head Moth (*Acherontia atropos*).—Last week, in a garden in this neighbourhood, several specimens of the larvæ of the Death's-head Moth, altogether nine in number, were found feeding on the leaves of some potatoes. Amongst these was one individual of the rare and extraordinary variety mentioned by Stainton in his Manual, the ground colour of which, instead of being lemon-yellow, with the anterior segments green, and the lateral stripes violet, is of a brownish-olive, the fore part whitish, and the lateral stripes darker, with a peculiar form of the anal horn. This seems to prove that such varieties are produced from the same moth, and at the same time, as the common forms; and are therefore merely acccidental or depending on causes which the naturalist has yet to seek. The present unusully warm summer seems to have been productive in some localities of various insects not formerly there observed. I have noticed several specimens of the Painted Lady (*Cynthia cardui*), a butterfly I have never before seen here; and some Foresters (*Procris statices*) have also been noticed. As to the common whites, they are swarming. A friend who has paid a visit to the Isle of Man compares them, in some of the fields there, to a snow shower. The cultivation of any of the cabbage tribe for winter use, it seems, will be a vain attempt.—*W. Robert, Wigton.*

Wasp (*Vespa sylvestris*).—This wasp has made its appearance in unusually large numbers, in the neighbourhood during the present season. I lately found two extremely beautiful specimens of their nest, in a small plantation of spruce fir. In both cases they were suspended from the lower portion of a spruce bough, not far from the extremity, and at the height of about four feet from the ground. One of these nests was as large as a man's head, the other twice the size of a cricket-ball. The twigs of the branches from which these nests were suspended had been curiously built in and interwoven with the substance of the nest, the dense close boughs of the young spruce completely shielding the fabric from wind and rain. The entrance was on the south side, and nearly underneath. *V. sylvestris* is not a common species in the neighbourhood, and it is very seldom that I have had an opportunity of inspecting their nest.—*J. C., Great Colne, Ulcely, Lincolnshire.*

BOTANY.

THE SUN-DEW (*Drosera rotundifolia*).—Of course the peculiar leaves of this plant are familiar to most of the readers of SCIENCE GOSSIP. Professor Babington says in his handbook, "leaves covered, as in all other species, with hairs, terminating in large glands, secreting a viscid fluid, which retains insects that settle upon them." In Bentham's "Flora," the leaves are said to be "covered on their upper surface with *long red*, viscid hairs, *each* bearing a small gland at the top." These remarks hold good in the greater number of species, which have the hairs *tapering*, red, and with a gland. In a tolerably common variety, however, the hairs are scarcely tapering, much longer, *colourless* always, frequently without the terminal gland, and in such forms the plant is always much smaller. Moreover the leaves are always uniform on the same plant, and the absence of colour is not due to etiolation, since the plants all grow together equally exposed to the light. The plant (both forms) may be found plentifully on Hampstead Heath. In some plants (*Myosotis*, for instance) the hairs are recognized as of specific value, and if so in *Myosotis*, why not in *Drosera?—A. P. H.*

ERUCASTRUM POLLICHII.—This plant appears again this season abundantly; it likewise has made its appearance among a large crop of common Charlock in part of an old pasture broken up this spring, which has certainly been undisturbed for fifty years, and probably for a much longer period.—*Joshua Clarke in Journal of Botany.*

MORE USES FOR NETTLES.—When a swarm of bees has been shaken into a hive, a number of them often cluster again round the branch on which they were knit, and it is sometimes not very easy to dislodge them. It is a common practice in Cheshire to hang over them a bunch of nettles dipped in liquid manure, which either does or is supposed to drive them away. In all probability it is the foul smell that the bees dislike, but as nettles are always the plants used, not only in Cheshire but elsewhere, as appears from the letters of "The *Times*' Bee-master," it would seem as though there were an idea that bees had a natural antipathy to nettles, perhaps from the fact of the plants being, like themselves, furnished with stings. Nettles are also used with a decoction of oak-bark as a cure for diarrhœa in calves. The oak-bark is the important ingredient, but the nettles are also beneficial, being slightly stimulant. It is a good and effectual remedy, but superseded, like most native remedies, by more powerful foreign drugs, in this case by catechu and other ingredients, of which a much smaller dose is required, a great advantage in physicking refractory animals.—*Robert Holland.*

A TRIPLE MUSHROOM.—A physician of my acquaintance has a mushroom-bed in his cellar. A few weeks ago he *cut* one which was about five inches in breadth, leaving the lower portion of the stem projecting from the bed. This afternoon he was surprised to find a peculiar double mushroom

on the spot. It is formed of two mushrooms attached by their upper surfaces; the smaller one being placed in the inverted position on the upper one, and the cuticle of the two being continuous. The stem of the upper one was continuous with that of the large one which was cut off. The annexed sketch will give some idea of the nature of this curious monstrosity. The part above the dotted line represents the one cut off a few weeks ago; the part below is the double mushroom at present in my possession.—*C. A.*

BOG ASPHODEL.—Dr. Buchenau, of Bremen, has called attention to the poisonous properties of *Narthecium ossifragum*. Cows which have eaten of this plant have died after a severe attack of dysentery, their milk turning as bitter as gall; and cats known to have partaken of this milk have died also. —*Journal of Botany.*

IRISH IVY.—There is in gardens a very fast-growing large-leaved plant, commonly called "Irish or Scotch Ivy." This plant, as I understand the species, is one of the many varieties of *Hedera Helix*. There is, besides, a plant which gardeners call "Sharp-leaved Irish Ivy," and this I hold to be one of the varieties of *Hedera Canariensis*. It occurs wild in Ireland, and is evidently the plant alluded to by Mackay in his "Flora Hibernica."—*Dr. Berthold Seemann.*

NEW BRITISH FUNGI.—Dr. Capron has found the Balsam brand (*Puccinia nolitangeris*) plentifully on *Impatiens fulva* at Albury. Also a brand, not hitherto recorded in Britain (*Puccinia virgaurea*) on Golden rod (*Solidago virgaurea*), and a white mildew on the spindle-tree, allied to that found on the Berberry, and named *Microsphæria comata*, Lev., also new to the British list. All these are interesting microscopic objects.

GEOLOGY.

Formation of the Alps.—The opinion seems to be gaining ground that this mass of mountains is the result of a number of independent upheavals of strata at isolated points; that there is no such thing as the Alpine "chain," but that the Alps consist of several mountains, or "central masses," as they are termed, grouped together more or less irregularly. These "central masses" are formed of hard crystalline rocks, such as gneiss, mica-schist, horneblende-schist, &c.; and the intermediate valleys consist of newer and softer material, chiefly clay-slate of different ages. This theory assumes, of course, that the Alpine valleys are essentially valleys of elevation, and not of denudation. But for further details we must refer our readers to Professor Theobald's work on the "Geology of the Grisons," and to M. Desor's "Die Gebirgsbau der Alpen."—*Geological Magazine.*

Llandeilo Fossils from Caradoc Strata.—At the July meeting of the Severn Valley Fish Club, held at Ludlow, Mr. Randall, F.G.S., exhibited a number of Llandeilo fossils from strata near Cound Brook (a tributary of the Severn), hitherto considered as of Caradoc formation. Mr. Randall read a paper, descriptive of the strata and fossils, and stated, in conclusion, that the fossils, particularly the *Agnostus* and *Trinucleus Lloydii,* must either be regarded as having been found for the first time in Caradoc beds or, as heretofore, of true Llandeilo type, and indicative of the Llandeilo character of the Cound shales.

Fossil Plants of Coal Seams.—Mr. E. W. Binney has recently communicated a paper to the Royal Society, in which he has endeavoured to show that the *Sigillaria vascularis* with rhomboidal scars gradually passes as it grows older into a ribbed and furrowed *Sigillaria;* and that this singular plant not only possesses two woody cylinders, arranged in radiating series, an internal and an external one, divided by a zone of cellular tissue, both increasing on their outsides at the same time, but likewise has a central axis, composed of hexagonal vessels, arranged without order, having all their sides marked with transverse striæ. Evidence is also adduced to show that *Sigillaria* dichotomizes in its branches something like *Lepidodendron,* and that, like the latter plant, it has a *Lepidostrobus* for its fructification. The outer cylinder in large *Sigillariæ* is composed of thick walled quadrangular tubes or utricles arranged in radiating series, and exhibiting every appearance of the tree having been as hard-wooded as the *Pinites;* but as yet no disks or striæ have been observed on the walls of the tubes.

Our Stock of Coal.—The extraction of saleable coal from British mines approaches a hundred million of tons per annum, and the waste of coal involved in getting this quantity is probably more than one-fourth part more. Coal weighs rather less than a ton to the cubic yard, and we are therefore removing and using, or destroying, from the portion of our own small island to which coals are limited, 125,000,000 of cubic yards every year of one of the most valuable substances in existence. Assuming a coal-seam to have an average thickness of two yards, it would take twenty square miles of such a seam to supply one year's consumption. It behoves us, then, to look around, and consider the resources we possess, whether we can afford to expend this portion of the capital stock of our national wealth, and what chance there may be of this stock becoming exhausted.—*Ansted's Practical Geology.*

Bituminous Oil.—The oil-bearing shales have recently been discovered in Australia, and promise to open up another important source of wealth. Extensive seams of this mineral have been found at Hartley and Wallongong, both in New South Wales. The seam at Hartley was accidentally discovered in consequence of a piece outcropping through the alluvial soil. The mineral is similar to the Boghead coal, but is superior from yielding a larger quantity of oil, and being free from sulphur. From the experiments which have been made, it is estimated that a ton would yield 140 gallons of crude oil. In colour it is a dark brown, breaks with a conchoidal fracture, and is so tough that when struck by a hammer the tool rebounds. Preparations are being made for working it.—*W. J. Sterland.*

Fossil Oak.—Oak occurs in the peat over the boulder-clay at Hoxne, in Suffolk, and in the peat-bed at the mouth of the river Cauche, which falls into the sea near the embouchure of the Somme, associated with the yew and fir, with the addition at the last-named place of the hazel. It is also found in considerable quantities in the peat-bed which extends over a considerable area in the county of Gloucester, to which the writer has had the satisfaction of first calling public attention.—*J. Jones, in Geological Repertory.*

The study of natural history is within the reac of every one; and he who is engaged in it, is pre sented at every step in his progress with something capable of awakening pleasing emotions.

Every pound of cochineal contains 70,000 insects boiled to death, and from 600,000 to 700,000 lbs. are annually imported to Europe for scarlet and crimson dyes.

The female cod-fish is supposed to carry in her ovary more than 500,000,000 of eggs.

WINDOW GARDENS AND AQUARIA.

BARNACLES AND CORALS.—Mr. P. H. Gosse, at page 282 of his new book, "A Year at the Shore," says that about one specimen in every six of the Cup-coral (*Caryophyllua Quicthii*) carries a Coral-barnacle (*Pyrgoma Anglicum*) affixed to it as a parasite. I, however, have not met with it so numerously, and, indeed, not one of the *Caryophylleæ* (35 in number) living in the Hamburg aquarium, has *Pyrgoma*. I have often looked for them but in vain; and yet the corals came from Torquay and from Ilfracombe. The tank, holding 30 gallons of sea-water, which contains these 35 corals, also contains about an equal number, or say 40, of the other commonly met with coral—the Royal Star-coral (I do not like these English names, and I much prefer the Latin *Balanophyllea regia*), and the whole of them are cemented firmly by their stony bases to the rockwork, of dark colour, with which the tank is lined. Some are fixed to perpendicular or to overhanging surfaces, as found in nature, and others are fastened as they are *not* found in nature, with their faces looking upwards horizontally or obliquely, but, in every instance, the aspect of this coral tank, as seen through its glass front, is very charming; and towards evening, when the animals become much expanded, they form a brilliantly-coloured crowd of animals, so thickly studded as to touch each other, (like an assemblage of flowers in a garden,) where they are thickest together. They reach their greatest degree of expansion and beauty late at night, when I sometimes illuminate the tank by means of a powerful gas Argand burner and conical shade, placed over the water. They are regularly fed with oyster and mussel, given to each separately in little morsels, and on this diet they thrive wonderfully. A stream of sea-water runs through the tank day and night, and the condition of the whole is so excellent, that numerous other animals are constantly making their spontaneous appearance in the same case,—such for example, as *Serpulæ*, *Sabellæ*, *Ascidians*, both simple and compound; *sponges*, and various other interesting things.—*W. Alford Lloyd, Hamburg.*

EFFECTS OF LIGHTNING ON FISH IN AN AQUARIUM.—On Friday, July 7th, 1865, at 3 p.m., a flash of lightning did much damage to a house in Marienstrasse, St. Pauli, in the suburbs of Hamburg. About 200 feet away from the house in question, a friend of mine, Mr. C. C. H. Muller, had in his garden, in a shady spot, and in the open air, a large fresh-water Aquarium, containing forty-three fish consisting of trench, carp, dace, roach, gold-fish, eels, loach of two species, and others, and at the moment of the flash of lightning, every one of these fish became suspended perpendicularly downwards in the water, with their tails at the surface, feebly and vainly trying to swim towards the bottom of the tank, with all their fins strangely attenuated and as transparent as fine tissue-paper, and densely covered on both sides with myriads of fine air-bubbles. Their heads and bodies were not so covered. In less than half an hour forty-one were dead, strongly curved, almost in the form of semi-circles, and already fast decomposing, but two gradually recovered by being placed in running water. It is well known that when fish become sick and die under ordinary circumstances, they turn belly upwards horizontally, instead of hanging nose downwards, as in this case. The manner in which the eels were almost jerked out of their hiding-places in the sand at the bottom of the tank, was very remarkable. None of the animals in the aquarium in the Zoological Gardens, about a mile off, were affected in any way.—*W. Alford Lloyd, Hamburg.*

FRESH-WATER AQUARIA.—Having had some little experience in the management of fresh-water aquaria, I would advise "F. C." to cover the bottom of his aquaria with well-washed small stones, which may be picked up on any gravel walk. For a long time I had nothing at the bottom of mine, but simply built up my rock-work of stones cemented together, and clinker. A layer of small stones, however, about an inch deep, greatly improves the appearance; but I never used gravel or sand of any kind. The weeds I used to plant in small chemical crucibles, which are easily concealed in the cavities of the rock-work. I found the same difficulty as your correspondent in procuring the small red worms, so I used now and then to put in a little finely-shredded lean raw beef; but I firmly believe that it it is better *not* to feed the fish at all when once you have got the proper balance between the animal and vegetable inmates. In my aquarium, I kept most successfully for nearly three years, a gold-fish, roach, a tench, minnows, young dace, and newts. I ought to mention that I used to have some sprigs of Canadian water-weed floating on the top, both to keep the water cool and shady and to afford a resting-place for the newts. Never having used the powdered charcoal, I cannot form an opinion of its merits.—*A. J. N. M.*

AËRATION OF AQUARIA.—I have seen several contributions lately, mentioning the difficulties which attend the production of a movement in the water in aquaria, and am surprised that no one advocates a small fountain. I have used one in my aquarium, for the past three years, with perfect success, and have never had to change the water, except when I clean it out each spring; but I do not think even that is absolutely necessary. The water always keeps clear and sparkling, and the fountain has a very pretty appearance. My jet usually passes about half a gallon to one gallon per hour, and the waste water is used again if clear.—*W. E. S. Willes.*

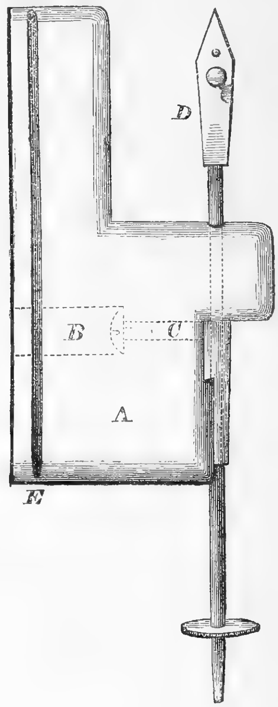
Fresh-water Aquaria.—In reply to F. C. the bottom of the aquarium should have first from twenty to fifty small pieces of charcoal strewed over it; upon that about an inch in depth of well-washed sand, in which the plants should be planted,—over the sand near an inch of the smallest stones or pebbles; minnows and sticklebacks are the best fish to stock with, being the hardiest, living the longest in confinement, and they agree well together. I have minnows now that I have had at least two years. They should be fed with animal food; any kind of cooked meat not fat; two or three pieces to each fish (about double the size of a pin's head) each time of feeding. I feed mine about every five or six days. Some minnows I have are so tame they will take food from the fingers. I have kept stickle-backs more than twelve months; the very small ones do better and live longer than the large ones; some I have caught about half an inch long, have lived until quite an inch and a half. A few snails should be kept in the aquarium with the fish; they assist to keep the water clear and eat the decayed plants. They breed, and the young ones, and also their spawn, or eggs, find food for the fish. When they die they are eat by the fish; there is no fear of their contaminating the water. No doubt fish will live a long time without any food but what they find in the water, but they thrive much better with occasional feeding. In my aquarium the water has not been changed since May, 1863; every month or two I put in about a pint to replenish what it has lost from evaporation; and it is now beautifully clear.—*Thomas Armstrong, Manchester.*

MICROSCOPY.

Bull's-eye Condenser.—Will you allow me to suggest a cheap and very effective condenser for the microscope for viewing opaque objects. I have tried, I think, every kind made, and find this better than most, and I think as good as some very expensive ones. I use a glass globe about three and a half or four inches in diameter, filled with clear spring water, inverted upon an ordinary wine-glass. With a series of them filled with various coloured waters, I have had some very beautiful effects. Mine cost me 1s.—*Thomas Armstrong, Manchester.*

Pollen of Evening Primrose.—I do not recollect seeing the Evening Primrose named among the flowers whose pollen grains form beautiful microscopic objects, and would advise those of your readers who take an interest in these matters, and have not already a slide of it in their cabinets, to mount one in balsam, and another as an opaque object. The flower being so common there is no difficulty in procuring it in most places.—*E. G., Matlock.*

On Stage Forceps.—Having been much inconvenienced by the unsteadiness of the stage forceps of the usual construction, I set my wits to work to make a better; and after some trials hit upon the following, which appears to me so simple that any one may make it for himself. The annexed diagram scarcely needs explanation: A represents a piece of wood; B, a hole for the reception of C, the forceps-holder, fastened by its screw; D, the forceps, passing through a hole in the piece of wood and the spring tube of the holder; thus the forceps have a smooth rotatory motion on their own axis, by which



any small object held therein can be viewed on almost all sides. To fasten the forceps to the stage I make a slit, E, near the bottom of the wood, which slips over the sliding-bar of the stage; by replacing the wood by a metal plate, the forceps could then be laid on the stage like a slide and the object rotated, without going out of sight, as was often the case with the old-fashioned forceps. I have found the above to answer admirably. For examining such things as flies' legs, heads, and proboscces, with the binocular instrument, as opaque objects, the effect is very good, and the investigation can be made with much greater comfort and precision than with the old stage forceps.—*A. J. Roberts.*

NOTES AND QUERIES.

EEL-LIKE ANIMALCULES.—In some animalcule water which I prepared with hay, by exposing it to the hot sun, I found a species of Infusoria, which I have never seen noticed in any book. Most likely it is common enough to many, but it is quite new to me, who am only a novice. With $\frac{1}{4}$-inch object-glass they are just discernible, and have the appearance of live hair, about half an inch in length. They wriggle themselves slowly along, moving like an eel, from right to left, and never seem to turn round, but go gently across the field of the microscope, and then return with either head or tail first. Could any of your readers inform me what they are, and what is their name, &c.? From what I noticed in their movements, I imagine that they feed pretty freely on the Polygastrica.—*J. S.*

Doubtless they are *Vibriones.—T. K.*

GOSSAMER SPIDERS.—In reply to H. W.'s question relative to Gossamer spiders feeding in the air, and House spiders having a taste for and love of music. In the first case I do not think there is any evidence to show that the spider can by any possibility catch its prey, save by pouncing on it, as in the Hunting spiders, or trapping it, as do all web-spinners, mason-spiders, and others of like mechanical craft. The web thrown out is solely for the purposes of transport, a simple yet beautiful contrivance to enable the tiny creatures to disperse, and thus obtain a better chance of thriving, in the great struggle for existence. I very much question the House spider's having the "least taste in life" for music. In the first place, it is doubtful whether the spider can hear at all; and granting it did, the auditory organs would hardly attain a degree of organization (where we have only the heterogangliate nervous system) compatible with power to detect and appreciate modulations of sound. We must seek the solution of the mystery—that is, in the first place, if it can be proven that House spiders ever do exhibit any fondness for music (I do not believe they do)—in the vibration caused by the instrument inducing the spider to come and see what great insect is creating such a disturbance. Hammer on a wall or shake a piece of furniture near a spider's trap, and nine times out of ten, he will come to see what it means; but he simply feels the vibration. Such a solitary savage never could have music in his soul, and admirably verifies the truth of the couplet:—

Is fit for treason,
Stratagem and spoil.

In a future number of SCIENCE GOSSIP I purpose adding my mite about North American spiders.—*J. K. Lord.*

AQUARIAN DIFFICULTIES.—E. T. S. refers to aquarian difficulties. The one great cause of non-success in the management of aquaria is the over-exposure of them to strong light. The second is the non-removal of dead matter; and the third, the too miscellaneous nature of the plants and animals introduced. I do not find any difficulty with either fresh-water or marine aquaria.—*T. P. Barkas.*

GUANO.—Can any of your correspondents tell me where I can obtain sufficient guano (say a quarter of a pound at least) to experiment upon for *Diatomaceæ*, as it generally contains more fossils than the earths or bergh-mehl?—*J. H. W.*

SEA-ANEMONES DIVIDING.—Instances of spontaneous division in Sea-Anemones are by no means rare; indeed, Mr. Gosse seems to think that some species (amongst others the *Plumose Anemone*) only increase in this manner. With the author, I have myself witnessed the operation. In Mr. Gosse's words (Brit. Sea-Anem., p. 169), "The fission begins at the margin of the disk, and gradually extends across and downward, until the separation is complete, when each moiety soon closes, and forms a perfect animal." With the Plumose Anemone and some others, the division is of a different character. Parts of the disk are torn off and remain adhering to the original resting place of the creature, whilst the Anemone itself sails off to some more comfortable quarter. The detached fragments then gradually form into small Anemones.—*C. A. Goodhart.*

SEA-ANEMONES DIVIDING.—Your correspondent E. T. S. appears to think that Anemones do not increase by division. I have kept Anemones in the same tank, without any change of water, for *five years*, and have seen them increase by division, by generation, and by ejection from the mouth. If he cuts a healthy Mesembryanthemum perpendicularly into two parts, by means of a sharp knife, he will find that the two portions will become perfect Anemones in a few days. The act appears cruel, but I am inclined to think that Anemones do not feel pain, and that all these motions are automatic.—*T. P. Barkas.*

E. S. writes us that it is impossible for two Anemones to have been contained in her tank, as suggested by E. T. Scott.

W. R. Adams confirms the fact of Sea-Anemones dividing, from personal observation on several occasions.

FRESH-WATER AQUARIA.—If F. C. will carefully read "Hibberd on Fresh-water Aquaria," and attend to his instructions, all his difficulties will vanish. I have kept fresh-water aquaria for years, water unchanged, without either trouble or difficulty. There are not any aquaria without Infusoria, but if the tank be not subjected to too much heat and light, Infusoria will not appear in excess. Dried beef, cut into *very small* particles, is the best and most convenient food for fishes, and they ought to be under-fed rather than over-fed. Charcoal is not necessary to keep the water clear, and caddis worms are best left in their native ponds. The best plants are *Vallisneria spiralis*, *Anachares alsinastrum* and *Chara vulgaris.—T. P. Barkas.*

VOLVOX GLOBATOR.—Your correspondent T. A. will find that the cause of the motions of *Volvox Globator* is said to be the action of cilia. I have gathered myriads, and examined thousands, but never succeeded in observing cilia on any of them. That may have been my fault in manipulation, but as the ciliary theory has been rejected in the case of *Diatomaceæ*, may it not ultimately be ascertained that the motions of *Volvox Globator* are produced otherwise than by cilia?—*T. P. Barkas.*

WHITE EARWIG.—The other day, I found among some gooseberries, a perfectly *white* earwig, the eyes being black. I have preserved it in spirits; thinking it very rare. I thought I should like to know whether it is so or not, and whether any of the readers of GOSSIP have met with anything of the kind.—*R. F. M.*

[They are occasionally met with.—ED. SC. G.]

ANOPLOTHERIUM.—Has *Anoplotherium commune* (Eocene) a short and thick, or a long and thin tail, as Beeton's Dictionary and Hugh Miller also appear to differ on this point.—*James Arrow, Jun.*

The *Anoplotherium commune* was eight feet long long, including the tail, which was three feet and a half. "The long and powerful tail must have formed the chief peculiarity in the living animal's outward form, and been of the same service to it in swimming as the tail of the Otter."—*Owen: Brit. Foss. Mammals*, p. 438. Cuvier gives 22 as the number of caudal vertebræ.—*R. T.*

EXUDATION OF CEDAR-WOOD.—About seven years ago, I had a cabinet made of walnut-wood, to contain my collection of birds' eggs. The inside of the drawers was made of the cedar-wood such as is used for pencils. The drawers were divided into partitions, and the eggs laid on cotton wool. In the course of a month or two I found several of the eggs sticking together, and covered with some kind of exudation, as if they had just been varnished. I could not wash it off with water, and I did not try spirit for fear of taking some of the colouring off the eggs. The Kestrel's, Peregrine's, Coot's, and Lapwing's were first infected, some were less so, and the greater number not at all. They have remained the same ever since. Can you or any of your readers tell me the reason of this, and remedy (if any) for it? A lady told me that she had a work-box lined with the cedar-wood, and the cotton reels, &c., got stuck together in just the same way.—*C. W. W.*

[By painful experience we have learnt that the wood of West Indian Cedar (as it is called) exudes a semi-fluid resin in large quantities. It can be removed from objects by the free use of turpentine. This wood is *not* the pencil cedar.—ED. SC. G.]

THE BATTLE OF THE BEES.—A friend of mine has a hive of bees. They are in a wooden hive with two compartments and glass windows to each, so that one can observe their movements. One compartment is pretty well filled with honey, the other empty. In this empty one they have been fighting from morning till night for the last *two months*. The floor of this compartment (the field of battle) a drawer about eight inches square, and one inch deep, has been twice filled with dead bees. We first thought that the drones only were being killed, but we find that there are as many workers dead as drones. It is not a natural death they die, or from any disease, as far as we can see, but they chase one another around the hive, and one or more lay hold of their victim, and sting him to death.—*C. W. W.*

THE PINGUICULA.—Will you allow me to ask your correspondent who writes on "The Pinguicula," whether he is quite sure that the species found by him in Wales was *P. grandiflora?* My reason for asking this is, that that species has not been previously recorded as a native of Great Britain, and its discovery as such would be of great importance. The commoner species, *P. vulgaris*, which somewhat resembles *P. grandiflora*, is not mentioned by your correspondent; and this also leads me to think it just possible that some confusion of names may have occurred. *P. vulgaris* is recorded from England, Scotland, and Ireland, and, though by no means a common plant, appears from the *Cybele Britannica* to be found in all of the eighteen provinces into which Great Britain is divided, and in seventy counties; while *P. grandiflora* is stated to be confined to Ireland.—*B.*

HART'S-TONGUE FERN.—I cannot agree with W. R. Tate in considering "Seaweed fern" an appropriate name for *Scolopendrium vulgare*, commonly known as "Hart's-tongue fern." In the first place, I naturally inquire, "What species of seaweed?" for out of the three hundred and eighty or more species of British seaweeds, there is only *one* to which it can properly be compared, and this is essentally a northern species, consequently not likely to be seen by the Surrey folk. The seaweed I refer to is *Alaria esculenta*, one of the Laminariæ, and the only species of that genus having, like the fern in question, a distinct midrib; and certainly—before the *alæ*, or leaflets which spring from the base of the stem, are produced—its resemblance to the Hart's-tongue fern is very striking; hence, indeed, the common name, in some localities, of this seaweed, that of Hart's-tongue Laminaria. In its mature state it is called by the Scotch, "Badderlocks," in allusion to the basal leaflets in which the spores of the plant are produced. I suppose it is too much to expect people to say "Laminaria fern," but it certainly appears to me that "Seaweed fern" is not sufficiently definite. Only yesterday I found a frond of *Alaria*, in a rock pool near Tynemouth, and its resemblance to the Hart's-tongue fern was very striking indeed.—*W. H. Grattann.*

WORMS' DIET.—Soon after a heavy shower of rain, I have often seen a number of withered leaves half buried in the soil, generally the stalks protruded, but sometimes the point of the leaf. By carefully digging around these, I came to what I concluded to be the cause of their being thus buried, viz., large earth-worms either enveloped in the leaves, or very near them. I have since watched them at work, dragging down into their holes—by the help of the stiff prickles and slime with which their bodies are covered—not only withered leaves, but also small twigs, grass, &c. I supposed it was for food, but it is stated by Mr. Lankester, in the last number of SCIENCE GOSSIP, that they live entirely upon earth; what then is done with the leaves, &c.? Do they form dwelling-places of them; or is it instinct that teaches the worms to draw under the leaves, so that by their decomposition the soil may be enriched, and thus indirectly furnish them with food?—*W. Bowen Davies.*

NAMES OF SEA BIRDS.—Can you tell me the scientific designation of the following sea-birds, which are, I believe, principally inhabitants of the Southern ocean. I do not remember having seen them elsewhere:—Parson-birds, stinkpots, whale-birds, ice-birds. I cannot give correct descriptions, as I have never seen these birds sufficiently close for anything of the kind. The above are the names by which sailors distinguish them. The "stinkpot" resembles very much in appearance the "Cape-hen" *Procellaria æquinoctialis.* The "ice-birds" are beautiful little creatures, about the size of the storm-petrel, *Thalassidroma pelagica*, with a silvery-grey plumage. The "whale-birds" are rather larger, with white bodies, and, apparently, black wings.—*H. G., Bangalore, India.*

EDIBLE FUNGI.—Dr. Blount, of Bagshot, informs us that having found a specimen of *Fistulina hepatica* near Ascott, which weighed two pounds, it was cooked and partaken of by every member of the family. He considers the descriptions given by both Dr. Badham and M. C. Cooke scarcely equal, both in vividness of its outward appearance and the tender delicacy of its flesh, to the subject of this experiment.

ANATOMATIZING LEAVES.—Is chloride of lime the best thing for bleaching leaves; and what is the best way of doing seed-vessels of plants, such as columbine, larkspur, &c., or fronds of ferns, which I hear will not anatomize, but look pretty bleached? Should the leaves be left all the time in the same water, and when some of the green still adheres to the fibres, can anything else be done to remove it?—*H. G. S.*

CAT-BRIAR.—Can you or any of your readers give me the scientific name of the "Cat-briar," of North America? I cannot describe the plant, as it is so long since I have seen it, but it grows (I believe) principally in swampy soil. I have found it plentiful in the dense brakes and copses inhabited by the American woodcock. This query is remarkably vague, I admit, but the plant is well known in many parts of the United States, by the appellation I have quoted.—*H. G., Bangalore.*

LABURNUM.—I shall be much obliged by your giving me some information as to the following particulars of the *Laburnum*:—1. Whence did Pliny get the name? 2. If from a Celtic root, what? 3. When was it introduced into England? To save trouble, I may mention that I know about the 16th century is given generally as the date of its introduction; and also that it came to us from Hungary, though an Alpine plant, but I seek more certain, *precise,* and *detailed* particulars.—*P. J.*

FOSSIL ELEPHANT.—I should be glad to know if *Elephas primigenius* has 15 or 17 ribs on one side, as Page and Hugh Miller appear to differ.—*J. Arrow,*

The mammoth found in Siberia, of this species. in 1799, has 17 ribs on the right side.—*R. T.*

DOES THE SPIDER EAT ITS WEB?—Fired with emulation, I carefully watched a common garden spider (*Epeira diadema*), which I found as entertaining as wonderful. I commenced by destroying the web of a fine fat spider, and the owner appeared excessively astonished as her web collapsed around her. At length she took refuge in an inverted flower-pot, where I found her two hours after. I am inclined to think that during this period she was preparing materials for a new web. I found in every case where a web is destroyed, that the spider goes away to some quiet spot, and, drawing his legs close round him, remains quiet for two or three hours. During this period of repose, the spider is stupid and dull,—just gives an impatient shuffle when touched, but does not run off as spiders generally do when disturbed. I watched again, then left, and when I returned in half an hour I found the spider as active as a spider could be, in building a new web, the old one, which at my last visit was still hanging, had now vanished. Had the spider eaten it?—"that's the rub." By a lucky chance another spider came along the piece of wood, from the end of which my spider had fastened one of her foundation lines. "They met," and in an instant the claws of each were shot out with a dexterity that a pugilist might envy; the blows were given in exactly the same manner as a cat strikes at her antagonist. The trespassing spider was soon convinced that it would be the height of folly to stay where he was, so, fastening a line from where he stood, he let himself down on to a convolvulus leaf. My friend rushed to the spot where spider No. 2 had fastened his line, and seizing on it, the other end of which, be it remembered, was in communication with spider No. 2's body, began to wind him off; that is to say she drew the line in towards herself, in the same manner that a sailor hauls in a rope, but with a rapidity that was truly wonderful, the front legs were moved so quickly that my eyes could scarcely follow them. Spider No. 2 having a decided objection to his vitals being wound away in this sort of manner, put an end to my friend's little pastime, by cutting the line. Spider No. 1 had now collected web that amounted to about the size of a large pea; when she found the supply cut off, she began stowing it away in her own body, forcing it in with her two front claws, and in a few moments not a vestige was left. —*H. Vokes.*

WASP FIGHTS.—A short time ago, while sketching some of the splendid inland cliffs of Matheran, one of the hill stations near Bombay, my attention was attracted by a rustling in the dead leaves close by, and, on observing the place, I found a fierce battle going on between a wasp of the large red and black kind, and a half-grown grass-hopper, whose wings were mere rudiments, and whose whole body was soft, green, pale, and succulent looking. The wasp seemed repeatedly to sting it, seizing it by the under side and endeavouring to wound it between the soft plates about the thorax. This went on for several minutes, the grass-hopper at times escaping beneath the leaves, but whenever caught sight of by the wasp the latter charged furiously again, and both for a time disappeared together. Seeing at length that the struggle was about to terminate, by the escape of the grass-hopper, and not quite liking the proximity of his enemy, I endeavoured to secure them both, but they were so much injured in the effort as to be of little value as specimens. Query: As the grass-hopper did not seem any the worse, was the wasp unable to sting it through its armour; and was his power of penetration, though so large an insect (over an inch in length), less than that of the little ticks which infest the large scaly lizard, called by the natives here *Gorepur*, and by the sahib log *Iguana?* —*A. B. W., Poona.*

SAFFRON, AN ORIENTAL CONDIMENT.—There is in India a very wide-spread error in the use of the word Saffron, and on referring the other day to a popular Biblical dictionary, I am afraid the error is not peculiar to India. Every one ought to know that Saffron is a collection of the dried stigmas of a certain kind of crocus, *Crocus sativus*, cultivated formerly, if not now, near Saffron Walden. That, however, which in India has usurped the name of Saffron, chiefly, I suppose, from its dyeing a similar colour, is Turmeric, a plant of a wholly different character, belonging to the natural order *Zingiberaceæ*, or the ginger tribe. Turmeric is used in almost every curry; and gives to that universal Indian dish its colour and some of its aromatic flavour. I do not know if your useful little publication may find its way to India, for the correction of this common mistake, but at all events I hope future editors of Biblical dictionaries will cease to say of Saffron that "Native dishes in India are oftened coloured and flavoured with it," for during a residence in India of nearly a quarter of a century, I never knew this to be the case, although it is true of Turmeric. —*W. H.*

[N.B.—Our correspondent may have resided in one part of India, and Saffron been employed as a condiment in another. We are confidently informed by medical men of long residence in India, that "Saffron" *is* employed in culinary operations in some districts, but not so commonly as Turmeric. Who shall decide when doctors disagree?—ED.]

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."

ECHINUS SPINES.—A correspondent offers these in exchange for other objects.—T. H. Martin, 78, Week Street, Maidstone.

QUEKETT MICROSCOPICAL CLUB.—We are requested to announce that the ordinary meetings of this club will be held on the *fourth* Friday of every month, at No. 32, Sackville Street, Piccadilly, W. For further particulars apply to the Secretary.

J. D. M.—The insects on bark of weeping ash are a species of *Coccus* (order *Homoptera*). This genus is complicated and the nomenclature uncertain, so that a name cannot be assigned for your insect with certainty. It may be *Coccus Fraxini*, but we have not been able to compare the specimens with the description.—*F. W.*

E. C.—The insects which accompanied your woody gall are *Callimome nobilis* (tribe *Chalcidites*). They are parasites of *Cynips aptera*, the fly which forms woody galls on the roots of oak-trees.—*F. W.*

BUNT.—Any one desiring specimens of corn affected with Bunt (*Tilletia caries*), should send a stamped envelope to R. Holland, Mobberley, Knutsford.

F. WILKINSON.—There is no such book at a moderate price. Curtis's "Entomology," Stephens's "Entomology," and Westwood's "Butterflies and Moths and their Transformations," are expensive. If you have Wood's "Index," add thereto Stainton's "Manual."

A. B. F.—We cannot tell positively from your description. Try to induce the caterpillar to feed and undergo its transformations, then if you forward the moth we will name it.

DEATH'S-HEAD MOTH.—A living specimen of larva or pupa is solicited, in exchange, address E. G. W., 3, Bertie Terrace, Leamington.

F. C.—Would he inform E. S. if his Vermicelli is first boiled for feeding his fish?

WOOD ROBERT.—Your caterpillar from Turnips belongs to a *Noctua* probably *Agrotis segetum*. For further particulars see Curtis's "Farm Insects." We can recommend no radical cure.

F. F. inquires for a work on "Fossil Botany," with figures, at a reasonable price. We are sorry that we know of no such work. Lindley and Hutton's is expensive and scarce. We thank him for the suggestion but doubt whether it is practicable to give a number, similar to the "Hepaticæ" number, on this subject, and supply a "Fossil Botany" for fourpence.

W. THORP.—The article originally appeared in the *Leisure Hour*, and then in "Holiday Papers," whence we reprinted it, as an example of what we consider to be good popular writing.

A. D. D.—The mosses were *Tortula muralis* and, we believe, *Anacalypta lanceolata*. The capsules of the latter were but few, and with these we were unfortunate.—*J. E. W.*

J. B. HUMBER ridicules the idea of H. G. K. having a score of wasp-stings extracted from his body (page 170), because "the stings of wasps are not barbed like those of bees, and consequently do not remain in the wound." We strongly recommend our correspondent to catch a wasp and look at its sting again.

W. C.—Your leaf contains the stalked eggs of the Lace-wing Fly (*Chrysopa*).

W. B. D.—The flowers are those of *Solenostemma Argel*, H., almost constantly found among Alexandrian senna.—*D. H.*

H. S.—Your sketch of geological specimen does not exhibit sufficient details to determine the species, or even genus. The object is clearly a coral, and probably of the genus *Isastræa*.—*R. T.*

T. O. B.—Your leaves, supposed to be injured by insects, are attacked by a parasitic fungus (*Rhytisma acerinum*), always common, but more than usually so this year.

F. W. C.—The insect is the larva of a *Coccinella*; most likely *C. 7-punctata*. An introduction to the study of British Beetles is announced to be published shortly, uniform with Lankester's "Ferns," by Mr. R. Hardwicke, 192, Piccadilly. —*R. G. K.*

E. M.—Continue to use plenty of camphor; or try a little benzine on a piece of sponge.

G. S.—The grass was in too bad a condition to determine satisfactorily. The other plant is a form of *Pimpinella saxifraga*.

H. L.—Yours is a proliferous variety; a form not uncommon.

E. G.—You may purchase British lichens of Mr. W. Mudd, Botanic Gardens, Cambridge. For exchange of mosses, &c., you had better send your list of desiderata to the Society of Amateur Botanists, 192, Piccadilly, London.

T. B.—The price of "Half-hours with the Microscope" is five shillings.

W. S.—We object to recommend any maker of microscopes. All instruments have their own peculiar advantages. Those you name have a good reputation at the price.

A HINT FOR CONTRIBUTORS.—If our contributors will oblige us by always using the common names of plants, animals, insects, &c., wherever there is a common name in use, to be followed by the scientific name in brackets, this will save us a large amount of trouble in sending their manuscript to press. As we do not pretend to address scientific readers alone, vernacular names are indispensable.

COMMUNICATIONS RECEIVED.—W. S.—J. E. W.—F. F.—H. H. K.—A. P. H.—B. F. M.—J. S. T.—W. A. L.—C. W.—R. G.—L. B.—H. S.—P. J.—T. P. B.—W. T.—A. J. R.—J. D. M.—W. ROBERT.—J. W. W.—J. B. HUMBER.—J. C.—C. A.—L. S.—F. P. P.—J. K.—E. C.—J. P.—J. F.—C. A. G.—H. L.—W. J. S.—D. R. R.—R. K.—W. S.—G. R. J.—W. R. A. —J. H. B.—A. J. NOLL.—H. G. S.—T. A.—H. (cannot be printed until name and address are sent).—W. E. W.—T. P. B. —H. G. E.—W. H. G.—H. M.—T. H. M.—A. G.—A. H.—H. G.—J. H.—F. T.—G. S.—E. G.—L. G. M.—A. G.—W. R. T.—C. W. W.—R. H.—F. P. D.—E. D.—H. W.—H. P. —W. B. D.—F. M.—W. B. D.—A. B. F.—A. B. W. (Poona).—F. W.—R. A.—G. C. D.—J. Q.—E. H.—E. G. (Matlock).—H. P. A.—A. C.—W. E. S. W.—E. W.—ELLEN DOUGLAS.—E. M.—H.—C. J. F.—T. O. B.—A. H.—W. P.—T. H.—T. B.—W. A. L.—W. S.—J. G.—E. W.

BRAMBLE-BRAND forwarded to:—F. W. C.—J. H. W.—G. G.—C. A.—W. J. B.—T. B.—E. W.—D. M.—W. R. M.—E. R.—J. M. P. M.—F. W. C.—H. J. W.—H. W.—R. H. M.—T. A.—J. H.—J. J. S.—E. G. W.—T. H. M.—H. R.—H. P. A. —W. H. G.—C. R.—H. N.—W. A. S.—J. R.—R. A. S.—W. W. N.—V. A. P.—R. C.—C. W. W.—J. J.—M. A. N.—W. J.—B. A. C.—L. R. G.—S. W.—L. H. M.—G. H. G.—R. S. —W. O. B.

BOOKS RECEIVED.

"Notice sur les Collections Scientifiques et sur le Musée Commercial-Industriel; Maison de Meile, Lez-Gand, Belgique. (Gand: C. A. Braeckman.)

"Catalogue of the Indian Department, Dublin International Exhibition." By J. Forbes Watson, A.M., M.D. (Dublin: J. Falconer.)

"COMMON THINGS."

Even without going from our own neighbourhood, or withdrawing from spots with which we have been long intimate, how much may be learnt in addition to what we yet know. It is not always the animals that we are most familiar with by name and frequency of occurrence whose history we understand the best.

REV. L. JENYNS.

SOME years since, when "national education" was in danger of running mad, Lord Ashburton made an effort to bring the system back to the bounds of reason and common sense by offering prizes for the successful teaching of "common things." It has been said that the effort was a failure, as compared with what was hoped of it; but it is not always easy to set down in figures, and draw up a correct balance-sheet, of such ventures until the disturbance caused by a sudden check subsides again into a calm. There is no doubt that the "skid" on the wheel did cause a check, did raise a dust, and did prevent the "old stage" dashing recklessly downhill to a final "smash." It is only in contemplating what the direction and aim of the dominant system is, and forecasting its horoscope, or determining in our own minds what that system might, in its working, be carried to, that we can imagine the benefits of a seasonable check. We can forgive the error of rushing to the opposite extreme, because we have faith that in the future it will be the *medium* that prevails.

This is applicable, in its spirit, if not in letter, to other than national education, and bears its moral, which he who runs may read.

There is cause for regret that in the study of the natural history sciences, the true aim is so often and studiously obscured by pedantry and ostentation, induced, perhaps, by a false notion of the end which is sought to be attained. The pursuit of science should cause the abnegation of self; instead of which, it is, alas! too often immolated at the shrine of selfishness.

These remarks do not apply to the true lovers of science. Let those who deserve the questionable honour appropriate it to themselves.

To collect any number of wild flowers, weeds, grasses, or twigs of trees, dry them between sheets of blotting-paper, then get a friend to aid in attaching to each a label with a Latin name and a date, is no better than "haymaking."

To catch any number of butterflies and moths, pin them out at certain angles on pieces of cork, and when dry to transfer them to glazed boxes with a little ticket, on which some imposing word stands, in all the glory of small capitals, and which, perhaps, some obliging expert has helped in placing, only deserves the name of "flycatching."

Haymaking and flycatching may be very healthy occupations for the body, but they do not therefore rise to the dignity of science, or merit regard as intellectual pursuits.

We by no means deprecate the practice of forming a herbarium or a collection of insects, but we have a word or two to say about this same haymaking and flycatching, believing it to be a "delusion and a snare." In itself, collecting is not science, but an aid to its prosecution. A cabinet and a herbarium are only tools wherewith work of a certain kind may be done, and a man is no more a botanist or entomologist on account of their possession than another may be a skilled carpenter because he has a good chest of chisels and planes. Each may be the means whereby a certain end is to be attained; the mistake consists in regarding the means as the end. It is too much the habit with amateurs to flatter themselves into the belief, because they have made good collections (by some means named correctly), that therefore they are scientific men. What a shock it would be to their feelings to tell them the sober truth, that they are only haymakers or flycatchers. How have the individual specimens been named, in the majority of cases, in the collections of such *mere* collectors? If they can lay their hands upon their hearts and affirm that they have named them all themselves, how has it been done? Surely it is no difficult task in these modern days to obtain access to accurate herbaria and cabinets, and by comparison, or rather, by matching form against form; or by the aid of figures in the numerous illustrated works, it may be quite possible that an entire collection has been named, without reference to a generic or specific description, or a just appreciation of any but the most prominent and characteristic differences discernible at a superficial glance, and without the least attempt at analytical examination. How much botany, for instance, is there in determining that such and such a plant must be a Water Crowfoot because it was found growing in water, and *parviflorum* because the flowers were small? Yet many a plant has been added to a neat little private herbarium, and many an insect transferred to a place in the drawer, upon evidence as circumstantial; the owner meanwhile flattering himself that he was really getting "a nice collection," and debating whether he ought not to be more widely acknowledged as a man of science. One collects plants, another butterflies, another postage-stamps, or another autographs, or old china, and we once knew an eccentric old bachelor who had a "fancy" for collecting old pipes. If making the collection is *all* the aim, then each of these worthies is as worthy as the other, and all are no better for their "hobby," except that the mind and body have been kept in exercise, and more objectionable employment of spare hours prevented.

The fancy for collecting rare plants, or rare insects, is with some enthusiasts such an infatuation that they will undergo in its behalf all kinds of privation and toil, now rushing in one direction, and now in another, as if they thought that their credit here, and their salvation hereafter, depended upon the number of rare plants or animals they had aided in exterminating. It is not the *rare* but the *common* species which give character to a flora or fauna, and the time spent in hunting after, or travelling for miles in pursuit of some rarity, would be better employed in cultivating a closer acquaintance with such "common things" as "buttercups and daisies," or ladybirds and "cabbage-whites."

How often have we plucked a daisy and placed it in the hands of such an one, asking if they could find a rarer gem, and seen it cast to the ground in disgust, as a thing too common to be worthy of a thought. May we not believe that because it is so common they know less about it? Everybody knows a daisy, and yet how few have ever compared a daisy with its description, examined or dissected it, or spent an hour in reading the lessons it has to impart. Will no one offer in the schools of science prizes for the study of "common things"? And yet there is such a prize, in the esteem and respect which all true naturalists entertain for him who toils day after day and year after year to present at last the life-history of a honey-bee, an earthworm, or such another "common thing."

Finally, young friend, and despiser of "common things," beware lest thy naughty heart should beguile thee to think that because thou canst vocalize glibly such compounds as *Glyphipteryx Schœnicolella* by the hour, that thou art the equal of the patient worker, who, concentrating his powers, has exhausted (if possible) a house-fly or a primrose, and can find in these no more that is left for him to learn.

HUMMING-BIRDS.

HUMMING-BIRDS and the wild-tangled loveliness of tropical vegetation, appear to be so closely linked together, that we are apt to think the one essential to the existence of the other.

We naturally (at least I always did in my earlier days) associate these tiniest gems of the feathered creation, with glowing sunshine, gorgeous flowers, grotesque orchids, palms, plantains, bananas, and blacks. This is all true enough, and if we take that large slice of the American continent betwixt the Amazon, the Rio Grande, and the Gila (embracing Guiana, New Granada, Central America, Mexico, and the West-India islands), as the home of humming-birds, we shall pretty truthfully define, what is usually assumed to be, the geographical range of this group—a group entirely confined to America.

Within the above limits, the greater variety of species, the most singular in form and brilliant in plumage, are met with.

Gazing on these gems of the air, one would suppose that Nature had exhausted all her skill, in lavishly distributing the richest profusion of colours, and in exquisitely mingling every imaginable tint and shade, to adorn these diminutive creatures, in a livery more lustrously brilliant, than was ever fabricated by the loom, or metal-worker's handicraft.

But away from the tropics and its feathered wonders, to the wild solitudes of the Rocky Mountains,—it is there I want you (in imagination) to wander with me, and to picture to yourself—you can easily do it, if you possess a naturalist's love of discovery—the delight I experienced when, for the first time, I saw humming-birds up in the very regions of the "ice-king." A brief narrative will best convey the information—the "Science Gossip"—I am desirous to impart.

Early in the month of May, when the sun melts down the doors of snow and ice, and sets free imprisoned nature, I was sent ahead of the astronomical party, employed in marking the boundary-line dividing the British possessions from those of the United States, to cut out a trail, and bridge any streams too deep to ford. The first impediment met with was at the Little Spokan river,—little only as compared with the *Great* Spokan, into which it flows. The larger stream leads from the western slope of the Rocky Mountains, and flows on to join the Columbia.

It was far too deep to be crossed by any expedient short of bridging; so a bridge had to be built, an operation involving quite a week's delay. The place chosen, and the men set to work, my leisure time was devoted to collecting.

The snow still lingered in large patches about the hollows and sheltered spots. Save a modest violet or humble rock-blossom, no flower had ventured to open its petals, except the brilliant pink Ribes, or flowering currant, common in every English cottage garden.

Approaching a large cluster of these gay-looking bushes, my ears were greeted with the sharp *thrum* —a sound I knew well—from the wings of a humming-bird, as it darted past me. The *name* by which these birds are commonly known has arisen from the noise produced by the wings (much like to the sound of a driving-belt used in machinery, although of course not nearly so loud)—whilst the little creature, poised over a flower, darts its slender beak deep amidst the corolla, not to sip nectar, in my humble opinion, but to capture drowsy *insect* revellers, that assemble in these attractive *drinking-shops*, and grow tipsy on the sweets gratuitously provided for them. Soon a second whizzed by me, and others followed in rapid succession, and, when near enough to see distinctly, the bushes seemed literally to gleam with the flashing colours of *swarms* (I know no better word) of humming-birds surrounding the entire clump of *Ribes*.

> From flower to flower, where wild bees flew and sung,
> As countless, small, and musical as they,
> Showers of bright humming-birds came down, and plied
> The same ambrosial task with slender bill,
> Extracting honey hidden in those bells,
> Whose richest blossoms grew pale beneath their blaze,
> Of twinkling winglets hov'ring o'er their petals,
> Brilliant as rain-drops when the western sun
> Sees his own miniature beams in each.

Seating myself on a log, I watched this busy assemblage for some time. They were all male birds, and two species were plainly discernible. Chasing each other in sheer sport, with a rapidity of flight and intricacy of evolution impossible for the eye to follow, through the bushes, over the water, everywhere, they darted about like meteors; often meeting in mid-air, a furious battle would ensue, their tiny crests and throat-plumes erect and blazing, they were altogether pictures of the most violent passions. Then one would perch himself on a dead spray, and leisurely smooth his ruffled feathers, to be suddenly rushed at and assaulted by some quarrelsome comrade. Feeding, fighting, and frolicking seemed to occupy their entire time.

I dare say hard epithets will be heaped upon me,—cruel man, hard-hearted savage, miserable destroyer, and such like,—when I confess to sitting and shooting numbers of these burnished beauties. Some of them are at this moment before me as I write; but what miserable things are these stuffed remains, as compared to the living bird! The brilliant crests are rigid and immovable, the throat feathers, that open and shut with a flash like coloured light, lose in the stillness of death all those charms so beautiful in life: the tail clumsily spread, or bent similar to the abdomen of a wasp about to sting, no more resembles the same organ in the live bird than a fan of peacock's feathers is like to the expanded tail of that bird when strutting proudly in the sun.

It is useless pleading excuses; two long days were occupied in shooting and skinning. The two species obtained on this occasion were the Red-backed Humming-bird (*Selasphorus rufus*), often described as the Nootka Humming-bird, because it was first discovered in Nootka Sound, on the west side of Vancouver Island. The other, one of the smallest known species, called Calliope. This exquisite little bird is mainly conspicuous for its frill of minute pinnated feathers encircling the throat, of most delicate magenta tint, which can be raised or depressed at will. Prior to my finding it in this remote region, it was described as being confined entirely to Mexico. About a week had passed away; the bridge was completed, during which time the female birds had arrived; and save a stray one now and then, not a single individual of that numerous host that gathered round the Ribes was to be seen. They cared nothing for the gun, and would even dash at a dead companion as it lay on the grass; so I did not drive them away; they scattered of their own free will.

My next camping-place was on the west slope of the Rocky Mountains, near a lake, round which grew some cotton-wood trees (*Salix scouleriana*), together with alder (*Alnus oregona*), and the sweet or black birch (*Betula lenta*). My attention was called to the latter tree by observing numbers of wasps, bees, and hornets swarming round its trunk. The secret was soon disclosed; a sweet gummy sap was exuding plentifully from splits in the bark, on which hosts of insects, large and small, were regaling themselves. As the sap ran down over the bark, it became very sticky, and numbers of small winged insects pitching on it, were trapped in a natural "catch-'em-alive-o." Busily occupied in picking off these captives were several very sombre-looking humming-birds. They poised themselves just as the others did over the flowers, and deftly nipped, as with delicate forceps, the helpless insects. I soon bagged one, and found I had a third species, the Black-throated Humming-bird (*Trochilus Alexandri*). Were any proof needed to establish the fact of humming-birds being insect-feeders, this should be sufficient. I saw the bird, not only on this occasion but dozens of times afterwards, pick the insects from off the tree, often killed it in the act, and found the stomach, on being opened, filled with various species of winged insects.

The habits of these three species differ widely. The Red-backed Humming-bird loves to flit over the open prairies, stopping at every tempting flower, to catch some idler lurking in its nectar-cells; building its nest generally in a low shrub, close to the rippling stream, finds pleasant music in its ceaseless splash.

Minute Calliope, on the other hand, prefers rocky hill-sides at great altitudes, where only the *Pinus contorta*, rock plants, and an alpine flora, "struggle for existence." I have frequently killed this bird above the line of perpetual snow. Its favourite resting-place is on the extreme point of a dead pine-tree, where, if undisturbed, it will sit for hours. The site chosen for the nest is usually the branch of a young pine; artfully concealed amidst the fronds at the very end, it is rocked like a cradle by every passing breeze.

The Black-throated Humming-bird lingers around lakes, pools, and swamps, where its favourite trapping tree grows. I have occasionally, though very rarely, seen it hovering over flowers; this, I apprehend, is only when the storehouse is empty, and the sap too dry to capture the insects. They generally build in the Birch or Alder, selecting the fork of a branch high up.

All humming-birds, as far as I know, lay only two eggs; the young are so tightly packed into the nest, and fit it so exactly, that if once taken out it is quite impossible to replace them. Several springs succeeding my first discovery that these humming-birds were regular migrants to boreal regions, I watched their arrival. We were quartered for the winter close to the western slopes of the Rocky Mountains, and the winters here vary in length, as well as depth of snow and intensity of cold; 33° below zero being no infrequent register; but it did not matter whether we had a late or an early spring, the humming-birds never came until the Ribes opened, and in no single instance did two whole days elapse after the blossoms expanded but Selasphorus and Calliope arrived to bid them welcome. The males usually preceded the females by four or five days.

The Black-throated Humming-bird arrives about a week or ten days after the other two. Marvellous is the instinct that guides, and the power that sustains these birds (not larger than a good-sized humble-bee) over such an immense tract of country; and even more wonderful still is their arrival, timed so accurately, that the only flower adapted to its wants thus early in the year, opens its hoards ready to supply the wanderers' necessities after so tedious a migration. It seems to me vastly like design, and foreseeing wisdom, that a shrub, indigenous and widely distributed, should be so fashioned as to produce its blossoms long before its leaves; and that this very plant alone blooms ere the snow has melted off the land, and that too at the exact period when humming-birds arrive. It cannot be chance, but the work of the Almighty architect, who shaped them both, whose handiwork we discover at every step, and of whose sublime conceptions we everywhere observe the manifestations in the admirably-balanced system of creation.

The specific characters of these three species, whose northern range I believe was first defined by myself, are briefly :—

Selasphorus rufus (the Nootka or Red-backed Humming-bird).—Sp. ch.: *Male*,—tail strong and wedge-shaped; upper parts, lower tail-coverts, and back, cinnamon; throat coppery red, with a well-developed ruff of the same, bordered with a white collar; tail-feathers cinnamon, striped with purplish-brown. *Female*,—plain; cinnamon on the back, replaced with green; traces only of metallic feathers on the throat. Length of male, 3·50; wing, 1·56; tail, 1·31. Hab.—West coast of North America to lat. 53° N., extending its range southward over the Gulf of California, to the Rio Grande.

Trochilus Calliope.—Sp.ch.: *Male*,—back bright green; wings brownish; neck with a ruff of pinnated magenta-coloured feathers, the lower ones much elongated; abdomen whitish; length about 2·75. *Female*,—much plainer than the male, with only a trace of the magenta-coloured ruff.

Trochilus Alexandri (Black-throated Humming bird).—*Male*,—tail slightly forked; the chin and upper part of the throat velvety black, without metallic reflexions, which are confined to the posterior border of the black, and are violet, changing to steel-blue. Length 3·30. *Female*,—without the metallic markings; tail-feathers tipped with white. Both have the same northern and southern range as *Sel. rufus*.

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

Blue Fleabane in Cumberland.—I believe I have made a little discovery; and take the liberty of sending an account of it, requesting the favour of insertion. The discovery I allude to is a habitat for *Erigeron acre* as a Cumberland plant. I am aware that it has been described before as belonging to this county. Wilson, of Kendal (1744), mentions it in his "Synopsis." Jenkinson (1775) also mentions it in his "Description of British Plants;" but neither of these gives any locality. In the "Cybele" it is said to grow in the "Lake district;" but as this includes Cumberland, Westmoreland, and part of Lancashire, it leaves the locality still indefinite. It is not mentioned by Withering, nor in Miss Martineau's useful little "Guide to the Lakes." I have consulted some of our most observant botanists, and they do not know it as a Cumberland plant. I think, therefore, I may fairly claim it as a discovery. I found it growing in considerable quantity on a gravelly bank of the river Coldew, a few miles from Carlisle. It would not be prudent to indicate the exact spot, as the rapacity of collectors, I fear, would soon eradicate my little protégé. Our rare plants are becoming still more rare. I wish every botanist would inscribe on his vasculum, "Woodman, spare that tree."—*Wood Robert.*

CORAL REEFS.

Deep in the wave is a coral grove,
Where the purple mullet and gold-fish rove;
Where the sea-flower spreads its leaves of blue,
That never are wet with the falling dew,
But in bright and changeful beauty shine,
Far down in the green and glassy brine.

THE formation of Coral Reefs is partly a vital and partly a chemical process. No more wonderful instance of animal agency is to be found than that which is exhibited in the work of the coral zoöphyte. In the warmer latitudes of every sea, where the water is sufficiently clear and tranquil, we find the homes of the polype, which, endowed with the power of secreting lime from the waters of the sea, rears with it its polypidom, and forms those mountains commonly known as coral reefs and islands. According to Cuvier's arrangement of animals, the builders of these reefs belong to the fourth, or lowest division of animal life, which consists of zoophytes, or radiated animals. These zoophytes are subdivided into five classes, the fourth of which contains the polypes, of which there are three orders; viz., fleshy polypes, gelatinous polypes, and polypifera polypes, the last of which are the coral-builders. These tiny architects of mighty works begin life in the shape of a gemmule, which, dropping from a pile of coral into the sea, swims about for some hours or sometimes days, until it finally settles on another portion of old coral, or other hard substance which is to be found at the bottom of the sea. It then gradually lifts itself into the shape of a tube, round the edge of which there soon appears a delicate, thick-looking rim, the beginning of the house in which it is to live. This chalk, deposited by the live jelly out of its own substance, looks at first like a milky fluid, but it soon becomes hard, and then the sides begin to rise up, something like a fine pencil-case. Next comes the growth of the mouth and the tentaculæ of the polype, which enable it to catch the food upon which it is to live, and with which it carries on its work of building. After the appearance of the tentacula, the remaining jelly takes the form of a tube polype, and for the rest of its life goes on ever catching food and building therewith new stories to its house. As the outside case grows higher and higher, the polype follows up after the rising walls of its house, always keeping its mouth just below the top of the wall, but high enough to enable it to thrust out its tentacula. The coralline polype does not approve of solitude. Vast numbers, past man's power to count, build their cells side by side. Nor are their chalk pipes dead walls, but rather, so long as the polype lives in them, living bones; for out of the body of the animal run little vessels into the outer case, making their body and their wall one living whole.

Further, all the polypes in one pile are joined together by their vessels into one great living creature; so that what one polype eats passes on to assist in nourishing the rest.

Very numerous are the family and genera of these wonder-working zoophytes; the more abundant, according to Darwin, being the *Madrepores*, *Astræas*, *Porites*, *Meandrinæ*, and *Mallipores*, at moderate depths. *Millepores*, *Seriatopores*, and other delicate forms, are found at depths varying from 15 to 20 fathoms. Although we are used to speak of coral reefs as rising from "unfathomable depths," in ordinary cases reef-building polypifers do not flourish at greater depths than 20 or 30 fathoms; a certain amount of light and warmth being necessary to their existence. It is true, however, that detached coral and coral drift have been found at the depth of 270 fathoms; but this was not the work of the true reef-building zoophyte. As has been said, not only animal but also chemical agency is at work in the building of coral reefs, which, though chiefly effected by the lime-secreting zoophytes, are in some measure owing to the promiscuous aggregation of marine *débris*.

Coral, as produced by the polypes, is almost pure carbonate of lime, which, although soft and porous at first, becomes in time so hard and compact as to be used by the South Sea Islanders for architectural purposes. However, in the formation process the pure secretion of the animals envelopes sponges, sea-weeds, star-fishes, sea-urchins, drift-wood, drift-coral, shells, and such-like; the whole mass being consolidated into a compact rocky mass by the growth of the new coral and through chemical action—that action consisting in the transfusion and percolation of carbonated water among the particles of lime of which the pure coral is mainly composed.

All this agency combined with that produced by the infiltration of carbonate of lime from decomposed coral, gives to the rock a brecciated appearance, and renders it extremely analogous to some older limestones of the secondary formations.

On the other hand, coral reefs are sometimes found closely resembling in formation some of the earthy varieties of chalk; these arise from the consolidation, in lagoons and sheltered water-channels, of particles of decomposed coral and other matter. A third species of coral-stone has a sparry crystalline aspect; but this is only found when the reefs have been upheaved by subterranean agency; as for instance, on the hills of Tahiti, where a stratum of fossil coral exists.

Thus, in the work of the polype we may find almost every gradation of limestone; varying from the soft chalky mass formed by animals even now alive, to the hard, compact texture of saccharoid marble, which has stood against wind and wave for thousands and thousands of years.

The rapidity of the growth of these rocks is a much-disputed point. By some, especially by the earlier authorities, it was thought to be a very slow process, and it was supposed that, on the average, little more than a foot could be added to a reef during a whole century. But this cannot always be the case, for Darwin speaks of a ship-bottom which was covered to the thickness of two feet in twenty months. Loose masses also have been known to become firmly cemented in six months by the growth of new coral. A further instance of the rapidity of growth was found in the Keeling Reef, a channel in which became entirely stopped up, through which a schooner had floated only ten years before.

From this fact Darwin draws the following conclusion :—" First, that considerable thickness of rock has certainly been formed within the present geological era by the growth of coral, and by the accumulation of its detritus ; and, secondly, that the increase of individual corals and reefs, both outwards or horizontally, and upwards or vertically, under peculiar conditions favourable to such increase, is not slow when referred either to the standard of the average oscillations of level in the earth's crust, or to the more precise but less important one of a cycle of years."

Coral reefs, partaking as they do of the depression or elevation of the sea-bottom, and also being subject to the waves and breakers, form a barrier of limestone more or less compact ; and as the polype ceases on reaching the surface of the water, the top of the reef frequently becomes weathered and converted into soil capable of sustaining vegetation. When the sea-bottom to which the zoophytes are attached partakes of a gradual elevation, they build outwards and seawards, and should it be undergoing depression, they strike upwards.

These sea mountains abound in the Pacific, Indian, and Southern Oceans. Masses of them abound in the Pacific, on both sides of the equator, but not beyond the 30th degree of latitude. They are also very numerous in the southern part of the Indian Ocean. For hundreds of miles, we find them trending along the north-east coast of Australia, and they occur more or less in the Persian, Arabian, Red, and Mediterranean Seas.

Owing to the great amount of volcanic agency which is constantly at work, upheaving and submerging in the Pacific, there are found there many peculiar phases of the coral reef; such, for instance, as the atolls or lagoon islands, fringing or shore reefs, coral ledges, and encircling reefs.

Atolls consist of coral reefs forming low circular slands, enclosing lagoons. Shore reefs are those which surround islands of igneous and other origin. Coral ledges are masses of coral thrown up by volcanic agency on to the top of other reefs already upheaved. The encircling reef is that which stretches along shore in surf-beaten ridges, often extending for many leagues, and varying in thickness from 20 to 200 feet. The great reef which lies off the coast of New Holland is described by Captain Flinders as being more than 1,000 miles long, and varying in thickness from 20 to 100 feet.

In this same reef there is one continuous portion of more than 350 miles, without a single break or passage through it.

So much for coral reefs and islands, commonly so called. But modern discoveries go to show that the work of the polype is not confined to those mountains which are still covered by the sea. On the contrary, it is, I believe, the general belief among the great geologists of our day, that the Dolomite mountains, hitherto the cause of so much doubtful controversy, were the work of the coral zoophyte.

These unstratified rocks, deeply divided by vertical fissures, and scattered about over porphyritic platforms, with so little connection with the neighbouring rocks, that they look like "icebergs stranded," have been shown by Dr. Richthofen, Mr. Churchill, &c., to bear a most remarkable resemblance to coral reefs.

And here I cannot do better than quote some passages from a review on Gilbert and Churchill's book on "The Dolomite Mountains :"—

"Mr. Churchill suggests that the formation of Dolomite may be going on in coral reefs at the present day ; for the specimens of coral rock brought home by Dana from the raised island of Mantea, or Aurora, were found to contain in one case 5 per cent. and in another as much as 38 per cent. of carbonate of magnesia. And if we suppose the Dolomite mountains of Carinthia to have been formed on a gradually subsiding basis, they may have grown up like the low islands of the Pacific, till the sea attained the depth of a thousand fathoms, preserving their original contour from first to last, the group of corals, like a forest of tree trunks without tops, rising upwards together, and becoming partially solid by lateral growth, or by filling up with sediment.

"We have no fossil coral in England wherewith to compare the Dolomite mountains. Our magnesian limestone affords only bryozoa, for it has not been suspected that the remarkably concentric and radiated concretions are metamorphosed corals. In one Silurian coral reef of the Wenlock Edge and Dudley there may be masses of branching coral a yard across, and convex *Stromatoporæ* (which are not corals) of nearly equal size. But the coral beds are separated by clay partings, and never attain a great thickness. The Devonshire marbles have much the appearance of coral reefs, so far as respects the scattering of small masses over a region of argillaceous schists. In the carboniferous limestone layer above layer of branching corals may be seen in the lofty cliffs of Cheddar and the weather-beaten shores of Lough Erne. There the corals are slightly silicified, and stand out in relief, while the mass of the rock is composed of sediment with foraminiferal and encrinital *débris.* The coral-rag forms a reef in some parts of Wiltshire, but it is rarely seen in section; the corals are obtained as stones from the ploughed fields.

"The conversion of a limestone coral reef into Dolomite becomes comparatively easy of belief, since Mr. Sarby has shown that coral (like nacre) has the constitution of aragonite, a much less stable compound than calcareous spar. Pearly shells are never preserved in calcareous rock, unless in a metamorphic condition; and the corals of the oolite formation are usually silicified, like those of Tisbury, in Wiltshire, and Mattheim, in Germany, or replaced by structureless calcite, full of sparry cavities. It is now also well known that the masses of accumulated chalcedony, called *Beckite,* found in the neighbourhood of Torquay, are Devonian corals, more or less completely replaced by silica; for they are sometimes hollow, and in other instances contain a nucleus of fossil coral." A. C.

OLD TREES.

WILL you allow me to add to the list of aged "Monarchs of the Forest" which appeared in Science Gossip for August? The Dragon tree of Teneriffe is said by some writers to be the most ancient of all known trees. Humboldt, when he saw it, computed its age at one thousand years, but I have read that the cypress of Soma, in Lombardy, is the oldest tree of which we possess any record; that there is a chronicle extant at Milan which mentions its being, in the time of that unbeliever in omens who fell on the ides of March (Julius Cæsar), a full-grown tree—forty-two years before our Saviour came upon this earth.

There is in Japan a camphor tree which the superstitious in Sorrogi declare to have grown up from the staff of Kobodarsi (a rather famed philosopher, who lived in the eighth century), capable of containing fifteen persons in its hollow. But what is this to the coniferous *Wellingtonia gigantea* of the slopes of Sierra Nevada? The bark of this tree, put in the form of a room, will hold forty persons—not closely packed together, but seated, with a piano for the benefit of the musical as well. This room made of bark was exhibited in London some years ago, when 150 little children were admitted, and the tree from which it was taken is said to have been three thousand years old. Some ninety trees of this kind are found, all within the circuit of a mile, on the slopes of Sierra Nevada, 5,000 feet above the level of the sea, varying in height from 250 to 300 feet, and in thickness, or diameter, from 10 to 20 feet, the bark being from 12 to 15 inches in thickness.

A writer in the *Gardeners' Chronicle* says (or rather said a few years ago) that this tree only grows ten inches in diameter in a period of twenty years.

Then we have old trees in our own land—the oak the chestnut, and others. Dryden assigns nine centuries to the oak.

> The monarch oak, the patriarch of the trees,
> Shoots rising up, and spreads by slow degrees;
> Three centuries he grows, and three he stays
> Supreme in state, and in three more decays.

Both the Bull oak of Wedgenorth Park and the Courthorpe oak of Colburn are said to be as ancient as the Norman Conquest. We have likewise Gospel oaks—the "Four Evangelists and the Twelve Apostles," so called because portions of the Gospel were formerly read under them on Holy Thursday.

The Bentley oak and the Winfarthing are believed to have been 700 years old when William came over to conquer us; therefore Dryden's allotted period of nine hundred years has been considerably exceeded by them.

There is a famous chestnut tree in Gloucestershire, at Tortworth, which has been standing since the reign of Stephen (1150), and others at Dorking, in Surrey, planted in 1377.

Our yew trees, likewise, are venerable. The Ankerwyke yew, on the banks of the Thames, opposite Runnymead, in Surrey, was an old tree when Magna Charta was signed in 1251; it yet, I believe, flourishes; at any rate it was living and in green leaf a few years ago. There is also at Cliefden Woods a very ancient shell, I may call it, of a yew tree, measuring nearly twenty-seven feet in diameter.

Olive trees are deemed old by modern writers; I ought, probably, to say long-lived, for in the environs of Nice there is one considerably over 900 years old; and some authors assert that a few of the trees on Mount Olivet are 2,000 years in age; nay, more, they say that many of them stood there eleven centuries before the Christian era. There is no doubt that olive trees still thrive on the rocky mountains of Palestine, on the very spot called by Hebrew writers "the Mount of Olives," yet I do doubt their being the self-same trees that grew there in our Lord's time.

A gentleman assured me yesterday that a tree in Tasmania, of the gum tree kind, is both the largest and the oldest in the world. Perhaps some of your readers will tell us something of its history.

Helen Watney.

Infusoria.—The polishing slate of Bilin, in Prussia, forms a series of strata fourteen feet thick, and is entirely composed of the siliceous shields of Infusoria, of such extreme minuteness, that a cubic inch of the stone contains forty-one thousand millions of distinct organisms.—*Mantell's Thoughts on Animalcules.*

POLARIZED LIGHT.

THE application of polarized light to the microscope is of great value to the student, inasmuch as by its aid the structure of many objects in the animal and vegetable kingdoms, such as scales of fish, hair, muscular structures, starch, granules, sections of wood, &c., are more plainly made out, and better seen; while in the mineral kingdom many crystals may be distinguished from each other, though having the same external form, by their action on polarized light.

To go deeply into all the beautiful theories respecting the nature and properties of light, would form an elaborate treatise, too voluminous for the pages of Science Gossip; but for our present purpose it will suffice to state that light is now generally considered to consist of a series of undulations or waves, taking place at right angles to each other with inconceivable rapidity, in a fluid of extreme tenuity which pervades all space, and has been designated "ether;" so that a beam of light may in section be represented by a circle, with a right-angled cross in it, thus ⊕.

To make what is meant by undulations more ntelligible, let the reader imagine a field of corn agitated by the wind—a succession of waves traverses it, each individual ear of corn oscillates on its stalk like the end of an inverted pendulum moving backwards and forwards a short distance, so that it is the motion which travels, and not the ears of corn through which it is conveyed; so that as regards the ultimate particles of the ethereal medium through which the light is conveyed, we have motion without progression of those particles.

Certain bodies, known as double refractors, possess the property of separating these undulations, and Iceland spar (crystallized carbonate of lime) is the one usually chosen for microscopic purposes, on account of its freedom from colour. It is well known that if an ordinary rhomb of Iceland spar be placed over a black mark or spot on a piece of white paper, two spots are apparently visible. This phenomenon is called double refraction; but here the undulations are not separated far enough for our purpose. If we divide the rhomb into two equal portions in a certain direction, then, having polished the cut surfaces, and cemented them together with Canada balsam, we shall find that, on looking through it at the spot, only one image is visible, and we have produced that very useful piece of apparatus called the "Nicol prism." A pair of these adapted to the microscope, one fitted beneath the stage, and called the polarizer, and the other either above the eye-piece or between that and the object-glass, and called the analyser, for a reason which will soon be apparent, and so adjusted that one or both prisms may revolve on their respective axes, and we shall have, with the addition of a plate of selenite mounted as a slide, a most useful appendage to the microscope.

Selenite is crystallized sulphate of lime, and has been called by the miners, quarry glass.

Now let us adapt our polarizing apparatus to the microscope, and examine some of the properties of the polarized light. First of all we observe that in a particular direction of the axes of the prisms to each other, *i. e.*, when they are parallel, light is freely transmitted; but if one of them is revolved so that the axes of the two prisms are at right angles to each other, the field will be dark. In passing through the lower prism, the light has been altered in character, and it is only in a certain position that it will pass through the second; one of its undulations has been, so to speak, bent aside out of its course, and the other allowed to proceed straight on, until it reaches the second prism, or analyser, which name is now obvious; for it analyses or tests the light, showing by its passage or non-passage, in every position of the axis of the prism, whether the light is polarized or not.

If we now interpose a plate of selenite between the two prisms, we shall find the light is transmitted through the whole combination in every position of the axes, but is coloured according to the thickness of the selenite, and the angle of the axes of the prisms with regard to that of the selenite.

A. J. Roberts.

Nuthatches at the Window.—I was staying in Leicestershire in March, 1865, during the excessively cold weather and deep snow. I fed a great many birds at the windows, and was anxious that some nuthatches should come, as I have never seen these birds in Westmoreland. I therefore followed a plan I had read of, and tied some walnuts to a string fastened to the window. I cracked the walnuts so as to let the kernels be seen. In a short time a pair of nuthatches came to the window, and, having once discovered the good things there, their visits were incessant; and they were not at all shy of being watched. It was very amusing to see them tugging away at the walnuts, and to watch their evident impatience when they could not detach them from the string; knocking them fiercely against the window-sill, twisting them backwards and forwards, and hammering away at them with their strong beaks, till they succeeded in carrying them off. They seemed almost to prefer broken biscuit, I suppose as being easier to get at. And they had quite an unfair advantage over the other little birds, for they held several bits at once in their long beaks, packing them in one after another, and flew off with them to the neighbouring deciduous cypress or mulberry trees, to eat them at leisure.—*F. Arnold.*

TOADSTOOLS.

HERE, there, and everywhere are springing the ubiquitous "Toadstools." Even the columns of the *Times* have honoured the "Stinkhorn" by permitting its appearance (in the gardens of astonished suburbans) to be recorded side by side with events in which kings and emperors were the heroes. Starting with this rather absurd name, in so far as its meaning is generally understood, it behoveth us to suggest a better derivation and signification. This we think it possible to do by transferring its origin to the German; how this may be affected by Saxon, or Anglo-Saxon, we are not learned enough in linguistic lore to determine. If instead of "Toadstool" we read "Todstuhl," and transfer from the poor inoffensive reptile the odium, or honour, to the great leveller of all, "Tod," or "Death," we have in the "stool of death" a much more appropriate idea than the popular one delineated in our woodcut. Here we encounter another vulgar error—for vulgar errors and prejudices are always numerous enough with regard to things that are but little understood,—and this regards all fungi as poisonous or unfit for food, except a very favoured few (somewhat less than half a dozen), whilst in reality we have fifty or sixty kinds found in Great Britain, such as would bring tears of delight into the eyes of the genuine epicure, if they were dressed and placed before him. How often have we smiled at the incredulous stare which greeted our announcement that we intended to sup or breakfast on a gigantic puff-ball; and many a time have we been consoled by an Irish friend that we might find ourselves dead in bed some fine morning if we persisted in making what would emphatically be our "last meal," on such abominations as "Fairy-ring Champignons" or "Chantarelles." Yet, after all, we are by no means hazardous, not like a friend who would eat almost any kind, till he narrowly escaped being poisoned. Our "toadstool"-eating propensities are always restricted to species which have been well tested, and are eaten by some people in some country or other, and even many of such we have left untasted. There is, however, one little infatuation to which we must confess,—it is in favour of the great puff-ball. In Norfolk they are called "Bulfers," and are common there in harvest-time, as large as one's head, and would afford a hearty meal for a dozen people. These we always condemn to the frying-pan whenever fortunate enough to secure them, and such friends as have partaken this relish with us—a number by no means small—have unanimously resolved in the future to follow so excellent an example.

This season of the year is eminently prolific in all the larger kinds of fungi; microscopic species can be met with at any time, but "toadstools" are the privilege of autumn. Now and then we hear of their upheaving pavements and hearthstones, but such freaks are not common. In every wood, meadow, or pasture; along any green lane, about rotten stumps, wherever there is sufficient moisture and decaying vegetable substances, they are sure to be met with. Sometimes of a brilliant red, or a golden yellow, a lurid green, a dusky grey, or of an ivory whiteness. Occasionally changing, when broken, from a whitish flesh to blue, or brown, or yellow, or with a faint tinge of red. Some leathery, tough, and dry; and others, whenever bruised, exuding a milky fluid, not only white like milk, but yellow, and in one instance changing to green. If the colouring is varied, so also is the form. Even restricting our observation to those which have a stem surmounted by a cap, as in the common mushroom, we shall notice some in which the stem is delicate and fragile, scarcely seeming to possess sufficient strength to support its head, whilst others are so obese in their bodies that the cap seems too small to cover them. Then the cap itself, now conical, now flat, now spherical, and now funnel-shaped, is as prolific in variety. If such a cap is unceremoniously kicked off, another feature, hitherto unseen, will greet the eye of the observer. Beneath the "parasol" or *pileus,* as the more scientific would term it, in many instances parallel plates or gills will diverge from the stem; but these plates are sometimes replaced by tubes glued together, so as to resemble pores, and, in less common instances, instead of tubes or pores, teeth or spines will clad the whole under-surface. To the "toadstool"—we suppose they are all "toadstools," for we hear no other name—these are very important processes, for they bear the seed of future generations. Whether gills, or pores, or teeth, upon or about them are clustered minute bodies, called the spores, which, when ripened, fall upon the soil beneath, or are scattered, and, in future days, originate another batch of toadstools. If we will take the trouble to gather one or two of these caps when fully expanded, and place them with the under-surface downwards, on a sheet of tinted paper at night, in the morning we shall find the spores deposited on the paper, perhaps forming a white, a brownish, or a blackish stain. Who shall count the myriads of germinating bodies thus originating from a single parent? Here, too, is work for the microscopist; for if he will take a fragment of one of the gills, or pores, or teeth, and submit it to observation under his instrument, he will see a new phase in the mysteries of vegetation, for the spores will appear, supported naked on short stems in groups or clusters of four; and if this is the first time that he has made such a use of his microscope, it will certainly not be the last.

We might refer also to the great variety of form exhibited by fungi, other than those having a stem and cap. To the cup-like but elegant bright orange Peziza, to the Cornucopia, to the waxy Clavarias, the lobed Tremellas, the shell-like Polypori, the eccentric Starry puff-balls, and the subterranean Truffles. As a contrast to the disagreeable odour of the "stinkhorn" already alluded to, we might enumerate those possessing a powerful but grateful fragrance; but enough has been said to indicate that there is something worthy of regard in the much-despised but little-known orders to which the "toadstools" belong.

M. C. Cooke.

HERMIT ROOKS.

Have any of your readers, in their wanderings over some lonely hill-side, ever noticed a solitary rook haunting the spot like an evil genius, and flitting from mound to hillock a few hundred feet in advance of the traveller? I am something of an anchorite myself, at least I love a silent walk when wearied sometimes with the din of the great city in which my lot is cast, and I cannot help feeling some sympathy for these odd birds, which nature has made gregarious, and which fate or misfortune has driven into solitude.

I have not made the common mistake, as may be suspected, of taking a crow for a rook, an error which nine-tenths of all townspeople are sure to fall into. I know the distinction well enough, and the difference in their habits, and am seldom sufficiently deceived, even for a moment, by the wild and vigilant "corone," to mistake his vigorous motions for the languid action of this melancholy "frugilegus." I use the epithet *melancholy* not only because he has that aspect, but to introduce one out of three hypotheses to account for a way of life so opposed to the usual gregarious habits of his race. It is at least possible that irrational creatures may be bred occasionally with that peculiar composition of the humours which constitutes a hypochondriacal temperament. I remember an old horse of my father's that used at times to heave the deepest sighs—a fact well known to the stableman, and he had, besides, the ill-conditioned look and occasional indisposition for work combined with wonderful spurts of energy at odd times, which certainly mark the rider—and if the rider why not the horse?—afflicted with this disorder; unless, indeed, it may be thought that old Herbert's proverb establishes a constant diversity of nature, "the horse thinks one thing and he that saddles him another." But, reasoning from analogy, may we not assign as one possible cause for the *lonely* habits of a *sociable* bird the possession of a melancholic system? He cannot hold up his head among the sprightly ones of his race—their senseless cawing grates on his nerves, and liable as he is, when in company, to aggravation from passing visits of cackling jackdaws and starlings, he retires into the wilderness to indulge in silence and constitutional spleen. Virgil indeed seems to think that impending changes in the weather may thus affect rooks in general—

> Tum cornix plena pluviam vocat improba voce,
> Et *sola* in sicca *secum* spatiatur arena.

But whatever truth there may be in this, it hardly applies to my supposed hypochondriac, for he, according to my observation, is not given to much speaking—he moves off mute and sad as you approach him, and giving himself an oblique twirl upwards to break his fall, settles down for, perhaps, the twentieth time with the least possible concussion to his bones.

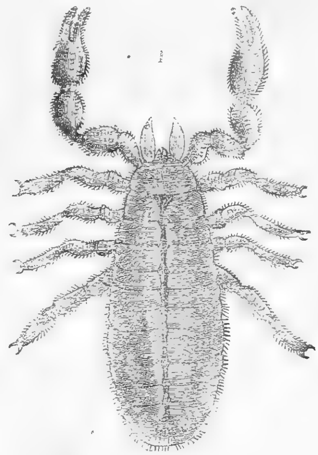
A different, and, as some may think, a more probable conjecture is, that these hermits are mutilated or disabled birds, incapable of the sustained flight and active habits of their congeners. It is certain that the breeding season makes no difference in their mode of life, and unless we suppose them to be hermaphrodite, or in some way unequal to the cares of a family, we cannot account for their exemption from the passionate instinct that wild creatures have for increasing their kind. Many years ago, when I was living in the valley of Homesdale, I noticed one of these unfortunates haunting the fields at the back of my father's house. Spiritless as he seemed, he kept a sharp look-out, and gave me some trouble before I could satisfy my curiosity by a long shot. He was lying on his back when I came up, and a moment's glance at his black legs, upreared in the air, revealed the cause of his solitary habits. One of the metatarsal joints was quite stiff, and enlarged to the size of a blackbird's egg. The three front claws were bent in a general direction backward along with the back claw, and on the stump end or knob the bird hopped and strode about. Doubtless a shot-corn had shattered the joint many weeks before, and the poor creature had borne up through the irritation of such a wound, and had found shelter and forage for himself till nature had wrought a mournful sort of cure. But he was a hermit for life.

The injury he had received possibly befell him in another way, of which I met an example some years later. One fine June day I was crossing, with a young friend, over the chalk downs east of Box Hill, in Surrey, and in the middle of a small patch of enclosed land we noticed what appeared at a distance as a piece of black cloth waving in the wind. On coming closer, it turned out to be a rook pinned to the ground by one leg, which was caught and horribly mangled in a steel trap. A very pitiful sight it was. A handsome young male, in the finest condition, his plumage still retaining a little of the superficial down of his nursing days, his wings well developed, and his lustrous black eye looking up with something of the touching expression attributed to that of the dying gazelle. It was to little purpose that we forced his shattered limb from the bitter gripe of the iron. In a few minutes he would, indeed, have regained the company of his kind, whose cawing was audible far down the valley, but only to be driven from their society to die a lingering death, or, after weeks of suffering, to pine in solitude for the rest of his days.

There occurs to me only one other way to account for the strange life of these hermits, viz., that old age has crippled their energies, and, exposing them to the ill usage of their fellows—who with all their sociability are far from tender-hearted—has forced them to a lonely life. It is true that the perils to which a rook is exposed, in this thickly-inhabited country, are manifold, and there are many chances to one against his reaching old age; but the case is a possible one, and all the more so because there is a very old standing impression that the tribe to which he belongs is endowed with longevity. The ancients had a notion that the natural term of his life is nine hundred years, and in the Greek anthology occurs an appellation (*κορωνεκάβη*) applied to a very aged person, which is curiously compounded of the Greek noun for "crow" and the proper name *Hecuba*, who, being the mother of a very numerous offspring, must needs have been a tolerably old woman. Hence the meaning is, "as old as a crow *and* Hecuba." I commend the subject to any of your readers who, being more happily circumstanced than I am, have the liberty of ranging with a gun over lonely moors. I doubt not they will soon meet with one of these anchorites, and determine a question which I can only guess at. H.

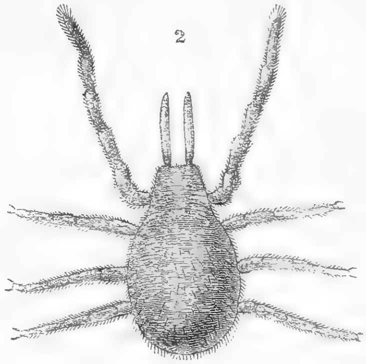
FLY PARASITES.

THE common house-fly carries about with it two insects of a parasitic nature (figs. 1 & 2 enlarged). No. 2 is the smallest and the most common; sometimes three of them and more will be found on one fly; but I have not found more than two of the largest (No. 1); indeed it was only this summer that I knew that they were the prey of the latter, and had seen the smallest some years ago; neither have I found both kinds on the same fly. Some of your readers may have seen them, and will perhaps favour us with further information concerning them.



No. 1 is extremely like *Tenebrio molitor*, the beetle of the mealworm; both are of a red-brown colour. The question suggests itself, whether flies do not carry about and deposit larvæ and small beetles of

2



various kinds, an office for which they are admirably adapted from their erratic character. Nobody can tell what sort of places and company they do not visit in their wanderings, and I cannot help thinking various small insects attach themselves to them and are quickly conveyed to places more congenial to certain periods of their being. And this idea is favoured when the object of the pincer-like appendages of No. 1 is sought. What can they be for, but to furnish a means of attaching itself to some larger insect with more extensive powers of locomotion, and thus being transported to the next stage of its life? Queer-looking insects are always turning up in unexpected places, and I have no doubt many of them are dropped by the flies! It is probable that by this means many of these "odds and ends" find their way into the human stomach, and produce various disorders in the skin.—*G. Bailey.*

ON THE COMPOUND EYES OF INSECTS.

IN Mr. Lewis G. Mills's very interesting paper on the spiracles of the fly, in Science Gossip for September, he remarks—"The head of the fly contains the compound eyes with which it sees." This sentence revived a thought that I have often had before, and for which I am indebted to Mr. Walker for bringing into existence; namely—Is this wonderful compound structure an organ of sight? I presume that all readers of Science Gossip are familiar with the polygonal facets, and the fine hairs springing from between, which form the so-called compound eyes of insects; and I think all who have given the subject any attention will allow that these organs seem singularly unadapted for vision. An excellent idea of the incompatibility of an organ so constructed for the purpose of sight may be obtained by looking in a subdivided convex mirror, in which it will be seen that objects reflected are broken into confused distorted masses. Cuvier, speaking on this subject, says that the structure is so very different from that of other animals, that it would be difficult to believe it an organ of sight, had not experiments demonstrated its use. The experiments referred to were covering the compound eyes of a dragon-fly, which was then found to dash against objects in its flight, with every appearance of blindness. A wasp was treated in the same manner, and it ascended perpendicularly in the air, until it completely disappeared. Upon the simple eyes being covered also, it did not attempt to fly, but remained immovable. "How futile these arguments are," says Walker, in his admirable work upon the nervous system, "need scarcely be pointed out. The same results would occur if these were organs of touch, equally essential to the guidance of insects." Another fact pointed out by Walker tends to overthrow the theory of these compound structures being organs of vision, which is, that the black coat (*pigmentum nigrum*) is external to what may be termed the retina. The Gossiper in science will the better understand this by the following simple experiment:—Let him open the window of his room and hold the crown of his hat (if a black one) parallel to the glass on the outside; he will then find that, looking at the crown of his hat through the pane, his face will be reflected. This is a simple illustration of the action of the human eye. The hat represents the dark pigment, the glass the retina, and the man the object looked at. Now, in the so-called compound eyes of insects, the dark pigment is before, instead of behind the retina, and hence, as Walker observes, "comparative anatomists complain lamentably of the difficulty of understanding how, under such circumstances, vision can take place." From these and other circumstances, Walker hardly admits of a doubt but that the so-called compound eyes of insects are organs of touch. He says—"Is not, then, the white matter, well supplied with nerves, in these eyes, analogous to a portion of the true skin of the higher animals; the black matter, to the mucous net-work, which is dark in the negro, whose sensibility is greatest; and the exterior substance to the cuticle, in itself insensible even in man, and horny in insects, because their general surface is more or less so, but furnished with fine hairs, which in them are separated and supported by the hexagonal facets, and descend through the black substance to the true skin and its nervous fibrils." The hairs arising from between the facets may be compared to the whiskers of the cat, the extreme sensibility of which is well known. A very simple experiment, that I have often tried, tends, I think, to prove that the so-called compound eyes are organs of touch. Let the reader stand by his window until a fly settles on the outside of the glass, and then let him move his hand about over the inside, being careful not to cause any vibration, and it will be found that the fly will not be disturbed. The reason of this is obvious, if we allow the compound eyes to be organs of touch, the simple eyes being placed on the top of the head (as in the bee),—the interior of the room is hidden from the creature's sight, and the intervening glass destroys the exquisite sense of touch, that would otherwise give it warning of the approach of our hand.

If this should be the means of causing those better adapted than myself to give their attention to this interesting question, my end will be attained.

H. Vokes.

VARIATIONS IN BRITISH PLANTS.

IN an early number of Science Gossip I made a few remarks upon the varieties of British plants which had come under my notice. As the present year has enabled me to make several additions to my list, I may perhaps be allowed a short space in which to record my observations, premising that they have all been made in the neighbourhood of High Wycombe, Bucks.

The Wood Anemone (*Anemone nemorosa*) varies greatly in the number of its sepals; I have found specimens with five, six, seven, and eight respectively. Perhaps the most curious malformation which I have noticed is one in the Corn Poppy (*Papaver Rhœas*), which occurred in a corn-field near West Wycombe. The specimen alluded to had a persistent calyx, formed of four sepals, two of which were opposite at the base of the petals, and the other two at short distances down the stalk; all were much larger than is usually the case, and the upper two seemed part sepal and part petal, as they were streaked with red, and in some parts of a fine petal-like texture. The true petals were perfectly formed, but were much smaller than usual. I have found *P. Rhœas* with white blossoms. Five-petalled blossoms of the Great Celandine (*Chelidonium majus*) have been of frequent occurrence this year: and in one such blossom the two upper petals were much larger than the three lower; thus giving it the appearance of a Violet. I gathered several specimens of Mousetail (*Myosurus minimus*) near Little Marlow, having the receptacle forked at the top.

A very pretty "sport" of the sweet violet (*Viola odorata*) was gathered in the spring near Little Marlow; this had white blossoms, beautifully striped with purple. The Wood Violet (*V. sylvatica*) occasionally produces petal-less blossoms late in the year; in one specimen found, these blossoms grew in the axils of the leaves, and extended some way down the stem. The Bladder Campion (*Silene inflata*) occasionally has its calyces so much enlarged as almost to conceal the blossoms; and the White Campion (*Lychnis vespertina*) has been observed in two or three places this year having bright pink blossoms. The Dove's-foot Cranesbill (*Geranium molle*), with white flowers, is of frequent occurrence with us; and I have two or three times noticed a form of the common St. John's wort (*Hypericum perforatum*) in which the calyces were somewhat larger than usual, and of a brownish-red colour. The white-flowered variety of the Purple Clover (*Trifolium pratense*) has been very common hereabouts this year, appearing in almost every clover-field. *Helianthemum vulgare*, with white blossoms, occurs on Bledlow Ridge.

In Wycombe Park there is a Hawthorn (*Cratægus oxyacantha*) which presents some of the peculiarities of the far-famed Glastonbury thorn. On the 9th of January it exhibited several fully-developed leaves, and many bunches of buds, in an apparently healthy condition; but the subsequent frosts prevented them from blossoming. A bush of pink-flowered May occurs at Hazelmoor, in a hedge of the common white-flowered form. I have found the Agrimony (*Agrimonia Eupatoria*) with the spike forked at the top; and I also saw the Hogweed (*Heracleum sphondylium*) with the umbel foliaceous; that is to say, composed partly of blossoms and partly of leaflets.

I have this year noticed several of the *Compositæ* varying with white blossoms, and among them *Cnicus lanceolatus* (Spear Thistle), *C. palustris* (Marsh Thistle), and the rayed variety of the common Knapweed (*Centaurea nigra, β radiata*). *Cnicus palustris* with white flowers appears to be about as generally common as the purple-flowered form. The *Stemless* Thistle (*C. acaulis*) occurs at Whittington Park with a *stem* nearly a foot high. A curious form of the Autumn Gentian (*Gentiana Amarella*) is not unfrequent, having the central flower-head composed of numerous abortive buds; a double-flowered variety, having the stamens, &c., transformed into petals, grows on Keep Hill. Yellow Wort (*Chlora perfoliata*) and Yellow Pimpernel (*Lysimachia nemorum*) occasionally occur with six divisions to the corolla instead of five.

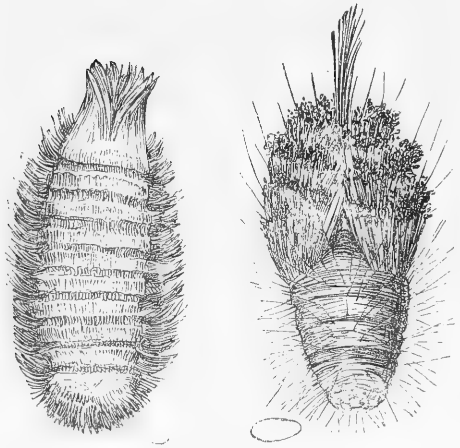
The Germander Speedwell (*Veronica chamædrys*) I have found with leaf-stalks nearly as long as those of *V. montana*. Marjoram (*Origanum vulgare*), with white flowers, is not unfrequent; and near Downley I found a patch in which the blossoms were almost, and in some places quite, concealed by the enlarged calyces. The Hemp Nettles (*Galeopsis Ladanum* and *G. Tetrahit*) occasionally vary with white flowers.

The Green-winged Orchis (*Orchis Morio*), which grows in the meadows near Whittington Park, occurs there with blossoms of widely-differing hues; the prettiest variety being that with pale pink blossoms, upon which the green veins were beautifully distinct. *O. maculata* frequently has the stem spotted as well as the leaves; and of the Military Orchis (*O. militaris*) I found a very pretty variety in Dane Gardenwood, the flowers of which were without stripes or blotches, the lip and helmet being tipped with reddish-purple. In meadows at Dinton, where the Fritillary (*Fritillaria meleagris*) grows in profusion, I gathered two or three specimens with pink, and one with white flowers. Herb Paris (*Paris quadrifolia*), with three, four, five, and six leaves, is abundant in a wood near West Wycombe. I observe that the young plants, which do not blossom, usually have but three. On the edge of a pond on Naphill Common I observed a dwarf form of the Water Star-fruit (*Actinocarpus Damasonium*) not exceeding an inch in height, and having but one flower; its neighbours, growing in the water, were of the usual size. B.

Cretaceous Fossils.—During the course of a visit to the Pavilion at Brighton, wherein is a museum of geological specimens, I observed some fossils of the cretaceous system, and amongst them examples of *Pertea* and *Plagiostoma*, which are well delineated in Page's "Elementary Text-book of Geology." There is also a good collection of shells, by which comparison of the connective links between ancient and modern species, should such exist, may be made. The variation found in the genus *Turbitella* is very instructive and self-evident. I would wish, however, to ask Mr. Page, or some of your readers more conversant with geological facts than I am, how it is that the chalk or cretaceous system is said, in para. 40, group III., "to consist of remains of plants and animals, chiefly marine, and belonging to species now extinct," when both *Perteæ* and *Plagiostomæ* now exist, which are exactly similar to those in a fossil state in the chalk?—*A. G. R.*

SIMPLE OBJECTS.—VII.

Dermestes and *Pencil-tail.*



1. 2.

1. Pencil-tail (*Polyrenus lagurus*).
2. Dermestes.

Both magnified; figures below represent the natural size.

DURING the last few days of February and first fortnight in March may be obtained, under the bark of aged elm trees, two objects which deserve a place in a microscopic cabinet, though, so far as I have ascertained from dealers, they are not commonly mounted.

The first is the larva of a beetle—some sort of Dermestes. It is of a light brown colour, and covered with fine hairs, similar to those figured in the "Micrographic Dictionary" as from *Dermestes Lardarius,* but differing from the pictures of that object in Carpenter's "Microscope and its Revelations," and Hogg's work on the same subject. I imagine this is because the specimens figured there have been damaged in the preparation, perhaps intentionally, with a view to show the structure.

Being certain that many possessors of microscopes have never seen the creature in its living state, I venture to recommend such persons as take a pleasure in preparing objects for themselves to make a search for it.

A low power, say ten diameters, is needed, and opaque illumination. The Dermestes then looks most formidable. It is covered with hairs of several sorts, those of the halbut shape being the most numerous, arranged close to the body, and pointing from the sides to the centre of the back in the anterior segments of the body, but grouped in small bundles, each containing an infinite number of hairs with longer shafts than the others, and looking like tiny sheaves of corn in the hinder segments. These latter can be erected and spread out like fans, giving the creature somewhat of the porcupine appearance.

There is also a bunch of long delicate hairs occupying the place of a tail, and the little fellow protests against interference by switching this article sideways in a ludicrous manner, if touched.

A preserved specimen can never give the full beauty of the living animal; but partial success may be gained by the following plan of mounting:—

I procured a wooden slide, 3 in. by 1 in., and $\frac{1}{10}$ in. thick, having a hole cut in the centre about $\frac{5}{8}$ in. in diameter. Having fastened to this a piece of clean thin glass, I placed the insect in the cell thus formed, and covered it up with another piece of thin glass. By this means I can view both sides of the creature without trouble, and also by illuminating from above and below the stage simultaneously, obtain certain advantages.

The other creature which is worthy of a search is obtained in similar situations. I have generally found it, however, in rotten bark that is covered with lichens and moss, while the Dermestes prefers a more sheltered situation in the crevices between the dead bark and the living wood.*

Its popular name is "Pencil-tail" (*Polyrenus lagurus*†), so called from two silvery tufts of delicate hairs which spring out of the hindmost segment. These myriapods are often very numerous, and a piece of the bark, having a colony of them upon it, is a wonderfully beautiful sight under the microscope.

They are grey, and their backs are covered by transverse bands of curiously-shaped objects inter-

a. b. Hairs of Dermestes.
c. d. Hairs of Pencil-tail.
All × 250.

mediate between scales and hairs, of a leaden hue. The sides and head are ornamented with bunches of a similar character.

To see these animals endeavouring to escape into the dark crevices of the bark when the light is condensed upon them by means of the large bull's-eye, cannot fail to excite surprise.

* Sometimes I have found them in company with each other.

† Wood's "Natural History."

They may be mounted dry in cells, and are very pretty, though a mounted slide cannot compare with the sight I have described.

The binocular microscope will show both these objects to peculiar advantage.

The greatest care is needed to prevent damage to the specimens when collecting. A clean pill-box, with plenty of the native bark, is the best means to arrive at this end. The bark will keep them alive for some time, and the smallest specimens will not be so likely to escape by the interstices of the box as they would if the box were empty.

GREEN DRAKE-FLY.

CAN you inform me where to find a full and accurate account of the metamorphoses of the *Ephemera vulgata*, or common Green Drake-fly, so well known to anglers? I have consulted several works, and not yet met with a satisfactory description of it. In one by Mrs. E. Cox, entitled "Our Common Insects," it is stated that the life of the Common May-fly (*Ephemera vulgata*) does not extend in its perfect state beyond five or six hours, being generally hatched about six o'clock in the evening, and dying before twelve at night. Now this is certainly not true with respect to the Green Drake-fly of the Irish lakes. I have seen it emerging from the water at all times of the day, and it lives for several days. The Green Drake-fly changes its skin, wings, legs, tails, and all, certainly once, and I believe two or three times during its short life, becoming at each change of a darker hue than before. As it comes to the surface of the water, it is of a beautiful yellow-green colour, and its wings in this state are not in the least injured by the water, as I have frequently seen it totally overwhelmed by the waves on a lake, and appear again sailing along as merrily as before. After changing its skin, however, the texture of the wing is much more gauzy, and cannot resist the water. On reaching the shore of the lake where it was born, it hides among the stones or bushes on the shore, and not until it has changed its coat does it become the active inhabitant of the air, whose graceful evolutions are so beautiful. Accompanied by swarms of its fellows, it then certainly enjoys life, now soaring aloft, anon dropping suddenly down, while often two or three together will come tumbling to the ground entangled by the long hairs of the tail. Presently some bird will make a dash through the crowd, and carry off a miserable captive, while the rest, heedless of danger, carry on their sport as before.—*H. G. E.*

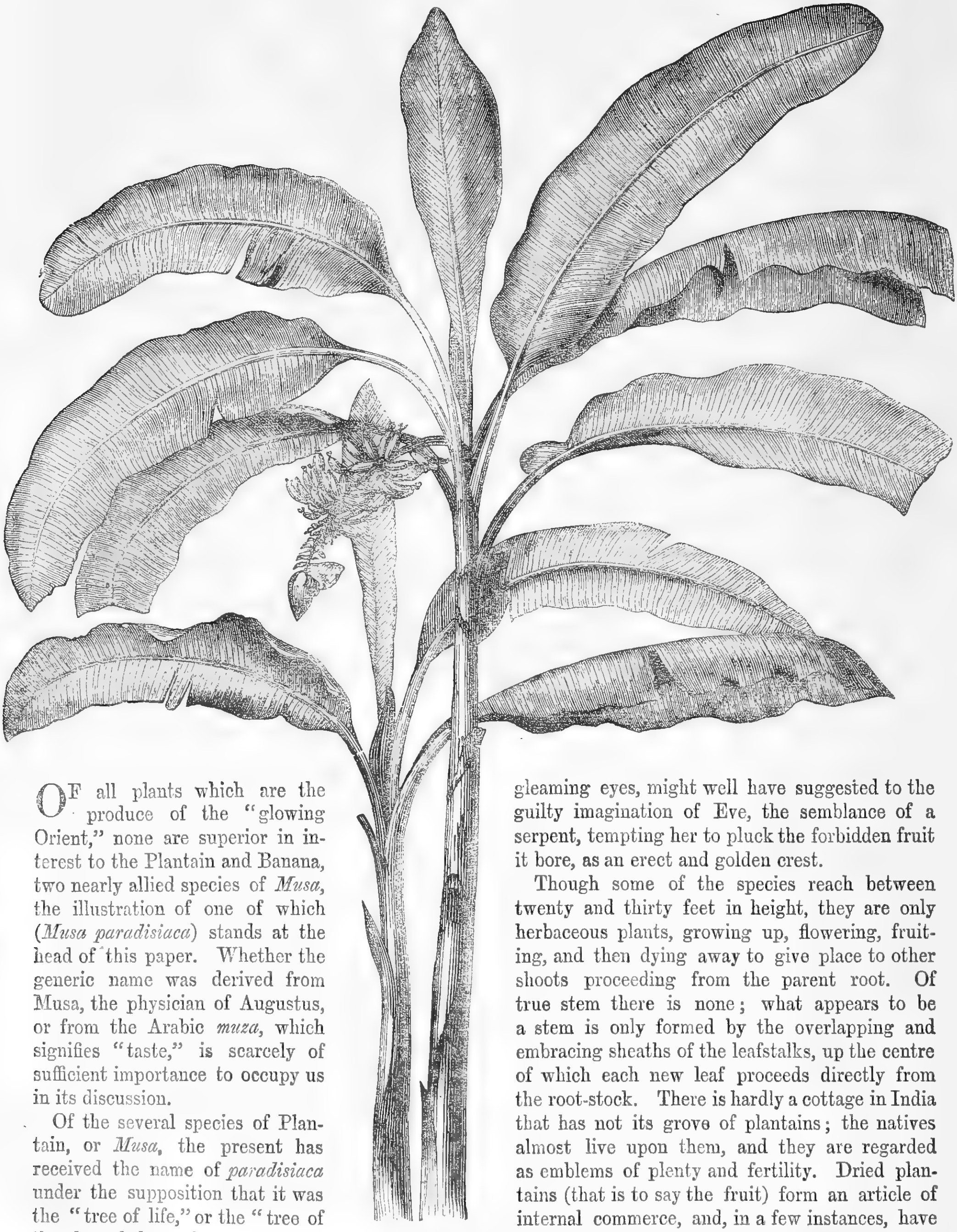
Picket's work on the *Ephemeridæ* gives the most complete account of the metamorphoses of *E. vulgata*, together with figures of larva, &c. See also Westwood's "Introduction to the Modern Classification of Insects." The story of the single-day existence of insects of the family, as applied to the bulk of this species, is a pretty little romance, but by no means true, as some of them will live for at least a week. Nevertheless, in one or two instances their existence in the perfect state is certainly limited to a few hours. You are in error in supposing that *E. vulgata*, or any species of the family, changes its skin two or three times after they assume the winged form. When they first emerge, the whole creature is covered with a membrane, and, in this state, is termed a pseudimago. It then throws off this membrane, and is in every respect perfect, not moulting a second time. Some individuals (generally females) never even perform this operation at all.—*R. McL.*

COLOUR OF BIRDS' EGGS.

IT is my opinion that the eggs of birds are not *necessarily* lighter from being laid later. I remember myself and two school-fellows wished to see how many eggs a bird would lay. The example we took was the Robin Redbreast (*Sylvia rubecula*, Lath.). We found the nest with two eggs, in a wall in the muster-yard, Peterborough. We abstracted one, and for fourteen days successively did we take one egg out of the nest. The bird altogether laid sixteen eggs, all of which we preserved, and I remember we remarked that the last were equally as fully coloured as the first. The Robin's egg is often found quite white. W. D. S. does not mention whether the last egg in his nest was white, and I gather from his communication that it was only found *lighter* than the earliest laid ones. But what I want to show is that sometimes those *earliest* laid are the lightest. On referring to my egg-collecting book, I find that on May 2nd, 1864, I found a nest built in a large box hedge, in Little Gidding churchyard, Hunts, containing one pure white egg. I did not know what bird it was; but on May 9th I took the nest, containing five eggs. Three were white, and the other two were smaller, and of a faint blue, spotted like a linnet's. A sight of the bird showed me they were the eggs of the Mealy Redpole. Here, then, is a case of the lightest egg being laid first. I do not know for certain whether the other two white ones were laid next in order; they were slightly larger than the two ordinary coloured ones. Of these five, one of the albino specimens fell to the share of my bird's-nesting companion, while of the other two, one is in my own collection, and the other is in the collection of Mr. S. L. Mozley. Another instance of a white egg being laid first, came under my notice at Peterborough, when a school-fellow found a solitary white egg in a nest, and gave it to me, saying it was a linnet's. I remember the circumstance well, as that same day I received a linnet's egg no bigger than a pea. R. B. Sharpe.

THE PLANTAIN.

(*Musa paradisiaca.*)



Of all plants which are the produce of the "glowing Orient," none are superior in interest to the Plantain and Banana, two nearly allied species of *Musa*, the illustration of one of which (*Musa paradisiaca*) stands at the head of this paper. Whether the generic name was derived from Musa, the physician of Augustus, or from the Arabic *muza*, which signifies "taste," is scarcely of sufficient importance to occupy us in its discussion.

Of the several species of Plantain, or *Musa*, the present has received the name of *paradisiaca* under the supposition that it was the "tree of life," or the "tree of the knowledge of good and evil." St. Pierre observes that the violet cone at the end of a branch of plantains, with the stigmas peering through like gleaming eyes, might well have suggested to the guilty imagination of Eve, the semblance of a serpent, tempting her to pluck the forbidden fruit it bore, as an erect and golden crest.

Though some of the species reach between twenty and thirty feet in height, they are only herbaceous plants, growing up, flowering, fruiting, and then dying away to give place to other shoots proceeding from the parent root. Of true stem there is none; what appears to be a stem is only formed by the overlapping and embracing sheaths of the leafstalks, up the centre of which each new leaf proceeds directly from the root-stock. There is hardly a cottage in India that has not its grove of plantains; the natives almost live upon them, and they are regarded as emblems of plenty and fertility. Dried plantains (that is to say the fruit) form an article of internal commerce, and, in a few instances, have been exported. In our opinion, they are preferable to figs as a dried dessert fruit, but hitherto are scarcely known in England. When deprived of the skin and dried in the sun, they are reduced to a meal, in great request in the West Indies for children and invalids. Professor Johnston states that this fruit approaches most nearly in composition and nutritive value to the potato, and plantain meal to that of rice. The fruit ripens in succession from the base to the apex of the flowering stem, so that, on the same plant, flowers and ripe fruit will be found together. Each fruit is nearly six inches in length, slightly curved, and about an inch in diameter; when ripe it consists of a rich mellow pulp, resembling a fine pear. One stalk of fruit will attain three feet, and bear from 120 to 150, or even 180 plantains, the entire weight of which would be from 50 to 70 pounds.

All the species of plantain contain a large number of spiral vessels in their structure, and afford strong and valuable fibre, from which cloth and cordage are manufactured. The substance called Manilla hemp, of which Blondin's Crystal Palace rope was twisted, and which is much employed for cordage both in this country and America, is obtained from a species of plantain (*Musa textilis*). The fibres derived from the common plantain, as well as those from other species, are also used in India, both for cordage and paper, and promise in the future to become important articles of commerce.

Scarcely any portion of this useful plant is devoid of its use to man. A limpid fluid issues from wounds in the body of the plant, which is employed in medicine, as also is the root. The natives cut the leafstalks into their curries, and in its entirety it may be regarded as one of the best of blessings which a beneficent Providence has bestowed upon the inhabitants of tropical countries.

ZOOLOGY.

Curious Places for Birds' Nests.—A correspondent to a Newcastle journal gives the following particulars of two sparrows' nests:—"One nest is under the tramway at the pit mouth of Garforth Colliery, under a two-inch plank, where from 300 to 400 corves of coal pass directly over the nest daily. The other nest is in a hole in the large beam belonging to the engine used for the purpose of lifting the water from the works in the pit, which beam works night and day."

How the White Owl takes its Prey.—All who have been accustomed to observe the habits of owls and of some species of hawks must have remarked that, when seizing their food, they almost invariably bring their wings forward and spread their tails, so as completely to conceal it, and then proceed to finish their meal in private. The reason of this is said to be because they do not like to be watched while feeding; but the real cause, I believe, proceeds from a far different origin. When a hawk strikes its quarry in the air, it does so in full flight, giving a blow with the hind-talon; but were it to act in a similar manner when the object of pursuit was on the ground, it would disable, or even perhaps kill itself by the shock with which it would strike anything resting upon a hard surface. This remark is still more applicable to the white owl, which, living almost entirely upon mice, takes its prey chiefly on the ground. A patient observer, taking his stand in a locality frequented by this bird, might easily witness the mode of its procedure, which is very curious; the owl either having but little dread of man, or else, from some peculiarity of its vision, not readily seeing him (as they will often fly against people, even when walking about). Upon sighting a mouse, the owl follows it a short distance with a hovering, undulating flight, more resembling that of a butterfly than a bird, and then, with a sudden pounce, swoops down upon its prey, bringing downwards and forwards its wings and tail with a sharp stroke, so as not only to alight upon the ends of its strong but elastic quills, thereby deadening any shock to its own body, but at the same time enclosing a space of some four or five feet in circumference, and forming a complete cage for the unfortunate mouse, as no opening whatever is left between the spread-out tail and wings for him to escape. The roots of the quills being plentifully supplied with nerves, the owl *feels* at once if his prisoner should endeavour to get through, and in an instant grasps him with his ready claws. It is the remains of this natural instinct, I believe, which causes these birds when in captivity to "hide their meat," and not from any dislike at being seen to feed, as the habit remains long after the bird becomes tame.—*R. K.*

Frog eating its Old Skin.—I lately caught one of my frogs in the above act, which I had supposed peculiar to the toads.—*W. R. Tate, Grove Place, Denmark Hill.*

Crested Newt eaten by a Toad.—I have a fine specimen of the Jersey Toad (*B. vulgaris*, var.), which was very kindly sent me last June by Mrs. E. Smith, of Bristol. This toad, on Friday, Sept. 8th, actually swallowed a female *Triton cristatus* five inches and a half in length; and a quarter of an hour after threw her up again, alive and quite uninjured by her short sojourn in the toad's stomach. I have named the newt "Jonah," in memory of the occurrence.—*W. R. Tate, Grove Place, Denmark Hill.*

Singular Occurrence.—A few days since, Mr. George Sloper caught an eel, which, before it could be got ashore, was seized by a pike. The eel in its struggles forced its tail through the gills of the pike, and twisted itself so firmly round the head of its assailant that both were landed together. The pike weighed 7½ lb.—*Wiltshire Independent.*

ENTOMOLOGY.

What has become of the Wasps?—In this central part of Warwickshire we cannot make out what has become of the wasps. I have been in the habit of killing from fifteen to twenty daily on my windows during the summer time for years past, but this summer I have not had the chance, for I have not even seen a wasp since the month of May. The other day a bee-master in our parish, who keeps generally from twelve to fifteen hives, and who is thoroughly conversant with the habits of bees and their enemies, asked me if I could account for the disappearance of the wasps, because this year his hives have been entirely free from those pests, and he has never even seen one since the end of May. Early in the spring he saw several, and they all seemed to vanish suddenly; and he tells me he has not been able to find a nest anywhere about this part, though he has searched for one. Our village boys, who are generally foremost in taking nests, have had no sport in that line this year.—*C. J. F.*

Death's-head Hawk-Moth (*Acherontia atropos*).—In July last, four caterpillars of this moth were brought to me. I filled a large flower-pot (12 inches deep and 14 inches diameter at top) with garden mould, transplanted into it a small growing potato, put my caterpillars thereon, and covered them with an old hand-glass, some of the squares of which were broken out, and their places supplied with perforated brown paper. The caterpillars buried themselves as follows:—One on the 12th July; one on the 13th; one on the 15th; and one on the 19th of the same month. The flower-pot was kept above the surface of the ground in the open air, sheltered from the mid-day sun and from heavy rain, but at other times exposed, and whenever the surface of the mould became dry, I watered it slightly. On the 10th September I had the satisfaction of finding two perfect moths beneath the glass, and another on the 12th, and I shall look for the fourth about the 17th. After being set out, my largest specimen measured exactly five inches from tip to tip of the expanded wings. While watching the two moths beneath the glass before administering chloroform, I noticed that one of them, in shifting its position, trenched upon the holding-on place occupied by the other. Thereupon a "scuffle" ensued for possession of the spot, and with expanded wings, and uttering their peculiar cry, the moths fought for several seconds, exactly as one sees two sparrows fight. The weaker of the two soon retired to another spot, and neither appeared injured by the fray.—*Sibert Saunders, Whitstable.*

Ants and Cocci.—Not long ago, whilst in an orchid-house, I noticed a great quantity of ants running here and there upon the leaves of *Calanthe vestita* and *Limatodes rosea*. My curiosity made me examine their movements, when, to my surprise, I saw them milking, as it were, a species of coccus which infested the leaves of the plants. Now, I had heard of this before, but, like many more persons, thought it was but a tale; but now I had found out the whole method, and here it was in full operation before my eyes. The ant gently stroked the coccus with the two antennæ, and sometimes with the legs; after this, the coccus excluded a small round white substance, which the ant ate, and then commenced upon another coccus. Perhaps some persons may doubt, but to all those I say get a plant infested with coccus, place a colony of ants upon it, and surround the whole with water, so as to prevent escape, and then they will be convinced. A few weeks after this incident, my attention was drawn to a still stranger sight; viz., in a hot-house I had cleaned several small plants of *Passiflora princeps*, and placed them upon a shelf. One day, while watering these plants, I noticed three large domes of earth surrounding the stems of three *P. princeps* I had cleaned. At the time I thought it was perhaps the work of worms, so I turned the plant out of the pot, and found to my astonishment, not worms, but a colony of ants, snugly enjoying their new home; and when I looked at the stem of the plant, I found a quantity of cocci attached, the earth forming quite a chamber for them; so I came to the conclusion that the ants had formed this chamber, and brought the coccus into a state of slavery, so as to serve for food when wanted.—*J. F., Clapton.*

White Earwigs.—Having very lately found an earwig casting its skin, and emerging from its old case *quite white*, I would suggest to R. F. M. that the one mentioned by him in your last number had just undergone that process; and that, after due exposure to the air, the *white* would have gradually become the colour we usually see. I put my specimen into liquor potassæ, intending to mount it whole, but the tissues were so very soft that, although immersed for one day only, the potash effectually destroyed it. I may also mention I have often found colonies of minute young earwigs under garden saucers, and they have generally been *quite white*.—*William W. H.*

Communications have been received on the same subject from *W. B. M.*, *H. W.*, and *E. Mence*.—Ed.

Queen of Spain.—It may be interesting to some of the collectors of butterflies who read Science Gossip, to know that a specimen of that rare butterfly, the Queen of Spain Fritillary (*Argynnis Lathonia*), was captured by a young gentleman in this parish some time last month. I have taken the specimen and compared it with one in the collection at the Norwich Museum, so that there can be no mistake about it.—*Hampden G. Glasspoole, Ormesby St. Michael.*

BOTANY.

On the Re-finding of Epipactis rubra in Gloucestershire.—I am glad to find that my old county has again produced some specimens of this interesting orchis, and long to know more of its locality and the circumstances connected with its growth, &c., and more especially as I have so often hunted for this plant in vain, and that, too, with B. L. Baker, Esq., late president of the Cotteswold Club, whose grandfather was the original discoverer of the species in the county. This discovery reminds me to notice that some years since I recorded the finding of *Epipactis ensifolia* in Gloucestershire. It occurred in a beech plantation in Oakly Park, Cirencester, and myself and Mr. Robert Holland, then one of my pupils, each secured a single specimen, which would appear to have been the whole of this species there grown, as most patient search for hours, both then and year by year afterwards, has failed in affording another example from this habitat. The *Epipactis grandiflora* is still in Oakly Park, in the greatest abundance. Can it be possible that *E. ensifolia* is but a variety of *E. grandiflora*, or that *E. rubra* is in any way indebted to hybridization of *E. latifolia* and *E. grandiflora*, both of which are abundant at Mr. Baker's station for *E. rubra?*—*Professor Buckman.*

Paris Quadrifolia.—The abundance of *Paris quadrifolia* in a damp wood in my neighbourhood has given me many opportunities of searching for a specimen in the state mentioned by A. Grugeon (page 143), and I have examined a great number of specimens with that view, but hitherto without success. Meeting with large quantities of the plant, not only in the normal form but also with three and five leaves, I divided the specimens examined into three groups. In the first group, with four-leaved perianths, the number of stamens was 8 (one specimen with 9); in the second group, with three-leaved perianths, the number of stamens was from 6 to 9 (two specimens with 3 sepals); in the third group, with five-leaved perianths, the number of stamens was from 7 to 11 (one specimen with 5 petals); with these exceptions all other parts of the flowers were normal. The late Professor Henslow has recorded the result of a similar examination in *Loudon's Mag. Nat. Hist.*, vol. v. p. 429, showing that in 1,500 specimens the number of parts developed in the whorls of leaves, sepals, petals, and *stigmas* ranged nearly between 3 and 6, and in the whorl of stamens between 6 and 12. In no case did I discover an agreement in the aggregate similar to that mentioned by A. Grugeon. Would he kindly state if he has met with more than one specimen in that state?—*R. A.*

Association of Plants and Animals.—Many instances are not wanting of the intimate relation subsisting between the lives of plants and animals. The association, and apparently necessary condition of life, of fungi to certain species of animals and to the refuse of others is well known; also the attachment of a large number of plants, constituting a group of what may be called domesticated species, as the nettle, &c., to the haunts of man, and following in his footsteps throughout the world, is a subject of every-day observation. The case that I here refer to is one of novelty, pointing to the appearance and disappearance of two agral plants with the introduction and removal of cattle. On the Holm of Gloup, North Yell, Shetland, the daisy and white clover appeared in the year 1852, after cattle had been pastured on it; the plants began to disappear at the end of two years, and, on the entire removal of the kine, disappeared *in toto*, and have not reappeared. No cattle have been pastured on the island since 1853–4. The two plants were confined to a limited area, supposed to be where the cattle laired.—*Ralph Tate, F.G.S.*, &c.

Mimulus Luteus.—A large quantity of this beautiful plant appeared in the bed of the river Dodder, at Templeogue, co. Dublin, in July, 1863, where I saw it in full bloom. It had not, I believe, been observed there before. The seeds had probably been carried down from some garden by the river when flushed by heavy rains, at which times it rises considerably. Bentham ("Handbook of British Flora") says that the plant is indigenous in "north-western America and Chili; long cultivated in our flower-gardens; and now naturalized in boggy places in many parts of Britain." *Mimulus luteus* is not mentioned in Smith's "English Flora," Hooker's "Flora," nor Mackay's "Flora Hibernica."—*Vincent A. Smith.*

Apetalous Stitchwort.—As you take notice in your little publication of abnormal states of plants (although I cannot consider that mere white varieties of plants are worth insertion), I send you a specimen of an abnormal state of the *Stellaria Holostea*, sent to me by Mr. Pughe, of Aberdovey, and which is one of the most remarkable I have met with. It is, as you will see, an apetalous variety of that plant; and the singularity of it is, that it has for many years covered several yards of a hedge in the neighbourhood of his house, and always presents the same appearance every year.—*T. Salwey.* [We have deposited this specimen in the botanical department of the British Museum, where it may be examined.]—Ed.

Tinctorial Bedstraw.—The roots of *Galium tataricum* and *G. physocarpum* dye red, like madder, but the colorific power of the former is only $\frac{2}{3}$, and of the latter $\frac{2}{7}$ that of madder.—*Bull. Soc. Imp., Moscow.*

FISH TATTLE.

The Sapphirine Gurnard (*Trigla hirundo*).—A specimen of this fish, about ten inches long, lived in the Hamburg aquarium all last summer (1864), in a sea-water tank containing over a thousand gallons. It was a fine and attractive fish for exhibition, on account of its unusual form, bright colours, enormous pectoral fins, and its open daylight character, not hiding itself in a hole and only making its appearance at night after visitors have left, after the fashion of many animals in zoological gardens, but boldly swimming about with a gentle sailing motion like that of a swallow, as it curves through the air with outspread wings. Indeed, the pectorals of the fish were very similar to the wings of the bird, though at other times their fine blue colour, edged with brilliant yellowish-white, and their broad "hovering" character, reminded one of the wings of a great butterfly. The general colour of the body of the fish was a rather cloudy or dusky brick-dust red, very different to the red of a gold-fish. It had very large and intelligent-looking eyes; and that they were far-seeing eyes I am convinced of, as it used to perceive its food dropping through the water at a remote corner of the tank, ten or twelve feet away. This food was exclusively living shrimps, and it would eat nothing else whatever, not even living prawns. As the double handful of shrimps went tumbling down towards the bottom of the tank, the Gurnard would dash into the midst of them, and would snap them up right and left with much quickness, so long as they were free above the sand with which the base of the tank is covered to the depth of two or three inches. But if the shrimps got into the sand, then the fish began to use its curious "fin-rays," of which it possessed six, three at the base of each pectoral fin. These fin-rays were, in fact, *fingers;* only, as they were not intended to *grasp*, but only to *feel* and to *touch*, they were not articulated into joints, like the fingers of a man or a monkey, but were composed of a series of minute pieces of bone united by cartilage, forming a stiff wire-like structure, having an abrupt curve downwards. Each fin-ray was made up of two of these wires (so to speak) enclosed in a sheath consisting of a continuation of the skin of the fish, and the two wires were connected at their tips within the sheath. The other ends of the two wires were each attached to a separate muscle, and as the pair of wires were free from each other except at their tips, and slid freely over each other in the sheath, it followed that a very accurate fingering motion (something like that of a pianoforte player's) could be given by the alternate pullings of the muscles, above or below. The extremities of the finger-rays were smoothly rounded and very slightly knobbed; therefore, whenever a shrimp was buried out of sight in the sand, the Gurnard would disturb it by feeling, poking, and prodding above it; on which the shrimp would fly out of the sand (as shrimps will do when alarmed), and would be caught and swallowed instantly. In this manner the fish would consume from twenty to thirty shrimps twice or three times a week, and between the feeding days it would employ itself in searching for stray shrimps all over the bottom of the tank, until not one was left. At length, in late autumn, the supply of shrimps from Cuxhaven failed, and I could get none alive from England or elsewhere, nor could I induce the Gurnard to eat anything else. I am sorry now that I did not return it to the sea; for its hunger became distressing to behold. Its head looked unnaturally big in contrast with its attenuated body; its eyes were sunk into deep pits, and its once magnificent pectoral fins became split up into shabby rags, and so, when on one Saturday afternoon in October it turned over dead, I was not sorry to see it out of its misery, and I then dissected it. I think this was the first specimen ever kept in an aquarium.—*W. Alford Lloyd, Zoological Gardens, Hamburg.*

Eels and Dew-worms.—I was removing some eels from an eel-trap, where they had been caught the night before. One of them had a substance, the size of a goose egg, about four inches down it, which I concluded was a disease. On opening it, I found it caused by a great number of dew-worms, which it must have taken very shortly before entering the trap; and to get them it must have been out in the meadows during the night. It was very showery weather at the time, and the river swollen, but not over the banks. Dew-worms are generally found in grass fields early in the mornings in wet weather.—*P. P.*

The Torpedo.—On the 20th July, I saw one of these fish at Budleigh Salterton, on the south coast of Devon, which had been caught in a Brixham trawl. The lads who showed it called it an "electrified ray;" and said the fisherman who caught it, though he only touched it with one finger, received a severe shock, "his arm was left quivering for ten minutes." When I saw it, it had been exenterated, and weighed about 25 lb. Its colour was black and shining above (skin like shagreen) and white below; tail large and flapping; spinal column heavy, seemingly with a great plexus of nerves attached to it; fins chiefly on the margin of its cylindrical outline. Having no book of reference with me, I could not at the time determine its species; from its colour, however, I take it to be the *Torpedo nobiliana*, of Yarrell, rather than the other which is given as a British species, the *Torpedo marmorata*, or "old British Torpedo."—*Rev. M. G. Watkins, Barnoldby-le-Beck, Grimsby.*

MICROSCOPY.

Photo-micrographs.—In a recent number of the *British Journal of Photography*, Mr. John Bockett has recently detailed his method for the production of Photo-micrographs by means of an ordinary landscape lens and camera. With regard to the exposure requisite, he says:—"The exuvia of spider, skin of caterpillar, leg of beetle, and the star-fish, were all done in open daylight, through an eighth of an inch stop, in one minute and a quarter."

Microscopic Lamp.—A good microscopic lamp is stated by Dr. Beale to still be a desideratum, and as with high powers, and also binocular microscopes, the importance of having a superabundance of light is imperative, I beg to submit to your readers a description of a lamp which I have had made (and which will be exhibited at the North-Eastern Exhibition at the Agricultural Hall, Islington), answering every purpose. It has been in use quite three years. Its construction is as follows:—A brass circular foot is countersunk into a broad base of mahogany (thereby obtaining stability without adding much to its weight), carrying a main stem. Upon this glides another tube (to the bottom of which is fitted a clamping screw), as also a spring holder to carry a Belmontine lamp. Sliding upon this tube are two pieces of apparatus, one a reflector and the other a condenser; the latter about 2 inches in diameter, the former from 3½ to 4 inches, and of the same or little longer focus than the distance which intervenes between it and the convex side of the plano-convex lens of the condenser. A shade covers the reflecting and refracting apparatus. With regard to its arrangement when in use, it is only necessary after the lamp is lit to move the reflector by slipping it up and down on the auxiliary tube, until the bull's-eye condenser is equably illuminated, which can easily be seen by placing a small disc of white card upon the plane surface of the condenser. If the whole has been arranged for transparent objects as above, and it is required to be used to show opaque objects, the auxiliary tube has only to be raised, and the arrangement previously alluded to still remains intact, the said alteration not being attended with the least trouble. It burns Belmontine, which I find far preferable to parafine, being without any smell, and, as I think, with all due deference to Mr. Hall's late deductions, equal to it in light. By its aid I can in my binocular use a ¼-inch bull's-eye piece most advantageously. The light with the lower powers is so intense that a ground or neutral tint glass slide must be used.—*John Bockett.*

Circulating Cabinet of Objects.—About six months ago some microscopists in Oldham and its neighbourhood formed a circulating cabinet of objects. Not knowing that there is anything of the sort in other towns, I will endeavour to describe it. In the first place we have as many trays as there are members, upon which each member puts six objects, in a horizontal position, held down by an elastic band. To prevent one tray from touching the objects on another, a bead runs all round each, about a quarter of an inch deep: the whole are enclosed in a box made for the purpose. Each member changes the objects on his own tray every time the cabinet comes round to him, and he retains it one week to examine the objects on the other trays. A small memorandum-book, in which are written a few short rules, the remaining space being left for remarks and suggestions, together with a stamp-case, to receive the contributions of the members, which goes along with the cabinet. The expenses of carriage, &c., are taken out of this stamp-case. We find this arrangement to work very well, and have not had an object broken yet.—*John Butterworth.*

Pollen.—Your correspondent "E. G. M." directs the attention of your readers to the pollen of the *Œnothera*, or Evening Primrose. I have seen the pollen of *Œnothera* offered for sale by dealers in microscopic objects, and have mounted several slides of it for my own use and for exchange with friends. I think the most beautiful pollen-grains are those of the common Marsh Mallow, or of the Garden Mallow, either of which may be had in great abundance. They are superior to the Passion-flower, Hollyhock, Dahlia, or Evening Primrose. Indeed, I know of no pollen worthy of comparison with them.—*T. P. Barkas.*

Cilia on Diatomaceæ.—A few days ago, while examining a recent gathering of fresh-water *Diatomaceæ*, I had my attention arrested by peculiar motions near a frustule of *Nitzschia sigmoidea*. The frustule itself was perfectly stationary, but it was surrounded by a considerable quantity of gritty matter, which was in motion. I observed closely, to see if any animalcules or small diatoms were present, and could not recognize any within the field of the microscope. The matter surrounding the *Nitzschia* was broken up into small patches and fragments, and the phenomenon that presented itself was the rapid motion of single and accumulated particles of foreign matter down the sides of the *Nitzschia*, which was lying perpendicularly to the line of vision. The motions were along the sides of the diatom, and all downwards. That direction of motion could not be caused by mere gravitation of the particles, because, as an erector was not used, the apparently downward motion would be in reality upward, and upward motion, under the circumstances, and to such an extent, could only, as it appears to me, be accomplished by the action of cilia flashing in one direction. Endosmose and Exosmose, or any other proposed theory to account for the movements of *Diatomaceæ*, will not explain the motions of the free particles as above described—*T. P. Barkas.*

NOTES AND QUERIES.

Ichneumons and Vanessa.—In your January number, p. 15, "The Entomologist" says that the "small Tortoiseshell Butterfly" is free from ichneumons. I send you a paper, the inside of which is completely eaten out by them, also one of the flies which crawled out of it, and some empty ichneumon-cases which I found close by. This is the second I have found in the same place.—*E. W.*

Wasps.—In Greece, a large wasp, marked on th abdomen with alternate rings of black and yellow, is very fond of grapes, and therefore a foe to the gardener, who gives them no quarter. It sucks the juices from the grape as soon as it is ripe, leaving nothing but the seed and shrivelled skin. This wasp also destroys numbers of spiders, which it treats like the grapes, rejecting the epidermis. Many severe and protracted combats ofttimes take place before the spider yields to its more powerful antagonist. I have observed that in pursuing spiders, the wasp rarely flies, but almost invariably runs after its prey. It attacks spiders without reference to size, and kills them by stinging. Does this happen in England?—*J. B. Hay, Athens.*

Birds' Eggs.—Some time since, while searching for birds' eggs, I found a Catbird's (*Turdus avidus*) nest, containing two full-sized eggs, and a third, similar to the others in colour, only of the size of a pea. How to account for this I know not. But it is well known that hens often lay eggs much smaller than the average size, sometimes not larger than a robin's; may not birds do the same? This is the only case which has occurred to my knowledge. Have any such instances occurred in England?—*J. B. Hay, Athens.*

Black Beetles.—For the information of "A. H.," I send you the following method of destroying them, which I have found more effectual than any of the advertised remedies:—Take one or more shallow glazed dishes (say three or four inches deep), and about half fill them with common beer, or warm water with a little ginger or nutmeg grated in to make it smell; a little treacle also is a good thing. Place the dishes in their haunts, and put some bits of wood or something against the sides of the dishes for them to creep up (paper will not answer, as the noise of running up it appears to alarm them). The beetles and crickets being very thirsty creatures, and always ready for their "drops," get into the liquor and cannot get out again.—*J. Goodyear.*

Guide to the Conservatory.—A. H. wishes to know a book for the *care* of a "conservatory," containing what flowers are the best to plant in pots and *vases*, so as to keep up a succession of flowers all through the year. How hot should a conservatory be kept during autumn and winter? Please state the price of book.

Black Ants.—Under July 24th, I have a note in my pocket-book to the effect that I noticed on that day a number of large black ants crawling about the streets of Camberwell and Kennington. I should like to know whether any one noticed the same in any other part of London, and what was the cause of it.—*W. R. Tate, 4, Grove Place, Denmark Hill.*

Poduræ Phosphorescent.—Is it known that any species of the genus *Podura* (Linn.), order *Thysanaura* (insecta), is capable of emitting a phosphorescent light? I have good reasons for believing that one which I have met with *is* so capable. The head has a vertical movement, the centre of motion; tail about two-thirds length of body; compact, silvery-white skin; slight annular markings on back. If worth while, I can supply live specimens and further particulars.—*H. M.*

Pollen of Valerian.—Have any of your readers observed how beautiful the pollen of Valerian is? if not, I advise them to do so. It requires rather a high power.—*W. Gibson.*

Diameter of Lenses.—Can any of your readers oblige me with the diameter of the compound lenses used in making $\frac{1}{8}$-inch object-glass, and the focus of each compound lens in it, and the diameter of the aperture?—*E.T.S.*

Parasites of Parsnip.—The leaves of the wild parsnip are very much mildewed; but, besides the usual round conceptacles, there are some others, consisting of an immense number of transparent bodies in shape very much resembling the blade of a reaping-hook. What is their name and purpose, as I don't see them mentioned by M. C. Cooke in the papers on fungi in *Popular Science Review.*—*E. T. S.*

[Specimens should have been sent.—Ed.]

A New Silene.—I extract the following from the *Guardian* of August 23rd:—"A specimen of a new plant, the *Silene dichotoma*, has been found near Painswick, Gloucestershire. It is a native of south-eastern Europe, and must have been introduced accidentally." Can any of your readers give me any additional information regarding the appearance of this "distinguished foreigner" in this country?—*B.*

Appendages to Water Beetles.—I have frequently observed on *male* specimens of *Dytiscus marginalis* (both alive and dead) a quantity of pear-shaped excrescences firmly attached by the small end to the underpart of the head of the insect. These excrescences are of a blood-red colour, and when squeezed, a red liquid exudes. Can you, or any of your correspondents, tell me what they are?—*E. Ragonot.*

Volvox Globator.—Will you kindly allow me to say, in answer to T. P. Barkas's reply to my query, I am quite aware that it is generally stated the motions of the *Volvox Globator* are caused by the action of cilia; but I have examined some thousands in every stage, and have been unable really to observe cilia; and many of my microscopic friends have also studied it, and none of them have been more successful than I have. I was in hopes my query would have drawn a reply from some one who had also devoted some time in examination of this very beautiful and interesting microscopic object, and who could, from observations, give a new theory respecting the cause of its revolutions. T. P. Barkas's remarks are really not a reply to my question. A great many of your readers are, I know, equally interested as myself in this, and quite as disappointed that my query has not drawn forth a better reply to it.—*Thomas Armstrong.*

Cat-Briar, in reply to H. G., Bangalore, is *Smilax rotundifolia*, L., nat. ord. *Smilaceæ*. A description of the plant may be found in Gray's "Botany of the North United States."—*M. H. L.*

Guano.—J. H. W. desires to know where guano may be obtained. There are guano depôts in nearly all the large towns in the kingdom, and any agent for the sale of guano will give or sell a microscopist a pound or two at any time. If the guano be pure, it will contain *Heliopelta* and *Arachnoidiscus* in abundance.—*T. P. Barkas.*

Spider and Wasp.—I saw to-day a wasp struggling with a small spider on the ground; they were spinning round and round, each striving for the mastery, but the long legs of the spider being wrapped over the wasp, prevented the latter from using its wings. At last, however, the wasp succeeded in cutting off two or three legs, and then it flew off with the body.—*Henry Ullyett, High Wycombe.*

Growing Ferns.—When ferns are grown in pots, do earth-worms do good or harm? If harm, can they be got rid of without disturbing the plants, and how?—*J. B. L.*

Names of Sea-birds.—In answer to H. G., Bangalore, India, page 214, the Stink-pot of sailors is the Black Petrel (*Procellaria æquinoctialis*, L.); the Cape Hen is the Sooty Albatross (*Diomedea fuliginosa*); and the Whale-bird is the Broad-billed Prion (*Prion vittatus*). The Parson-bird and the Ice-bird I do not know. I may, perhaps, be allowed to add, that H. G. will find further information about these birds in the number of the *Ibis* for last July.—*F. W. Hutton.*

An Aquarium Difficulty.—In my fresh-water aquarium several small worms wave about just above the pebbles, and cast up the sand from below, thereby thickening the water. No doubt I could get rid of them by putting a fish in the aquarium; but this would eat other small insects which I do not wish eradicated. Perhaps some of your readers can help me?—*C. A. J.*

Exudation of Cedar-wood.—If C. W. W. will wash the eggs with soda and hot water, I think he will find it will cleanse them of the exudation of cedar-wood.—*H. B. Preston.*

Wardian Cases.—Do fern-cases require air, and what is the best soil for ferns in cases?—*George Norris.*

Infusorial Earth.—I think that infusorial earths are not to be purchased; at all events I have tried for years to buy some, and failed; but if your correspondent lives in town, and likes to call on me with a few slides, I will provide him with what specimens I have by me. I keep some in a moist state.—*F. White*, 1, *New Road East.*

Worms.—I think Mr. W. Bowen Davis is right in his idea. The earth-worm eats on the surface of the ground some of the *softer* parts of decaying vegetable matter, and then drags the woody fibres, such as the stalks of leaves, &c. &c., under ground to fertilize the soil.—*H. Watney.*

Madrepores.—Is there any work published on "Madrepores," whereby some knowledge of them could be obtained?—*B. T. S.*

House Ants.—Can any of your readers inform me how I can get rid of ants (a very small light-brown kind, not the garden species) which are infesting my house in the plaster of the walls? They come out of every tiny crack, and crawl in numbers over the kitchen ceiling and walls. We have tried, but in vain, to rid ourselves of this nuisance, and I should feel greatly indebted to any one who can suggest a remedy.—*M. S.*

Sea-Anemones.—My friend Mr. W. A. Lloyd asks in his interesting article on Sea-Anemones, "Has any one ever seen a very small specimen of *Sagartia parasitica* or of *Tealia crassicornis?*" I have obtained many *parasitica* from the fishing-lines at Cullercoats, near the mouth of the Tyne, but never saw one that was not at least one and a half inch in height when fully expanded. *T. crassicornis* are very abundant on the Northumberland and Durham coasts; and from Sunderland to Alnmouth there are tens of thousands of them. I have never seen young "crass" produced, as is so frequently the case with the *Mesembryanthemum*, and the smallest specimens of *crassicornis* I ever saw had bases about the size of a threepenny piece. Are they produced by ejection or by fission? On the Northumberland coast we have in the littoral zone, the following anemones:—*Crassicornis, Mesembryanthemum, Troglodytes*, and buff, grey, and white *Dianthus*. Off the coast, at a depth of from forty to sixty fathoms, we have *Crassicornis* various, *Dianthus* various, *Parasitica, Stomphia, Churchiæ*, and *Bolocera Tuediæ*. *Bellis, rosea, gemmacea, venusta, nivea*, and other well-known south-country species, are not to be found in these northern regions. —*T. P. Barkas.*

Book Wanted on Conservatories.—*A. H.* would be glad to know of a book which will give instructions for keeping a conservatory in the house filled with flowers in bloom all the year. She has the "Greenhouse Manual for the Many;" but that names such a few flowers.

British Woods.—Can any reader inform me where I can obtain a *complete* list of British woods? —*B. T. S.*

[In Jury Reports of the Exhibition of 1851, page 104, is a very good catalogue.—Ed.]

Has *H. Papilionaria* been generally abundant this year? I have taken thirteen, for the most part beautiful specimens. A friend also took several; nearly all were seated on the grass, under birch trees, having just emerged from the pupa. I have a few duplicates, and shall be happy to receive offers of exchange.—*Rev. G. Norris, Wood Dalling, Reepham.*

Mosquitoes in England.—I notice the following in to-day's *Shipping Gazette*:—"A correspondent of a Portsmouth paper states that mosquitoes, of a true West Indian type, have made their appearance at Woolstone, in Hants. A young lady there has been stung by them in the arms, which swelled up to an immense size in consequence."—Query—from the great heat, or *what?*—*James Charles Arrow.*

Anatomatizing Leaves.—I think hydrochloric acid is preferable to chloride of lime.—*W. Gibson.*

A Fine Trout.—Some years ago a relation of mine caught a trout weighing 21½ lb. at Christchurch, Hants.—*E. W.*

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."

Departure of Swifts.—J. M. G. observed one as late as the 30th of August. Gilbert White gives the 21st as the date of departure; the Rev. L. Jenyns, the 23rd. Therefore there is no doubt that their departure is later than usual this year.

Aquaria.—Mr. Hardwicke promises a Handbook to the Aquarium, to be published shortly.

T. J. B.—Your suggestion is a good one, and shall be borne in mind. Although we dare not make rash promises, we hope ere the year closes to see it carried out.

Errata.—See page 197, col. 1, line 8, for "natural" *read* "mutual." Page 211, col. 1, line 5, for *Caryophyllua Quicthii* read *Caryophyllia Smithii*.

J. H. A.—The following are some of the works which have been published on the microscope:—

"The Microscope." By Professor Quekett. Published by Baillière.
"Text-book of the Microscope." By Dr. Griffith. Van Voorst.
"The Microscope and its Revelations." By Dr. Carpenter. Churchill.
"How to Work with the Microscope." By Dr. Beale. Harrison.
"The Microscope." By Jabez Hogg.
"Half-hours with the Microscope." By Dr. Lankester. Hardwicke.

All possess their peculiar style of treatment of the subject; therefore, not knowing J. H. A.'s special desideratum, we could not recommend any one. We have already stated our reasons for declining to give preference to any maker of microscopes.

J. E. T.—We have also met with the white variety of *Centaurea nigra*, and do not think it very rare.

G. N.—Address your query to the *British Journal of Photography*.

Books on Fungi.—Mrs. Hussey's "Illustrations of Mycology," in two vols., 4to. Rev. M. J. Berkeley's "Outlines of British Fungology." Mrs. Price's "Illustrations of Fungi," two series, 4to. These works were all published by Lovell Reeve, Henrietta Street, Covent Garden.
"Microscopic Fungi" and "British Fungi." By M. C. Cooke. Both published by Mr. R. Hardwicke, 192, Piccadilly.
Sowerby's "English Fungi" is now a rare and expensive book.
Greville's "Scottish Cryptogamic Flora" contains many Fungi.
Bolton's "Funguses" has nearly two hundred good figures, and may sometimes be met with.

Mycophilus and Medicus should read our oft-repeated caution about assumed names.

H. Vokes.—The bract and fruit of the Lime-tree.

E. H. R.—Forbes's "British Star-fishes," published by Van Voorst.

E. G. V. is thanked for his specimen of *Lyngbya*.

J. C. S. confirms that the viper swallows its young. We have already given several instances, and could scarcely afford space for more.

J. J. R.—(1.) Oak spangles—a kind of gall produced on oak-leaves by a species of *Cynips*. (2.) Button galls; also produced by a species of *Cynips*, called by the French naturalists *Diplolepis lenticularis*. For further information see *Gardener's Chronicle* for 1843, p. 52.

Vallisneria.—E. G., Post-office, Roundhay, near Leeds, has plants for disposal.

H. W.—Feed your snake with young frogs (alive, of course). It will hybernate during the winter.

F. W.—Your insects *must* be damp. You must place the drawers before the fire occasionally. Mould will appear with the least dampness.

H. B.—(1.) Catching insects. (2.) It was probably injured in capture. It is not always easy to account for such things.

E. B.—See article on Death-watch, in Science Gossip, No. 3, p. 60.

G. N.—See remarks on Flowering of Artichoke in Science Gossip, No. 6, p. 142.

E. B.—We know of no one so capable of naming your foreign mosses as Mr. W. Mitten, of Hurstpierpoint, but whether he will undertake it we cannot affirm.

E. T.—Your insects appear to be the larvæ of a fresh-water beetle. There is no work specially devoted to fresh-water insects, but an Introduction to the Study of British Beetles is announced by Mr. Hardwicke, 192, Piccadilly, at a very reasonable price.

E. W.—For accounts of bats flying during the day, see *Zoologist*, pp. 6 and 35, and Jenyns's "Observations in Natural History," p. 60. This correspondent observed a bat catching flies in the middle of the day, under a hot sun.

W. S.—Bring them home in sea-water or spirit.

E. Ragonol.—Groser's "British Beetles" is announced to be ready shortly.

Aquarium.—Mrs. D. may obtain such an aquarium of Mr. Lloyd's successor, Mr. King, Portland Road, London.

A. S.—Your monstrosity of rose is not uncommon.

E. S.—Our correspondent F. C. did not boil his vermicelli for feeding fish, only breaking it into small pieces. He is now using beef, and does not recommend vermicelli, but considers meat preferable.

Scales of Fresh-water Fish.—A correspondent offers these in exchange for other objects. Address—E. Marks, 5, Millman Street, Bedford Row, W.C.

Erratum.—In T. P. B.'s answer to E. T. S., last month, the word "generation" was printed by error, instead of "gemmation."

A Hint for Contributors.—If our contributors will oblige us by always using the common names of plants, animals, insects, &c., wherever there is a common name in use, to be followed by the scientific name in brackets, this will save us a large amount of trouble in sending their manuscript to press. As we do not pretend to address scientific readers alone, vernacular names are indispensable.

Communications Received.—G. B.—J. B. Hay.—T. S.—W. A. L.—E. C.—A. G. R.—H. W.—W. B. M.—W. H. B.—T. D. R.—J. S.—G. N.—J. B.—F. C.—Wood Robert.—B.—E. M.—E. Y. S.—B. T. S.—W. R. T.—M. D.—M. H. L.—F. B.—T. P. B.—P. P.—G. N.—H. B.—H. W.—E. H. R.—E. R.—M. G. W.—W. W. H.—W. E. S. W.—Mycophylos (no name and address).—F. W.—S. S.—W. G.—J. C. M.—H. G. G.—V. A. S.—W. H. P.—E. T. S.—J. J. R.—L. C. B.—J. M. G.—T. A.—H. V.—R. H.—E. M.—S. J. McI.—W. G.—J. H. A.—F. W. H.—W. W. S.—H. B. P.—C. A. J.—T. J. B.—R. B. N.—J. B. L.—H. U.—E. G.—G. N.—A. H.—E. B.

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.

INDEPENDENCE.

> The private poor man hath cities, ships, canals, bridges, built for him. He goes to the post-office, and the human race run on his errands; to the book-shop, and the human race read and write of all that happens for him; to the court-house, and nations repair his wrongs. He sets his house upon the road, and the human race go forth every morning, and shovel out the snow, and cut a path for him.
>
> R. W. Emerson.

SOME men delight to vaunt of their independence, and some women, too, are not one whit behind the other sex in their assertion of personal independency. How often do we make use of words and phrases in ordinary conversation which reflection would cause us either to repudiate or condemn. "Independence" is one of these, for in reality there is no such a thing as absolute independence in creation. It is true that one man may flourish in circumstances and conditions in which he is less dependent upon the will and caprice of others; but, after all, his independence is only relative. There is a very comfortable association of this word in the announcement that such an one is "possessed of independent means." Never having realized such a consummation in our own proper persons, we shall not call its realities in question, nor deem such independence a myth; relative though it may be, its relations are good. It is easy enough in the common affairs of life to observe how a man is dependent upon the vicissitudes of trade, and the deeds of other men; how his own equanimity depends upon the digestion of his dinner; how much the quality of his beef has depended upon his butcher; how his butcher has depended upon the markets; how the markets have depended upon a hundred other circumstances linked together in a chain; and how this chain is woven into such a network of dependence that small and remote events exert their influences in all directions. The first dead cow of the Rinderpest is now denouncing independence with golden arguments drawn from the pockets of thousands of beef-eaters.

In the lower walks of life, amongst the humblest of creatures, there are unceasing examples of dependence. Early in the spring unusually large numbers of queen wasps prognosticated a prolific year, and yet the numbers have been so few that it is likely to become an event worthy of remembrance. Had the queens been independent, as queens are supposed to be, we should have swarmed with wasps. And the multiplicity of flies, again, with which we have been favoured, is, in part at least, the consequence of a minority of wasps.

Cabbages and brocoli are vegetables which have many foes. Some bipeds delight to devour them at dinner, but a host of caterpillars struggle for their share. If the stock of caterpillars should preponderate, then the dinner-table must be left bare. But the caterpillars are not independent. An army of winged enemies puncture their bodies, which become the ultimate home of a brood of Ichneumons, destined to puncture and keep in check a future race of caterpillars and protect the vegetables for the table of man. In this instance the proud and independent burgomaster owes his boiled cabbage to the assiduity of a little fly. Réaumur found that of thirty caterpillars of the Cabbage Butterfly, twenty-five were destroyed by a species of *Microgaster*. Very recently the Archbishop of Bordeaux has alluded publicly to the great dearth of cabbages in that district, causing the vegetable to disappear even from the tables of the rich, the ultimate occasion of which he attributes to the wholesale destruction of small birds.

In articles of clothing, as well as food, until we return to the pristine simplicity of our first progenitors, we must rest content to be dependent in almost every direction. As it is, our hatter will inform us that one insect furnishes the external material, and another the scarcely less important dressing for the body; and that for a hat we are dependent not only upon the larvæ of the silk moth, and the proper development of mulberry leaves, but also upon the minute lac-insect which punctures the branches of the fig and the jujube in the forests of India.

Shall we vaunt of independence when a preponderance of hop mildew may rob us of our "bitter beer;" when a prolific mould may spoil all our potatoes; when murrain or deficient root crops may make beef scarce; or an American quarrel double the price of cotton.

Neither can the fair sex give a much more favourable account of their independence when the ghosts of all the birds from whom they have plucked feathers to adorn themselves arise to condemn them. The little quadrupeds of the weasel tribe that have lent their robes to keep them warm. The oysters that have gasped and yielded shells to make them buttons. The skins taken from the backs of kids, lambs, and other subservient animals, to furnish gloves and boots; and the silken thread spun from the entrails of a little grub, dyed with the product of gas tar, or the galls produced by a minute *Cynips*.

Rather let us say that we are dependent upon the whole of creation, and that much depends upon us; that there is a mutual dependence one upon the other, and all have their duties to perform "in that station of life unto which it has pleased God to call them." To talk of independence, in this sense, is but to lay bare our ignorance, and to deny the great fact upon which all the operations of nature are based, of mutual dependence for the good of all. "All the parts incessantly work into each other's hands for the profit of man. The wind sows the seed; the sun evaporates the sea; the wind blows the vapour to the field; the ice on the other side of the planet, condenses rain on this; the rain feeds the plant; the plant feeds the animal; and thus the endless circulations of the Divine charity nourish man."

THE ROCK WHISTLER.

THE Hoary Marmot (*Arctomysokanaganus*), or, as styled by the trappers and fur-traders, the "Rock Whistler," lives on the very summit of the Rocky Mountains.

If there is a spot, on the face of the globe, more dismal, solitary, inhospitable, and uninviting than another, that spot is where this most accomplished *siffleur* resides; and it is not by any means a matter to be wondered at, that so very little is to be found, in works on natural history, relating to this little anchorite's habits.

Years have rolled by since I first *heard*, and then saw, the Rock Whistler *at home*, but the scene, in its every detail, is still vividly impressed on my memory; and the story may be worth relating.

Our camp—the camp of the Boundary Commission—was placed in a snug gap, a little distance from the Kootanir Pass, on the west side of the Rocky Mountains; altitude, 8,000 feet above the sea-level. About a mile from the camp was the terminal point of the Boundary line (as far as our Commission were concerned), the Lake of the Woods being its real termination—a line not yet marked and defined.

It was near midsummer, yet the mornings were cold and chilly, though the midday was scorching hot. I started soon after sunrise, to have the benefit of the cool, fresh morning air, my purpose being to climb the craggy ascent that led up to the actual summit, or watershed.

It was not by any means a dangerous thing to do, —"clinging to beetling cliffs, overhanging giddy heights, a single false step, and the daring adventurer plunges into unfathomable space,"—nothing half so sensational or romantic in my case. It was simply leg-aching, tiresome, scrambling work. The grass, being dry, it polished the soles of my mocassins, until they became like burnished metal, so that progression, up the long green slopes, was much the same as it would be, up an ice slant, at an angle of 45° with skates on. I got up at last, and, feeling somewhat fagged, seated myself on a flat rock, unslung my rifle, lighted my pipe, and had a good look at everything round about me.

The sun had crept steadily up into the clear sky, unflecked by a single cloud; the mists that in early morning hung about the ravines, and partially veiled the peaks and angles of the vast piles of rocks, had vanished, revealing them in all their naked immensity. Below me was a lake, smooth as a mirror, but the dark, green, cold look of the water hinted at unfathomable depth. To my left, and almost hanging over me, was an immense glacier, and as the glowing sun-rays slanted down on its crystal surface, each ray seemed at once reduced to its prismatic colours, giving the entire mass the appearance of being a heap of broken rainbows. Tiny rivulets, fed by its drip, wound their way, like threads of silver, between the rocks and through the grass, to reach the lake; the outflow of which eventually found its way into the Atlantic Ocean. Behind me rose a sharp ridge of rocks, clothed in snow, which, as it thawed, grew into mountain streams; these into rivers, that, mingling eventually into one great whole, become the mighty Columbia, that finds its home in the blue Pacific.

I was not so much impressed with the beauty of the landscape, as awed by its solemn, substantial, massive magnificence. It seemed to absorb me; I felt as a minute marine zoophyte might be supposed to feel if engulphed in the capacious mouth of a Greenland whale. Few living things were to be seen, save a group of Ptarmigan, sunning themselves on a ledge of rock; a couple of Mountain Goats (*Antilocapra Americana*), browsing by the lake; and a few Grey-crowned Linnets,—birds seldom seen but at great altitudes. There were also the recent traces of a Grizzly or Black Bear, that had been munching down the wild Angelica. A solemn stillness, that appeared almost tangible, intensified the slightest sound to a supernatural loudness: even a loosened stone rattling down the hill-side made me start; there was no buzz and hum of busy insects, or chirp of birds, or splash of torrents to break the silence; the very wind seemed afraid to moan: it was *death-like* silence to the very letter.

As I puffed away, silent as all about me, suddenly a sharp, ringing, clear, piercing whistle that awoke the echoes far and near, thoroughly roused me, and sent all other thoughts to the rout. As I could see nothing, I deemed it expedient to remain quiet; cocking my rifle, I lay on the grass, and waited patiently for a repetition of the performance. I had not long to tax my patience: again came the same sound, more shrill than was ever the whistle of a locomotive; then another, and another, joined in the refrain, until the place, instead of being steeped in silence, resembled the gallery of a theatre on Boxing-night. I very soon spied one of the performers seated on the top of a large rock; the position, that of a begging dog; with his fore-feet he was busy cleaning his whiskers, smoothing his fur, and clearly going in for a somewhat elaborate toilet; perhaps he was going a-wooing, or to a morning concert, or for a constitutional, or a lounge on the "marmots' mile;" but whatever his intentions, I regret to say, they were frustrated. Solely in the cause of science I had to stop him; resting my rifle on a flat rock, as I lay on the ground, I drew a steady bead on the hapless musician; and the sharp *crack*, as it rang amid the rocks, was his death-knell. Rapidly reloading, I scampered off to secure my prize. I am afraid there was not much pity felt; delight, at getting a new animal, was uppermost. Smoothing his fur, I plugged the shot-holes, examined him closely, measured him, admired his handsome shape, bright grey coat, and brushy tail; investigated his teeth and claws; walked back and had a look at him from a distance; then set to work and skinned him. You can see him also, if you like to visit the British Museum, where this very victim is "set up" and placed amidst the marmots; his name, together with that of his destroyer, black-lettered, on the board to which he is affixed. At the sound of the rifle, every single one of his companions took sensation headers into their holes; and came not out again during my stay on this occasion.

The length from the nose to the root of the tail was a trifle over 21 inches. The tail, 6 inches. Head, oval and very flat. Nose, short and broad, thickly covered with fine hairs. The cutting (incisor) teeth, large, strong, and of a yellow colour. Whiskers, black and long. Ears, nearly hid by the fur on the neck and vertex. Claws, strong and curved; are admirable digging implements. The general tint is that of rusty grey, with a blackish conspicuous band extending from the back of the head down the shoulders. Space forbids a more minute detail of specific characters.

In habits, they are essentially social animals, inasmuch as they live in little colonies; but unlike some of the prairie marmots, these Rock Whistlers, when married, have a house to themselves, and if blessed with a family—a blessing seldom denied them,—they kick out the youthful pledges of affection, as soon as they can nibble up a living for themselves. The burrow, which is quite two feet in diameter, is dug invariably in a slanting direction, generally at the base of a rock, standing up like a pedestal, on which they love to sit, and whistle. Wide trails, beaten like roads, lead in all directions from their holes, to the feeding and drinking places; their hours of repast, sensibly chosen, are early in the morning, when the grass and herbage is wet with dew, and late in the evening; and as the sun sinks behind the snowy hills, tinting with rosy light each crag and rugged outline, the vesper hymn of the Rock Whistlers sounds from every grassy plateau—the sole good-bye to departing day, heard amid the weird, untrodden wilds of the Rocky Mountains.

For only a few months, during summer, is this quaint little miner permitted to revel in the luxury of light. Seven dreary months out of the twelve sleep overpowers him, and keeps watch and ward over his drowsy existence. What a wise and wonderful provision to secure from utter extinction animals compelled to live in hyperboreal regions, is hybernation! Growing wondrously fat during the "golden summer days," they retire, when the nipping cold and deep snow comes, into burrows, lined with soft, warm bedding, become semi-torpid, and literally a living stove, for the fuel, stored as fat, is slowly burned up in the lungs, giving out heat, just as coal would in a fire-grate. Thus the Rock Whistler heeds not the icy blasts, that, sweeping ruthlessly through gorge and glen, are powerless to even breathe on him, as he sleeps on and on, safe from every harm, until Sol comes to set him once more free.

The Red-skin is the Whistler's most implacable enemy; he never tires of hunting and trapping the little animal, delighting to use his jacket in the fabrication of rugs. The hair being thick, the marmot-robe keeps out both cold and wet, and stands an immense amount of wear and rough usage. Much as the savage likes the coat of his captive, he likes his carcase even better. When skinned, a long peeled stick is thrust through the body, from tail to head; then placed slantwise, one end being fast in the ground, the treasured morsel is slowly roasted over a gentle fire.

I can bear testimony to the delicacy of roasted marmot, it beats an Ostend rabbit hollow—all honour to the Red-skin's taste! With a hunter's proverbial hunger, and with good "digestion waiting on appetite," and health on both, a dinner off a roasted Rock Whistler, washed down with a pull at the crystal stream, is a repast many a gourmand, who by constant gorging has worn out health, appetite, and digestion, would give gladly half his life to relish, as I have relished it, by the lodge fire of the savage of the far North-west.

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

A CHAPTER FROM THE LIFE OF A VOLVOX.

A DROP of water is a world to the minute beings that inhabit it. We place it under the microscope, and are astonished to find that it is a world teeming with life, and that the forms of life are not less beautiful and scarcely less varied than those of the higher beings that dwell in the great world around us, and therein exercise their wonderful instincts.

There are various instincts at work amongst the tiny inhabitants of that little world, though, on account of the *apparent* simplicity of their structure, we are often inclined to think their actions more the result of mechanical than of instinctive power, perhaps only because our microscopes are not even yet perfect enough to reveal all the complexity which really exists.

I once had the good fortune to observe an incident, which I do not think has ever been recorded before, in which two of the inhabitants of a drop of water—the Rotifer and the Volvox—played a very curious part. Whether what I saw was the result of instinct, as I would fain believe, or whether it was mere caprice or a chance action, I must leave my readers to judge for themselves.

All who read SCIENCE GOSSIP do not profess to be learned naturalists, and they will perhaps like to know what sort of creatures these Rotifers and Volvoces are. The first is undoubtedly an animal, and one of the most active that you will find in a drop of water; darting about here and there, poking his nose into every corner, rolling about like a porpoise, and, Proteus-like, assuming various forms. He is put by naturalists into the lowest division of the animal kingdom,—the division *Radiata;* and, by some, into the lowest class of that division,—the class *Infusoria,** which consists entirely of minute animalcules, some of which are so low in the scale of creation as to have only one organ, and that a stomach; the whole animal, in fact, being a stomach, with an opening at one end for a mouth, and sometimes not even that.

The Infusoria, however, are not all of them of quite so simple a structure as this; and amongst them are a number of species of our friends the Rotifers, so called because around their mouth they have two or more sets of *cilia* or hairs placed in circles, and which, being in constant motion, have the appearance of revolving wheels. They have the power of stretching themselves out and retracting like worms; and their tail acts as a claw, by which they can anchor themselves to a leaf or anything in the water; and they can likewise draw in their wheels at pleasure. Under the microscope there is seen, within their transparent bodies, a complicated arrangement of digestive organs. Here is a drawing of one of the Rotifers.

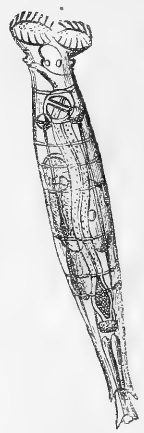


Fig. 1. *Rotifer vulgaris.*

The Volvox is a very different object. It is just large enough to be seen with the naked eye, when the water containing it is held up to the light, and appears like a green speck floating in the water; indeed, after some practice in looking for minute objects, it is possible to fish a single one out of a wine-glassful of water with a teaspoon. A low power of the microscope is sufficient to reveal one of the most beautiful objects that it is possible to conceive,—a globe of the most delicate green-colour, formed of a transparent membrane, which is marked with a network of fine lines, with darker green spots where the lines cross. Within are seen smaller Volvoces precisely similar to the parent, and sometimes within these, smaller ones still. The

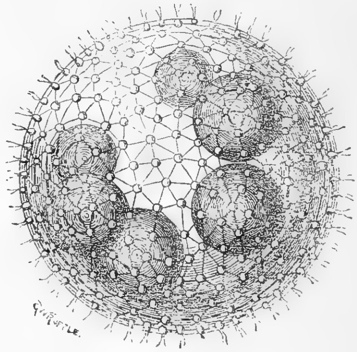


Fig. 2. *Volvox globator.*

Volvox, by means of a constant rolling motion, moves slowly through the water from place to place. When viewed with a higher power, the green spots are found to be bunches of delicate hairs, and probably the constant motion of these propels the Volvox through the water.

* Others place the Rotifers in the class *Annelidæ;* others again in the class *Crustaceæ.*

If the Volvox be broken up by pressing it tightly between glasses, its outer membrane is resolved into a number of small cells, each crowned with a bunch of hairs, and each capable of spontaneous motion in the water. Naturalists are not yet agreed whether this beautiful creature is an animal or a plant; most, I think, are inclined to place it in the animal kingdom, though its powers of motion do not necessarily exclude it from the vegetable kingdom, as it is well known that certain parts of many undoubted plants are capable of moving spontaneously.

The strange circumstance that I witnessed, and am about to describe, is not, perhaps, *the* way, but *one of the* ways, in which the Volvox gives birth to its young, if it be an animal, or is propagated, if it be a plant.

I had under the microscope a drop of pond-water containing a Volvox, apparently so ripe, that eight smaller Volvoces within seemed to fill it almost to bursting. Whilst I was looking at it, two Rotifers, one larger than the other, came across the field of view, swimming so closely together, that they looked just as if they were arm in arm. Presently the Volvox attracted their attention; so they came close up, and began swimming round and round it, always keeping their heads towards it, touching it every now and then, and then rebounding from it. After a short time the smaller Rotifer went away, and then the other, after hovering about for a little while, attacked the Volvox in good earnest. He fixed on one side, and continued pecking at it, as it were, with great rapidity and perseverance, till in about ten minutes he had succeeded in making a small lacerated opening in the external membrane. I, of course, thought the Rotifer was making a meal of the Volvox, as perhaps, in the first instance, he was; but, to my great astonishment, he now suddenly changed the nature of his labours, and began swimming round and round the object of his attention, constantly butting against it, and rebounding from it, till, in about the space of ten minutes more, he had, by means of the butting process, so compressed the side *opposite* to where he had made the opening, that one of the internal balls was forced out into the water.

Still the Rotifer continued his labours, and in a little while a second ball was excluded. After a time another escaped, and then a fourth; the Rotifer, all the while working in precisely the same manner. These last took a longer time in being expelled than the first, for the Volvox being partially emptied, greater external pressure was required.

Having thus helped four young Volvoces into the world, the Rotifer seemed to think he could be of no further use, and went away. And now the remaining four balls, having plenty of room, rolled about inside the parent, and when they chanced to come close to the opening, rolled out into the open water. Thus three more escaped; but the last I never saw expelled, though I watched for several hours.

I have never been able to make further observations on what I have thought a very curious subject. If the facts that I have described were not the result of a chance action, but are such as often take place, then the amount of instinct displayed in creatures as low in the scale of creation as these animalcules, is truly wonderful, and quite on a par with many facts that we observe to take place in the habits of animals that we think to be far above them in intelligence.

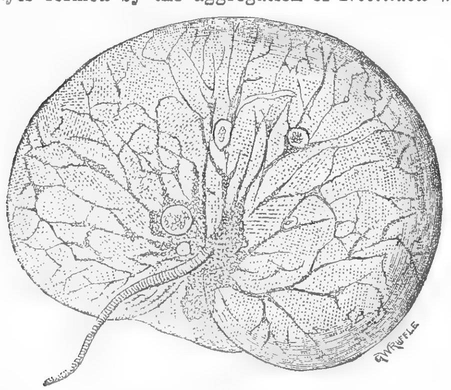
But what about them is not wonderful? Their forms—their minuteness—their life; and the same Hand that bestowed these attributes upon the smallest of His creatures, could certainly as readily give them instincts to perform the duties of life that He has destined them to fulfil.

ROBERT HOLLAND.

PHOSPHORESCENCE OF THE SEA.

On Sunday evening last (October 8th) I had an opportunity of witnessing this singular and beautiful phenomenon on a very extensive scale at Hastings. Sitting at the window, I saw the whole surface of the water near the shore covered with large patches of brilliant light. At first I thought it was the reflection of the moon, but I found that the moon had not risen, moreover, the whole of the sky within view was covered with dark and threatening rain-clouds. Flashes of lightning, at first at rare intervals, afterwards nearly continuously, seemed not to alter the position of the patches of light, but to turn them from the liquid fire (which they looked like in the twilight) to dead silver. I then came to the conclusion that it must be phosphorescence, and sallied out to learn what I could from some of the boatmen or coastguardsmen. I found, however, that they were far from lucid, or agreed on the point. One had seen it "once before this year;" another "did not recollect seeing it before at Hastings;" another had seen it "very often." They all agreed, however, in the expression, "The water burns." Failing in getting any satisfactory information out of my nautical friends, I took to speculation, and attributed the appearance to the decomposing animal and vegetable refuse which is thrown on the shore. I had, however, to give up this hypothesis, for the tide was coming in very strongly, and, to my surprise, I found that the luminous appearance, instead of coming nearer, as it would have done had it originated as I supposed, went farther out to sea, and, on looking through a glass, I found the whole surface, as far as the eye could range, covered more or less with large spots of light. I then gave up guessing, and determined as soon as I arrived in London to consult the

Popular Science Review, where I knew there was an article by the celebrated naturalist, De Quatrefages, on this very subject. The article is far too long for reproduction in SCIENCE GOSSIP; but some of the readers may perhaps feel interested in knowing that M. De Quatrefage's experiments tend to show that the luminous appearance is owing to the presence of living creatures, called *Noctilucæ*. Many theories seem to have obtained credence from time to time. The article in question says, "Ancient navigators appear to have attributed the light which is developed on the surface of the water to what may be termed 'ordinary causes,' and they believed it to be due to various atmospheric phenomena. To them phosphorescence was the *meteor of the sea*. Abbé Nollet sees in it nothing more than a modification of electrical phenomena. Bujon refers it to a disengagement of electricity. Tingry compares it to the *fluorescence of the diamond*, and thinks that the sea absorbs solar light during the day, which is liberated at night. It has also been attributed to 'phosphoric fires,' and to the ignition of bubbles of hydrogen bursting at the surface of the water, &c., &c. As far back, however, as 1705, Professor Viviani, of Genoa, discovered fourteen species of luminous animalculæ. To their presence he attributed the phosphorescence of the seas of his country. In our day everything tends to prove that the sea possesses its phosphorescent fauna, as does the land." Some of M. De Quaterfages' experiments were very striking. He says, "I took some water from a very brilliant wave, and with it filled a tube one decimetre (about four inches) in height. After it had been permitted to stand a few minutes, the layer formed by the aggregation of *Noctilucæ* was



one and a half centimetres in thickness; consequently, the animalculæ constituted a seventh of the whole mass of fluid." He also says, "I have subjected luminous water to filtration (a rather fine handkerchief suffices for the experiment). The *Noctilucæ* remained in the linen, to which they imparted a brilliant light, whilst, on the other hand, the filtered liquid presented no signs of phosphorescence, notwithstanding every means employed to promote it." Some of our readers may, perhaps, be interested in his description of the animal. He says, "The *Noctilucæ* are microscopical animalculæ, bearing a pretty general resemblance to little melons deeply indented at one end. Near this depression is fixed an appendage, which the animalcule moves slowly to and fro, swaying from right to left. The body is so completely transparent as to admit of its structure being studied in its minutest details. Near the appendage these membranes present a minute orifice, which serves as the outlet for a little mass of pellucid, homogeneous, and finely granulated substance, which is prolonged into the internal part of the body. From the mass which forms, as it were, a centre, there radiate in every direction a number of extensions, which become more and more ramified as they proceed, and of which the ultimate indefinitely multiplied ramifications spread themselves over the whole inner surface of the animal." M. De Quatrefages then describes the animal very minutely, and adds, "Examined by a power of twenty or thirty diameters, the illuminated portion of the body of the *Noctilucæ* presents a uniformly bright aspect. With sixty diameters, a number of small but brilliant scintillations become visible, detaching themselves, as it were, from parts of what appears to be a pale luminous background, and these scintillations come and go with the rapidity of lightning. An enlargement of one hundred and fifty diameters, however, reveals the true character of the phenomenon. It then becomes obvious that the light emitted from the whole body, or any of its parts, is composed of a vast number of instantaneous scintillations, closely approximating to one another at the centre of the "phosphorescent" portions but disseminated and clearly distinguishable at the edges. Occasionally there may be seen isolated sparks at the extreme limit of the luminous part, or even beyond it. Those of our readers who care to go further into this subject will do well to consult M. Quatrefages' article.

BROMLEY: AND WHAT I FOUND THERE.

MANY and many a visit has the writer paid to this pretty neighbourhood, and very many have been the microscopical treasures there found.

One day last summer, being unable to get a companion, he set out alone, resolved to make the best of circumstances, such as they were. No sooner had the train started than it began to rain, and it continued raining, sometimes heavily, during the rest of the day; being provided, however, with a waterproof cape, the inconvenience was not great.

Diptera, &c., being scarce in such weather, there was no alternative but to search the horseponds and ditches in the vicinity of the path, in the hope of obtaining aquatic larvæ.

Collectors thus employed, are generally objects of great interest on the part of bakers' and butchers' boys running their masters' errands, and of the public at large, if the weather permits them so to be. In the present instance, as I stood over a pond, occasionally making a dive with the water-net at something which rose for an instant to the surface, these parties stopped. One was heard to say in an undertone to another who had been looking on for some time, "What is that cove catching?" The reply was, "Don't know,—think it's tiddlers. O! there! he's got something; come and see." Then they came closer, looked into the bottles, and made sundry comments to one another on what they saw. Occasionally their comments were diverting, but more frequently otherwise.

Perplexed whether to box ears all round, or to wait till the rain should tire out their inquisitiveness, it was a relief to notice that two individuals equipped with rods and lines, evidently thinking this a good place for their sport, stopped short in their walk, and got out their tackle and commenced operations.

Now, it was more than probable that the only representatives of the finny race in that piece of water —seeing that it was only a horsepond—were sticklebacks, or, as the boys said, "tiddlers:" consequently, the prospect of "good sport" was not great. Nevertheless, the anglers perseveringly plied their vocation for a good hour, not even getting one of the above-named fishes during the time. Perhaps I should not tell this much of their exploits, because I felt under obligation to them, since their arrival had diverted attention away from my proceedings.

To be pestered by small boys, inquisitive old ladies, or practical jokers, is the inevitable fate of the collector. His bottles and apparatus invest his proceedings with mystery, or furnish materials for ridicule. It is not very gratifying, for instance, when you are busy in some field by a roadside, getting specimens out of a pond, to hear the alarm given, "Stop him; he's going to drown himself," and find that you are the individual referred to. "*Vox populi, vox diaboli,*" you mentally ejaculate; but you settle down, and, like John Bunyan, *grin and bear it.*

Plenty of whirligig beetles (*Gyrinus natator*) were obtained from the surface of the river Ravensbourne, which runs through a field close by the Shortlands Station. A slide containing a good specimen of each of the three pairs of legs of this water beetle, common almost everywhere, is well worth the trouble of preparation. They must be mounted in balsam, and form a beautiful object for either transmitted or polarised light.

In a horsepond just out of the town of Bromley, on the left-hand side of the road going towards Keston, were caught nine *Dytiscus* larvæ—three full-grown, and six small. Experience having shown that these larvæ are anything but friendly-disposed towards each other, they were severally wrapped in grass, and taken home in this condition.

The ferocity of these tyrants of fish-ponds is quite equal to their powers. Once I kept one in a basin of water for a fortnight, during which time he ate seven or eight tadpoles, besides sundry earthworms, and grew so large that he cast his skin twice. If a small stick were presented to him, he would grasp the end boldly; that mode of testing his bravery being deemed more prudent than offering him a finger, which, judging by his manner of despatching tadpoles, might have been painfully made acquainted with the sharp points of his mandibles. One gripe was sufficient to settle any tadpole, and was always taken through the sides, apparently quite transfixing the poor little wretch, which quivered while life lasted, its enemy meanwhile keeping tight hold and sucking its juices, till nothing but the blanched skin was left to tell the tale.

Earthworms were more trouble to him, since, owing to their violent struggles, he was obliged to divide the larger ones and eat them piecemeal.

Perhaps the most interesting part in the structure of the larva of *Dytiscus* is the tracheæ. Tracheal tubes of insects at all times are beautiful microscopic preparations, and those to be obtained from this ferocious creature are among the finest. A careful incision with the fine scissors down the centre of the back, and repeated washing, after a prolonged soaking in acetic acid, enables one to remove them from the skin of the insect almost entire, provided the hand be light and a sufficient amount of patience be used.

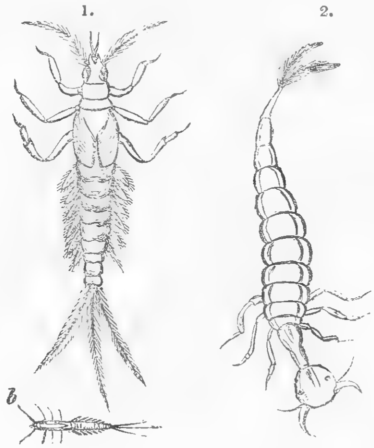


Fig. 1. Larva of *Ephemera*.
b. Natural size.
Fig. 2. Larva of *Dytiscus*.

The only implements employed by the writer are, the scissors to cut the skin open, the forceps to detach the tracheæ which lie along each side, and a camel's-hair brush for washing and occasionally assisting the forceps. Of course, the insect must be pinned down to a loaded cork, under water all the time.

When obtained, the tubes may be mounted dry, in fluid or in balsam. The latter plan is the best, none of the others offering so much security from ultimate deterioration or damage.

From the same pond were obtained plenty of *Ephemeræ* larvæ, enabling me to add to the cabinet a slide of one showing tolerably well the tracheal system. A *perfect* specimen of this object is extremely difficult to obtain, owing to the fragility of the leaflets; but even a mediocre one is worth while. No caustic potash is necessary. The insect, after being killed in hot water, must be simply arranged, dried, and mounted in balsam. The chance of success will be the greater if it is spread out on the thin glass cover in preference to the glass slide, as is usual, and then, after drying, inverted into a drop of balsam.

When mounted, the parabolic condenser, or other dark ground illumination, will be the most effective mode of viewing, especially under the binocular microscope.

Great advantage to the mounter will be obtained if he will first look at the living larva in an animalculæ cage. This is a sight easily seen, and one of the most beautiful that the microscope can afford.

The remainder of the day was occupied in a walk to the bog at Keston, known to most microscopical observers, from the abundance of *Desmidiacæ* to be found there, and several hours in the evening were spent in turning over the contents of the bottles filled from the little pools of water in the cattle tracks. Wonderful indeed they were!

S. J. McIntire.

JELLY-FISHES.

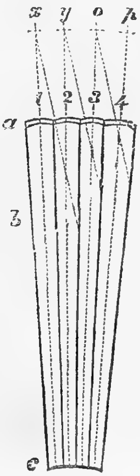
About a fortnight ago, while the weather was yet fine and the treacherous sea smooth, and the breeze so gentle as scarcely to produce a ripple on the surface of the water, I rowed from the haven

at Tynemouth, to visit some wonderful caves which have been hollowed out of the limestone rocks by the action of the waves, about three miles down the coast south of the Tyne. As I rowed along, I several times encountered magnificent specimens of the large jelly-fish, known to science by the name of *Cyanea chrysuora*. Few marine animals with which I am conversant are more singular and beautiful than this extraordinary creature. The umbrella-like disk, by the alternate expansions and contractions of which the animal glides along, is, in this species, marked with fine brown lines, which radiate from the centre, and the numerous tentacles and waving appendages which are suspended from the underside of the disk, float gracefully hither and thither, and but for their motion in the water would, from their delicacy and transparency, be scarcely perceptible to the sight. The colour of these highly-attenuated organs, as well as that of the other portions of the creature, being a pellucid cream, or sometimes a faint brown or fawn. Who would imagine, while gazing at these transparent, evanescent creatures, that they possess the power to inflict pain? Yet such is really the fact; hence another common name of these jelly-fishes, that of "sea-nettles." The stinging, or at least irritating, properties, reside in the tentacular appendages, and a curious instance of the smarting pain occasioned by contact with them occurred here lately. It was related to me by the boatman, who, upon observing the interest with which I examined one of the specimens, said, "Them's jelly-fishes, sir, and some of 'em stings awful." He then went on to say, that a few days ago he took a gentleman out in his boat to have a bathe in deep water, who, being a good swimmer, took a first-rate "header," and in doing so plunged directly upon the disk of a large specimen of *Cyanea chrysuora*, a species to which, *par excellence*, the term "stinger" may be applied. The poor jelly-fish, although smashed to pieces, amply revenged its death, for as his unintentional destroyer was drying himself after his bathe, he said to the boatman, "I am afraid the water has not agreed with me this morning, for my back itches terribly;" and the pain increased so violently that, upon his return home, the victim to jelly-fish acquaintanceship found it necessary to take to his bed. The boatman, expecting what would happen, called in the course of the day to inquire after the gentleman, and, upon learning his condition, requested to be admitted, when he at once explained the cause of his suffering; upon which, as the boatman said to me, "the gen'l'man 'ops out o' bed, and says he, 'why didn't you tell me that afore?' and down he sits, and writes out a 'scripshun, which I takes to the chemist, and gets a hointment to rub his back wi'; law, sir, the jelly-fish had stung his back as red as scarlet. Hows'ever the stuff as I rubbed him wi' cured him; and by night he was all right ag'in." I have often heard people doubt the stinging properties of the *Medusæ* or jelly-fishes, but from my *own* experience of the fact, I would strongly advise bathers, who may be sceptical on this head, not to trust their limbs in contact with the tentacles of *Cyanea chrysuora*.

W. H. Grattann.

COMPOUND EYES.

I THINK if your correspondent, H. Vokes, comes to study the eyes of insects a little further, he will see that they are something far different from organs of touch, which, of all the strange ideas of the present day, seems to me to be passing strange. Paley teaches us that a piece of mechanism adapted to a certain purpose will show that its maker intended it to serve that purpose, and not an altogether different one. Now, let us trace the eyes of animals from one to another. Spiders, monoculi, crustacea, and insects. We shall find a likeness, though a difference. We shall find their organisation such as is adapted to visual organs; that amongst other things they are capable of refraction, like lenses, able in a beautiful manner to transmit light, and form correct images of objects—some moveable, some immoveable. Those that are moveable consist mostly of one or few lenses; the immoveable ones of many, and these not on a level surface, but on a curve, or less spherical one. Now, let us look at the eye of a dragon-fly. It first consists of a cornea composed of some thousands of lenses, for their action shows them to be truly such. Put a piece of one under the microscope, and direct it to the windows, trees, or human beings, some little distance off, and you will see all as through a miniature telescope; or put a piece over some scales of butterflies, and you may make it act as a power of the instrument, that is, it will show the objects magnified. Now, from each of these lenses proceeds a tube lined with a dark pigment. They are of a conical



shape, as they must be, to converge regularly towards one point—the retina, or nervous centre. To go further into the mechanism of them would take up too much time and room; but in a rough way a section of a fly's eye will somewhat resemble the figure, in which *a* represents the cornea; *b*, the tube proceeding from it; and *c*, the retina. Now, we know how a single eye acts, and how it can be directed from one object to another; but in the eye of a fly, which is immovable, this cannot be done, and were there no means of preventing it, truly a fly would have nothing but a confused vision—a multitude of images of the same object; but from the drawing we see how beautifully this is prevented, yet with a considerable extent of vision. Let *x*, *y*, *o*, *p* represent four objects opposite the four lenses of the cornea (*a*), draw a straight line of light from each object. That from *x* passes down the whole length of tube 1, but the light falls on the dark pigment in No. 2, &c., and is absorbed, and so in the other focals. The light from *z*, in like manner passes without interruption to the retina in 2, but is absorbed in the others before it reaches it: and so on with *o* and *p*. In *m* the light goes a little farther down the tube but still is absorbed ere it reaches the retina. So that, notwithstanding the multitude of lenses, we see that no object is visible to the insect except that, the light from which can proceed without stoppage down the whole length of the tube. I should suppose the hairs on a fly's eye are something like our eyelashes, and not so many thousands of organs of touch. Try and catch a fly, watch it, and then see if it don't show most acute vision. Consider how little the mechanism of a fly's eye is fitted for touch, how well its lenses act, and we can hardly doubt but that light and not touch is intended by its Maker to act upon it; although we may not, with our present knowledge, just perceive the why and the wherefore it is formed as it is. Surely it is no wonder the poor dragon flies were troubled and perplexed to know what to do or where to go to with their eyes blinded. Cover any one's eyes, and put him into an open field, and see how utterly unable he is to guide himself straight, how confused he instantly becomes.

E. T. SCOTT.

MOUNTAINS OF THE MOON.—It curiously enough happens that we were acquainted with the height of the lunar mountains before those on our own earth, or before the barometer was invented wherewith to measure them. Galileo estimated the height of some of the mountains to be nearly 29,000 feet high, and in recent times it has been found from actual measurement that one named *Doerfel*, at the southern part of the moon, is nearly 25,000 feet high. Upwards of twenty are higher than Mont Blanc. The highest peak on the earth is 28,180 feet; but if we compare the size of the earth and moon, we shall find that the proportion of the diameter of the latter to the height of its most elevated mountain is as 1 to 454, whilst the same ratio on the earth is as 1 to 1,481. Some of the highest of the mountains on the moon, as those of *Newton* and *Tycho*, are of the circular type.—*Popular Science Review.*

NEW ARCADIAN FIR.

IN the late Sir T. Wyse's "Excursion in the Peloponnesus," just published by Day and Son, an account is given of an interesting coniferous tree, which is named Queen Amalia's Fir (*Abies Reginæ Amaliæ*). It was first described by Dr. Heldreich, in 1860, and has only been found on the mountains of Central Arcadia, where it forms forests of considerable extent, at from 2,700 to 5,000 feet above the level of the sea. It is especially remarkable for its peculiarity of pushing forth new shoots and branches where the trunk has been cut.

"The Greek foresters, Messrs. Origoni and Balsamaki, first saw this singular tree when passing, on a tour of inspection, near the village of Khrysovitza, about nine miles from Tripolitza. They came to a pine forest extending for eighteen miles in a northwesterly direction across Mount Rhoudia (1,400 feet high), and through the adjacent valleys as far as Alouistena and Magouliana. Their surprise became great at observing the countless branches that had been lopped off at every variety of size and height (doubtless by the neighbouring villagers for their own use), and which had again thrown forth new crests around the broken parts. In some instances three and four new shoots sprung up, the stems having the thickness of a tree; but, generally speaking, when the central branch had been cut away, not only a new top-shoot had grown, but two or three upright branches rose anew, giving a chandelier-form to the tree, often of very symmetrical proportions. . . .

"These firs, in favourable localities, attain the height of fifty-five feet, the trunk having a diameter of two or three feet. In those trees which have been deprived of their original top-shoots, the new crests and upright shoots often grow to eighteen or twenty feet, whilst their lower part is one foot and a quarter thick. These new shoots, however, are of very unequal growth, and one of the number usually develops itself to the prejudice of the others. . . H. M. Queen Amalia sent one of her gardeners, M. Bayer, to Arcadia to examine this fir, and he fully confirmed the report of the foresters, bringing back with him to Athens ripe seeds and several small trees showing this peculiarity. . .

The illustration, placed at our disposal by the publishers, is from the work already named.

SEA-SIDE DIATOMACEÆ.

SINCE Dr. Donkin in the *Quarterly Journal of Microscopical Science*, vols. 5 and 6, recorded his discovery of several new and beautiful forms of marine diatomaceæ, gathered from the open Northumberland sea-beach, I have not seen any published accounts of the best mode of gathering free forms of marine diatomaceæ.

It may not, therefore, be uninteresting to the readers of SCIENCE GOSSIP to be informed how to recognise diatoms when they make their appearance on the open sea-beach, how to gather them free from admixture of dirt, and what the principal forms are that may be gathered on those parts of the beach which mark the high, middle, and low tides. My experience in gathering marine diatoms is confined to the Northumberland coast, and to that, therefore, the observations I am about to make particularly apply, although there can be little doubt that were the coasts on other parts of the United Kingdom properly searched, similar and perhaps more extensive varieties might be found on many of them. Marine diatomaceæ may be obtained during all periods of the year, but the months most favourable for obtaining them in great abundance are April, May, August, and September; the days most favourable are those that are clear and bright, with considerable warmth in the sunshine; and the period of the day, the afternoon or early evening, when the sun has had an opportunity of exerting his full influence on the exposed sea-beach.

Diatoms are found in greatest abundance on the edges of the sand-ripples on the sea-beach, where the furrows left by the retired tide stand filled with water. The edges of those furrows often present a more or less dark ocherous brown appearance, and that peculiar colour is caused by myriads of diatoms, which, under ordinary circumstances, lie buried in the sand, having risen to the surface attracted by the sun's light and heat. To prevent disappointment, it may be said that in searching for diatoms on the beach, it is possible that for several days, or it may be weeks, few or no indications of their presence may appear; but if the search be continued with perseverance, success will certainly reward the investigation. It is difficult to account for the changes which take place in the times and circumstances in which diatoms appear on the sea-coast. I have seen them in great abundance in July and August of one year, and in the next year, although the weather was bright and appeared favourable, they have not made their appearance in large numbers until September or October, and then the beach was covered with matter of a deep coffee-brown colour, which, on being gathered and examined, was found to consist entirely of diatomaceous frustules.

The apparatus requisite for hunting diatoms on the sea-coast are, half-a-dozen two oz. bottles, one four oz. bottle, with wide mouth, and an ordinary dessert spoon. The best method of gathering is to take the spoon, and with it shave off the ocherous brown matter that lies on the surface and colours the sand, put it, with the sand and water that are taken up at the same time, into the wide-mouth bottle. When the bottle has been half filled with colouring matter, sand, &c., let it be well shaken; the sand immediately subsides, and the water is left tinged with a more or less deep cloudy-like brown, all of which colouring matter consists of diatomaceæ. When the bottle has been shaken, and the sand allowed to subside, which it does almost instantly, then the supernatant fluid should be poured into a clean bottle, the contents of which would then constitute the gathering; the sand may be thrown away, and the large bottle cleaned in readiness for another collection. The following new forms, together with about one hundred others, registered in "Smith's Synopsis," and "Pritchard's Diatomaceæ," are to be had in large numbers near the high, middle, and low tide marks. Near high tide mark *Attheya decora, Cocconeis excentrica, Navicula clepsydra, N. trevelyana, Donkinia carinatum,* &c.; and at the middle and low tide zones, the following forms abound:—*Pleurosigma lanceolatum, P. arcuatum, Donkinia rectum, D. carinatum, D. minutum, Druridgia geminata, Toxonidea Gregoriana, T. insignis, Bacillaria cursoria,* &c., nearly all of which are very beautiful, and the majority of them so delicately marked as to afford the best possible means of testing the excellence of first-class objectives.

Newcastle-on-Tyne. T. P. Barkas.

"HOMES WITHOUT HANDS."

NOTWITHSTANDING the recent and very interesting volume on this subject, it is not yet exhausted. Fresh facts may be gathered about what has already been done, and result in the contemplation of animal life in the highest phases of its intellectual or instinctive development. The infinite variety of means by which one end is to be attained is marvellous. To multiply its kind, and provide a home and shelter for its future offspring. is the great idea which pervades all forms of life, This is more or less elaborated in different individuals, but in all the same object is paramount. Two or three instances may be given here, which possess in themselves another interest, of an economic character.

Trehala.—A singular substance has long been known in the East under the name of *Trehala* or *Tricula.* It consists of oval cases from half to three-quarters of an inch in length, found attached by one side to twigs of a species of Syrian *Echinops.* The external surface is rough and irregular, nearly of the colour of Sicilian manna, hard, brittle, and with a sweetish taste. These cases are constructed

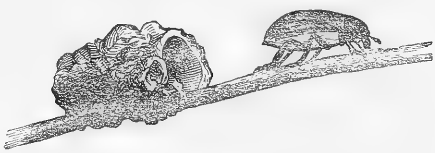


Fig. 1. *Trehala.*

by a little beetle (*Larinus subrugosus,* Chevr.), of which a figure is given (fig. 1). "It appears that the larva of the *Larinus* collects a considerable quantity of saccharine and amylaceous matter, which it procures from the *Echinops,* and that it constructs its dwelling by disgorging this matter and moulding it with its rostrum." Each case contains only one individual, and when this has assumed its perfect form it emerges from the orifice at the upper end. There is much in the history and economy of this little insect which is still a mystery to us, but enough is known to make us wish for more. Analysis of these curious nests has shown that they contain gum, starch, and sugar in their composition, and when thrown into water, at the ordinary temperature, they swell, partly dissolve and become converted into a pasty mass. In Turkey and Syria they are collected and employed as food, many being sent to Constantinople and other Turkish cities, where they are regularly offered for sale. Some of this substance was exhibited in the Turkish department of the Great Exhibition of 1851. The insect itself is of an oblong form and black, about three-fifths of an inch in length. Its snout is projecting, with the antennæ attached on either side about half-way down. The elytra or wing-cases are marked on the surface by ten punctated lines, which commence at the upper edge and unite before reaching the opposite extremity.

Shukhur-ool-ashur, or *Shukhur teeghal*, is a very similar substance, and consists of the nests of just such another little beetle. In this instance the country of production is India, where the cases are known by the Arabic names already given; they are far from common, but are collected by the natives and employed as a kind of manna. The plant on which they are found is the Mudar or Ashur (*Calotropis gigantea*, and probably allied species), whence the name "Sugar of the Ashur" is derived.

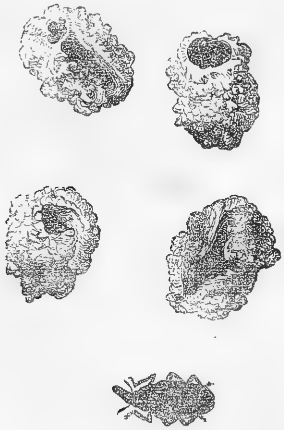


Fig. 2. *Shukhur-ool-ashur.*

Dr. Royle, in his "Himalayan Botany," says of it: "This is a sweetish exudation formed on the plant, in consequence of the puncture of an insect called *Gultigal*." With but little modification this paragraph has been repeated by subsequent authors, and is almost the whole knowledge we have possessed of this substance or its fabricator. Having obtained specimens of the *Shukhur* from India, I succeeded in discovering one of the beetles still enclosed in its case, all the other cases being empty. This insect, with its nidus, I submitted to Mr. Smith, of the British Museum, for identification, and he has declared it to be the species known as *Larinus ursus* of Fabricius. It may now, therefore, be affirmed with confidence that the sweetish cases, or "sugar," of the *Calotropis* is the nidus of a small beetle known in Arabic as *Gultigal* (which, being interpreted, appears to mean "flower-nest"), and to entomologists as *Larinus ursus*. It is very much like the insect which produces the *Trehala*, as also is its nidus (see fig. 2); although I am not prepared to affirm that both are in reality the same species, under different names, but should rather be disposed to regard them as distinct.

Poonyet.—Whilst upon this subject of "Insect-homes," I cannot resist adverting to another singular substance, which is found in Burmah, and called *Pwai-ngyet* or *Poonyet*. It is a blackish resin, channelled with little chambers or cells, by some species of Dammar-bee, and is found in holes in the ground, and in hollow trees. This resin, or wax, is employed by the Burmese for caulking boats, and is constantly on sale in the bazaars. The resin which I have seen under this name is slightly fragrant, and apparently identical with that of *Canarium strictum*, the honey-combed structure alone excepted. The latter resin is common in Travancore, in Southern India, and Mr. J. Brown, of Trevandrum, says that it exudes from cuts in the trunk of the tree, and seems to be a great favorite of several species of insect, especially of one resembling a bee, called by the Hillmen *Kulliada*, which live in pairs in holes in the ground. It is singular that the same tree is common in Malacca, where it yields a black resin, and there also is found a honey-combed resin, which the natives call "Dammar Klotee," and which is said to resemble the *Pwai-ngyet*, although the cells are larger, and the resin blacker and harder. This substance I do not remember to have seen. Dr. Mason, of Rangoon, states that he forwarded some specimens of the insect which produces the Burmese *Pwai-ngyet* to Mr. F. Smith, and that he identified them with *Trigona læviceps*, which had been first received from Singapore. The conclusion, therefore, at which I have arrived, is to the effect that the "honey-combed resin" of Pegu and Burmah is the natural resin which exudes from the bark of the Black Dammar tree (*Canarium strictum*), channelled and perforated by the insect known in Southern India as *Kulliada*, and which is also found at Singapore, as well as in Pegu and Burmah, and recognized by entomologists as *Trigona læviceps*, but whether the resin is perforated in its soft state, soon after it issues from the tree, or, if after it becomes hard, how the feat is accomplished, is more than I am at present able to affirm. Perhaps some correspondent who resides near one of the localities indicated will institute enquiries, and render our information more complete respecting the economy of the Dammar Bee.

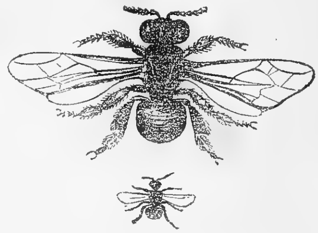


Fig. 3. Dammar-bee (upper figure magnified).

M. C. Cooke.

A single female house-fly produces 20,080,320 eggs in one season.

THE FOOT OF A FLY.

RECENTLY an article appeared in these pages on the Breeze-fly (page 194) in which some interesting particulars were detailed of the species of Breeze-fly, with which the writer had been brought into unpleasant contact. On the present occasion we have selected a portion from our common species (*Tabanus bovinus*) to illustrate a few observations on the feet of flies in general. How can a fly walk upon the ceiling? is a question which has often been asked, and a great many successive efforts have been made to answer it. The most recent researches in this direction are those of Mr. Tuffen West, which were published in the "Transactions of the Linnean Society, for 1861," profusely and beautifully illustrated, and we shall freely avail ourselves of the results of those researches.

The foot of the fly differs a little in minor particulars in the house-fly, the blow-fly, and the drone-fly, but there is a still greater divergence from this type in the foot of the breeze-fly. In the former instances the fifth tarsal joint is terminated by a double pad, but in the present the pad is treble. On the upper surface at the base of these pads is a pair of strong claws. Somehow or other the fly manages to walk, head downwards by the aid of these pads or these claws, or both; but how this is accomplished we can scarcely understand without a more minute examination of the parts already named. It must be premised that in our illustration the upper surface of the foot is shown.

The pad, cushion, or pulvillus is deeply cleft into what seems to be three pads, but which is in reality a single pad with three lobes. The under surface is clothed with minute hairs, which are somewhat trumpet-shaped, expanding at the outer extremity into a membranous elastic disk. It has been supposed that each of these hairs is hollow, and when the fly moves over a highly-polished surface a minute drop of fluid passes down it, to assist in adhesion, by the more effectually excluding the air. There was at one time a notion extant that the whole surface of the pad was a kind of "sucker," and that by means thereof the fly sustained itself, as a schoolboy lifts a stone by means of a moistened disk of leather at the end of a string.

The pair of claws, shown in the figure, are moveable, and both to them and the pad, flexor and extensor muscles are attached.

The mode in which these parts are employed, is thus graphically described by Mr. West:—"When a fly is not making use of its pads (*pulvilli*), as on a surface sufficiently rough to afford it foothold with its claws alone, these only are made use of. On a smooth surface, perpendicular or horizontal, the pulvilli are brought down, and the tenent (holding) hairs applied to such surface; a slight push forwards of these, succeeded by a gentle draw backwards, at each application, removes the air between their soft elastic expansions and their plane of motion, and thus a firm hold is gained. Access of air is prevented by the minute quantity of moisture which exudes from the expanded tips of the tenent appendages; and thus a vacuum is formed. When the fly wishes to move a leg from its place of attachment, the claws are brought down and pressed against the surface; from their position they raise the hinder part of the pulvillus, where the tenent hairs* are least developed, first, and so on forwards. I think a fly when once stuck fast, if it had no claws might remain so."

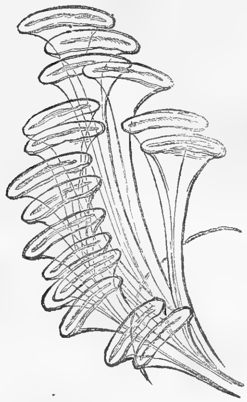
"That the pressure of the atmosphere is the *main* agent by which a fly is enabled to adhere to perfectly

Foot of the Breeze-fly.

smooth surfaces, cannot, I conceive, be doubted. Careful experiments on the weights of numerous

* The term "tenent hairs" is applied to the trumpet-shaped hairs which cover the lower surface of the pads of pulvilli.

flies, compared with the area of their pulvilli, both of the membranous portions and of the surface covered by the organs of holding, show the following



curious facts. That atmospheric pressure, if the area of the flaps be alone considered, is equal to just one-half the weight of a fly. If the area covered by the tenent hairs be added, an increase of pressure is gained, equal to about one-fourth the weight of a fly. This still leaves one-fourth to be accounted for, by slight viscidity of the fluid, by the action, which may be called 'grasping,' by molecular attraction, and doubtless, by other agents still more subtle, with which we have at present scarcely any acquaintance."

We give also a figure of a group of "tenent hairs," from a species of Beetle (*Pterostichus niger*) in which these appendages are unusually large; from which we may predicate of the character of the minute hairs on the pad of the fly, to which these are doubtless analogous.

SPIRACLES OF INSECTS.

In addition to what I have communicated on a former occasion, I desire to make a few further observations on Spiracles, which, I trust, may not be without interest to some.

The possession of a mounted spiracle of the larva of the fly is desirable to the microscopist who takes an interest in insect structure, and the questions naturally arise, how is the larva to be obtained? and where are its spiracles situated?

Kirby and Spence say, "The larva of the fly is a disgusting grub, without wings, without legs, without eyes, wallowing well pleased in the midst of a mass of excrement." This statement would seem rather to repel than invite the attention, and few indeed would feel inclined to disturb the larva's enjoyment of its peculiar haunts, yet it may be readily obtained by the most sensitive, and interest may be excited, and instruction may be obtained by its dissection, and that quite free from any feeling but the pleasure and admiration which generally attend the lover of Nature in his investigations. One day I placed a dead mouse on a shelf, with the intention of mounting some of its hair, and while I was making the necessary preparations, a blow-fly lighted upon it, and deposited a few eggs on its mouth. When I had taken the hair I required, I covered the mouse with a glass shade, with the intention of watching the progress of the eggs, and not to say anything about this, suffice it to state that after a few days, I had many specimens of veritable, full grown larvæ. I searched for the spiracles in one of these, expecting to find them along the sides, where they are usually found in the larvæ of moths, but I soon saw they were not there, but that they appeared as two brownish specks in one end (fig. 1), from

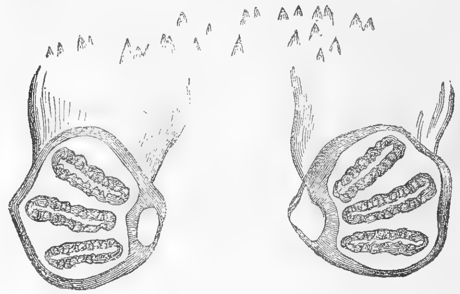


Fig. 1. Spiracles of Larva of Fly.

which two tracheæ stretched through the body from end to end.

They were easily mounted, as they required but little cleaning, and little steeping in turpentine, the chie thing to be attended to, being the prevention

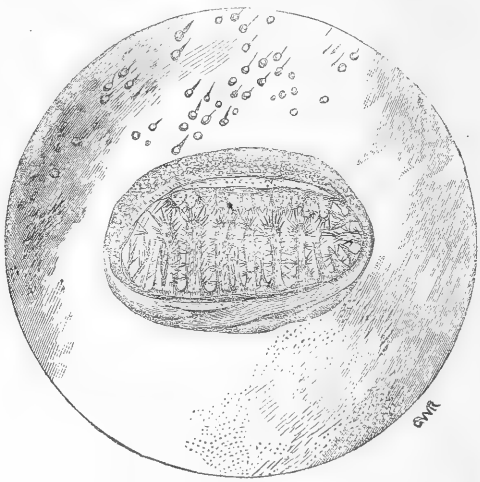


Fig. 2. Terminal Spiracle of *Dytiscus*.

of particles of dirt from entering the spiracles, as it would be difficult to get rid of these by the most careful washing.

In bees, wasps, &c., the spiracles of the abdomen generally become smaller as they approach the extremity of the body, the last spiracle being almost a mere point, and without any complexity of structure. This order is reversed in the large water-beetle (*Dytiscus*), for in this case, the spiracles become larger as the segments of the abdomen become smaller, and the last segment contains the two largest spiracles.

The large terminal spiracle (fig. 2) of the *Dytiscus* is accurately figured in the "Micrographic Dictionary," but on too small a scale to show the beauty of the object. Another figure has been given in a publication which obtained a wide circulation, but in that figure I failed to recognise the spiracle I had so frequently mounted.

The upper and under plates of the abdomen are connected by a membrane and in this are the

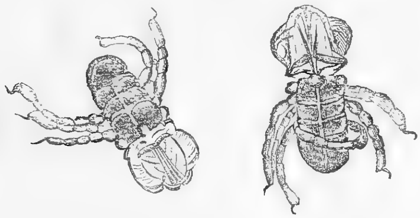


Fig. 3. Parasite of *Dytiscus*.

spiracles; here, also, may the parasite (fig. 3), which is of a red colour, be frequently found, and sometimes so deeply imbedded in the skin, and surrounded with a brown incrustation, that it is very difficult to take one out without tearing it to pieces.

Any one who has stood beside a pond, and observed the *Dytiscus* on the surface of the water, cannot fail to have remarked, that while the heavy portion of the body is immersed with the head inclined downwards, the two lighter and terminal segments are above the surface. In this natural and easy position, four of the largest spiracles are exposed for the reception of the supply of air, for which, no doubt, the insect rose to the surface.

Now, if the large spiracles were in the upper segments it would be necessary for the insect to expose its whole abdomen to the air, and this would require such a continual effort as would be inconsistent with the insect's ease.

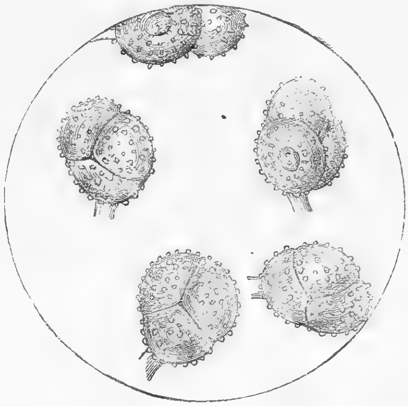
In the case of the larva of the fly, when the head is buried in the tissue it is eagerly devouring, and the sides are bathed in the juices by which they are surrounded, the extremity containing the spiracles freely exposed to the air.

The above afford instances of the general conformity to system so prevalent in Nature, with those deviations in minor detail which, so far from being discrepancies, are among the harmonies of Creation.

Armagh. LEWIS G. MILLS, LL.B.

SIMPLE OBJECTS.—VIII.

MEADOW-SWEET BRAND* (*Triphragmium ulmariæ*).



IN a former number we gave a figure and description of a species of parasitic fungus commonly found in the autumn on the leaves of the Bramble. We now direct attention to a species of Brand, which is parasitic on the leaves of the Meadow-sweet (*Spiræa ulmaria*). This is not probably so common as the bramble brand, but can generally be found in wet situations. The appearance which it presents is that of a number of small black spots or tufts on the under surface of the leaves, not larger than the head of a pin. These tufts are often scattered at some distance apart from each other, but are occasionally closely peppered over the whole under surface. When examined by a quarter of an inch objective, these pustules will be found to consist of an aggregation of three-celled spores, which are formed by one transverse and one longitudinal partition. The outer surface, or epispore, is studded with warts or protuberances. Each spore is furnished with a slender stipe or peduncle. It will be observed that this species differs considerably in microscopical characters from the bramble brand, hence botanists regard it as belonging to a different genus, and one which has only this single representative in Britain. To examine the present object it is only necessary to remove one of the pustules on the point of a sharp penknife, and transfer it to a glass slide, with a drop of water or spirit, and having covered it with thin glass, to submit it to a quarter of an inch power. A slight pressure and sidelong motion of the cover when laid on will serve to separate the spores from each other. Specimens may be mounted for the cabinet with balsam and chloroform. M. C. C.

* Microscopists desiring specimens of this brand may forward stamped envelopes to W. M. B., at the office of this Journal.

ZOOLOGY.

The Black-headed Gull.—During the latter part of May and the first week in June last, I had an opportunity of seeing the Black-headed Gull feeding after the manner of a swallow. Every fine evening it was a common sight to see a number of these gulls flying over the hay-meadows at a little distance above the grass. After watching them for some time through a glass, I saw that they were catching the Ghost Moth, which was very abundant there.—*R. Blight.*

The Spotted Fly-catcher.—On August 24th last, I saw what was to me a new sight. A Fly-catcher pursued a large White Cabbage Butterfly, and after a few attempts succeeded in capturing it. Its plan appeared to be to disable the insect first, and then to seize it. The bird made several darts, snapping each time at the butterfly until it was at last quite helpless, and fluttered on the ground. The Fly-catcher then seizing it, flew off to a tree and made a meal of it.—*R. Blight.*

Small Molluscs.—I have been a good deal interested lately watching the action of the cilia of some of the small Molluscs on seaweed. There is no trouble about seeing them, if the animal is taken out of the shell and crushed between two glasses with a little water. They taper in form, and their curious action may perhaps amuse some of your readers. Supposing one's fingers are the cilia, their movements are something like closing fingers 1, 3, 5, 7, &c., opening with a jerk 2, 4, 6, already closed; but not in any regular order. The time they retain their motion after the animal is dead, is remarkable. I watched them for thirty-six hours, when the movements of some were still visible. At the end of forty-eight hours the substance of the animal seemed to decompose, or to separate into minute pieces, and all form disappeared.—*E. T. Scott.*

Toads Feeding.—There is a remarkable circumstance with regard to the Toads, which I have not seen recorded. I have several Toads and Natterjacks in a fern-case, and if I put an insect on the soil and two of them perceive it, the one who is successful in getting it receives a smartish smack on the side of the head from the tongue of the other, the noise produced being distinctly audible.—*C. A.*

The Spider and its Web.—I begin to think that the question, "Does the Spider ever eat its own web?" might rather be put, "Does not the Spider *always* eat its web when making a fresh one?" What I saw this evening seemed so thoroughly natural that I am almost convinced in my own mind that the answer must be affirmative. There was a large web—only one among a host—in an angle between two walls, which had got so thoroughly incrusted with dust that it failed to supply the owner with food; so the process of renewal was set about, which I was fortunate enough to witness. Starting from the centre, the spider ran along the old threads, devouring them as she went, and at the same time spinning a new one after her to supply the place of each. I distinctly saw them drawn into the mouth, not rolled up first, but eaten as she went, and now and then tucked in with the feet; as she ran with her back downwards it was easy to observe this. After the new radiating threads were finished, she commenced at the centre to form the connecting ones; she worked in a spiral direction, making them at very small intervals until she got some distance from the centre, when she judged it expedient to form strengthening threads, first at the distance of an inch or so. Of course, as she got nearer the ends the radii diverged so much that she could not reach from one to the other, but she got over this difficulty by ascending to the nearest connecting thread, crossing by it, descending the next radius, and fastening the next thread. When these strengtheners were finished, she commenced to fill in at smaller distances, but working now from the outside spirally *towards* the centre. The two hind legs were occupied exclusively in drawing the threads from the body and guiding them, but they were attached solely by the end of the abdomen. When the whole was finished, there remained something at the centre—a piece of cotton wool, or else some of the old web, I could not distinguish which; this she went up to and devoured. The time occupied in eating the old web and replacing it with a new one was about fifteen minutes.—*Henry Ullyett, High Wycombe.*

Man in the Past.—If man constitutes a separate family of mammalia, as he does in the opinion of the highest authorities, then, according to all palæontological analogies, he must have had representatives in miocene times. We need not, however, expect to find the proofs in Europe. Our nearest relatives in the animal kingdom are confined to hot—almost to tropical climates; and it is in such countries that we must look for the earliest traces of the human race.—*Sir John Lubbock's "Prehistoric Times."*

The Hoopoe.—A fine specimen of the Hoopoe made its appearance in the beginning of September last at Caldy Island, where it still remained when I left, in the latter part of the month. It sometimes consorted with a covey of partridges, but was more frequently alone. I have seen it pursued by crows, which it avoided by flying to cover. It was very tame, and we had frequent opportunities of seeing it erect its beautiful crest. Its flight was peculiar, and somewhat resembled that of a large butterfly.—*E. K. B.*

ENTOMOLOGY.

Rare Insects.—I have pleasure in reporting the capture of *Chærocampa Celerio*, fresh and in beautiful condition, on the 29th of last month, about twenty minutes past six o'clock, or just dusk. I took it in the net whilst hovering over the flowers of a bed of geranium christine. This is the second specimen I have taken in the garden at Brantingham, ten miles from Hull. I took one in 1846, fast by the proboscis in a flower of *Physianthus albicens*, the flower of which is an excellent insect capturer; the flowers are very sweet and attractive to insects; the stamens are so placed that the slightest touch by the proboscis of an insect entering the nectar, the stamens and anthers close firmly round it. I have seen this plant with dozens of dead insects upon it, *Pluisa gamma*, in abundance. *Macroglossa stellatarum* has been abundant, hovering over the flowers throughout the day. The larva of *Acherontia Atropos* never known so abundant in this part.—*J. H. C. Kingston, Brantingham, Yorks.*

Wasps in Plenty.—A correspondent, writing from near Guildford, says, that "contrary to the experience of many observers in other parts, we have been annoyed with most unusual numbers of wasps, no room in the house being free from dozens of them."

Hive Bees Removed.—I have been taking up four stocks of Bees in the common straw hives this season, and instead of killing the Bees I have removed them into four other stocks, where they are now doing well. The smoke from a piece of puff-ball forced into the hive renders the Bees insensible. I have a small fumigator, or circular bellows, used for fumigating plants when infected with insects. I put a small piece of the puff-ball, well dried, with a live coal on it, into the box of the fumigator, and introduce the pipe into the entrance of the hive, stopping up any space there may be left, and by turning the handle the smoke is forced into the hive; a great buzzing is soon set up within the hive, but in a few minutes all is quiet again. The hive may now be lifted from the board it stands on, and the Bees shaken out upon a newspaper, and search made for the queen, which should be removed. I then take the bottom part of an old hive, or a hitch made purposely, and place it on the board the hive stood on. I put all the Bees into it and place it on the stand where the old stock stood. I then take the stock the bees are to be joined to, and place it over the hitch. The Bees, as they revive, will ascend and mingle with the others, and no opposition will be made to it. Some time the next day the hitch may be removed, and the stock set on its own board again, and all will go on well.—*P. P.*

Why Wasps have been Scarce.—At a recent meeting of the Entomological Society, Mr. Stone, who is specially interested in the natural history of wasps and their allies, confirmed the fact that these insects have been unusually scarce in England this autumn, and stated that the larvæ had been attacked by a disease which had destroyed them in large numbers.

Rose Saw-fly.—An interesting life-history of this insect is translated from the Dutch and published in the *Zoologist* for October.

The Fly Nuisance.—You are not perhaps accustomed to regard Wasps and Hornets as of any use to us; but they certainly destroy an infinite number of flies and other annoying insects. The year 1811 was remarkable for the small number of wasps, though many females appeared in the spring, scarcely any neuters being to be seen in the autumn; and probably in consequence of this circumstance, flies in many places were so extremely numerous as to be quite a nuisance.—*Kirby and Spence's Introduction, p.* 157.

Money-wort Aphis.—In his "Observations on Natural History," the Rev. L. Jenyns records (p. 285) the occurrence of a species of *Aphis* "at the roots of *Lysimachia nummularia*, when growing in a pot in my garden, and rendered unhealthy by being kept too dry. They kept more on the surface of the ground, at the bottom of the leaves and stems, than under the ground, though many might be noticed at the roots themselves." Under precisely similar conditions I have now the same insects flourishing on the same species of plant, which latter is commonly cultivated in towns, and submit them for identification.—*A. F.*

It is probably *Aphis Dianthi*. See *Ann. and Mag. of Nat. Hist.*, ser. ii. v. 391.; *Zoologist*, vi. 2218, 2246; vii. App. xlvi., li., lv., lvii.; viii. App. ciii., civ. —*F. W.*

Aphis Populi.—From the 15th to the 24th October, 1858, I observed here (Melle, near Ghent, Belgium) an immense quantity of *Aphis populi*, coming from the West; the same were seen at Ostend the 12th and 13th. Should not these insects have been observed somewhere in England? I have just read in several papers that immense swarms of little flies had been seen at Leeds about the 12th of this month. Were they not *Aphides?* I saw from the 9th the *Aphis populi* in Belgium.—*Bernardin.*

Appendages to Water-Beetles.—I have read somewhere that the eggs of water-mites are parasitic attachments on Dytiscus and other aquatic insects. See Lane Clarke's book on the Microscope, page 148.—*S. J. M.*

BOTANY.

The Plane-tree of Vostitza.—The chief wonder of Vostitza is the celebrated plane-tree, with the fountain close by. We reached it by a good and clean paved road, creditable to the police of Vostitza. The plane-tree, which is now in almost decrepit old age, has suffered greatly since the revolution. At what period it became hollow, no one knows: but its branches are broken in many places, and the foliage is a scant remnant of its old flourishing wardrobe. I well remember it in its better days, with its white, fresh-looking mosque near, its well-arranged encircling seats, its Turkish-built fountain, and all the usual encouragement and provision for true Oriental kief. The plane-tree suffered, about a century ago, from lightning and a fierce whirlwind; but the injury was apparently confined to its branches, which still, however, have a circumference of sixty feet: that of the trunk measures thirty feet. A guard keeps watch in the bowels of the tree. It answers capitally as a substitute for a gigantic sentry-box. Not satisfied with this, the Greeks have imposed upon it a sort of *café*. We saw chairs and tables placed inside in the usual confusion. The scooped-out centre is capacious enough for all. These hollow plane-trees are to be found in many parts of Greece. At Cheledonia, near Kephissia, is one, in the interior of which you can dine.—*Wyse's Excursion in the Peloponnesus.*

The Duckweeds.—I have found all the four sorts of duckweed (*Lemna*) so clearly described in the interesting article in your January number, in the Nene, near Northampton. Of the four perhaps *Lemna gibba* seems most uncommon, the others being abundant. Can you or any of your correspondents tell me what is their usual time of flowering, as I should like to look out for what seems to be an unusual occurrence.—*R. S.*

Pear Tree in Blossom.—There is at the present date, 10th October, 1865, in a garden by the side of Sandford Lane, Stoke Newington, at the back of the post-office, a pear tree in full bloom, on which I counted full eighty bunches of bloom. It can be seen by any one passing down the lane, and has been, of course, the talk of scores in the neighbourhood. —*Augustine Gaviller.*

[This is not a solitary instance.]

A New Silene.—*Silene dichotoma*, Ehrh., is merely an introduced plant, and not new to this country. In 1853, I discovered it by the Trent side at Norton, near Gainsburg, where it had probably been introduced with linseed. The specimen was exhibited at a meeting of the Edinburgh Botanical Society. *S. dichotoma* would be a welcome addition to our flora, as it is very fragrant and an elegant flower.—*John Lowe.*

Toadstools.—More than forty years ago, a great deal of fun was made in the *British Critic*, upon the names given in Gray's Natural Arrangement of British Plants, to mushrooms and their more immediate allies, the point of the joke residing in the real meaning of the second member of the word "toadstool." It is always desirable that there should be correct information about the most trivial things, and though the subject is rather unsavory, it may be as well to point out that the word toadstool does not indicate a seat for a toad. The ancient herbalists conceived that these plants were the excrements of animals, and hence such names as *Lycoperdon*, *Crepitus Lupi*, and *Toadstool*. In Dorsetshire poisonous fungi are often called "Frogstools."—*M. J. B.*

Large Mushroom.—At the recent meeting of the Tetbury Horticultural Society, Mr. Reynolds, gardener to the Earl of Suffolk, exhibited a very fine mushroom, measuring twelve inches across, which was grown in Charlton Park.—*Wiltshire Independent.*

Blue Fleabane in Cumberland.—The occurrence of this plant, *Erigeron acre*, is no new discovery in Cumberland, for it was sent to me in August, 1850, from the neighbourhood of Carlisle by Mr. William Salkeld, and I think was most probably obtained from the same locality as indicated by "Wood Robert."—*I. Gifford, Minehead, Somerset.*

Naudin on Hybridism.—I regard, in accordance with most botanists, all those slight species classed under the names of *races* and *varieties* as forms derived from a primitive specific type, and having in consequence a common origin. I go further; the best characterized species themselves are, in my opinion, so many secondary forms relatively to some more ancient type which actually comprised them all, as they themselves comprise all the varieties to which they give birth under our eyes, when we submit them to cultivation.—*Naudin in Natural History Review.*

New British Moss.—At Southport, in November last, I observed a new species of *Brachythecium*, intermediate between *campestre* and *ratabulum*, differing from the former in its less plicate leaves, and very rough setæ, and from the latter in its slightly plicate leaves lanceolate, gradually tapering from a wide base to a very acute point, not at all acuminate, shining; inflorescence, as in these species, monoicous. If a variety, it must be united with *Brachythecium campestre*, which has not yet been certainly identified in Britain.—*G. E. Hunt, at Manchester Literary and Philological Society.*

The Duckweeds are called in this neighbourhood "Duckmeat" or "Jenny Green Teeth." — *C. A., Birmingham.*

GEOLOGY.

Forest of Cromer period.—I am not aware that there are any stratified deposits in the West of England which represent that preglacial period known to geologists as the Forest of Cromer period,—a period which preceded the great general submergence of a large portion of Europe, including a principal part of the British Isles, below the waters of the glacial seas,—that preglacial period when England was a portion of the continent of Europe, and when, though the species of shells living in the seas were the same as those now existing, and the vegetation was European, three extinct species of elephant, the *Rhinoceros etruscus*, the *Hippopotamus major*, the extinct Irish elk, and the gigantic beaver (*Trogontherium*) lived in the British forests and haunted British rivers. It is on the Norfolk coast that the geologist finds evidence of the preglacial deposition of those strata which contain the relics of so many extinct mammalia, by the superposition of thick masses of boulder clay full of its ice-witnesses, the scratched, grooved, and polished erratic blocks. In the West of England such evidence is wanting.—*Rev. W. S. Symonds.*

Fossil Cone.—Mr. W. Carruthers, of the British Museum, has recently described (*Geological Magazine*, vol. ii. No. 10) a cone from the carboniferous beds of Airdrie, Lanarkshire, which he proposes to call *Flemingites gracilis*, placing it in a new genus which differs from *Lepidostrobus* in each scale of the cone, supporting a double series of roundish sporangia, whilst in the latter genus each scale supports a single oblong sporangium.

Asphalte is the technical name for the bitumen commonly employed for pavements. It is found, in France, at Seyssel, in the department of L'Ain, at Gaugeac, in the department of Les Landes, at various places (Lobrann and Bekelbronn) in the department of the Bas-Rhin, and also in the Puy-de-Dôme department. Abundant supplies are found in Albania, Wallachia, on the shores of the Dead Sea, and in Trinidad; and no doubt many other places would yield this material, especially in the Northern States of America and in Canada. Mineral pitch is found in the island of Zante.—*Ansted's Practical Geology.*

Fossil Spider in Coal Measures.—Professor Romer has announced the discovery of a fossil spider, which resembles the recent genus *Lycosa*, in the coal measures of Upper Silesia. The interest of this discovery lies in the fact that hitherto spiders have not been known from any rocks older than the Jurassic, and that now the existence of them in the Palæozoic period is proved.—*Geological Magazine.*

MICROSCOPY.

Circulation in a Fly.—I was wishful to examine a Blue-bottle Fly some time ago, and caught, and, as I supposed, killed one for that purpose. I carefully with my dissecting scissors opened it and removed its intestines, and then examined its inside under a 1-inch objective. You may judge of my surprise when I discovered that the blood was still circulating, and that in a most beautiful manner. I had long wished for a sight of the circulation of the blood of the fly, and I here had my curiosity satisfied most unexpectedly.—*Thomas R. Jones.*

An Insect Larva.—Mr. Ray Lankester has published an interesting paper in the last part of the *Popular Science Review* "On the Microscopic Anatomy of an Insect Larva—*Corethra plumicornis*."

Wire Clip.—It is but justice to state, since continual reference is being made to Dr. Maddox's Wire Clip as a new invention, that we some time since received a similar clip from Mr. Adcock, the principle of construction in which was precisely the same, and which the latter gentleman had been in the habit of using for two or three years prior to the publication of the description of the former.

Maltwood's Finder.—Some makers are adding to the stage of their microscopes a scale graduated in conformity with Maltwood's Finder, whereby the use of a separate "finder" is dispensed with.

Spicules of Sponge.—These are often glass-like in appearance and of various shapes; many are found resembling needles (whence their name); some from the synapta are anchor-like, whilst others are star-like, and of complex and almost indescribable combinations. As some of these are composed of silex and are consequently not injured by the use of nitric acid, the animal substance may be got rid of by boiling them in it. Those, however, which are calcareous must be treated with a strong solution of potash instead; but whichever way is used, of course they must afterwards be freed from every trace of residue by careful washing. These spicules may be often found amongst the sand which generally accumulates at the bottom of the jars in which sponges are kept by those who deal in them, and must be picked out with a camel-hair pencil. The specimes obtained by this means will seldom if ever require any cleaning process, as they are quite free from animal matter, &c.—*Davies on Mounting.*

WINDOW GARDENS AND AQUARIA.

The Netted Dog-whelk (*Nassa reticulata*).—This little marine mollusc is a very interesting aquarium animal. I have several colonies of them, one being in a shallow tank measuring five feet long, two feet broad, and six inches deep, and having a further depth of six inches of fine sand, in which these animals ordinarily burrow quite out of sight. But if I draw over the surface of the sand a piece of oyster, mussel, or meat, or even if I touch it ever so lightly with the feeding forceps, the points of which smell of food, then in a few moments may be perceived the tips of the long proboscis of the molluscs projecting here and there above the sand, and gradually working through it higher and higher, till presently the shells themselves emerge (each one bearing on its upper surface a little load of sand, which presently drops off), and travelling to and fro with much earnestness of purpose till the food is discovered, or till the whole surface of the sand is diligently searched for it. They look exactly like little elephants moving about with their trunks aloft, and when they are half in and half out of the sand, with their proboscis above its surface, they remind me of a picture I have somewhere seen of elephants crossing a river, the body of the animal being submerged, with only a part of the trunk visible above the water's surface. Sometimes I place in the tank a half-picked mutton or beef bone, and in a few minutes it becomes completely covered with *nassas*, and in the course of some hours they leave it perfectly bare, and then descend into the sand. It is impossible, in fact, to introduce any animal substance, living or dead, into the tank, without these Whelks smelling it, and coming up to see what is to be got.—*W. Alford Lloyd.*

Dead Sea Water.—Some time since, having obtained a quart of water from the Dead Sea, through the kindness of a friend who had recently come from the Holy Land, I of course must needs yield to my aquarium predilections, and arrange it in a glass jar for the maintenance of plants and animals, and accordingly I exposed the glass of water, with some shingle at the bottom, to the influence of light, in order to get some vegetation to grow, but none ever came, as it would have done in any ordinary sea-water in one-fourth of the time. Nor would any animal live in it. I tried various small hardy crustaceous fish, molluscs, sea-anemones, and other creatures, but all in vain; it was most intractable stuff, intolerably nauseous to the taste and sticky to the touch, and of very high specific gravity; so I soon bottled it up again.—*W. Alford Lloyd, Zoological Gardens, Hamburg.*

Sea Anemones.—Mr. Lloyd asks whether any one has ever seen a small specimen of *Sagartia parasitica* or *Tealia crassicornis?* I have had little *Parasitica* born in my tank, and they have grown up and flourished. I have also had *Crassicornis* born, but only from a deep-water species obtained on the south-coast. The common Thickhorn has never bred in my aquaria. *Adamsia palliata* has bred by division into two halves, as is the habit in *Corynactis*, &c. It was very singular to see the annoyance of the *Pagurus Prideauxii* at the division; he tore off one of the halves and cast it away, and fed the other at once. There is an article in the November number of *Annals of Natural History*, for 1863, giving some insight into the relations subsisting between these two animals. I have frequently dredged *Parasitica* attached to *Maia Squinado* and other large crabs, but do not remember ever having dredged an *Adamsia*, except on an univalve shell. I have, however, a very beautiful specimen attached to the rockwork in one of my aquaria, its crab having been killed in a battle. I envy Mr. Lloyd his opportunities of studying marine natural history, and wish I could manage to see the Hamburg aquaria. Even in my comparatively small aquaria the study is of the deepest interest, and with care I manage to keep very delicate animals alive. The fifteen-spined stickleback bred in my tank two years ago, and the building of their nest was most interesting to watch. I have a very fine pair of that handsome deep-water crab, *Gomplex angulata;* they have built a regular house, pushing small rocks together and completely clearing out the sand, carrying it away in armsful to a considerable distance The *Aldheus ruber* has the same habit, and has subterranean ways all round the tank in which he lives. He is a wonderfully interesting animal, and I have never heard of his being kept alive before. He was sent to me from Guernsey, and has been with me for eighteen months, having just cast his shell for the fourth time. He is now as big as a rather large prawn, and of a brilliant pellucid scarlet. Keepers of aquaria should have the *Haliotis* (ormer or ear shell) if possible, there is no mollusc like them for keeping the vegetation within bounds. I think few people know how beautiful an object a vase of sea anemones may be made, with their brilliant colours and elegant forms. I took a photograph of one of my aquaria two years ago, solely to record the graceful form of some of my favourites. I am very anxious to compare the various anemones of the British coast. Would any of your readers join with me in this, by sending me, for examination, specimens from their own part of the coast?—*S. W.*, F.Z.S.

Intermittent Fountain.—M. l'Abbé Laborde, writing to *Les Mondes*, describes a simple apparatus for producing an intermittent fountain. It consists of an inverted flask fitted with a cork, through which pass two tubes of unequal length. The longer reaches nearly to the bottom of the flask, and outside has a length of some twenty inches. The shorter tube merely pierces the cork, and does not extend to any length inside, and outside it ends immediately in a jet, which can be curved round. The flask is filled with water, fitted with the two tubes, and then, with the finger on the shorter tube, is inverted plunging the end of the longer tube in a vessel of water. The instrument may now be fixed in this position, as an intermittent jet of water begins to flow at once, continuing until the flask is empty. The column of water in the longer tube will be seen to be alternately rising and falling, from which phenomena an explanation has been given of the cause of the intermittent flow.—*Popular Science Review.*

FISH TATTLE.

THE DORSE, OR VARIABLE, OR BALTIC COD-FISH (*Morrhua callarias*).—This Cod is rare in the British islands, Yarrell never having seen it, but in the north of Europe it is abundant, and I get it from the Baltic Sea at Kiel, and less abundantly from Heligoland. Consequently, the Hamburg aquarium always contains living specimens, and it thrives well in captivity, as indeed most fishes will thrive, if kept in large tanks furnished with a constantly running stream of water, and a proper supply of food. The Dorse under my care consume great quantities of oysters, mussels, earthworms, dead fresh-water fish, prawns, shrimps, and indeed all animal matters except sea anemones, which no fish that I know of will touch, if ever so hungry. Indeed, these Cods have with me grown so rapidly as to become a nuisance, from their habit of devouring all other fish—even their own species—lesser than themselves, in the same tank, and I had to return some of them to the sea and get smaller ones in their place. But one of the original stock I retained, and it grew from five to thirteen inches long in a year. It became quite tame —or rather fearless—and it would at feeding time regularly lie on the top of one particular flat stone, and take its oyster or mussel out of my fingers. I am afraid to add that it would then allow me to stroke its head, as I may be disbelieved by those persons who did not see it; but so it certainly was; I stroked its head with my hand every day, as regularly as I stroke that of my cat. This fish at length went the way of most pets; it sprang over the side of its tank one night, and next morning it was found on the floor, dead and stiff. I sent some to the aquarium of the Zoological Society of London, and I hear that they soon died.—*W. Alford Lloyd, Zoological Gardens, Hamburg.*

THE "GERMON" (*Orcynus alalonga*).—Dr. Scott has recorded the occurrence of this rare fish on the coast of Devonshire. Three specimens had before this been taken on the English coast, and the fish is figured in "Couch's British Fishes" (vol. ii., pl. 84, p. 100). It is the Long-finned Tunny of some authors, and is abundant on the south coasts of Europe, where it is the object of extensive fisheries. The specimen captured was twenty-four inches in length and weighed twelve pounds. It somewhat resembles a gigantic mackerel.

MULLER'S TOPKNOT.—In the second week of September last, while fishing with a net off Caldy Island, Pembrokeshire, we caught a specimen of Muller's Topknot, about ten inches in length, a fish very rare in those parts, and unknown to any of the fishermen.—*E. K. B.*

THE STURGEON.—On Thursday, the 5th inst., a fine specimen of that rare fish in English waters, the Sturgeon, was left stranded by the receding tide near Aveton Gifford Bridge, on the Devonshire Avon, three or four miles from the coast of Bigbury Bay. The fish was six feet ten inches in length. It was captured by a labourer, who, as I am informed, sold it to a neighbouring miller for five shillings, the purchaser forthwith sending it by train to London and realising £15 by its sale there. It may be worth remarking that the Sturgeon is one of the very few existing species of the *Ganoid* order, to which so large a number of our fossil fishes are referable.—*Horace Waddington.*

FISH SCALES FOR THE MICROSCOPE.—The eel affords a beautiful object for this purpose. The scales are covered by a thin "*skin*," which may be slightly raised with a knife and then torn off. The required portion may then be removed; or if a piece of skin can be procured as stripped off in cooking, the scales may be easily taken from the inner surface. They must then be washed and thoroughly cleaned. After drying, soak for a day in turpentine, and mount in the ordinary manner with balsam. This is a good polarizing object; but the interest, and I think the beauty, is increased by procuring a piece of eel's skin with the scales *in situ*, washing and drying under pressure, and mounting in balsam as before. The arrangement of the scales produces beautiful "waves" of colour, which are quite soothing to the eye after examining some of the very gorgeous salts, &c.—*Davies on Mounting.*

LIGHT IN THE OCEAN.—I am often reminded of the small amount of light existing in the sea, by noticing that when I first receive crabs, lobsters, and some other similar animals, their shells are quite clean, but after I have had them for some time in the aquarium under my care here, they become gradually covered with conferva and other parasitic plants, the growth of which depends upon the amount of light they obtain; and yet the tanks are darkened to an extent which does not do more than permit the animals to be seen. There is never any *glare* of light; the front halves of the tops of the tanks are boarded over, so that the light enters only by the hinder halves, and even then some blinds are carefully drawn over them. In addition, these crustacea are permitted to hide in holes in the rockwork of the tanks. It is only when they are taken out of the tanks and placed in reservoirs *completely darkened*, that the parasitic plants die away.—*W. Alford Lloyd.*

NOTES AND QUERIES.

Volvox Globator.—If Mr. Armstrong and his fellow-observers would satisfy themselves that cilia are really present upon the surface of *Volvox Globator*, let them try the following method:—Place a volvox upon a slide, cover it with a piece of thin glass, and apply a drop of diluted sulphuric acid, and shortly after a drop of solution of iodine. Then submit the slide to an object-glass of $\frac{1}{8}$-inch focus, and, if the light be properly managed by means of a Webster's conductor, or otherwise, the cilia may be seen arising in pairs from the points upon the organism and passing beyond the surface, as they are ordinarily represented. It is to be understood that the observation is a matter of some difficulty and delicacy.—*J. H.*

Wanted a Key to the pronunciation and meaning of such new scientific names as *Micrasterias Mahabuleeshwarensis.—A. W.*

Objects in Tumuli.—Very often small objects, with holes pierced in them, are found in tumuli, &c., with bones, flints, &c. Are these objects not beads of collars or necklaces? were they not afterwards a medium of exchange—a primitive money? and is there not here a new means of observing the relations of primitive people? The collars of the Egyptians, Celts, &c., are well known; the North-American Indians had *Whampums,* which were at the same time a necklace and a money; the Phœnicians had pierced coins; the Chinese have them yet.—*Bernardin, Melle, Belgium.*

Artichoke in Flower.—Your correspondent who inquired some months since respecting the flowering of the Jerusalem Artichoke, might like to know that it is flowering profusely this year in *this* locality. On a plant with a stem some twelve feet high, in my own garden, I have just counted thirty blossoms and buds.—*Henry W. Livett.*

[Several correspondents send us similar accounts, and we have also seen it blooming freely.—Ed.]

Butterfly Parasites.—Allow me to state in your pages, in reply to a note by G. W. in your last number on the small Tortoise-shell Butterfly, that I by no means intended to assert that *Vanessa Urticæ* was exempt from ichneumon enemies, but only that it was comparatively free. There is little doubt that every species of Butterfly or Moth has some ichneumon attached to it; though the Butterfly named—and, I imagine, most others with spiny larvæ—suffer less than others. During the past summer I have myself observed that both *V. Urticæ* and *V. Atalanta* were infested with the larva of a large Dipteron; only one individual being usually produced from each butterfly larva.—*John R. S. Clifford.*

Ants.—These insects are very partial to the Honey Dew, which plant-lice collect in the form of a sap from various trees, and afterwards eject in a state of great purity. Ants will carry off the *eggs* of *Aphides,* and hatch them and keep them, as "J. F." would his cows, with the greatest care, milking them, as he describes in Science Gossip, for the sake of the sweet honey dew they afford.—*Helen E. Watney.*

How to Grow Ferns.—In reply to the query in No. 10, I have found the following plan to answer best for the culture of those beautiful plants. A case of the octagonal shape is, I think, the best, for you get so many "views;" but of course they grow quite as well in the ordinary cases. One of about two feet long may be purchased for something under a sovereign. Break up some light coke into pieces about the size of a walnut, and lay it on the bottom of your fern case; this greatly assists drainage. On this place a mixture of peaty soil and cocoa-nut fibre; the latter may be purchased of almost any florist; the proportion may be two parts of the mould to one of the fibre. In this plant a few ferns, not too thickly; you will soon find they grow fast, and require thinning out. The choice of specimens I leave, as almost all our English ferns will grow in a case of this kind, and many foreign ones. Water but seldom; the door will nearly always be closed, and consequently little evaporation will take place.—*W. G.*

Wasps and Flies.—Round Melksham, about a fortnight ago, we were visited by immense swarms of flies, they being so thick for a day or two, that whilst I was walking with a friend, we were obliged to tie our handkerchiefs like veils over our faces, in order to prevent the flies—for they are very small—from getting into our eyes, noses, &c., whilst our coats were literally covered with them. It has, at the same time, been noticed that there has been a great paucity of wasps. Is it not, therefore, probable that as the increased number of flies and the decreased number of wasps has been noticed all the summer, that the one influences the other?—*J. Augustus Lloyd.*

Gill Fans of Sabella.—On the 19th of August, one of two Sabellas that I had had in my aquarium from the 4th of August dropped its Gill Fans; but the remainder of the annelid retained the power of ascending from and descending into its tube. On the 23rd, the other Sabella also cast its Gill Fans, but seemed as indifferent to their loss as the other had been, both annelids appearing above their tubes from time to time. They seemed to have the power of obtaining food, for in cleaning the sides of my aquarium, I tried to disengage the tube containing the Sabella from some sea-weed in the aquarium, when I found a piece of weed was firmly held into the opening of the tube. I could not get it away without leaving a piece of weed in the mouth of the tube. A few minutes after, the worm protruded itself above the tube. I did not see any part of the Sabella again until the 4th of October, when one of the Sabellas appeared with a new set of Gill Fans, smaller than those it had cast, but quite perfect. I should be glad to know if it is a common occurrence for Sabellas to cast their Gill Fans. —*T. L. D.*

Guide to Conservatory.—With regard to the query of A. H., as to a book with instructions for keeping a conservatory in the house filled with flowers all the year, I beg to recommend the purchase of Miss Maling's book on "Indoor Plants, and how to grow them for the drawing-room, balcony, and greenhouse; containing clear instructions by which ladies may obtain, at a small expense, a constant supply of flowers." It is published by Smith, Elder, & Co.—*J. F. C.*

Wasps and Bees.—As your serial is devoted to the discussion of all subjects connected with natural history, all local notices connected therewith must interest your readers, and lead to comparisons with their own areas of observation, and so elucidate the various workings of Nature, and her many diversified *arcana*. Now I have been much struck, all the latter part of the summer especially, with the fact that in *West* Sussex we have scarcely any Wasps this year, despite the abundance of plums and fruit generally, whilst our wall-fruit in August, and our pears *now*, are infested with myriads of *Bees*, which make it dangerous even for children to approach the fallen fruit, and these Bees, strange to say, never go near the numerous flowers abounding in our parterres! I inquired yesterday of the Earl of Egmont's lodge keeper, at Cowdray, who keeps many hives always, why Bees *thus* deserted the flowers and rich clover blossoms for fruit this year? Her answer was:—"The heat of the early summer evaporated the pollen of the flowers so much that the pollen was impoverished, and the Bees were *so weakly* generally this summer, that in place of having thirty or forty pounds of honey in *each* hive, as customary, I have not had this year more than twelve pounds at the utmost in a comb." She added that the stronger Bees attacked the weaker ones and killed them all, robbing their hives of all the stored honey, even in twenty-four hours' time! Can your Bee-keeping correspondents elsewhere certify to the above facts. —*H. E. A.*

Fuchsia and Bees.—It is well known that when the blossom of any plant is too narrow at its mouth to admit of the entrance of a bee into it, the bee will with its proboscis perforate the tube from without, and so suck the sweets from the nectary. I have, in my garden at Torquay, two large plants of the *Fuchsia elegans*, the blossoms of which are of this narrow construction. The trees are from five to six feet high, and of proportional circumference, and always blossom very abundantly. I carefully watched these plants in the summer of 1864, from the middle of July to November, vainly seeking one blossom that was *not* thus perforated. I was ill, and, therefore, not able to observe them before the afternoon, but during the whole season I never found one bell on which the little yellow mark of perforation was wanting. This year I have with equal care, watched from June to this 13th October on which I write, and have not been able to find a single blossom that *had* been perforated. There is not now, nor has there, so far as I have seen, been one with the yellow mark. Can any of the correspondents of Science Gossip explain the cause of this circumstance? —*M. D. P.*

Unicorn Hawk-moth.—Can any of your correspondents inform me if the use or purpose of the double proboscis in the Unicorn Hawk-moth (*Sphinx Convolvuli*) is known to naturalists; and also whether it is the only moth which possesses this peculiarity? A fine specimen of the above (which is rather a rare insect) has just been captured here (Sidmouth, South Devon).—*E. M.*

Saffron, an Oriental Condiment.—Dr. Riddell says that the Persians resident in India universally employ saffron as a colouring ingredient with their rice; but that in native cookery where saffron is named, turmeric is always intended.

Small Tortoise-shell Butterfly.—On the 4th of August last, while in a lodging at Southerndown, on the Glamorganshire coast, I found no less than twenty-two specimens of this butterfly, in a torpid state, pitched on the ceiling of a narrow up-stairs passage, in groups of five or six together. On bringing them into the light, they revived in the course of a few minutes, and, with two or three exceptions, were able to fly with ease. Can you explain the presence of such a number of the insects in that situation? I was much surprised at it myself.—*Horace Waddington.*

Cilia of Volvox.—In reply to Thomas Armstrong, allow me to observe that the question of *Volvox Globator* possessing cilia, never to me appeared to offer a doubt, and I am only surprised that he should have failed in observing them. Unpretending microscopist as I am I have seen them many times without anything beyond ordinary manipulation; I use the parabolic condenser and the one-inch lens, and a beautiful sight it is to see the plant in a living state, revolving on its axis, with its edge surrounded by a blueish halo produced by the cilia in excessively quick action; to see the cilia individually a quarter-inch lens must be used, when two will be seen springing from each green point on the surface of the Volvox, precisely as depicted in the "Micrographic Dictionary," and Dr. Carpenter's book. With regard to the cause of the revolution of the young plant in the interior of the parent (which is frequently to be observed) I am not quite so clear, yet, still I put it down to the same *prime mover*, though I have been unable to detect cilia in this instance. I may mention that I am not likely to have been deceived by a faulty instrument, as the one I have is Ross's 1 A., with every requisite for correct observation; and, moreover, I have examined hundreds of the plants referred to, and in every instance have seen the appearances described. —*John G. Braden.*

Ichneumons and Vanessa.—I beg to confirm the statement of E. W., in your paper respecting Ichneumons and Vanessa, as out of twenty caterpillars I got off one bunch of nettles this season, eight were infected and never came to maturity.—*J. Aspdin.*

Eggs of Thrush.—In reply to your correspondent J. B. Hay, Athens, I have found the eggs of the common thrush as small as those of the chaffinch. Two seasons ago I found a nest of four eggs; three were the usual size, but the other was hardly one-third the size, and the spots on it were considerably lighter.—*James Aspdin.*

Winged Ants.—Respecting Mr. Tate's inquiry, relative to winged ants. I also noticed numbers in the neighbourhood of Brixton, Clapham, and Vauxhall. Page 308, in the popular edition of Kirby and Spence, may afford an explanation. What is there said refers to white ants, but probably the habit referred to is common to most species of ants: the males and females having arrived at their imago state, adorned with two pairs of wings, rise in the air to seek their fortune, and effect their marriages. Afterwards the males die, and the females, deliberately cutting off their wings, turn their attention to the foundation of new colonies. Very few of them, however, effect their object, surrounded as they are by many enemies, and subjected to many casualties. —*S. J. M.*

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."

O. W.—The small cocoons from the Cabbage Caterpillar are those of a parasitic species of Ichneumon.

R. G. M. has two hundred named specimens of British Mosses, together with a coloured copy of Wilson's "Bryologia Britannica," to dispose of. The price is that of the book. Apply to Editor.

J. F. P.—Your yellow fungus on rose-leaves is called *Lecythea Rosæ*.

C. A.—Your fungus on decayed wood is *Didymium nigripes*.

O. W.—The larvæ sent us, which caused such havoc amongst your cherry and pear trees, is that of a saw-fly of the genus *Athalia*. You should endeavour to rear the fly and send us specimens if you wish to know the species.

M. E. B.—We are not numismatists.

T. C. H.—Ring Ousels are not uncommon in some parts of Great Britain. We have seen them plentifully in North Wales.

W. P.—We have answered this query in a former number. The viper, the common snake, and the smooth snake.

Pecten, not *Pertea*—see Geological query, p. 229, where this error occurs.—*A. G. R.*

C. A.—The species of *Lemna* alluded to at page 6 as not having been found in Britain, is *Lemna arrhiza*, described and figured in Reichenbach's Flor. Germ., VII. 14.

M. A. B. — Your shells are of three species, *Bulimus obscurus*, *Clausilia nigricans*, and *Clausilia bidens*.—*R. T.*

H. A. A.—Mr. Hardwicke announces a Handbook for the Aquarium, shortly to be published, which will give all the information you desire.

E. W.—No one would venture to name your specimen of seaweed from description only.

H. L.—The least reflection will enable you to answer such a question for yourself. Replace the fly by a feather and watch the result.

W. L. C.—It is not a fungus, but disease. A common case of "shanking."

W. P.—A good and cheap work on British Lepidoptera is "Stainton's Manual."

J. C. M.—Prepare a glass slide with hydrochloric acid, and then breathe sufficiently on it that you can condense the moisture by heat of a lamp, or otherwise, before it has evaporated.—*H. L. A.*

W. L. S.—You enclosed three flies to be named, but did not attach any number or mark, so that were we to give the names, you could not tell to which individual each name belonged.

D. G.—It is an Ichneumon, known as *Ophion luteus*.

Erratum.—At page 237, instead of "¼-inch *bull's* eye-piece," *read* "¼-inch and B eye-piece."

F. C. J. S.—Probably a viviparous fly; see p. 82.

T. H. is thanked for his suggestion, but the illustrations would cost too much for us to give a figure and description of all the British Diatoms for fourpence.

E. M.—(1) We cannot tell. (2) We must not tell.

W. W. S.—Vegetable. Incomplete state of a fungus.

A. J.—We cannot say, without seeing the specimen, what your larva might be.

T. H. M.—Can be had anywhere.

R. T. C.—The black spots on Sycamore leaves are caused by a parasitic fungus which is very common, and called *Rhytisma acerinum*.

T. F. W.—What we require is popular names, with the localities where they are employed, known by personal experience to the writers, and *not* derived from books.

M. M.—The misfortune of which you complain is a common one, for which we can recommend no radical cure. Keep your insects dry, let them be quite dry when pinned, and change your pins when verdegris appears.—*F. M.*

Poor Things.—If any poor creatures ever were persecuted with pen and ink, then Wasps, Humming-bird Hawk-moths, and Death's-head Moths have this year good cause to complain. We have a pile of such communications, and must immolate them to appease the poor insects; for to insert them is out of the question.

W. H.—Flowers of the Jerusalem Artichoke were duly received and forwarded to J. G.

C. K.—It is unusual for Laburnum and Apple trees to bloom a second time, in the autumn; but "times are out of joint" this year, and freaks of nature common.

A. S.—Really not sufficiently uncommon to merit notice.

C. A. J.—We should scarce think it would be injurious.

L. D.—(1) The most appreciable sexual differences are the relative sizes, and distinctness of markings. (2) Any vegetable.

A. J.—One of the *Sphingidæ*, probably *Acherontia*. It is unsatisfactory to name from description.—*F. M.*

W. D.—See our remarks on Fish Moulds, pp. 119, 134.

E. D. M. W.—The only work we know is Nichol's "Dictionary of Scientific Terms," Reeve, 12s. 6d.

A. G.—As to the age of the Fossil Human Skeleton in the British Museum, consult Mantell's "Petrifactions," pp. 483-5, and Mantell's "Wonders of Geology," p. 86.—*R. T.*

E. C. Y.—Forwarded as requested.

Drying Starfish.—See p. 136.

Communications Received.—O. W.—H. L.—S. J. McI.—G. C. B.—J. H. C. K.—W. G.—J. A.—A. S.—J. R. S. C.—M. J. B.—J. L.—E. W.—H. A. A.—H. W.—R. G. McL.—W. P.—T. H.—W. L. S.—J. B.—W. L. C.—H A. A.—E. T. S.—A. G. R.—T. L. D.—H. E. W.—T. R. J.—F. C. J. S.—P. S. B.—E. R.—A. G.—T. C. H.—J. A. L.—R. S.—A. G.—M. E. B.—C. A.—J. H.—W. C. H.—H. W. L.—J. C. B.—T. P.—E. M.—H. W.—C. R.—J. F. P.—M M.—L. G. M.—R. T. C.—J B.—A. S.—E. G. W.—T. H. M.—W. R. T.—C. A.—T. F. W.—A. J.—J. F. S.—L. D.—I. G.—R. Bl.—S. S.—M. D. P.—J. A.—S. W.—J. B. H.—H. B.—C. A. J.—W. H.—F. H. B.—G. W.—T. P. B.—C. K.—B. H.—J. W.—C. W. B.—G. R. R.—E. B.—F. E. T.—W. D.—E. D. M. W.

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 Optical Defects of the Eye, and their Consequences." By John Zachariah Laurence, F.R.C.S., M.B., &c. 112 pp. 8vo. cloth. (London: Hardwicke.)

"In Memoriam."

Mourn for the mighty dead,
Mourn for the spirit fled,
Mourn for the lofty head
Low in the grave.—Dr. Mackay.

IT is customary with us at the close of the year to look around our family circles, and note the absent faces of old and familiar friends, or "nearer still, and dearer ones," who have passed to their last home since the previous Christmas gatherings dispersed. As the present year draws near its close, it may not be inopportune for us to note the vacant chairs in the learned societies, whence death has snatched many a veteran since our first number appeared. As a nation we have suffered deeply in the loss of men whose place it would be difficult to fill. The majority of these have passed away in a ripe old age, leaving to us the duty of cherishing their memories, mourning their loss, and profiting by their labours.

Even while the odours of Christmas still lingered, while the holly was fresh and green, and before the sound of festivities ceased, we learnt that Dr. Balfour Baikie would no more wander on the banks of the Niger, since, in making preparations to revisit England, he was preparing for another land, to which, towards the close of September he passed, to take his station in the silent halls of death, from whence no visitor returns.

A still wider-known travelling naturalist, whose loss other than naturalists deeply deplore, passed from amongst us with the advent of May flowers. Admiral Fitzroy, F.R.S., was just completing his sixtieth year. It was nearly thirty-five years since he returned from the survey of the southern coasts of South America, after which, with Mr. Charles Darwin as naturalist, he again visited those coasts, and performed the voyage of research for which his name is most honoured by the student of natural history. The voyage of the *Beagle*, under the command of Captain Fitzroy, will long be remembered as one of the richest in results of the many voyages of exploration undertaken by Englishmen.

The month following left us to mourn the loss of another explorer, at the advanced age of seventy-eight years. This was Sir John Richardson, C.B., F.R.S., who was three times engaged in an Arctic expedition; twice under the command o Sir John Franklin, and once after he had reached threescore years of age. He first entered the navy as assistant-surgeon in 1807, and for seven years was engaged in fighting and buccaneering expeditions. His scientific career commenced with the first Arctic expedition in which he was engaged, and the publication of the Appendix to Sir John Franklin's Narrative. "His scientific writings fill up some twenty volumes, treating mainly of the zoology of mammals, birds, and fishes, and most instructively of the distribution of species." His most important work is the "Fauna Boreali-Americana," by which he will hereafter be best known.

In March Sir Robert H. Schomburgh was numbered with the dead. From his earliest years he was devoted to natural history. In 1831 he surveyed the island of Anegada, in the West Indies. In 1835 he undertook the exploration of Guiana,—a journey rich in scientific results. During this expedition he discovered that queen of flowers, the gigantic Water-lily (*Victoria regia*). On his return home, the Royal Geographical Society presented him with their gold medal; and in 1840 he returned to British Guiana to make a survey for the British Government. This work being completed, he received the honour of knighthood. The concluding portion of his career was spent as consul, first at St. Domingo and afterwards in Siam. It is chiefly as a naturalist that we include him in our brief memento, in companionship with such kindred spirits as Dr. Baikie, Admiral Fitzroy, and Sir John Richardson.

What can we say of Charles Waterton, for, whether as a naturalist or a gentleman, it may be long before we look upon his like again? On the 25th of May, at the age of eighty-three years, his "wanderings" came to a close; and the Squire of Walton Hall no longer roamed amongst the denizens of the paradise which he had established for them. "Walton Hall," says a contemporary, "was famous throughout the North as a new paradise for animals, and as showing, practically, what might be the state of things even now, were man not carnivorous and gifted with the irrepressible bump of destructiveness. Around the lake stretch grounds broken into every variety of wood, meadow, morass, and rivulet—all encompassed by a lofty wall, entirely shutting in the domain. Thus secured from attack, and confiding in the tried favour of the master of the estate, birds and beasts of every known British species came to live with Charles Waterton. For the starlings, owls, and jackdaws he built lodgings expressly; the other *feræ naturæ* took apartments as it suited them. You might look from his study window and see the 'natural history' of the British islands unrolled, with illustrations by Nature herself."

Hugh Cuming was perhaps less widely and popularly known. To conchologists his name is a household word. In 1826, and when thirty-five years of age, he gave up his business, built himself a yacht, and started on a twelvemonth's cruise among the islands of the South Pacific, in search of objects of natural history. After a second and longer cruise, he returned with his stores to his native land. In 1835 he again left to spend four years in exploring the Philippines, and returned to England "with the richest booty that had ever been collected by a single man." His dried plants numbered about 130,000 specimens, and his cabinet of shells was the largest and most valuable private collection in existence. After an active life of upwards of threescore years, he quietly sank to sleep surrounded by the treasures which he had collected.

The lovers of geology and palæontology lost a chief in Dr. Hugh Falconer, Vice-President of the Royal Society, who died on the last day of January, just on the completion of his fifty-seventh year. At the age of twenty-one he was an M.D., with an appointment as assistant-surgeon in the Bengal army. In 1832 he was left in charge of the Botanical Gardens at Saharunpore, whilst Dr. Royle returned on leave to Europe. During this temporary charge, in concert with Sir Proby Cautley, the exploration of the Sewalik Hills was undertaken, with which their names are so intimately associated. Acting on the advice of Dr. Falconer, in 1834 the Bengal Government commenced the cultivation of tea in the Himalayahs, now so successful. He also afterwards recommended the cultivation of the *Cinchona*, which promises to be equally successful. In 1848, when Dr. Wallich retired from the superintendence of the Botanic Garden at Calcutta, Dr. Falconer was appointed his successor; and in 1852 finally retired from the service. In concluding their notice of him, the *Reader* says:—"It is obvious that Falconer did enough in his lifetime to render his name immortal in science, as one of the greatest palæontologists who ever lived. But the work which he published was but a small fraction of that which he accomplished. The amount of scientific knowledge which has perished with him is prodigious, for he was cautious to a fault; he never liked to commit himself to an opinion until he was sure that he was right; and he has died in the fulness of his power, before his race was run."

Dr. Samuel P. Woodward, born at Norwich in 1821, died at Herne Bay in July last. As well as geologist and palæontologist, he also was a botanist; and in 1845 was appointed Professor of Botany and Geology to the Royal Agricultural College at Cirencester; and in 1848 removed to the British Museum. His "Manual of Recent and Fossil Shells" is the only separate work which he published; but he contributed many important papers to various scientific journals. During the last twenty years of his life he suffered much, which will, in a large measure, account for the little published work which he has left behind as a memorial of his name.

In botanical science, the "cold hand" has fallen upon its chiefs, and a trio, long to be remembered, have been gathered to their rest. Sir Joseph Paxton, the representative of horticulture, died early in June, at the age of sixty-one, at Sydenham, within sight of the Crystal Palace, the great work which caused his name to be best known both at home and abroad. Except his "Botanical Dictionary," his literary productions are confined to the *Magazine of Botany* and the *Flower Garden*, which he conducted. As a landscape gardener he stood deservedly high, and Chatsworth remains as his testimonial, the Crystal Palace as his monument.

Sir William Hooker is no less intimately associated with Kew Gardens, and here, within scent of the floral odours which he had collected from every clime, his liberated spirit passed away, after having spent fourscore years on earth. Sir William was born at Norwich in 1785; at first destined for a commercial life, which was soon abandoned. At the age of twenty-four he published his "Tour in Iceland," in which the flora of that country received notice; but unfortunately all his collection was lost, which prevented justice being done either to himself or his subject. We could not enumerate the contributions to his favourite science which Sir William made between that time and the day of his death. He was for many years Professor of Botany at Glasgow, whence he removed to become Director of the Royal Gardens at Kew. In this latter position, he merits the gratitude of his country for the development of this truly national institution. Sixty years ago he discovered a little moss, which had not before been noticed in this country. It was *Buxbaumia aphylla*. From that period, for more than half a century, he watched the progress of botany in Britain,—as it was when the Linnæan Society was established, when Sir J. E. Smith had scarcely done half his work, and Sowerby's "English Botany" had but recently commenced, till it became what it was when *he*, as one of its patriarchs, passed away.

Last, not least, DR. JOHN LINDLEY, who had scarcely left his cradle when Sir William Hooker's botanical career commenced, only survived him a few weeks. He also was born in Norfolk, a county famous for the production of excellent botanists, in the year 1799. At the age of twenty he published a translation of a French work on fruit, and the next year appeared his first original production, a Monograph of Roses. He assisted Loudon with his "Encyclopædia of Plants;" produced a great monument for himself in his "Vegetable Kingdom;" was for a quarter of a century Professor of Botany at University College; wrote the majority of the botanical articles for the "Penny Cyclopædia;" and was for many years associated with the *Botanical Register* and the *Gardener's Chronicle.* Besides this he was doubtless our best special authority for orchidaceous plants.

It is impossible to estimate the influence of these two men on botanical science in this country during half a century. If we endeavour to compare what it was under the old Linnæan system, when they each began the study of plants, with what it is when both have but just departed, we shall be astonished at the changes, in which each performed his share of the work.

It will be long ere the eventful year now fast drawing to a close will be forgotten. This year, which deprived America of its President and Britain of its Premier; Russia of its Czarevitch and Rome of its Anglican Cardinal, will be remembered through many generations. But to men of science in England it will be remembered as the year which robbed them of some of their noblest veterans; to botanists especially as that in which Hooker and Lindley died. "Peace to the souls of the heroes departed." They have left us for a land where, not only "the wicked," but the minor cares and anxieties of this life—

. . . cease from troubling,
And the weary are at rest.

WHAT TO SEEK AND WHAT TO AVOID IN THE CHOICE OF A MICROSCOPE.

IN these days, when the Microscope is becoming a valuable auxiliary in the education of the people, a few brief hints on the selection of an instrument by whose aid we pry into Nature's minutiæ, may not be considered out of place in the pages of SCIENCE GOSSIP.

As the stability of a house depends on the solidity of its foundations, so does that of a microscope depend on similar qualities—the solidity and strength of its stand. The tripod, or three-footed stand, seems of all forms to be that most generally adopted by our best makers, and from which we may fairly conclude that it has recommended itself to their notice by its firmness and freedom from tremor. The feet of a tripod should be both broad and solid, so as to furnish a firm support or base to the pillars or cheeks resting thereon, and between which the whole optical part of the instrument, with its lenses, stage, substage, and illuminating apparatus, is suspended. And these portions of a microscope should be so well balanced, that the centre of gravity will not be materially disturbed, at whatever angle its optical part may be inclined. In a badly-constructed microscope there is often a tendency to tip over in some given direction whenever the body is inclined from a vertical to a horizontal position. And it is just as well to test this tendency before purchasing an instrument. In microscopes constructed with a single pillar resting on the centre of a round foot, this tendency is augmented, and such an instrument should be rejected as unstable. In working with the microscope, it is frequently necessary to incline the body of the instrument for convenience of observation. To allow of such a motion, the optical portion must be attached to its pillars or supports by hinge or cradle joints, which enable the body to be inclined ninety degrees from the perpendicular. These should work with just sufficient stiffness to retain the body of the microscope at whatever angle it may be placed. Where, however, the microscope is in daily use, the wear and tear will tend to loosen the joints; but the fault may be easily remedied by simply tightening the screws. In the majority of instruments the tube or body is firmly screwed into one end of an arm, while the other end is attached to a triangular bar, with a rack cut on one of its edges, in which works a pinion with two large milled heads. In the more modern instruments, the triangular is superseded by a square form of bar, having the rack-work on one of its sides. But I am not aware whether or not greater steadiness and smoothness of motion is gained by this mode of construction. Some makers prefer a stand in which the body of the microscope is supported along the greater portion of its length. In such a form the rack-work is attached to the body itself, and has two small flanges that work in grooves, ploughed out of the limb. By this contrivance the body is kept in contact with the arm that supports it, and on which it freely moves. This plan possesses the merits of simplicity and steadiness, but does not, as in the former plan, admit of the body being turned away from the stage, an advantage which is sometimes of use to the microscopist. Whatever, however, may be the mode of supporting the body, the rack and pinion should be accurately cut to fit each other; unless great nicety is here shown, we shall fail to obtain that smooth and even motion so necessary to securing the focus of a sensitive object-glass. A badly-cut rack may be known by its jerking uneven motion, which communicates a most disagreeable vibration to the whole instrument, and makes it a very difficult matter to obtain the focus of a good objective. And it not unfrequently gives an apparent motion to the object on the stage, which may be seen gliding backwards and forwards to the extent of an inch or more over the field. Such a microscope, however cheap it may be, should be studiously avoided, as it will inevitably prove a source of constant irritation to its possessor. In some of the cheapest instruments, the rack-work and pinion movement is dispensed with altogether. The focussing of the lenses is accomplished by sliding the body up and down an outer tube which embraces and supports it. A microscope of this character may be used with low powers, but it can never be made to work with the same degree of accuracy as those which possess the higher mechanical movements. There is one other mode of adjustment which I think it right to mention here. It is known as the chain movement. A watch chain is in this case substituted for the rack-work. The chain is wound round a small drum, connected with the usual milled heads. The movement thus obtained is so beautifully smooth and so little likely to get uneven by wear, besides obviating the necessity of a fine adjustment, that I cannot understand why it is not more universally adopted. The only objection I have heard urged against it, is that the chain, being made up of so many small links and rivets, is, like a fortress, no stronger than its weakest point: it is liable to snap asunder. The old chain may, however, be easily replaced by a new one, at the cost of a few shillings. Besides the movements already alluded to, and known as the *coarse* adjustment, there is in all the better class of microscopes a much more delicate mechanical contrivance termed the *fine adjustment*, which, as its name implies, gives greater facilities for securing to the greatest nicety the focus of a one-eighth or one-twelfth objective. In the former arrangement the entire body or tube is moved up or down by the rack-work; in the latter, it is the object-glass alone that is affected. This advantage is secured by attaching the object-glass to a short piece of tubing that fits accurately the interior of the lower part of the body, and at the same time slides freely in it. The tube is kept down in its place by a spiral spring, which presses upon it from behind. Motion is communicated to the tube by a graduated milled-headed screw, acting on the end of a lever. The screw itself contains 150 threads to an inch. One revolution, therefore, of its thread raises or depresses the tube, carrying the object-glass the 150th of an inch. The tenth part of a revolution gives us the 1,500th, while the half of a division realizes a movement not exceeding the 3,000th of an inch. This extreme nicety of adjustment may, to the beginner, seem unnecessary, but to the practised operator it is found to be not a bit too sensitive for his minute investigations. It also proves a safeguard for the object-glass, when, through inadvertence, it is brought in contact with the glass that covers an object. The spring tube yields to the pressure, carrying with it the objective, which is thus sometimes saved from destruction.

We now come to the stage: this, in its simplest form, consists of a flat brass plate, with a circular hole in its centre for the transmission of light from the mirror beneath it. It should be broad and roomy, and firmly attached to the bar that supports it; not too thick or deep for oblique illumination, nor so thin as to be springy under a slight pressure of the manipulator's hand. Such a stage is furnished with a sliding ledge, against which objects rest when the instrument is used in an inclined position; but there is no mechanical arrangement for giving motion to an object; this must be effected by the fingers of the observer. It is not, however, every microscopist who possesses a touch delicate enough for such a purpose. Although stage movements necessarily render a microscope more expensive, the advantage more than counterbalances the extra cost. A moveable stage consists of two or three flat plates, sliding one over the other in rectangular directions, by means of screw and rack-work. Such movements should be as perfect as those required for the body of the instrument. The value of a stage with such mechanical appliance is best appreciated when high powers are employed.

By turning the milled heads on either side of the stage, the stage-plate carrying the object slowly traverses the field either in the direction of its length or breadth, and the whole of an object too large to be seen in the field at one view is thus made to pass slowly before the eye. If both heads are turned at the same time, the object then takes a diagonal direction. In the best microscopes there is also a circular motion produced by rack and pinion, which enables the stage-plate to revolve three-fourths of a circle, or, in come cases, to make a whole revolution. Such an arrangement is advantageous, provided it be not obtained by sacrificing other conveniences of more importance. The ordinary traversing motion of a stage should not be less than three-quarters of an inch in each direction; if extended to an inch, or even more, so much the better for the operator, who will be saved the trouble of shifting his specimen. There is yet another contrivance, known as White's Lever Stage, in which motion is communicated to the stage by a lever. By applying a slight force to its handle or free end, the stage-plates glide quickly one upon another, thereby presenting considerable facilities for following the rapid evolutions of the numerous agile animals found in stagnant water. We had almost forgotten another useful and simple arrangement—the magnetic stage, which consists of a single plate of brass, having two narrow tongues projecting slightly above its surface, and running longitudinally at equal distances on each side of the circular opening. The tongues being in contact with a horse-shoe magnet attached to the under-surface of the stage, are rendered magnetic by it. A soft iron bar resting upon them at right angles, serves as a ledge for objects to rest against when the microscope is inclined from the vertical position. The attraction between the bar and the tongues is just sufficient to keep the former in its place with any ordinary object that may be resting against it, and is not too strong for being easily shifted about.

As the modern microscope possesses many adjuncts —as condensers, spotted lenses, polarizers, &c., all of which are used beneath the stage; and as these need permanent support and accurate centering, a moveable sub-stage is constructed, into which they all fit. A traversing movement is given to the stage itself, by rack-work and pinion. The microscopist is thus enabled to shift the position of his various apparatus to suit his requirements. Between the stage and sub-stage is a shutter for regulating the amount of light reflected upward from the mirror; it is termed the diaphragm, and consists of a thin circular plate perforated with holes varying in diameter, the largest being equal to the central aperture of the stage, and the smallest not much larger than a pin-hole, while in one position the light is cut off altogether. The plate revolves on a pivot, so that each aperture may, in its turn, be brought under the stage. The diaphragm should never be permanently fixed to the stage, but should be so attached as to be easily removed when other modes of illumination are desired. An improved form of diaphragm has lately been constructed, in which the circular shutter with its various openings has been superseded, and in its stead we have but one aperture, which can be gradually closed by two small plates that move horizontally to the right and left of the stage, and have their proximal borders incised in a wedge-shaped manner. The advantage of this diaphragm consists in the nicety with which the orifice can be regulated so as to obtain the most effective illumination.

Another important part of the microscope is the mirror, by whose aid we collect and reflect the light upwards to the object-glass. This should in all cases be double, having one of its surfaces flat and the other concave, with a diameter not less than an inch and a half, or even more. The greater the extent of the reflecting surface, the larger will be the amount of light obtained therefrom. As so much depends on the proper illumination of an object, the mirror should be so constructed as to admit of free and easy motion in all directions. It should slide freely up and down the stem which supports it, thereby enabling the microscopist to regulate the intensity of its light as he increases or decreases its distance from the stage; and if it be mounted on a lengthening arm, a further advantage will be gained by the oblique illumination it produces.

When high powers are used, a more intense light than that afforded by the mirror is needed. The microscopist then has recourse to the various kinds of condensers in vogue. These are usually achromatic combinations of lenses, and, when properly adjusted, condense on the object in one brilliant spot all the light reflected from the mirror. Our space, however, precludes us from entering further into the subject of illumination.

Having selected a good solid stand, the microscopist should next secure the best lenses that can be procured from our most skilful opticians. These may be purchased one at a time, according to the means and wants of the purchaser. Two of the most useful powers are the one-inch and one-fourth objective; and with these two powers a large amount of useful work may be done. Good object-glasses may be known by the clear and distinct images they give of suitable objects placed in their foci, and a bad objective may be equally well known by the absence of these qualities. No amount of careful focussing will ever enable such a lens to give a clear and well-defined view of an object submitted to its scrutiny. The eye of the observer, however keen, sees nothing distinctly where all is involved in fog.

One very good test of the quality of an object-glass of moderate power is the way in which it bears the strain of the higher eye-pieces, even when the draw tube is pulled out to some extent. If the combination be properly corrected for light and colour, it will give a flat field, with clear definition in every part of it, and will suffer scarcely any deterioration in its performance. The reverse of this will hold good with inferior lenses. The question of angular aperture scarcely comes within the scope of a short paper; but those who are interested in this branch of optics will find it fully discussed in our standard works on the microscope. The ordinary method of attaching an object-glass to the body of the microscope is by screwing it into the tube, and as the threads of the screw are generally very fine, some little time is consumed in substituting one lens for another; to obviate this difficulty, and to facilitate a rapid exchange of objectives, a mechanical contrivance has been invented, termed a nose-piece, which consists of two or more rotating arms, each carrying an objective at its free end. By the rotation of the arms, each lens, in its turn, is brought into its proper position beneath the tube.

The eye-pieces (of which some three or four with varying magnifying powers are supplied by our best makers) should be constructed so as to slide gently into the upper end of the body, a mode of attachment that gives great facility to the microscopist for changing his eye-pieces.

One of the greatest modern improvements in connection with the compound microscope undoubtedly is Mr. Wenham's binocular arrangement. Its simplicity and facility of adaptation to almost every kind of microscope, and the successful results it gives, are reasons why every one who can afford it should add it to his microscope. Its superiority over the single-tubed instrument is most strikingly shown when used in the examination of opaque objects. These stand out in bold relief, and with a solidity unattainable by the ordinary microscope. By this invention, the penetrating power of an object-glass seems to be greatly increased, and by its aid we dive, as it were, deeper into those tissues and structures that form the objects of our investigation; but when applied to the examination of transparent objects, its performance is not equal to that of the single-tube instrument, which, to my mind, gives a clearer and sharper image than the binocular. The latter, however, be it observed, can be readily reduced to the condition of an ordinary microscope by the withdrawal of its prism.

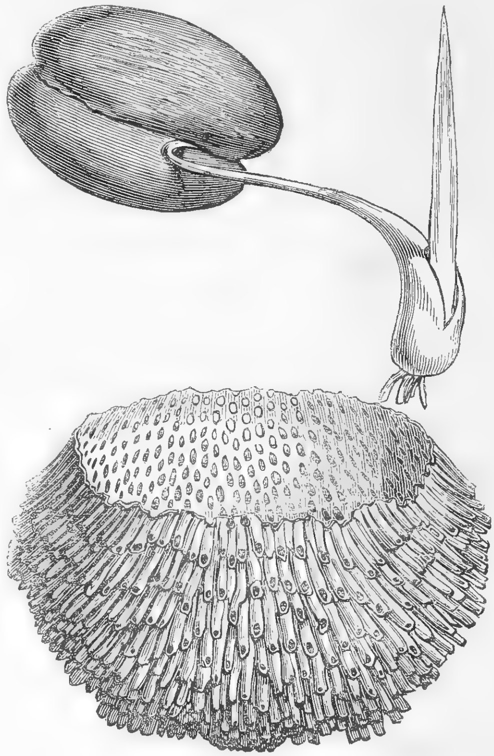
In conclusion, we may add that whatever may be the form of stand chosen by the purchaser, it should possess the qualities we have described,—a steady solid base, an equal distribution of the parts which it supports, and a smooth and even movement wherever motion is required. T. K.

A BLACK CRADLE.

We are indebted to the Editor for introducing to notice, in the April number of Science Gossip, Dr. Seemann's interesting little volume, and for a charming generalizing sketch of the nature and uses of Palms, headed by the pretty quotation from the poet Laureate, "Under a palm-tree." But poor Enoch Arden's dreams never pictured to him the extraordinary sort of cradle (or bowl-shaped socket) in which Mr. Swinburne Ward, H.B.M.'s Commissoner of the Seychelle Islands, in a letter addressed to our so deeply-regretted friend Sir W. J. Hooker, describes the Seychelle Islands Palm (*Lodoicea*) to be rocked and lulled, and the noble trunks thus preserved from injury when struggling against the force of violent gales. Many explanatory particulars yet seem wanting to enable us fully to understand the nature and uses of this most extraordinary appendage, so different from what is known of any other tree.

There has recently been received, and is now exhibited in the Museum of the Royal Gardens at Kew, an enormous colander-like object, of a substance as hard and close-grained as black lava, pierced with numerous holes, about the size of a thimble, and each hole communicating with a hollow tube, which tubes bristle round the outside of the bowl like roots, and no doubt have been the cases or conduits of roots, if not the hardened bark of the roots themselves.

The accompanying figure and measurements were taken from the specimen at Kew: inside depth of bowl, 23 inches; inside diameter, 27½ inches; outside diameter, to the ends of tubes as now remaining, 39½ inches. Through these hollow tubes, says Mr. Ward, the roots penetrate the ground on all sides, never, however, becoming attached to the bowl, their partial elasticity affording an almost imperceptible but very necessary play to the parent stem, when struggling against the force of violent gales. Mr. Ward says, that, unlike the Cocoa-nut Palms, which bend to every gentle gale, and are never quite straight, the Coco-de-mer trees are as rigidly upright as iron pillars, undisturbed in their position by the heavy gales and violent storms so often occurring in tropical regions. Dr. Seemann (who, however, does not write as an eye-witness), on the contrary, says, speaking of these same Lodoicea Palms, the diameter of the trunk varies from 12 to 15 inches, and the height from 80 to 90 feet, and the whole stem is so *flexible* that the tops



of those trees which stand in each other's vicinity strike against and chafe each other in a strong breeze, making an extraordinary noise!

Which of these accounts are we to rely upon as correct?

One of the greatest and most ennobling pleasures attending on all natural history investigations, is the contemplation of that fitness and perfection of contrivance, which gives us everywhere the most striking examples of adaptation of structure to requirements. Now, if we admit as certain the premises that the stiff rigidity and want of suppleness in the stem of the Lodoicea (different from all other Palms) requires a special arrangement to prevent the shattering of the noble trunks, nothing could be conceived of more effectually suited to the purpose than the play and rolling of the stem in this mechanical ball-and-socket "universal joint;" the roots piercing the socket, however, must possess greater toughness and flexibility than any gutta-percha-coated wire cable, to avoid being torn out of the ground, or frittered to rags, when we consider the strain put upon them by the amount of leverage from the great height of the trunks; and there are other difficulties in understanding the mode of growth and development. Did the socket nourish, and protect, and nurse up the stem, or did the stem, as it grew to maturity, elaborate and deposit the materials for the socket? The Coco-de-mer bowl is of the substance and colour of the shell of the nut; but that it can be no swollen enlargement of the nut, from which the tree has grown, is plain from the mode of germination, so fully described and figured by Sir W. J. Hooker, in Nos. 2,734 to 2,738 of the *Botanical Magazine*, new series. The germ rises from the sinus of the lobes of the nut, and extends itself to a considerable distance from its parent seed before it takes root. The outer extremity then penetrates into the earth, and from a cleft in the thickest part near the middle, throws up the *plumule*, which gradually and slowly forms leaves, and grows up into the tree.

So far, then, we see no preparation for the formation of this bowl underneath, and loose from the trunk; and it seems easier to trace the mode and purpose of its growth, if it may be supposed to be formed as the tree attains age, as a sort of tuberous excrescence of agglomerated roots, which have gradually enlarged and hardened and thickened till it forms a powerful bulbose buttress, to hold firmly in the earth the towering stem with all the enormous weight it was destined to support, each drupe or fruit frequently attaining a length of eighteen inches, with a circumference of three feet, and weighing from forty to fifty pounds.

Some similar tendency of growth seems to be exhibited in another Palm, namely, the conical masses of what are called "aërial roots" of the *Iriartes ventricosa*, of which protuberances very sonorous musical instruments are made.

There is a beautiful illustration of these sort of supplemental buttress-roots, which it is in the power of any one to watch. The Indian Corn (*Zea Mays*), in a favourable garden soil and aspect, will, even in England, shoot up to the height of eleven or twelve feet, its shining silky tassels of the styles waving to every breeze; but as these wither (the pollen of the upright male spikes having been shed upon them), the fecundated female spikes begin to swell, and due preparation is made for the considerable bulk and weight they are to attain to. Then may be seen little pinkish buds issuing from the joints of the stem, from an inch to fifteen inches or more above the surface of the soil; these gradually grow and anchor themselves firmly in the earth, and thus help to steady the stem, and enable it, with its ever-hardening flinty outer cuticle, to support the heavy heads of maize as the grains fill and ripen. Now, the grasses have been counted as near, though plebeian, relations of the "princely Palms;" so perhaps a free pardon may be insured for thus introducing "a mere grass" into a chapter on this king of the "princely Palms," if any of my readers will turn to Longfellow's entrancing allegory of the first gift of the Maize to the Red Man, in the "Song of Hiawatha."

The object of the digression was to call attention to the nature of these supplemental, and what may be called buttress-roots, and to ask, *can* the curious colander-like bowl be formed of such, amalgamated, as it were, into a massive state in the course of growth? It has been suggested by a very acute observer, that the specimen at Kew *may* have been the base of some very old tree cut down years ago, and with all the softer internal parts decayed away.

But how, then, account for the smooth, polished hard surface of the inside of the bowl, which it is so tempting to adduce as a proof of the effect of friction from the rolling motion of the stem in its socket? Ah! there are many more clever polishers in Nature's workshops than are dreamed of in our philosophy; and how do we know what strange insects, worms, and fungi may have been at work, clipping and filing and rubbing down, bit by bit every little fibre or projecting roughness from the decaying portions of the former trunk. This charming poetic theory of the Lodoicea being rocked in a cradle of the *earth*, is at first sight a most plausible, ingenious, and interesting interpretation of a natural phenomenon; therefore it may appear presumptuous to say that it yet seems to want confirmation by more and closer observation of the *living* and *growing* trees. Has any one of these ever been actually examined at its base, and seen to be standing within its bowl, and yet not attached to its substance, and only fastened in the ground by the comparatively slender roots passing through the perforations of the bowl?

Various strange myths have from time to time been propagated about these wonderful trees, whose huge fruits were long considered as productions of the sea! Fit nuts indeed for Leviathan or the great serpent to crack for their dessert!

Whatever may be the merits of the conjectures which have here been offered, any visitor to Kew may admire the realities of all the wondrously elegant articles, baskets, boxes, hats, flowers, caskets, dishes, &c. &c., manufactured from the leaves, stalks, and nuts of the Lodoicea Palm, and then survey the hard "Black Cradle," and form their own opinions as to "What is it?"

P. S. B.

PIRATICAL GULLS.

During a few weeks' ramble through the Shetland Islands, I had opportunities of studying and admiring the sea-birds, a great variety of which inhabit the rocky shores. They give animation to the coast scenery, otherwise painfully solemn, from the majesty of its stupendous cliffs, rising abruptly from the sea to form a blank wall, three and four hundred feet in height, and in a few cases towering to that of six hundred. These cliffs on the western shores of Ultima Thule are continued out to sea in a long row of pinnacles and an uninterrupted series of arches—

> The hoary rocks of giant size,
> * * * *
> Seen far amidst the scowling storm,
> Seen each a tall and phantom form,
> As hurrying vapour o'er them flee,
> Frowning in grim security;
> While, like a dread voice from the past,
> Around them moans the autumnal blast.

These fantastic forms "indicate how the attrition of the surf has told upon the iron-bound coast, demonstrating that lines of precipices hard as iron, and of giddy elevation, are in full retreat before the dogged perseverance of an assailant that, though baffled in each single attack, ever returns to the charge, and gains by an aggregation of infinitesimals the result of the whole." * For these rocks are subject to the continued action of the fierce Atlantic waves, hollowing out the more easily degraded parts of these crystalline rocks, piercing them, and detaching portions as needles; awaiting the final change when they shall be ground to sediment, and so assist in the building up of like structures; and thus it is we see everywhere around us that this apparent destruction is the real source of renovation in nature.

It is among these cliffs and natural caves that multitudes of sea-birds *scream aloft in middle air*, and have their homes; here they resort for the purpose of breeding, each species associating together in vast communities, and usually isolated from others. Here is a cave, the haunt of the Kittawake; the top of that little shelving holm is crowded with the nests of the common Gull; on yon ledge of rock, scarcely wide enough for the eggs to rest on, is a long rank of Guillemot's eggs; around that beetling cliff the Rock Pigeon is seen whirling in rapid flight; here and there on the face of the same, are the burrows of the Little Puffin. Many of these species breed together in apparent harmony and good-will.

But the most secluded of all the sea-birds are the Skua Gulls, a species of a very interesting nature from their peculiar habits and form, so ungull-like. They are characterized by their boldness, rapid flight, and by supporting themselves chiefly on the fish which they compel other gulls to vomit. Of the Skua Gulls, three species frequent the Shetlands Archipelago,—the Skua Gull, or Bonxie; the Richardson's Skua, or Arctic Gull; and the Pomarine Gull: they belong to the genus *Lestris* of naturalists, and though closely allied to the true Gulls (*Larus*), yet they appear to partake both of the nature of the Gull and Hawk tribes.

The Richardson's Skua, with the scientific appellation, *Lestris Richardsoni*, is a very elegant bird, of a blackish colour all over, with the exception of the belly, which is of a rusty or tarnished hue; not unfrequently this gives place to a pure white; others with the breast more or less speckled graduate from the white to the rusty. The Shetlanders regard the black and white bird as the male; but the varieties of colour are without doubt the effect of different periods of development, as one may see, where there are numerous individuals, pairs belonging to the same nest associated in every possible combination of colours; for evidently this species breeds before it attains the plumage of maturity.

The bird is seen to advantage on the wing; its truncated tail, with the middle feather prolonged beyond the rest, its long arched wings, and its rapid flight, suggest to the casual observer the flight of the Hawk. This impression would increase upon us, if we should witness its piratical propensities exercised among the Kittawakes and small gulls. Thus, while one of the parent birds remains watching over its progeny, its mate sallies forth to secure wherewith to appease the hunger of its family. But the Richardson knows only one law of possession, that which the strong exercises over the weak: might is right with him. Poised on wing, or sailing to and fro over the fishing-grounds of the smaller gulls, he awaits a capture by one of them, and while the poor bird speeds on his homeward journey, the Richardson is after him, and through his superior power of flight overtakes him, worries the poor gull, and to escape this persecution the victimized bird disgorges its fairly-acquired prey; as it falls, it is seized by the tyrant, who hurries home with his ill-gotten gains. The cry of this gull is shrill and peculiar in tone, and in the solitude of a summer's midnight-twilight strikes on the ear of a person, a stranger to it, as an agonized wail of a child.

There are many breeding stations of this bird throughout the islands, though there are rarely more than a few pairs congregated in one place, yet on Comb Hill, in the island of Foula, which these gulls have appropriated to themselves for the purpose of nidification, as many as from fifty to one hundred pairs may be observed.

Unlike the majority of the Gulls, the Richardson's Skua sel ts for a breeding-place the heathy and treeless moors at various altitudes, and distant a

* Hugh Miller.

mile or so from the sea. The nest is a mere concavity in the ground; the eggs, two in number, are laid in the month of June. It is during the nesting season that the bird displays such courage and tenacity in holding possession of its domain. When the nest is approached, the bird shows a determination to defend its own. Any bird, whether raven, gull, or hawk, that happens to stray into the Skua's territory, is at once attacked; the parent birds dart down from a considerable height, and dash vehemently, with a noise and speed truly astonishing, against the intruder, and cease not the attack until the enemy is well driven away; even when the intruder is the more powerful Bonxie, do they continue the charge without intermission. Man even is not prepared to brave the gull's fury, he receiving constant flaps with the wings of the bird; usually the bird comes sweeping along full at the person, and when within a foot, rises a little in its flight, so as just to graze the head. If a stick be elevated at this juncture, the bird swerving to the right or left, skilfully avoids the obstacle; but not unfrequently dashing against it, falls a mangled corpse at one's feet, a prey to its own fury, so great is the vehemence of its charge.

The Richardson, like the Partridge and Plover, employs the same stratagem to decoy enemies from its nest,—scrambling along on all fours (wings and legs), assuming an appearance of being disabled and incapable of flight, tumbling over and over; thus exciting pursuit, but in a direction away from its nest; and on the success of its trick, mounts and leaves one with the impression that he has been "sold."

The Scories of this species (for so the young of all gulls are called) are the least sombre of the tribe; the plumage of the young Richardson may be fairly called handsome; it is of a glossy, darkly speckled-brown. It is a cunning, nimble little bird, and leaves the nest soon after it is hatched. It secretes itself in holes, behind stones, or lies close among the vegetation on being approached, and when captured, its show of defence is really very amusing.

The Skua Gull, or Bonxie (*Lestris cataractes*), is one of the largest of European gulls, and is only an occasional visitor to Great Britain, save in the Shetland Isles, to which it annually resorts for breeding purposes. It is there, however, confined to one or two stations. It is said still to breed on the island of Foula; it formerly bred on Hermaness, Unst, where, until the death of its protector, Thos. Edmonston, Esq., the colony numbered about twenty pairs. Since his decease, which occurred a few years ago, a war of extermination has too successfully been carried on against this noble bird. The nests have been robbed, the old birds have been shot,—for a price was fixed on their skins and eggs; and this wanton destruction has resulted almost in the extinction of this rarity. Though fortunate in seeing a live Skua, it was under unfavourable circumstances; he was not at home, for though a bird of great power, he was harassed by the Richardsons, and exhibited all the appearance of an Ishmael among his tribe.

To the sportsman, a successful shot at this fine bird may be a source of gratification; but the wantonness exhibited by visitors to these islands, the main object often being nothing more than to secure the skins of this sea-fowl, is a theft, and its results are sad to contemplate. Take me out of the beaten track of sight-seekers, too often indelibly marked; I wish for none other museum than the precipices and moorlands, if the extermination of a species like this is to be the sacrifice.

The habits of the Bonxie are the same as those of the Richardson. This bird is no less tenacious of its domain, and is as fearless in defence of its nest as its congener. When the Bonxie is attacked by the Richardson, for it is the old story, "every cock can crow on his own dunghill," he has one resource left, that of alighting; for the tactic of his aggressor is lost, his long pinions, so advantageous while on the wing, are quite the reverse on the ground.

The Pomerine Gull (*Lestris Pomarinus*) is a rare visitant to the Shetlands. It approaches the Bonxie in size, and resembles the Richardson in plumage. Specimens are occasionally shot.

Ralph Tate, F.G.S., &c.

MISTLETOE.

Those who live in the orchard districts of Herefordshire can scarcely avoid being struck with the quantity of mistletoe. Being, as I may say, brought into contact with it in my daily walks, and having an interest excited in me by others, I endeavoured to collect what information I could concerning its mode of growth. The result of a short research is here. If you think it worth insertion, it is at your service, and may perhaps induce others to examine more fully and carefully this remarkable parasite.

A description of the stem, leaves, and flowers will be found in any botanical work, and would therefore be superfluous.

The *seed* is heart-shaped and compressed. A vertical section (fig. 2) shows *two* club-shaped radicles, which are superior, *i.e.*, directed towards the apex of the fruit (fig. 1). In the seeds I have examined I have met with two, showing *one* radicle only. Baxter, in his "Flowering Plants," says that some exhibit *three*. These radicles bend themselves down or up, as the case may be, to the surface on which the seed is sown, and attach themselves to it before the plumule extends itself (fig. 3).

As far as my observations have gone, I am led to believe that birds are the great means of disseminating the mistletoe; and that by seeds alone does the plant take entire possession of the tree. During last winter I examined some scores of trees of different kinds, chiefly apple, poplar, and thorn, and found seeds deposited on them in large numbers and large masses by birds. In the notes to an

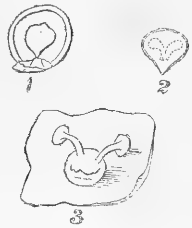


Fig. 1. Vertical section of the fruit.
,, 2. Vertical section of the seed.
,, 3. (From Baxter) showing the way in which the radicles extend themselves.

edition of Evelyn's Sylva by Dr. A. Hunter, 1776, I find:—"It is the opinion of some that it is propagated by the Misleto-Thrush, which, feeding upon the berries, leaves the seeds with its dung upon the branches of the respective trees where the plant is commonly found. Others say, that as the berries are extremely glutinous, the seeds frequently stick to the beaks of those birds, which being rubbed off upon the branches of trees, they become inoculated, as it were, and take root. In the same manner the Misleto may be propagated by art; for if the berries, when fully ripe, be rubbed off upon the smooth part of the bark of almost any tree, they will adhere closely, and produce plants the following winter." Adopting the suggestion expressed by Dr. Hunter, I see no difficulty in the fact that the plant is found on the under side of a bough. Or again; we all know that water running on the surface of a cylindrical body does not fall off from the side, but by attraction follows the surface, unless diverted, to the middle of the under surface. Might not the rain thus gradually carry down, or leave in an intermediate position, the seeds deposited by a bird? The viscid matter enveloping the seed would still be adhesive enough to keep the seed attached to the bough. As an instance of this viscidity, on December 23rd last, I found a mass of seeds deposited by a bird on a painted gate-post. After all the storms of rain and snow and the severe frosts which we had during January and the beginning of February, the mass was there still, and showed no sign of falling from the *painted* surface of the post. The seeds, after having been deposited, have a great enemy in the Great Tit, and very probably in other birds too. On one occasion I climbed a tree covered with Mistletoe, and found numbers of seeds rifled, leaving the mere integument. Five minutes' watching showed a Great Tit at work upon a mass on another tree.

I have not yet found a large per-centage of plants on the under side of the branches, but on the contrary have found them on the upper side or edge.

No matter in what position the seed is sown, the same plane of growth continues throughout, and the plant does not bend upwards, as plants generally do.

The old moss and lichen-covered trunks of apple-trees I have, last winter, seen covered with such clusters of young plants as one would expect to find from the successful germination of masses of seeds like those I have noticed deposited on all parts of trunks.

It may be asked:—"Why is not the Mistletoe more widely spread, if birds carry the seeds?" This is easily answered by the facts; first, that the plants are diœcious, and therefore the chances are numerous against the seed possessing the principle of life. The majority of plants in an orchard of several acres

Fig. 4. Section across the grain of apple.
,, 5. Section across the grain of ash.
,, 6. Section down the grain of apple.

which I examined were pistiliferous. Out of fifteen trees which I specially examined, twelve bore only pistiliferous, two both pistiliferous and staminiferous, and one staminiferous plants only. Secondly, many seeds will be annually destroyed by such birds as the Tits.

The seed being deposited, no matter in what position with regard to the bough, the radicles are directed to the bark, and the root penetrates to the heart of the wood. I have cut specimens having the plants growing in every possible direction, and yet a section vertical to the plane of growth of the bough on which it is found, always exhibits the root forcing its way to the heart of the wood or beyond the heart, at right angles to a tangent drawn from the point of contact with the bark. The root appears to force its way, taking entire possession of the bough by expansion behind the growing-point, and gradually forming an excrescence above the bark somewhat resembling the crown of a root.

The absorption of the juices by the Mistletoe in time causes the decay of that part of the branch cut off from communication with the trunk by it. This I think will account for large plants of Mistletoe, found on the branches, being almost invariably at the end of the branch.

The expansion is a strange phenomenon. The accompanying sketches will convey some idea of the general appearance of different sections. They are reduced from nature, the shaded part representing the Mistletoe. (See figs. 4, 5, 6.) A horizontal section of the expansion itself shows concentric rings and medullary rays, but distorted in every possible way, owing, I suppose, to the pressure of the wood of the bough.

A theory has, I think, been started that it may be propagated by fibres running from one plant, and so take possession of the whole tree. I have tried several specimens where on the same bough I obtained two large plants within six inches of each other. But I have failed, as yet, to detect in sections cut from between the two plants, any fibrous connection.

The capricious habit of the plant is very remarkable. In a wide district abounding in White and Lombard poplars there is scarcely a White poplar that is not covered with masses of Mistletoe, while on not a single Lombard can I find even a sprig. On one Ash, standing in a clump of ash-trees, I found ten plants; but not one of the surrounding trees bore a single plant. The same caprice applies to its growth on the Lime and White Thorn, as far as I have been able to ascertain.

The inquiry into the growth of the Mistletoe, a plant enveloped in so much mystery, mythical and natural, is fraught with interest; and I shall be extremely glad if this letter should prove to be the means of exciting or assisting the researches of others.

R. B.

A PLEA FOR NETTLES.

If one might be allowed to form an opinion from the way in which people generally speak of nettles, the conclusion would be inevitable that they are not only the most useless weeds in creation, but the greatest pests wherewith the earth has been cursed. There are some morose beings in the world who are for ever looking on the dark side, no matter what it is that has its evils, to them it is *all* evil. For our own part we don't believe in such a doctrine. Our creed is that there is something good in everything, and we have faith in this creed, even though our own knowledge may be too limited to discover all the good which we believe to exist. Stinging nettles are very disagreeable things we confess, either to handle or sit upon, but that they do not deserve wholesale condemnation shall be evident before we have done.

Our indigenous nettles are small and insignificant beside those of tropical countries. It is true that they are by no means scarce, and if there is any luxury in coming into contact with them, it need not remain long unsatisfied. We possess three, some say four, species; the Small Nettle (*Urtica urens*), and the Great Nettle (*Urtica dioica*), both of which bear fruit in spikes, and the Roman Nettle (*Urtica pilulifera*), in which the clusters of fruit are globose. The last is only local, whilst both the former are common everywhere. It is doubtful whether we have any other indigenous plants so often abused, ill-spoken of, or maltreated as nettles. Scarcely any one, from the infant to the grey-beard, speaks a word in their praise, and for insect and fungal parasites they are almost without parallel. Indeed the wonder seems to be that we have nettles at all, since so many enemies combine against them. Yet nettles and parasites increase and multiply and replenish the earth.

There is a nettle found in the East Indies, known to botanists as *Urtica crenulata*, the handling of which is certainly "no joke," if the account given by Leschenault de la Tour is a plain, unvarnished tale. He says, "One of the leaves slightly touched the first three fingers of my left hand; at the time I only perceived a slight pricking, to which I paid no attention. This was at seven in the morning. The pain continued to increase; in an hour it had become intolerable; it seemed as if some one was rubbing my fingers with a hot iron. Nevertheless there was no remarkable appearance: neither swelling, nor pustule, nor inflammation. The pain rapidly spread along the arm, as far as the armpit. I was then seized with frequent sneezing, and with a copious running at the nose, as if I had caught a violent cold in the head. About noon I experienced a painful contraction of the back of the jaws, which made me fear an attack of tetanus. I then went to bed, hoping that repose would alleviate my suffering; but it did not abate; on the contrary, it continued nearly the whole of the following night; but I lost the contraction of the jaws about seven in the evening. The next morning the pain began to leave me, and I fell asleep. I continued to suffer for two days; and the pain returned in full force when I put my hand into water. I did not finally lose it for nine days." A similar occurrence took place at the Calcutta Botanic Gardens, and the man who was stung described the sensation, when water was applied to the part, as if boiling oil was being poured over him. The common nettle of the Neilgherry Mountains (fig. 1) and some parts of Northern India (*Urtica heterophylla*), Roxburgh stated was the most ferocious plant he had ever seen, and that

Fig. 1. Neilgherry Nettle (*Urtica heterophylla*).

a, Male Flower; *b*, Female Flower; *c* and *d*, Seeds, magnified; *e*, Seed, natural size.

it fully acted up to its appearance. In Assam and also in Kumaon are several other shrubby nettles with woody stems and troublesome stings. The Java stinging-nettle (*U. stimulans*) is also anything but a pleasant companion. But above all, the great Devil's-leaf Nettle of Timor (*Urtica urentissima*) has the reputation of being the most virulent. The effects are said to last for a year, or even to cause death.

Nearly all the nettles are possessed of a very strong and silky inner bark. The common nettle (*U. dioica*) has been used almost from time immemorial as a fibrous plant, and not only do the inhabitants of Siberia make from it the cordage for their

Fig. 2. China-grass Nettle (*Bœhmeria nivea*).

a, Female Flower; *d*, Cluster of ditto; *b*, Male Flower; *c*, Seeds, natural size; *e*, Seeds, magnified.

nets, but in Piedmont the fibre is converted into a kind of linen cloth. We possess thread lace of excellent quality which had no more aristocratic origin than the common stinging-nettle. The Puya (*Bœhmeria puya*) of Darjeeling, and the China-grass (*Bœhmeria nivea*) of Assam, China, &c., are nettles (fig. 2) which yield fibres unsurpassed for strength, are easily bleached, and may be converted into the finest linen in the same manner as flax. The Neilgherry Nettle is also useful in a similar manner.

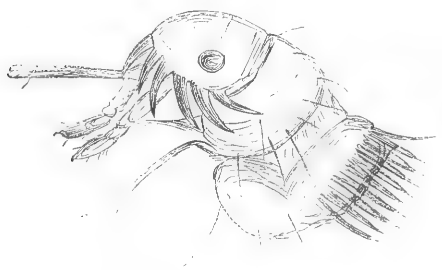
Indeed scarcely a nettle has yet been found growing to a sufficient size which does not yield an excellent fibre for spinning or rope-making.

Returning again to our common species, we learn that the roots have not only been used in domestic medicine, but that when boiled with alum, a colouring matter is developed, which has been employed to dye yarn yellow. The young shoots, when boiled, are by no means to be despised as greens. In Manchester, and some other parts of Lancashire and the North, "nettle beer" is as well known and appreciated as "ginger-pop." Fowls are said to be fond of picking up the seeds and eating them, and if the whole plant is cut down and given to cows as food, it is declared to increase the quantity and improve the quality of their milk; and if strongly salted, this same much-abused plant may be used as a substitute for rennet in making cheese. So that were we to try our best, we could hardly meet with a more useful plant than the nettle, not a fragment of which need be wasted, but all may be applied to some economic purpose. Not only is this true of one species, but also of the majority, although they offer no attractions of sweet odours, bright colours, or handsome flowers, they are, in spite of their stings, good servants to man who abuses them.

CAT-FLEAS.

SOME months ago, a person brought me a green baize cushion, with a request to know what certain objects, scattered in considerable numbers over it, were. They were white, small, and oval, and in appearance resembled minute pearls. Upon telling him that probably the cat had made her bed on that cushion for some time past, and those objects were simply the eggs of the cat-flea, he admitted the accuracy of the first of these guesses, and in his disgust nearly dropped the cushion.

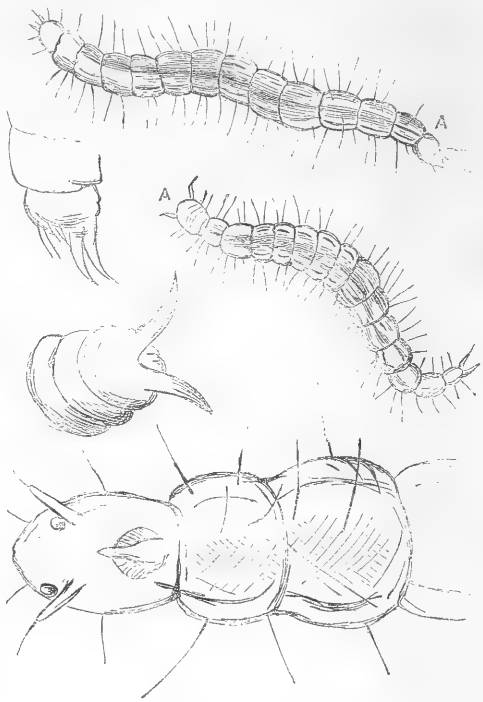
This circumstance, however, appeared to me to be likely to afford the means of verifying the interesting



Head of Cat-flea.

and instructive remarks made by Mr. R. Beck, at the Microscopical Society, in October, 1864, so I quickly caught the pad, and transferred the whole of the eggs to a sheet of paper. Together with the eggs, which were very numerous, was a quantity of black powder. This, according to Mr. Beck, is the excrement of the flea; and I see no reason to doubt the truth of it.

The eggs, in total amounting to I suppose about a thousand, were variously distributed. The two friends to whom I gave a considerable quantity each, were not successful in the experiment. The writer enclosed some in glass cells at once, and they hatched in about a week afterwards. A larger number were put into a small bottle, and carried in the pocket for a few hours. This novel sort of incubation was very successful. At night, about eight hours after



Larvæ of Cat-flea.

putting them into the bottle, there was a wriggling mass of larvæ, the greater part of them having liberated themselves from the egg already. In many eggs, though, the larvæ might still be seen, and careful watching showed that they shifted their positions inside.

The exit of many individuals from the shell was also observed. Once out of confinement, their appetites seemed to come simultaneously with their liberty, and they fell to on the food I had prepared for them, the black powder aforesaid, which consists of blood, only partly digested.

Thinking that as heat had so far hastened the result, it might judiciously be applied to still further accelerate the process, means were taken to warm the cell containing the few specimens which had been separated from the rest; but, unfortunately, the temperature was raised too high, and all that lot of larvæ perished,—in fact, they were cooked.

Another cell was filled and covered with thin glass. This was decidedly better, inasmuch as in a week's time one flea had so far outgrown his companions that he spun a cocoon, and entered into a state of repose preparatory to his final change, and I had great hopes; but this change never took place, for one of his juniors, supported by a hungry friend, got inside the cocoon and gobbled up my poor protégé. I had the satisfaction, after an interval of two days, of seeing the two cannibals wriggling out of the aperture by which they had effected an entrance, while nothing remained of the former occupier, not even the skin.

Warned by this circumstance, precautions were taken to separate from the rest some half-dozen larvæ, which a few days afterwards were desirous of seeking a place of rest, and had changed considerably in colour through ceasing to eat.

The weather now became colder, and it appeared to affect the subjects of the experiment to some extent. Two of them settled down in different parts of the cell in which I had confined them, and without spinning any cocoon, prepared to undergo their metamorphosis into the imago state. Twelve days afterwards, they were noticed to have altered in appearance to something approaching the shape of the perfect flea, the resemblance becoming closer each day afterwards. The legs were formed, but soft apparently, and much distended by the contained fluids; the general colour was white, and the skin semi-transparent,—very like the colour of shrimps before boiling.

Alas! my scientific hatching did not end satisfactorily. My baby fleas proved abortive, and soon shrivelled up. The cause I have not ascertained for certain, but think I am not far out in attributing it to want of moisture, and, perhaps, want of air and food. I have not had an opportunity of completing the experiment, but hope to do so at a future time.

The place in the office where I kept my pets, was regarded with great suspicion by my companions; and I was to be held responsible, should fleas become numerous there at any future time.

This, however, involved a question which has not yet been decided, namely, whether the cat-flea will fulfil all the conditions, and rejoice in the comfort, notwithstanding its dangers, which is the lot of the bed-flea. My own impression is decidedly in the affirmative.

The cat-flea is to be distinguished from the human tormentor, by the array of spinous processes it possesses at the front of the head and back of the neck, somewhat like a collar, while the bed-flea is destitute of them. The squirrel-flea has a similar series of spines at the back of the neck, but none in the front of the head. This kind is also to be found on rats, the writer having once caught a specimen on one.

I have never seen the larva of the bed-flea. It is said to inhabit dusty corners of rooms and carpets; very likely the cat-flea larva often does the same, particularly in houses where puss is allowed to roam at will.

I lately found that oftentimes mice are infested with fleas, and procured some for my cabinet. It is remarkable in this species, that either there are no eyes or they are very obscure. I cannot find them. The figure given of the head of the bat-flea in the Micrographic Dictionary resembles the head of the flea in question.

The subject of this paper is well worth experimenting upon, and cannot fail to supply interest. The expression of all the friends who saw in my microscope the active and, apparently, ferocious worms now described, was that of surprise and wonder.

S. J. M'INTIRE.

THE FLY IN PIKE-FISHING.

AS many of our readers are, at this time of the year, amusing themselves with Pike-fishing, and as some of them are obliged to confine their attention to one stream, it may not be out of place in the pages of SCIENCE GOSSIP to suggest to them the use of the fly as a new sensation. All fishers have remarked that the fish in any stream soon cease to take a particular kind of artificial bait if worked too long at once. For this reason a change is extremely desirable. Mr. Pennell, in his "Book of the Pike,"* has figured a fly for Pike-fishing which might be tried with advantage in some localities where it is at present unknown. We quote his own words:—

"The fly, although it has always held a recognised place amongst pike-baits, is practically very little either known or used, and the small experience I have had of it leads me to class it rather as a 'fancy bait,' which may perhaps be occasionally employed as an agreeable variety, than as a rival to the more solid and time-honoured modes of trolling. Mr. Stoddart seems to be much of the same opinion. The Pike-fly is also used in the Norfolk Broads, where, according to a recent writer in the *Field* newspaper, the experience of trollers is precisely contrary to that of Mr. Stoddart, as it is found that large-sized Pike will frequently take it freely, when nothing over 6 lbs. can be tempted with the natural bait."

* "The Book of the Pike: a Practical Treatise on the Various Methods of Jack-fishing; with an Analysis of the Tackle employed; the History of the Fish, &c.; also a Chapter on Spinning for Trout in Lakes and Rivers." By H. Cholmondeley Pennell, author of "The Angler Naturalist," &c. London: Hardwicke.

FLY FOR PIKE-FISHING.

The same writer says that he has not unfrequently killed Pike with a fly on bright clear days, when spinning was utterly useless. As a rule, Pike-flies cannot well be too gaudy, though they may easily be too big. The bodies should be fat and rough, made of coloured pigs' wool, cocks' hackles, &c., and plentifully bedizened with beads and tinsels; the wings of two peacocks' moon-feathers (tail-feathers with eyes in them).

"In the western lakes of Ireland, patterns dressed with sable or other furs and without wings, are more in favour. Ephemera thinks the Pike-fly is looked upon by the Pike as a gigantic Dragon-fly; but that it is mistaken for a Yellow-hammer, or, perhaps, for a Swallow, appears to me to be the more probable hypothesis. Indeed, a Yellow-hammer or other small bright bird dragged along the surface of the water, is quite as good a bait as the regular Pike-fly, if not better. According to an excellent trolling authority, much may be done in Ireland by trailing the tuft of the end of a calf's tail well armed with hooks. The engraving is taken from a very fine specimen of the Pike-fly, as used in Ireland, and was presented to me by Mr. Martin Kelly, of Dublin. Any combination, however, of feathers and tinsel, which is bright and big, would probably answer the purpose equally well; indeed, even the size seems to be doubtful, as I have twice caught Pike with *Chub-flies;* and Stoddart says, that in Loch Ledgowan, Pike are fished for with flies 'dark in colour, and resembling those used in many rivers for summer Grilse.'

Mr. Pennell's treatise is well worthy of the attention of Pike-fishers, as it contains, besides a very large personal experience, the results of the opinion of all the leading authorities on the subject.

SIMPLE OBJECTS.—IX.

PANDORINA MORUM.

THE accompanying figures represent one of the Volvocineæ, apparently that form of *Pandorina morum* referred to in the Micrographic Dictionary,* "with sixteen or thirty-two gonidia closely crowded together, instead of standing at wide intervals in the large colourless envelope: it is uncertain whether this form is multiplied vegetatively; but we have seen its gonidia all converted into resting spores."

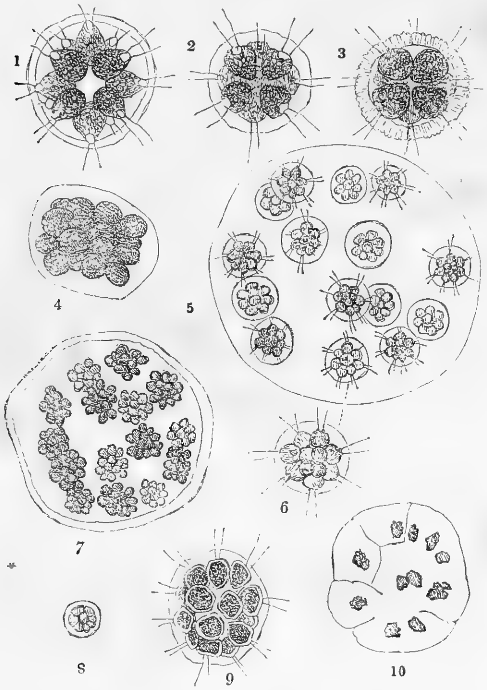
What I have noticed with respect to this plant seems to prove that it is "multiplied vegetatively."

In its usual condition the number of gonidia is sixteen (figs. 4, 6, 9), though there are frequently only twelve (figs. 1, 2, 3). These are enclosed in a thick gelatinous envelope, through the walls of which pass two cilia from each gonidium, by means of which these plants move rapidly with a rotatory motion. The gonidia seem to have the power of altering their shape spontaneously, being sometimes pear-shaped (fig. 1), at others inversely pear-shaped (fig. 2). Each has a vacuole at the end, from which the cilia spring; and, very frequently, if not always, a red spot near. Sometimes the envelope has a striated appearance, (fig. 3), as if the substance had become

* Page 526, second edition.

hardened and cracked. Fig. 4 represents a motionless form, in which the cilia are wanting.

In fig. 5 each of the gonidia has become changed into a cluster of gonidia like the parent plant, each with its own proper envelope, but all contained in the original covering. This seems to be clearly a condition of vegetative growth. It is remarkable



that in this, and in a corresponding form (fig. 7) in which the gonidia are without cilia, there are only fifteen clusters; not sixteen, as one would naturally have expected.

In a state of decay, the envelope seems to break up into indistinct cells (fig. 10), each of which contains a gonidium. This seems to indicate that there is a proper envelope to each gonidium, as well as one common to all. J. S. TUTE.

ZOOLOGY.

THE GRAY WAGTAIL.—Some years ago a discussion took place in the pages of the *Zoologist* on that curious habit which the Gray Wagtail (*Motacilla boarula*) has of sometimes fluttering for hours together at some particular window in a dwelling-house. Various reasons were there assigned for this strange propensity. Mr. H. Doubleday suggested that the bird was seeking its food; but as no insects could be discovered, and the bird did not seem to pick up anything, this explanation was considered untenable. Others supposed that the bird seeing its own image in the glass, mistook it for its lost mate, which it was endeavouring to rejoin; but it was shown that, at the time indicated, the bird could have no mate. A third solution was that some reflection from the window had the same effect on the Wagtail as a piece of looking-glass is known to have on Larks; but this seemed a mere fancy, as fear is the prevailing influence in the latter case, but not at all in the former. An instance of the exhibition of this odd habit took place a while ago at the house of a neighbour of mine. Day after day the bird kept fluttering at the window of the common kitchen, and how often soever driven away, always returned. So unusual a circumstance began to be talked about, and a report soon got abroad that the house was haunted, and there were not wanting those who believed it. One Sunday afternoon many scores—nay hundreds—of people from a neighbouring town came to see the ghost. This was so annoying to the farmer that he let loose a rather formidable-looking bull, the sight of which soon effected a clearance; and next morning the poor bird had to bear the penalty of its notoriety; it was shot, and that without a silver sixpence in the charge. But superstition apart, this habit of the Gray Wagtail, not recorded, I think, of any other bird, is a very strange one, and one worthy of investigation. Do any of the readers of SCIENCE GOSSIP know whether it has ever been satisfactorily explained?—*W. R.*

TOM-TITS AND CELERY-FLY.—A few days before your republication of the description of the insect which is the cause of what is commonly called celery blight, my ubiquitous friends the Tom-tits discovered that the larvæ were fit for eating; and a few dozen Tits were actively engaged in flitting up and down the rows of celery in the kitchen garden here in search of what must be to them as great a treat as fried grasshoppers are to a Hottentot. Although two men were digging on the adjoining plot, the Tits pertinaciously examined every leaf; and the result was that the larvæ were cleared in two days. Let us, therefore, save our small birds.—*J. W. Laurence*, in *Gardener's Chronicle*.

SQUACCO HERON.—I understand that a specimen of the beautiful Squacco Heron (*Ardea comata*) has been shot this year on the pond at Lord Eldon's place, Encombe, in the county of Dorset.—*C. W. Bingham.*

CLOUDED YELLOW BUTTERFLY.—A great number of the beautiful butterfly, "Clouded Yellow" (*Edusa*), have been taken during the past week in this neighbourhood. Connoisseurs here say they are evidently fresh from the chrysalis, their wings being quite soft, and the whole insect in a state of beautiful perfection. One young enthusiast took fifty in two days (last Friday and Saturday), all unusually large, and of brilliant colours. This is the third brood this season—one in June, one in August, and now one in mid-October. — *Frederick Hudson, Ventnor, Isle of Wight.*

Several specimens of the Clouded Yellow Butterfly (*Colias Edusa*) were seen at Newby, near Annan, on the 5th October, 1865, when the Dumfries and Galloway Natural History Society met there. It has been seen several times in Dumfriesshire before, at the following places and dates:—Obtained by Dr. Gibson, on the 17th August, 1857, at Kirkmahoe,—seven were taken, and several more seen near Glancaple Quay; another taken by Dr. Gibson, in September, 1858, at Colvend; and those of this year on the 5th October, at Newby, near Annan. —*C. D. M. S.*

The Moa of New Zealand.—The marvellous adventures and journeys of Sindbad the Sailor have at some time or other been familiar to most of us. It would seem that his gigantic bird, the Roc, had, however, at some remote date a distant relation in the Moa or Dinornis. From time to time accounts have reached this country of the native traditions respecting this gigantic bird, now supposed, and with good reason, to be extinct. Bones of it have been found from time to time, and from them Professor Owen and other naturalists have drawn on science and imagination as to its probable size and shape. We now have a link that is a very important one in the chain of construction; and that is the arrival of an egg of this bird from New Zealand. It was discoverd by a man in the employment of Mr. Fyffe, at Kai Koras. He was digging the foundation of a house, and on the side of a small mound came upon the egg in question. It was in the hands of a skeleton Maori, and with the skeleton there were numerous tools of sharpened stone, including a spear-head, axe, &c. In digging out the egg it was slightly injured, but the pieces were preserved. It measures ten inches long, seven inches broad, and the shell is about the thickness of a shilling. It was brought over in the ship *Ravenscraig*, and was sold by auction by Mr. J. C. Stevens, of King Street, Covent Garden, on the 24th Nov., for £120.—*Gardener's Chronicle.*

A Visitation of Spiders.—On Sunday afternoon, October 15th, my attention was directed to a colony of spiders which were industriously weaving their tiny webs over the iron railing in front of my residence. On examination I found they were small, black, glistening, active, and aërial, as they floated through the air in a peculiar manner, and with apparent ease. They were all industriously engaged on the tops of the railings only, covering them with a web of the utmost delicacy. My curiosity was excited by the fact that not two or three rails only, but all the rails in front of my residence had their busy group of arachnidean workers. The number on each rail varied, some having twenty, others five spiders upon them; but on an average there were eight spiders to each rail. I extended my inspection to the rails of the neighbouring houses, and found them equally covered with spiders. I examined several streets, squares, and churches in the neighbourhood, and without exception each rail was the scene of a busy working colony. I estimated that in my own locality they covered about three miles of iron railing. I subsequently ascertained that on the same day they were equally numerous about one mile north of Newcastle, in the centre of the town, and at the extreme west end, my residence being in the northern outskirts; so that the spiders may be fairly represented as covering the entire town. A gentleman from Hexham, a town twenty miles from Newcastle, informed me that they were abundant there also. If any of your readers south or north of Newcastle saw and recorded this phenomenon, it would afford the means of ascertaining the speed at which these spiders travel. I secured a few of these spiders in a bottle, and have since mounted them in balsam as microscopical objects: four are female and one male. They do not exceed an ordinary ant in size, and are not unlike them in general appearance, although they are in the strictest sense spiders. They have four legs, with three claws on each, on each side of the thoracic cavity. They have mandibles of the most keen, strong, and piercing kind at each side of the head, and they have palpi fixed at the roots of the mandibles. Each male palpus has eight joints, and is terminated by a strong pair of pincers. There is a remarkable feature connected with the male palpi—viz., on each palpus there is a beautiful wing of considerable size; but whether the wings are intended to aid in aërostation or not I do not know; they are there, however, and similar appendages do not appear on any of the spiders which are figured in Mr. Blackwell's elaborate two-volume work on British spiders, published under the auspices of the Ray Society. The spider to which I now direct the attention of your readers was unknown in Britain when Mr Blackwell's elaborate work was issued, and they are consequently not figured there. They have only been recently noticed by Mr. Blackwell, in the "Annals of Natural History," vol. for 1863. Previous to 1863, they had not been observed in England, and then only in Denbighshire and Caernarvonshire. Now they have visited Newcastle in numbers of which it would be no exaggeration to say that there were several millions. The most striking fact, however, has yet to be related: no entomologist in this neighbourhood ever saw this species before; they all made their appearance in one day, October 15th, and since that time, although I have looked carefully for them, not a single spider of the species has ever been seen in the neighbourhood. Mr. Blackwell says that the spider is an aëronautic species, and that its name is *Neriëne dentipalpis.*—*T. P. Barkas, Newcastle-on Tyne, Nov. 4.*

BOTANY.

Christmas Leaves.

O'er the lover
I'll shake the *berried Mistletoe*, that he
May long remember Christmas; to the son
Of boasting war I'll give the *Holly-leaf*
And its *red berries;* such he'll find its meed,
A little show of pomp, and many thorns.
I'll give the poet *Ivy;* for, like it,
Around the ruined pile he ever clings,
Adorns the loneliest spot with fancy's charms,
And props the tott'ring column in his rhymes.
I'll give the scholar *Fir*, for he must be
Like it for ever green, erect, and firm,
And with his needles of philosophy,
Contemn the snows of life. Here's darkling *Yew*,
The mourner must have that, who seeks the shade,
And hides his melancholy head in caves,
Or by the sandy beach, utt'ring aloud
His dull soliloquies, unseen, unknown.

Christmas—a Masque.

Mistletoe on the Oak.—At last, on June 7th, 1837, I was fortunate enough to behold a young oak, about seventy or eighty years old, with four fine bushes of Mistletoe growing upon it, in Earl Somers' Park at Eastnor, near Ledbury, on the side of an old British road, at the western base of the Malvern Hills, called the "Ridgway;" but on the strictest inquiry and examination, among natural oak woods there of more than three hundred acres in extent, this was the only Oak with Mistletoe upon it, and is the only one I have ever seen.—*Edwin Lees, Botanical Looker-out.*

Mistletoe on the Oak.—There are now growing on an Oak-tree by the side of the drive leading to Eastnor Castle, the seat of Earl Somers, situated between this town and Ledbury, no fewer than five large bunches of Mistletoe, apparently in the greatest luxuriance. I discovered them a few days ago, on the right-hand side, about a quarter of a mile from the Deer Park gates, going down from the Malvern and Ledbury road. If those who may still be unbelievers in this matter will pay me a visit, I will direct them to the spot where it is growing.—*G. Butcher, Great Malvern.*

Mistletoe on Mountain Ash.—The Mountain Ash is not mentioned amongst the trees upon which it springs up spontaneously. But there is a Mountain Ash tree in a garden at Odiham, in Hampshire, on which it grows with the greatest luxuriance, without the health of the tree appearing to be impaired by it. Having only been acquainted with the place for a few years, I am unable to say whether the parasite grew spontaneously in the first instance. That which, however, appears the most curious feature of the case is, that the whole of the Mountain Ash seems to be so impregnated with Mistletoe, that wherever a bough is cut off, a swelling begins to form, upon which delicate sprays of Mistletoe immediately make their appearance.—*Once a Week.*

Trees on which Mistletoe grows.—Dr. Harley communicated to the Linnæan Society, in his paper on the "Parasitism of the Mistletoe," the following trees upon which it grows spontaneously, or may be grafted:—Maple, Walnut, Plum, False Acacia, Cherry Laurel, Portugal Laurel, Hawthorn, Apple and Crab, Almond, Lime, Olive, Ash, Poplar, Willow, Pear, Elm, Fir, Larch, Oak, and Beech.

Alpine Plantain in Shetland.—At the last meeting of the Society of Amateur Botanists, Mr. Ralph Tate exhibited *Plantago alpina*, a species now recorded for the first time as British, discovered by him during his recent visit to the Shetland Islands. This alpino-boreal species is allied to *P. maritima*, and is a native of the Tyrolese and Savoy Alps; and is a maritime plant in Iceland and Faroe. Mr. Tate found it in great abundance on the sea-banks of Lerwick Harbour. We would direct attention to Mr. Tate's paper on the "Flora Zetlandica," in the December number of the *Journal of Botany.*

Natural Curiosities.—In a garden in Dorsetshire two or three rows of broad beans, having borne the usual crop, were about to be destroyed, when it was discovered that fresh plants were springing up from the old roots. A row was therefore left to see if they would come to perfection, which they did, and bore a fair crop. In a garden in Gloucestershire, there are four apple-trees which are now bearing a second crop, the blossoms having formed in July. The first crop is picked; the second is now on the trees, the apples not having yet attained quite their full size, and it remains to be proved if they will ripen.—*E. J. W.*

Influence of Palms.—It must not be imagined that the spell which Palms exercise upon mankind is a matter of recent growth, due to the refinement of taste which modern civilization has wrought amongst us. On the contrary, it began to operate in antiquity. It is the true origin of that species of tree-worship which once had such a hold upon all nations of the Eastern hemisphere, which still exists in full force in parts of Asia, Africa, and Polynesia, and which survives even here in the decoration of our houses at Christmas time with Mistletoe and Holly, or wassailing our Apple-trees on Twelfth-night eve. If tree-worship had passed away without leaving any other traces, we should have little reason to be thankful for it; but we are indebted to it for two of the most noble styles of architecture which the human mind ever conceived—the Grecian and the Gothic.—*Gardener's Chronicle.*

FISH TATTLE.

The Migration of Eels.—During a conversation upon the habits of certain fish, my informant mentioned that on the *top* of a cotton mill, owned by a friend of his, was a large water-tank, and at the *bottom* another. These were always kept filled with water for the purposes of the factory. The tank at the top requiring to be cleansed, was emptied, when, lo, a number of eels were found in it. How did they get there? None could tell. In the lower tank they were always kept, but not in the upper. However some time afterwards the mystery was solved. The walls were wet on one side, from a leakage in the upper tank, and up these moist places eels were observed wriggling from the bottom vessel, until they attained the top of the lofty building, when they precipitated themselves into the upper tank.—*Charles Strange.*

The Sand-Launce, the Herring, and the Smelt (*Ammodytes lancea, Clupea Harengus*, and *Osmerus eperlanus*).—Mr. P. H. Gosse, at page 113 of his recently-published book, "A Year at the Shore," says that he can vouch for the Sand-Launce "*making a very attractive tenant of an aquarium, where it will live a considerable time.*" I am glad to hear this, because, with the tolerably complete arrangements of the Hamburg Aquarium, I have been unable to get it to live for more than a few minutes, or an hour or so, or, in one instance, in a perfectly dark and very shallow stream of water, and running strongly, for a day and a half. I have tried on several occasions, the last time being a fortnight ago, when I received from Heligoland twenty nice specimens, in an eight-gallon vessel of sea-water. On opening the can, the fish were swimming about in perfect health, apparently, and I thought that if so many lived in that quantity of fluid during a ten-hours' voyage in warm weather, I should have a good chance of preserving them alive when distributed by twos and threes in tanks in perfect condition, and with streams running, and containing from twenty-five to one thousand gallons' capacity each, especially if I took care, as I did, that the temperature and specific gravity of the water in which the fish travelled were exactly the same as in my tanks. But it was all in vain: the creatures took an impetuous rush and a wriggle through the aquaria, and turned up dead, some almost instantly, and some a little later, with the exception of the one I have mentioned, and which lived thirty-six hours. Can any one, therefore, give me *actual dates* of the times in which the Launce has been kept in the aquaria, together with a statement of all the circumstances under which the conservation was managed? Did the Launce eat anything, and if so, what? Did they, or it, burrow in sand in the aquarium? Mine did not; they were too frightened to do anything. So also with Herrings. I have received them cooped up in small quantities of water after they have been a whole day on the journey here, and yet looking as well as fish possibly could look; but on being placed in the aquarium, they shot wildly and aimlessly hither and thither, ploughing the surface of the water into waves with their extreme speed, and sometimes even jumping clean into the air, as if in pain, and then bolting into a corner and dying in a very short time. So also with the Smelt. They, too, have reached me alive and well, but have behaved and died under precisely the same circumstances as the other two fishes named. It is difficult to account for these things by reference to any known law; but all of these three fishes have scales which are removed by a very slight touch, and their bodies are of a peculiar gleaming silvery-blue colour, and they have a quivering or trembling motion of the muscles of their sides, which can be plainly seen through their delicate thin skins; and I have always noticed that when these appearances exist in any fish, it is difficult to be kept in confinement in an aquarium. I should be glad to know why, on anatomical grounds. Can any one please tell me?—*W. Alford Lloyd, Zool. Gardens, Hamburg.*

WINDOW GARDENS AND AQUARIA.

On the Management of Ferns in Cases.—Do fern-cases require air? asks a correspondent in Science Gossip for October. Having had some little experience in fern culture, I reply that in my opinion ferns will not thrive in a *small* case without it. Mr. Ward, I believe, thought that it could be dispensed with in his cases, but I never could get my ferns to thrive unless there were some means for the foul air to escape, and fresh air admitted. All plants, save mosses, require fresh air properly admitted, and even mosses would be better, according to my notions, with a little of it; but they can be cultivated in an air-tight case, provided they are well shaded. Your correspondent Mr. G. Norris also asks respecting the soil proper for fern-cases. What sorts does he intend to grow? Different ferns require different soil. Some thrive in the shade, others on rocks; some in moist places, others in dry. He must imitate their natural soil as well as he can; get peat, turfy loam, and small sandy stones well mixed together, and fill his case with it. The best stand for a case of ferns is facing the morning sun, and the bottom of the case and its glass cover ought to be in two different parts; it is so much nicer for planting and arranging your ferns when this is the case—a door is not half so convenient. You know the glass soon gets covered inside with moisture, and this moisture ought to be evaporated by air; for excess will cause mouldiness to appear on the ferns.—*Helen Watney.*

Sea-Anemones.—I should like English aquarium-keepers to know of the enormous dimensions attained by some English sea-anemones in Germany, that is in the Hamburg aquarium. About a year ago I received from Torquay three specimens of the Opelet (*Anthea cereus*), each measuring about two inches in diameter in their state of greatest expansion; but by constantly feeding them, increasing the quantity of food as they grew bigger, they have become ten inches in diameter when fully out, and they are from four to five inches in diameter of column. Their tentacles are very strong, so that their tug will bend a cane four feet long in the act of pulling it away from them. Every day each of them eats one large oyster or mussel, or, when I have neither of those mollusks, I give each a quarter of an ounce of raw beefsteak, free from fat. Of this food I never see one particle after the animal has fairly swallowed it. These *Antheas* can sting very severely. I once drew one of their tentacles across my tongue, and the pain and the swelling produced were great, lasting several hours. I do not know whether this species has been observed of such large dimensions in the sea as I have named: if not, it would seem that by constant attention and feeding, some of the lowest animals (as well as many of the higher creatures) can be improved in a state of captivity. I may mention that they are in a tank measuring 72 inches long, 60 inches broad, and 30 inches high, containing about 300 gallons of sea-water, and that from 300 to 500 gallons—according to weather—run through the tank day and night, every twenty-four hours. I am very successful also with the great "Thick-horned Sea-anemone" (*Tealia crassicornis*), and in a tank of the same size and stream power as that just named, I have not less than eighty of these *Crassicornis*, most of them finely coloured and marked, and many of them being monsters of six, seven, and eight inches diameter when quite expanded. Each of these takes its mussel or oyster daily, or more rarely its piece of steak, and as with *Anthea*, not a morsel is rejected. The other anemones under my care, consisting of *Bunodes Ballii*, *B. gemmacea*, and *B. thallia*; and *Sagartia viduata*, *S. troglodytes*, *S. nivea*, *S. venusta*, *S. bellis*, and many others, take food with surprising readiness and in great quantities, so long as I feed them regularly, and carefully give each individual its proper quantity with a pair of wooden forceps. In this way I pass about three hours every day in feeding the Anemones and Madrepores only. But if I neglect the feeding, the creatures rapidly deteriorate in size and vigour, and lose their power of taking food. Of course if the streams of sea-water ever ceased passing through the tanks, the whole thing would speedily come to grief, from the water becoming fouled by the introduction of such a great quantity of oysters, mussels, and beef every day; but as it is, it remains perfectly transparent. I have mentioned twice that when the food has disappeared in the anemone's stomach, I never perceive any of it afterwards in the form of excrement, but only in the shape of cast-off epidermal matter, which falls in rings of dirty-looking mucus around the exterior of the bases of the anemones, and those which take most food cast off the largest quantity of skin. I omitted to state in its proper place in this little communication, that if I were to name the dimensions of some of our *Sagartia venusta*, *Bunodes Ballii*, and *Corynactis viridis*, which have been purposely fed up to ascertain how big they will grow, I should be accused of exaggeration. *Actinoloba dianthus* feeds well with me, and attains a good size; but I have never seen one so large as a specimen I got from Weymouth in the summer of 1857; it stood twenty inches high, measured ten inches across the disk, and the column varied from five to three inches in diameter.—*W. Alford Lloyd, Zoological Gardens, Hamburg.*

GEOLOGY.

Cretaceous Fossils.—Your correspondent A. G. R. (see p. 229) criticises Page, forgetting that he himself is in the wrong. For though *Pecten* and *Spondylus*, &c., have fossil representatives, yet no living species of either genus "is exactly similar to those in a fossil state in the chalk." A. G. R. should familiarize himself with the principles of classification; the mutual relations of species of a genus. Distinctive characters can be pointed out between any chalk-Pecten and any living one. *Pertea* should be *Pecten*; *Plagiostoma* is synonymous with *Lima*, but *Spondylus* is evidently the genus meant. *Turbitella* is a new name; *Turritella* and *Terebratula* are chalk genera; probably the latter is intended.—*Ralph Tate, F.G.S.*

Coral Reefs.—In this paper (see p. 221) the author parallels several coral-bearing formations with coral reefs of the present day. None of these really indicate the physical conditions at present prevailing in existing tropical seas. The only limestone that at all approaches to the structures at present in process of formation, is the Coral Limestone in the district of Trichinopoly, East India. This limestone rests on gneiss, and appears as ridges, extending from a few hundred yards to three and four miles in length. Its chemical and physical characters correspond to those of recent coral reef rock. These ancient coral reefs are surrounded by strata of the Ootatoor and Trichinopoly groups of the Cretaceous epoch; and evidences are not wanting to show that this coral limestone was formed on a sinking base, around which were deposited cotemporaneously the Ootatoor and Trichinopoly beds.—For *Mr. Sarby* read *Mr. Sorby*; for *Mattheim* read *Nattheim*.—*Ralph Tate, F.G.S.*

NOTES AND QUERIES.

Bees.—I beg to say, in reply to "H. E. A.'s" question, that it is by no means an unusual thing for bees to plunder their neighbours. I have known several instances where a strong hive of bees have attacked a weak one, killed all the defenders (for the poor injured insects generally make a good resistance, and fight to the death for their kingdom), and rifled the combs. This marauding system is most common in unpropitious seasons; and some of my bee-keeping friends have complained this year that their hives have suffered in the way described by H. E. A., from the attacks of robber-bees.—*Helen E. Watney.*

Bees and their Food.—An intelligent gardener stated to me, that about six years ago, when in the employment of Lady Maitland, at Lindores, we had a very warm summer in Scotland, and from the rapid ripening, so to speak, of flowers, the bees were deprived of their usual food. They, in consequence, attacked plums and apricots in such numbers, that it was no uncommon thing to find eighteen or twenty bees within one plum. They effected their entrance by a small hole, only large enough to admit one at a time, and gradually eat away the pulp till nothing was left but the rind. So artistically did they carry on their operations, that, till examined, the plum or apricot with the bees within, had all the appearance of sound and juicy fruit. My informant further stated, that, on being shaken out, the bees were helpless and feeble, and could not rise from the ground, and most of them, he thought, died from the effects of their rich and unaccustomed food.—*A. L.*

The Small Tortoise-shell Butterfly.—Perhaps the following account may afford some explanation of the circumstance referred to by Mr. H. Waddington. Some time ago, I kept in a room a number a caterpillars, of the small Tortoise-shell Butterfly, which I had taken from a stinging-nettle. Before long I observed that they lessened in number, and, searching for the cause, I found that the absent ones had crawled on to the walls and ceiling of the apartment, and had assumed the chrysalis state. Here they remained till they were fully developed into butterflies, when my room presented a similar appearance to that described by your correspondent. —*T. J. W.*

Skeleton Leaves.—"The leaves are boiled for two minutes, then transferred to a strong solution of permanganate of potash, and gently heated. In an hour or two the laxer tissues may be easily removed by means of a brush. Sulphurous acid or a solution of chloride of lime may be used for bleaching them. The stains of permanganate of potash upon the fingers are easily washed off by dilute sulphuric acid."—*H. J. Church, in Chemical News.*

Colias in Exchange.—In the early part of this month, A. B. succeeded in capturing five specimens of *Colias Edusa.* Three of these (apparently all males) she would be glad to exchange for some other specimes of value. *Apatura Iris, Acherontia atropos,* or *Hypercompa hera* would be preferred. If this exchange could be effected through the medium of Science Gossip, A. B. would be gratified. Please to address any communications to *A. B., the Parsonage, Boltonsboro', Glastonbury.*

Sea-Anemones Dividing.—In the month of September last I was on a visit, in the Isles of Scilly, to my son-in-law, the Rev. D. P. Alford, M.A., the chaplain of the isles, and the discoverer of the new Anemone, *Ægeon Alfordi,* when a curious circumstance occurred, that I ought to have communicated to you before this, as I fear the lapse of time may have rendered it comparatively uninteresting; but various professional engagements prevented me. Being one afternoon among the tide-washed rocks of the south side of the island of St. Mary, I saw a rather fine *Althea* (*cerea,* I think), and having detached it from the rock, there is *no doubt* that it was a *single* one. I took it in a large limpet-shell to the Parsonage, and there placed it in Mr. Alford's aquarium. On the following morning *two* singular things occurred, and occurred contemporaneously; and it is this circumstance which has induced me to write to you. I happened to be reading in the August number of your interesting publication, Science Gossip, the first paragraph of page 190,—"Notes and Queries"—headed, "Sea-Anemones dividing," wherein E. T. Scott appears incredulous on the subject, when casting my eye on the aquarium, I saw my Althea actually *divided* into two *Altheæ,* but connected by a *band* some one or two inches long, analogous to the *umbilical cord.* You may imagine that this singular evidence of the truth of L. S.'s statement very much engaged my notice. I therefore very narrowly watched the *Altheæ,* until by continued *tension,* I found that the band *snapped,* and there were two distinct and detached *Altheæ.*—I am very truly yours, *Osborne J. Tancock.*

Kakra-singhee.—Curious horn-shaped galls produced on a species of Sumach (*Rhus integerrima,*

Wall.), are employed in India as an astringent in medicine, and, to a limited extent, in dyeing.

The Milk-tree of Para.—S. G., in the article on "Wooden Cows," p. 172, speaks of the Milk-tree called "Massenodendron," from the forests of Para. I believe this tree is the same as the *Massaranduba,* of which the Catalogue of the Brazilian Department at the Exhibition of 1862, says: "330. Milk of *Massaranduba,* white colour, extracted from the colossal tree *Achras paraensis;* when liquid very savorous, and used with tea or coffee. In medicine it is employed internally as pectoral and analeptic; and externally in plasters as a solvent. This milk coagulates after twenty-four or thirty hours, and is then like gutta-percha, or gettania; a small difference existing is, that gutta-percha is brownish, and concrete massaranduba whitish; both have the same degree of elasticity.—*Bernardin.*

Duckweeds.—In reply to the Query at p. 258, I send two notes from *Loudon's Magazine.* Mr. D. Stock writes under date June 11, 1828:—"I never saw any of the species in flower till the other day, when I found almost every plant of *Lemna minor* in blossom. Mr. Sowerby (J. D. C. S.) says, "In the vicinity of London, *Lemna minor* may alwas be found in flower in the beginning of June, and *Lemna trisulca* rather later." Shirley Hibberd gives May as the month for flowering.—*J. A. K.*

Swarms of Aphides.—In reply to M. Bernardin, will you allow me to state that during the first and second weeks in September this locality in Lincolnshire was infested with immense swarms of Aphides, or, as Gilbert White very aptly and appropriately terms them, "smother flies." It was impossible to go out without being covered with them, and the eyes, nose, &c., could not escape unprotected. They settled on the pavement and hedges in myriads, and the Garden-spider (*Epeira diadema*) caught any quantity in his meshes. At the same time the *Aphis rapæ* or *Vastator* made tremendous havoc with the cauliflowers and other greens in the garden, except the curled broccoli—the *Aphis rosæ* not being so numerous as usual. Contemporaneously hundreds of acres of turnips in this district were either destroyed or their growth arrested by the ravages of the Turnip flea (*Haltica nemorum*); and for some time after, at sunset, the stench was most horribly offensive.—Another correspondent, J. B. L., will, I think, find it difficult to remove the worms from his fern-pot without disturbing the roots; in one of my cases, noticing numerous small casts, and finding the ferns anything but healthy, I discovered several small worms, but so intertwined amongst the rootlets that I was obliged to take each plant out. They are now for the most part putting out afresh.—*Henry W. J. Ellis, Crowle.*

Habits of Reptiles.—In the last number of Science Gossip, C. A. remarks, that if two toads perceive an insect at the same time, "the one who is successful in getting it receives a smartish smack on the side of the head from the tongue of the other." This is, undoubtedly, often the case; but I think C. A. will find, on further observation, that this summary salute has no reference to the *success* of the other reptile, but simply to its movement in taking, or attempting to take, the insect. I have long kept reptiles, and have now toads that have been many months in my possession, as well as several natterjacks. These animals, like most or all other reptiles, confine themselves to living prey, and only take *that* when it is in motion; their vision appears to be so defective that they will strike at almost any object that attracts their attention by moving, while suitable food will lie unnoticed close to them, as long as it remains quiescent. One or two fresh-water tortoises used to share captivity with the toads, and when one of the former protruded its head within reach of a toad, the latter would gaze at it with fixed attention for a moment, and then smack would go its tongue on the cranium of the tortoise, which would be hastily drawn back into its shell in alarm at the unexpected assault. They will constantly make similar attacks on each other; and nothing is more common than when a toad or natterjack moves, to take prey or otherwise, to see a companion strike at its head or foot, evidently mistaking it for some creature suitable for food. They are just as ready to go at an inanimate object, if it is but put in motion; and I have often amused visitors by moving about a pencil or other object just outside the glass when it is almost certain to attract their attention, and they will strike at it again and again, seeming quite incapable of learning wisdom by failure. The other day, a natterjack observed a green lizard moving at some distance, crawled across to it, and, after due consideration, administered one of its tongue-strokes, to the surprise and discomfiture of the lizard. The green-tree frog, though equally alert for prey, I have never seeen commit mistakes of this nature.—*G. Guyon, Ventnor, Isle of Wight.*

Wardian Cases.—The arrangement of soil best suited for a Wardian case of ferns, is as follows: First put a layer of coarse gravel, or broken pottery, &c.; upon this a thin layer of turfy loam, filling up the box with a good depth of well-moistened loamy soil. The case need not be quite air-tight; its only object is to exclude dust, smoke, &c. If the steamy appearance of the glass renders the contents of the case invisible, it is easily dissipated by opening the door for a few minutes.—*H. J. H. B.*

Can any of your readers or correspondents give any information respecting the preparation on mounting of the proboscis of the blow-fly? I have not seen the process described in any book.—*T. S.*

Corals and Madrepores.—In reply to B. T. S., the best illustrations and specific distinctions of British Corals and Madrepores will be found in Nos. 4, 6, 7, 8, and 9 of the Monographs (to members and subscribers only) now issuing from the Palæontological Society. Information as to access to those splendid productions might be obtained on a polite application to the Rev. T. Wiltshire, Bread-street Hill, E.C.—*Edmund Wheeler.*

Bees Attacking Fruit.—I can fully corroborate H. E. A.'s statements. Both in the west of Sussex and also in Hampshire bees seem to have completely taken the place which the wasps held last autumn. The "reason why," I leave to your more scientific correspondents to explain. Another curious fact bearing upon the same point is that *moths* seem to have entirely deserted the ivy-blossom (which at all events has *looked* tempting enough this year), although the swarms of them on "sugar" about June raised the entomologist's expectations of a great "*ivy*"-season. During the day, however, it has been very full of all kinds of insects, including bees, although, perhaps, not so full as in former years. Could the early summer have "impoverished the pollen" of such a late-blossoming thing as ivy?—*F. G. D. D.*

Fresh-water Sponges.—As I have several times tried to keep specimens of our fresh-water sponges alive, without any successful results, I cannot do better than make an appeal to you, or some of your readers, for a few hints. It may be that the sponges are particularly susceptible of change of water, but whether it has been young animals growing on *Anacharis* and water-moss, or larger specimens, either from submerged posts and walls, or on sprigs of trees, all seem to decompose a few weeks after being located in their new homes, though I have tried keeping them in a moderately-sized aquarium, with a single gold-fish and a natural vegetable growth, as well as separately in smaller vessels. Three sorts, judging by the outward form only, seem very common, and of one of these I have found a colony on the *muddy* bed of a somewhat shallow stream. Is not this very unusual, as they seem generally to prefer a more substantial basis? The disappearance of some large specimens of a green-branched species I attributed to a visit from a brood of swans, but am not aware whether they are in the habit of feeding on sponges. Bowerbank's "Monograph of British Spongiadæ," published by the Ray Society, is almost too advanced for a novice; but I would suggest that a paper from you on some of the commoner fresh-water species might not be uninteresting to many of your readers who have opportunities for collecting.—*F. H. M., Chelmsford.*

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.

We cannot undertake to return "rejected addresses."

The Aquavivarium, Fresh and Marine.—The new Edition of the above work has been somewhat delayed by the desire of the publisher to present it in a more useful shape than any work hitherto published. It will consist of different departments, by various writers, each especially "up" in his own subject; and in addition to the usual information about Fresh-water and Marine Aquaria, there will be separate chapters devoted to the Cultivation of Minute Plants and Animals for Microscopic purposes; and on Out-door Aquaria, Ponds, and Ornamental Waters. As the Editor would like the information to be as complete as possible, he would be glad to receive any hints or suggestions from readers of Science Gossip who possess special knowledge on the latter subjects. Address the Publisher, 192, Piccadilly.

E. M.—The price of "British Reptiles" will be six shillings, coloured plates.

Port St. Julian Earth.—F. W. desires a little of this diatomaceous earth, in exchange for other objects.—Address, No. 1, New Road East, London.

T. S.—We take no note of queries unless the initials of the inquirer are attached. See pp. 48, 144, &c.

W. G.—The Meadow-sweet (*Spiræa Ulmaria*) is a common wild-flower. The object on Hazel-leaf is also a fungus called *Phyllactinia guttata*. The parasitic fungi are themselves plants of a low organization.

J. I.—Dr. Baird's Entomostraca, with 36 plates, mostly coloured, 8vo. pp. 364, 21s., is published for the Ray Society, by R. Hardwicke, 192, Piccadilly. It is the best and most recent book.

C. M. D. L.—The Caterpillars which caused such irritation of the skin belonged to the Bombycidæ, but from your description we could not venture to name the species. They are covered with stiff brittle hairs, the sharp points of which breaking into the skin occasion the annoyance you complain of. This was increased by the rubbing.—*F. M.*

J. S. has unmounted sections of Horn of Rhinoceros, Antelope, Ox, and Whalebone, which he would exchange for sections of Norfolk Island Pine (*Araucaria excelsa*), or Chili Pine (*Araucaria imbricata*). Address, 103, St. John's Road, London, E.C.

J. R.—The object on Oak-leaf is a gall. It is one of the Oak spangles referred to at p. 240.

A. M. B.—Your shells are *Limnæa palustris*.—*R. T.*

P. G. (*Wigan*) says that immense swarms of spiders have occurred there, so that the ground was quite covered with them.

H. W. J. E.—We have seen the sunflower attain fully twelve feet during favourable seasons, on a rich soil.

British Land Shells.—A. M. B. offers to exchange specimens. For particulars, address, 36, Guildford Street, Bury St. Edmunds.

A. G.—Your fish are attacked by the fish mould (see p. 134). We can only recommend their removal to a constant current of water. If this fails, we know of no remedy.

A. W.—See several communications on mounting Polyzoa, pp. 65, 93, 94.

Plants Named (A. M.).—Three specimens received appear to be—1. *Bupleurum tenuissimum*; 2. *Juncus acutiflorus*; and 3. *Juncus compressus*; but the specimens were too fragmentary to name with certainty.—*W. W. N.*

Errata.—At p. 260, column 1, 15 lines from bottom, for "crustaceous fish" read "crustacea, fish;" column 2, line 22, for "Gomplex" read "Gonoplax;" line 26, for "Aldheus" read "Altheus;" p. 262, column 1, line 10, for "conductor" read "condenser."—*W. A. L.*

C. A. J.—The book projected will include both marine and fresh-water aquaria. Covers for Science Gossip will be sold separately.

A. W.—Your sea-side plant is a *Salsola*; but as the character is gone we cannot state the species.—*W. W. N.*

J. H. B.—The coccus on Myrtle-leaves is the same as occurs on Orange-leaves, viz., *Lecanium hesperidium*.—*J. O. W.*

W. D.—See our reply to A. G.

F. H. B.—The larva sent, and which you saw attacking an earthworm, was that of one of the *Staphylinidæ* (beetles), probably a *Philonthus*.—*J. O. W.*

A. C. S.—The best book on British Birds is Yarrell's; but that is more than double the price you name. We should think Macgillivray's would meet your views.

Hair-worm.—F. H. M. reminds us that the figure of the Hair-worm at p. 197 should be "male," and not "female," as stated in error.

C. A. J.—The Brown Rat (*M. decumanus*) was not known in this country prior to 1730.

H. B.—We cannot afford space. You had better insert an advertisement.

Microscopist.—Please observe our notice, oft repeated, about anonymous communications.

F. J. B.—"Toynbee's Hints for the Formation of Museums, &c.," published by R. Hardwicke, 192, Piccadilly, at one shilling.

B. T. offers Diatoms (*P. angulatum, Campylodiscus costatus*, or *Epathemia turgida*) in exchange for *Volvox globator*.—Address, 57, Lowther Street, Whitehaven.

J. B. B. affirms that the figs. 3 and 4, on page 83, are representations of the larva and egg of the *Bibio*, probably *B. hortulanus*; and that the fly parasite, fig. 1, page 227, is *Chilifer cancroides*. He recommends the examination of the skin of the latter, as an interesting microscopic object.

E. R.—The plan you propose to follow with your pupæ is the best. Study to render the condition as natural as possible.—*F. M.*

W. H. H.—*Angular aperture* has reference to the angle at which oblique rays are admitted by the object-glass. To describe the mode of ascertaining angular aperture would require too much space to be inserted here. See Griffith & Henfrey's Micrographical Dictionary.—*W. M. B.*

W. J. E.—*Focal length* of an object-glass is the distance from the object under examination to a point *within* the object-glass. The actual distance from the bottom of the object-glass to the object varies according to the angle of aperture.—*W. M. B.*

Crystallized Carbon.—J. B. sends us a small crystal, which he states that he obtained from the fusion of charcoal. This has been examined and found to be glass. All vegetable charcoals contain both silica and alkali in small quantities, and it is suspected that the charcoal was heated so long that all the carbon was driven off, and that the ashes then fused and formed the glass bead received. It certainly is not carbon; therefore our correspondent must not flatter himself that he has discovered the secret of manufacturing diamonds.

Communications Received.—R. T.—J. G.—C. A. J.—C. S.—J. B. A.—J. C. Q.—P. S. B.—J. J.—A. B.—W. B.—E. A.—R. G. C.—A. G.—G. T. A.—E. J. W.—J. S. T.—B. T.—H. D. G.—W. R.—C. D. M. S.—T. J. W.—A. W.—R. T.—A. L.—R. B.—H. E. W.—J. B.—E. C.—T. P. B.—J. G.—S. L.—C. M. D. L.—O. J. T.—A. C. S.—W. J. E.—H. W.—A.—E. M.—J. S.—A. W.—J. A. K.—H. J. B. H.—E. W.—A. G.—W. H. H.—P. P.—A. M. B.—W. A. L.—H. W. J. E.—R. H. J.—P. G.—J. S.—J. R.—J. S.—E. R.—F. G. D. D.—J. S.—C. M. D. L.—G. G.—Bernardin.—J. I.—C. A. J.—F. H. M.—J. B. B.—W. G.—T. S.—F. W.—E. D.

BOOKS RECEIVED.

"Contributions to Blow-pipe Analysis." By E. J. Chapman, Ph. D. Toronto, Canada West, 1865.

"Traité des Champignons, au point de vue Botanique, Alimentaire, et Toxicologique." Par L. F. Morel. (Paris Germer-Baillière, 1865.)

"How to use the Barometer; a Companion to the Weather-glass." By the Rev. R. Tyas, M.A. (London: Bemrose and Sons, 1865.)

"Les Cryptogames classés d'après leurs stations naturelles." Par G. D. Westendorp. (Gand: Van Dooselaere, 1865.)